Power Panel 100/200

User's Manual

Version: **1.6 (August 2004)**

Model No.:**MAPP02-0**

Power Panel 100/200 User's Manual V 1.6

Chapter 1: General Information

Chapter 2: Technical Data

Chapter 3: Installation

Chapter 4: Software

Chapter 5: Standards and Certifications

Chapter 6: Accessories

Chapter 7: Maintenance / Servicing

Images

Table Index

Index

Model Number Index

Power Panel 100/200 User's Manual V 1.6

Chapter 1 • General Information

Information:

B&R does its best to keep the printed versions of its user's manuals as current as possible. However, in some cases a newer version of the user's manual can be downloaded in electronic form (pdf) from the B&R homepage www.br-automation.com.

1. Manual History

Version	Date	Comment
1.0	02.05.2002	Changes / New Features - First version
1.1	20.08.2002	Changes / New Features - Model numbers added for 24 VDC supply voltage plug - Metal housing for PP120 versions 4PP120.0571-01 and 4PP120.0571-21 added - Compact Flash cards (5CFCRD.0xxx-00) added
1.2	30.10.2002	Changes / New Features - Layout - changes
1.3	06.12.2002	Changes / New Features - Layout - changes - Restructuring of the manual - The following model numbers have either been updated or added: 4PP120.0571-01, 4PP120.0571-21, 4PP120.1043-31, 4PP120.1505-31, 4PP220.0571-45, 4PP220.0571-65, 4PP220.0571-85, 4PP220.0571-A5, 4PP220.1043-75, 4PP220.1043-B5, 4PP220.1505-75, 4PP220.1505-B5, 5PP120.0571-27, 5PP120.1043-37, 5PP120.1505-37, 0AC201.9, 0TB103.9 0TB103.91, 0TB704.9, 0TB704.91, 3IF772.9, 3IF786.9, 3IF787.9, 3IF789.9, 9A0013.01, 9S0001.13-010, 9S0001.13-02 New Chapter 3, 4, 5, 6, 7 added
1.4	27.03.2003	Changes / New Features - Description of BIOS revised (table formatting, content)
1.5	28.04.2003	Changes / New Features - Technical data for the 3-pin supply plug updated - Mounting instructions (distance) and mounting position updated - Following Power Panel devices added: 4PP210.0000-95, 4PP251.0571-65, 4PP251.0571-A5 - Battery change, battery buffer time updated - Power consumption and operating temperatures added - BIOS Upgrade description added - REMHOST description added - CMOS backup description added - Windows CE section updated - Distribution of resources by BIOS added - Delivery scope for each Power Panel device added

Table 1: Manual history

Version	Date	Comment
1.6	01.07.2004	Changes / New Features - Changeover to a new A5 book template V3.3 - Ground resistance information added to the "Technical Data" for the individual Power Panel devices - New figure for "Power Panel 100 and Power Panel 200 devices", on page 29. - "Features", on page 30 revised. - Chapter 4 "Software", section 2 "Power Panel with BIOS" revised, separate BIOS descriptions for VGA, SVGA and XGA and for QVGA Power Panel devices. - Section "BIOS Upgrade", on page 300 regarding the new BIOS Upgrade disk set (3 disks) revised. - Section "Windows XP Embedded", on page 316 as well as the model number for Windows XP Embedded Image added. - Device 4PP151.0571-01 added (see section "Device 4PP151.0571-01", on page 56) - Device 4PP151.0571-21 added (see section "Device 4PP151.0571-21", on page 60) - Device 4PP152.0571-01 added (see section "Device 4PP152.0571-01", on page 66) - Device 4PP152.0571-21 added (see section "Device 4PP152.0571-21", on page 70) - Device 4PP251.0571-45 added (see section "Device 4PP251.0571-45", on page 122) - Device 4PP251.0571-85 added (see section "Device 4PP251.0571-85", on page 130) - Device 4PP251.1043-75 added (see section "Device4PP251.1043-75", on page 138) - Device 4PP251.1043-B5 added (see section "Device4PP251.1043-B5", on page 142) - Device 4PP252.0571-65 added (see section "Device 4PP252.0571-65", on page 150) - Device 4PP252.0571-85 added (see section "Device 4PP252.0571-85", on page 154) - Device 4PP252.0571-A5 added (see section "Device 4PP252.0571-A5", on page 158) - Device 4PP252.1043-75 added (see section "Device 4PP252.1043-75", on page 162) - Device 4PP252.1043-B5 added (see section "Device 4PP252.1043-B5", on page 166) - Device 4PP280.1043-75 added (see section "Device 4PP280.1043-75", on page 170) - Device 4PP280.1043-B5 added (see section "Device 4PP280.1043-B5", on page 174) - Device 4PP280.1505-75 added (see section "Device 4PP280.1505-75", on page 178) - Device 4PP280.1505-B5 added (see section "Device 4PP280.1505-B5", on page 182) - Device 4PP281.1043-75 added (see section "Device 4PP281.1043-75", on page 186) - Device 4PP281.1043-B5 added (see section "Device 4PP281.1043-B5", on page 190) - Device 4PP281.1505-75 added (see section "Device 4PP281.1505-75", on page 194) - Device 4PP281.1505-B5 added (see section "Device 4PP281.1505-B5", on page 198) - Device 4PP282.1043-75 added (see section "Device 4PP282.1043-75", on page 202) - Device 4PP282.1043-B5 added (see section "Device 4PP282.1043-B5", on page 206) - Device 5PP120.1214-37 added (see section "Device 5PP120.1214-37", on page 226) - aPCI Interface Modules section deleted from the the Accesories chapter and Model Numbers Overview - Weight and dimensions specifications for Power Panel devices corrected - Device types Power Panel light / compact added (see section "Power Panel Light / Compact", on page 234) - 2 GB Compact Flash card (5CFCRD.2048-02) added - USB memory sticks (5MMUSB.0128-00, 5MMUSB.0256-00, 5MMUSB.0512-00) added - Slide-in legends 5AC900.057X-00, 5AC900.057X-01, 5AC900.104X-00, 5AC900.104X-01, 5AC900.104X-02, 5AC900.150X-00 added

Table 1: Manual history (Forts.)

2. Safety Guidelines

2.1 Introduction

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

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

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

2.2 Intended Use

Electronic devices are generally not fail-safe. In the event of a failure on the programmable control system, operating or monitoring device or uninterruptible power supply, the user is responsible for ensuring that other devices that may be connected, such as motors, are made safe.

2.3 Transport and Storage

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

2.4 Installation

- The installation must take place according to the documentation using suitable equipment and tools.

- The devices are only allowed to be installed without voltage applied and by qualified personnel.

- General safety regulations and nationally applicable accident prevention guidelines must be observed.

- Electrical installation must be carried out according to the relevant guidelines (e.g. line cross section, fuse, protective ground connection).

2.5 Operation

2.5.1 Protection Against Coming into Contact with Electrical Parts

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

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

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

2.6 Safety Notices

The safety notices in this manual are organized as follows:

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

Table 2: Safety notices

3. Guidelines

E
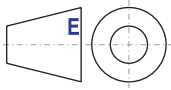
All dimension diagrams (e.g. dimension diagrams, etc.) are drawn according to European dimension standards.

4. Model Numbers

4.1 Power Panel 100 with Automation Runtime

Model Number	Description	Note
4PP120.0571-01	**Power Panel 120 LCD B/W 5.7" T MH** Power Panel PP120; 5.7"QVGA b/w LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP120.0571-21	**Power Panel 120 LCD C QVGA 5.7" T MH** Power Panel PP120; 5.7" QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP120.1043-31	**Power Panel 120 TFT C VGA 10.4" T MH** Power Panel PP120; 10.4" VGA TFT color display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP120.1505-31	**Power Panel 120 TFT C XGA 15" T MH** Power Panel PP120; 15" XGA TFT color display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP151.0571-01	**Power Panel 151 LCD B/W QVGA 5.7" F MH** Power Panel PP151; 5.7" QVGA b/w LC display; 6 softkeys; 16 function keys and 20 system keys; 16 MB SDRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP151.0571-21	**Power Panel 151 LCD C QVGA 5.7" F MH** Power Panel PP151; 5.7" QVGA color LC display; 6 softkeys; 16 function keys and 20 system keys; 16 MB SDRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	

Table 3: Power Panel 100 with Automation Runtime

Model Number	Description	Note
4PP152.0571-01	**Power Panel 152 LCD B/W QVGA 5.7" F MH** Power Panel PP152; 5.7" QVGA b/w LC display; 20 function keys and 20 system keys; 16 MB SDRAM; Compact Flash slot (Type I); ETH 10/100; RS 232; 2xUSB; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP152.0571-21	**Power Panel 152 LCD C QVGA 5.7" F MH** Power Panel PP152; 5.7" QVGA color LC display; 20 function keys and 20 system keys; 16 MB SDRAM; Compact Flash slot (Type I); ETH 10/100; RS 232; 2xUSB; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	

Table 3: Power Panel 100 with Automation Runtime (Forts.)

4.2 Power Panel 200 with Automation Runtime

Model Number	Description	Note
4PP210.0000-95	**Power Panel 210 Controller MH 2aPCI** Power Panel PP210 controller, Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91)	
4PP220.0571-45	**Power Panel 220 LCD B/W QVGA 5.7" T MH 1aPCI** Power Panel PP220; 5.7" QVGA b/w LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI Slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.0571-65	**Power Panel 220 LCD C QVGA 5.7" T MH 1aPCI** Power Panel PP220; 5.7" QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.0571-85	**Power Panel 220 LCD B/W QVGA 5.7" T MH 2aPCI** Power Panel PP220; 5.7" QVGA b/w LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.0571-A5	**Power Panel 220 LCD C QVGA 5.7" T MH 2aPCI** Power Panel PP220; 5.7" QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	

Table 4: Power Panel 200 with Automation Runtime

Model Number	Description	Note
4PP220.1043-75	**Power Panel 220 TFT C VGA 10.4" T MH 1aPCI** Power Panel PP220; 10.4" VGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.1043-B5	**Power Panel 220 TFT C VGA 10.4" T MH 2aPCI** Power Panel PP220; 10.4" VGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.1505-75	**Power Panel 220 TFT C XGA 15" T MH 1aPCI** Power Panel PP220; 15" XGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.1505-B5	**Power Panel 220 TFT C XGA 15" T MH 2aPCI** Power Panel PP220; 15" XGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP251.0571-45	**Power Panel 251 LCD B/W QVGA 5.7" F MH 1aPCI** Power Panel PP251; 5.7" QVGA b/w LC display; 6 softkeys; 16 function keys and 20 system keys; 1 aPCI slot; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP251.0571-65	**Power Panel 251 LCD C QVGA 5.7" F MH 1aPCI** Power Panel PP251; 5.7" QVGA color LC display; 6 soft keys; 16 function keys and 20 system keys; 1 aPCI Slot; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP251.0571-85	**Power Panel 251 LCD B/W QVGA 5.7" F MH 2aPCI** Power Panel PP251 5.7" QVGA color LC display; 6 softkeys; 16 function keys and 20 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP251.0571-A5	**Power Panel 251 LCD C QVGA 5.7" F MH 2aPCI** Power Panel PP251 5.7" QVGA color LC display; 6 softkeys; 16 function keys and 20 system keys ; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP251.1043-75	**Power Panel 251 TFT C VGA 10.4" F MH 1aPCI** Power Panel PP251; 10.4" VGA color TFT display; 10 softkeys; 28 function keys and 20 system keys; 1 aPCI slot; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal houding, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	

Table 4: Power Panel 200 with Automation Runtime (Forts.)

Model Number	Description	Note
4PP251.1043-B5	**Power Panel 251 TFT C VGA 10.4" F MH 2aPCI** Power Panel PP251; 10.4" VGA color TFT display; 10 softkeys; 28 function and 20 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP252.0571-45	**Power Panel 252 LCD B/W QVGA 5.7" F MH 1aPCI** Power Panel PP252; 5.7" QVGA b/w LC display with touch screen (resistive); 20 function and 20 system keys; 1 aPCI slot; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP252.0571-65	**Power Panel 252 LCD C QVGA 5.7" F MH 1aPCI** Power Panel PP252; 5.7" QVGA color LC display; 20 function and 20 system keys; 1 aPCI Slot; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP252.0571-85	**Power Panel 252 LCD B/W QVGA 5.7" F MH 2aPCI** Power Panel PP252; 5.7" QVGA b/w LC display; 20 functions aund 20 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP252.0571-A5	**Power Panel 252 LCD C QVGA 5.7" F MH 2aPCI** Power Panel PP252; 5.7" QVGA color LC display; 20 function keys and 20 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP252.1043-75	**Power Panel 252 TFT C VGA 10.4" F MH 1aPCI** Power Panel PP252; 10.4" VGA color TFT display; 32 function keys and 32 system keys; 1 aPCI slots; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP252.1043-B5	**Power Panel 252 TFT C VGA 10.4" F MH 2aPCI** Power Panel PP252; 10.4" VGA color TFT display; 32 function keys and 32 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP280.1043-75	**Power Panel 280 TFT C VGA 10.4" FT MH 1aPCI** Power Panel PP280; 10.4" VGA color TFT display with touch screen (resistive); 10 softkeys and 12 function keys; 1 aPCI slot; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP280.1043-B5	**Power Panel 280 TFT C VGA 10.4" FT MH 2aPCI** Power Panel PP280; 10.4" VGA color TFT display with touch screen (resistive); 10 softkeys and 12 function keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	

Table 4: Power Panel 200 with Automation Runtime (Forts.)

Model Number	Description	Note
4PP280.1505-75	**Power Panel 280 TFT C XGA 15" FT MH 1aPCI**	
4PP280.1505-B5	**Power Panel 280 TFT C XGA 15" FT MH 2aPCI**	
4PP281.1043-75	**Power Panel 281 TFT C VGA 10.4" FT MH 1aPCI** Power Panel PP281; 10.4" VGA color TFT display with touch screen (resistive), 10 softkeys, 28 function keys and 20 system keys, Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP281.1043-B5	**Power Panel 281 TFT C VGA 10.4" FT MH 2aPCI** Power Panel PP281; 10.4" VGA color TFT display with touch screen (resistive), 10 softkeys, 28 function keys and 20 system keys, Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP281.1505-75	**Power Panel 281 TFT C XGA 15" FT MH 1aPCI** Power Panel PP281; 15" XGA color TFT display with touch screen (resistive); 12 softkeys; 20 function keys and 92 system keys; 1 aPCI slot; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP281.1505-B5	**Power Panel 281 TFT C XGA 15" FT MH 2aPCI** Power Panel PP281; 15" XGA color TFT display with touch screen (resistive); 12 softkeys; 20 function keys and 92 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
4PP282.1043-75	**Power Panel 282 TFT C VGA 10.4" FT MH 1aPCI** Power Panel PP282; 10.4" VGA color TFT display with touch screen (resistive), 12 softkeys, 32 function keys and 20 system keys, Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP282.1043-B5	**Power Panel 282 TFT C VGA 10.4" FT MH 2aPCI** Power Panel PP282; 10.4" VGA color TFT display with touch screen (resistive), 12 softkeys, 32 function keys and 20 system keys, Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	

Table 4: Power Panel 200 with Automation Runtime (Forts.)

4.3 Power Panel 100 with BIOS

Model Number	Description	Note
5PP120.0571-27	**Power Panel 120 LCD C QVGA 5.7" T MH** Power Panel PP120 BIOS; 5.7" QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 128 MB SDRAM; battery; Metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	

Table 5: Model numbers for Power Panel 100 with BIOS

Model Number	Description	Note
5PP120.1043-37	**Power Panel 120 TFT C VGA 10.4" T MH** Power Panel PP120 BIOS; 10.4" VGA TFT color Display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 128 MB SDRAM; battery; Metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
5PP120.1214-37	**Power Panel 120 TFT C VGA 12.1" T MH** Power Panel PP120 BIOS; 12.1" SVGA color TFT Display with touch screen (resistive); 128 MB SDRAM; Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; Metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	
5PP120.1505-37	**Power Panel 120 TFT C XGA 15" T MH** Power Panel PP120 BIOS; 15" XGA TFT color Display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 128 MB SDRAM; battery; Metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	

Table 5: Model numbers for Power Panel 100 with BIOS (Forts.)

4.4 Accessories

Model Number	Description	Note
0AC201.9	**Lithium Batteries (5 pcs.)** Lithium batteries, 5 pcs., 3 V / 950 mAh	
0TB103.9	**Plug for the 24 V Supply Voltage (Screw Clamps)** Plug 24 V 5.08 3-pin Screw clamps	
0TB103.91	**Plug for the 24 V Supply Voltage (Cage Clamps)** Plug 24 V 5.08 3-pin Cage clamps	
5AC900.057X-00	**Legend Strips 3x 5.7" high1** Legend strip template for 4PP151.0571-01, 4PP151.0571-21, 4PP251.0571-45, 4PP251.0571-65, 4PP251.0571-85, 4PP251.0571-A5	
5AC900.057X-01	**Legend Strips 2x 5.7" horizontal2** Legend strip template for 4PP152.0571-01, 4PP152.0571-21, 4PP252.0571-45, 4PP252.0571-65, 4PP252.0571-85, 4PP252.0571-A5	
5AC900.104X-00	**Legend Strips 1x 10.4" high1** Legend strip template for 4PP151.1043-31, 4PP181.1043-31, 4PP251.1043-75, 4PP251.1043-B5, 4PP281.1043-75, 4PP281.1043-B5	
5AC900.104X-01	**Legend Strips 1x 10.4" horizontal2** Legend strip template for 4PP152.1043-31, 4PP182.1043-31, 4PP252.1043-75, 4PP252.1043-B5, 4PP282.1043-75, 4PP282.1043-B5	
5AC900.104X-02	**Legend Strips 3x 10.4" horizontal1** Legend strip template for 4PP180.1043-31, 4PP280.1043-75, 4PP280.1043-B5	
5AC900.150X-00	**Legend Strips 4x 15"** Legend strip template for 4PP280.1505-75, 4PP280.1505-B5, 4PP281.1505-75, 4PP281.1505-B5	
5CFCRD.0032-01	**Compact Flash 32 MB TrueIDE SanDisk/R2** Compact Flash card with 32 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0032-02	**Compact Flash 32 MB TrueIDE SanDisk/A** Compact Flash card with 32 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0032-01*

Table 6: Model numbers for accessories

Model Number	Description	Note
5CFCRD.0064-01	**Compact Flash 64 MB TrueIDE SanDisk/R2** Compact Flash card with 64 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0064-02	**Compact Flash 64 MB TrueIDE SanDisk/A** Compact Flash card with 64 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0064-01*
5CFCRD.0128-01	**Compact Flash 128 MB TrueIDE SanDisk/R2** Compact Flash card with 128 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0128-02	**Compact Flash 128 MB TrueIDE SanDisk/A** Compact Flash card with 128 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0128-01*
5CFCRD.0192-01	**Compact Flash 196 MB TrueIDE SanDisk/R2** Compact Flash card with 196 MB FPROM, and true IDE/ATA interface.	*Abgekündigt seit 07/03*
5CFCRD.0256-01	**Compact Flash 256 MB TrueIDE SanDisk/R2** Compact Flash card with 256 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0256-02	**Compact Flash 256 MB TrueIDE SanDisk/A** Compact Flash card with 256 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0256-01*
5CFCRD.0384-01	**Compact Flash 384 MB TrueIDE SanDisk/R2** Compact Flash card with 384 MB FPROM, and true IDE/ATA interface.	*Abgekündigt seit 07/03*
5CFCRD.0512-01	**Compact Flash 512 MB TrueIDE SanDisk/R2** Compact Flash card with 512 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0512-02	**Compact Flash 512 MB TrueIDE SanDisk/A** Compact Flash card with 512 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0512-01*
5CFCRD.1024-02	**Compact Flash 1024 MB TrueIDE SanDisk/A** Compact Flash card with 1024 MB FPROM, and true IDE/ATA interface.	
5CFCRD.2048-02	**Compact Flash 2024 MB TrueIDE SanDisk/A** Compact Flash card with 2048 MB FPROM, and true IDE/ATA interface.	
5MMUSB.0128-00	**USB Memory Stick 128 MB SanDisk**	
5MMUSB.0256-00	**USB Memory Stick 256 MB SanDisk**	
5MMUSB.0512-00	**USB Memory Stick 512 MB SanDisk**	
9A0013.01	**Pen for Resistive Touch Screen**	
9A0017.01	**RS232 Null Modem Cable 0.6 m** To connect the Power Panel to the remote PC (9-pin DSUB socket - 9-pin DSUB socket)	
9A0017.02	**RS232 Null Modem Cable 1.8 m** To connect the Power Panel to the remote PC (9-pin DSUB socket - 9-pin DSUB socket)	

Table 6: Model numbers for accessories (Forts.)

4.5 Software

Model Number	Description	
5S0000.01-090	**HMI Drivers & Utilities CD** HMI Drivers & Utilities CD ROM, contains driver (touch screen, graphics, etc.) as well as the latest BIOS upgrades for all HMI product families	
9S0001.13-010	**OEM MS-Win CE4.1 German** Only delivered with a Power Panel BIOS device	

Table 7: Software model numbers

Model Number	Description	
9S0001.13-020	**OEM MS-Win CE4.1 English** Only delivered with a Power Panel BIOS device	
9S0001.16-020	**OEM MS-WinXPe PP100/200 w/CF** Only delivered with a Power Panel BIOS device	

Table 7: Software model numbers

4.6 Documentation

Model Number	Description	
MAPP02-0	Power Panel 100 / 200 User's Manual, English	*In preparation*
MAPP02-E	Power Panel 100/200 User's Manual, English	*In preparation*

Table 8: Model numbers for documentation

Chapter 2 • Technical Data

1. General Information

B&R offers the B&R Power Panel 100 and Power Panel 200 product range for automation of small to midsize machines and systems.

The Power Panel 100 and Power Panel 200 product range encompasses a line of devices from operating units with QVGA, VGA or XGA display to visualizations and control of machines. Programmable with Automation Studio (Visual Components), these devices close the gap between Panelware and IPC based systems. Depending on the design, the devices contain the embedded operating system Automation Runtime or a BIOS based operating system such as Windows CE or Windows XP Embedded. The number of onboard interfaces is reduced to a minimum and size is optimized to the smallest dimensions.

Depending on the model, the devices have a 5.7" QVGA touch screen available in color or black/white, a 10.4" VGA, 12.1" SVGA or 15" XGA touch screen in color. Additionally, there are horizontally or vertically formatted devices available (numeric and alphanumeric keys, with/without legend strips) for all display sizes.

Figure 1: Power Panel 100 and Power Panel 200 devices

1.1 Features

- 24 VDC supply voltage
- 2 USB 1.1 connections
- Ethernet 10/100 MBit interface
- Compact Flash card (type I) slot
- RS232 interface, modem capable, not electrically isolated
- 2 operating mode switches (2 x 16 digit)
- 2 status LEDs (User or Compact Flash card access)
- Fan free operation
- Touch screen (analog resistive), function keys or both[1]
- Filter glass (multiple coated non-reflective)[1]
- Horizontal and vertical mounting placements, numeric and alphanumeric keys[1]
- Software compatible with B&R 2000 PLC family
- Maximum 2 aPCI slots (see B&R System 2005 Manual for available aPCI interface modules)[1]
- BIOS or Automation Runtime operating system[1]
- Real-time clock (battery-buffered)[1]
- Up to 128 MB SDRAM main memory[1]

1) Depending on the design of the Power Panel device version.

2. Power Panel 100 with Automation Runtime

2.1 Device Interfaces

In the following section, a description is given for all interfaces and plugs which a Power Panel 100 device with Automation Runtime can have.

2.1.1 Supply Voltage

Input voltage: 24 VDC ± 25%, not electrically isolated

The 3-pin socket required for the supply voltage connection is not contained in the delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The cable required for the connection must be supplied by the customer (see also section "TB103 3-pin Supply Voltage Connector", on page 324).

The supply voltage is internally protected, so that the device cannot be damaged if there is an overload or if the voltage supply is connected incorrectly.

The pin assignments can be found either in the following table or printed onto the Power Panel plate or device label (see section 2.2.2 "Device Label" on Page 37).

Supply Voltage		
Pin	**Description**	
1	+	
2	Ground	
3	-	
Accessories		
0TB103.9	Plug 24 V 5.08 3p screw clamps	
0TB103.91	Plug 24 V 5.08 3p cage clamps	
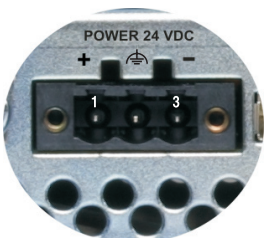
Figure 2: Supply voltage connection

Warning!

The pin's connection to the ground (functional ground) should be as short as possible. If the Power Panel is installed in a switching cabinet, the connection cable should not be longer than 15 cm.

2.1.2 Grounding Clip

Should be connected with ground using the shortest route possible.

Grounding Clip

Figure 3: Grounding clip

2.1.3 COM Interface

The Power Panel is equipped with a PC compatible serial interface with 16 bytes FIFO. This non-electrically isolated interface is primarily intended for programming the Power Panel devices using Automation Studio.

The RS232 can also be used as a general interface (e.g. third-party connection, bar code reader, etc.).

Serial Interface		
RS232 Interface modem capable, not electrically isolated Up to 115 kBaud		9-pin DSUB connector
Pin	**RS232**	
1	DCD	
2	RXD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 9: COM pin assignment

2.1.4 USB port

The Power Panel is equipped with a USB (Universal Serial Bus) Host controller with two USB ports.

Universal Serial Bus
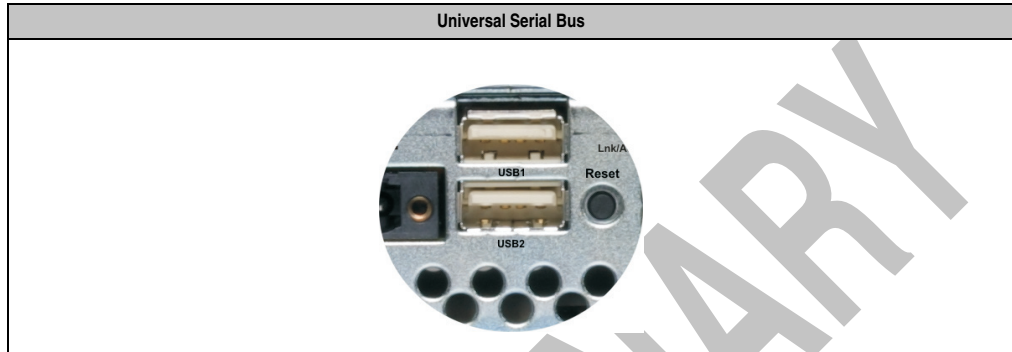
Figure 4: USB port

Technical Data for USB Port	
Transfer Rate	1.5 MBit/s to 12 MBit/s
Power Supplies	500 mA for each port
Maximum Cable Length	5 m (can be extended using a USB hub)

Table 10: Technical data for USB connection

Warning!

Only USB devices tested and verified by B&R, which can be found in chapter "Accessories", on page 321, are allowed to be connected to the USB interface.

Warning!

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

2.1.5 Mode / Node switch

The Power Panel devices are equipped with 2 hex switches, which are used as an operating mode switch. Switch positions 01 up to FD are available for any purpose in an application. The switch position can be evaluated by an application program.
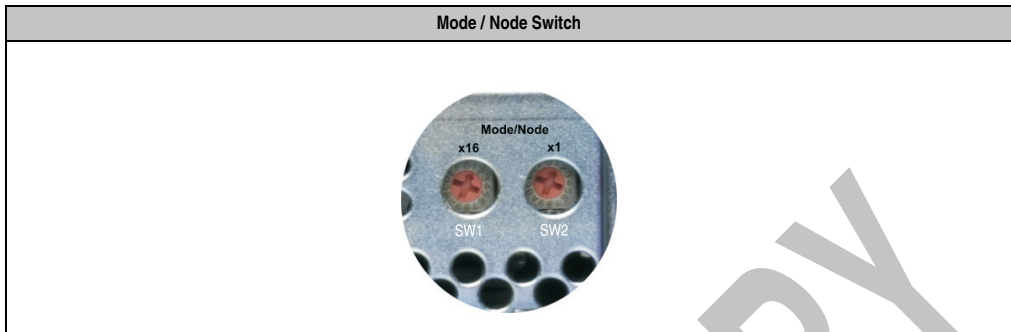
Mode / Node Switch

Figure 5: Mode / Node switch

Switch Position		Function	Description
SW1 (x16)	SW2 (x1)	Operating Mode Switch	
0	0	Boot	Automation Runtime boot mode for operating system (firmware) upgrade (default Automation Runtime). With this mode, a new or missing operating system can be downloaded.
0 to F	0 to F	Node	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation) Freely available for use in an application e.g. setting the INA2000 node number for the Ethernet interface.
F	E	Dyn. Mode	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation). Device addresses can be defined by the software.
F	F	Diagnosis	Automation Runtime Diagnose Mode (Compact Flash Automation Runtime or Terminal Operation).

Table 11: Switch settings for the Mode / Node switch

2.1.6 Status LEDs

Power Panels are equipped with two status LEDs, which are visible on the outside.
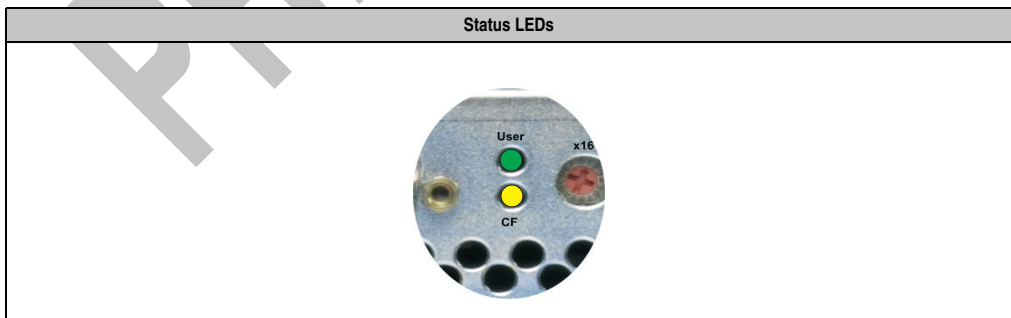
Status LEDs

Figure 6: Status LEDs

LED	Color	Function
User	Green	Freely available for use in an application (corresponding libraries for Automation Studio in preparation)
CF	Yellow	Indicates that the Compact Flash card is being accessed

Table 12: Status LEDs

2.1.7 Ethernet Connection
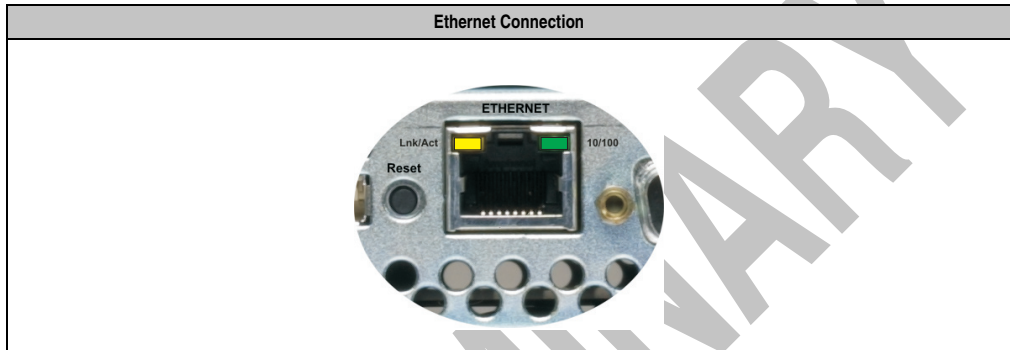
Figure 7: Ethernet Connection

Ethernet	10/100 MBit/s [1]
Connection	RJ45 Twisted Pair (10BaseT/100BaseT)
Controller	MacPhyter DP83815 or DP83816 - depends on the revision
Cabling	S/STP (category 5)

Table 13: Ethernet Controller

1) Both operating modes are possible. Switching takes place automatically

The onboard Ethernet controller for Power Panel devices provides an RJ45 Twisted Pair connection, to which 2 LEDs are attached for status control:

LED	On	Done
Green	100 MBit/s	10 MBit/s
Yellow	Link	Activity (blinking)

Table 14: Status LEDs Ethernet controller

2.1.8 Reset Button

The reset button can be accessed through a small hole between the USB and the Ethernet connection. In order to avoid accidental activation, a reset can only be triggered with a pointed object.
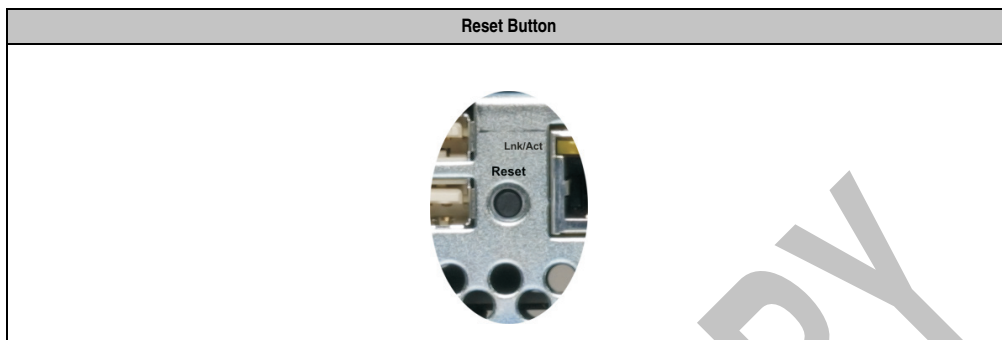
Reset Button

Figure 8: Reset button

2.1.9 Compact Flash Slot

Power Panel devices are equipped with a Compact Flash slot which is accessible from the side. Compact Flash cards of type I are supported.

Figure 9: Compact Flash slot

It is possible to protect the Compact Flash slot using a safety clip. By pressing the ejector (using a pointed object is the best way to do this) the Compact Flash card can be changed quickly and safely.

Caution!

Changing the Compact Flash card can only take place without power applied! As a safety measure, a sticker will also be attached to Power Panel devices.

2.2 Label

2.2.1 Safety Sticker

A safety sticker is attached over the Compact Flash slot, which advises that the power must be switched off Power Panel device when inserting or removing a Compact Flash card.
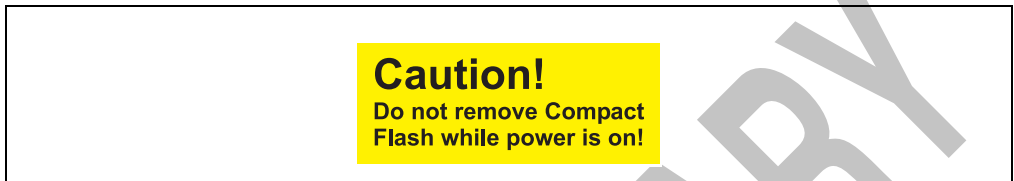
Figure 10: Safety sticker

2.2.2 Device Label

The following label attached in a suitable location on the Power Panel, displays short definitions for all of the interfaces:
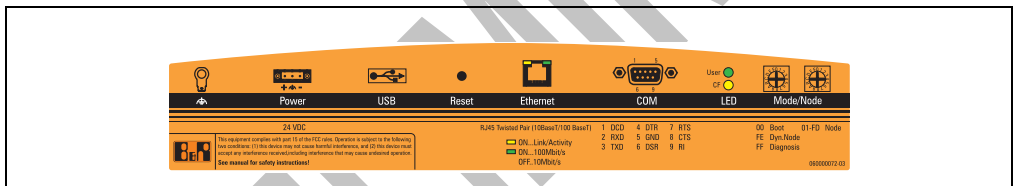
Figure 11: Device label

2.2.3 Serial Number Label

General Information

Each B&R device is assigned a unique serial number label with bar code, which allows the device to be clearly identified.
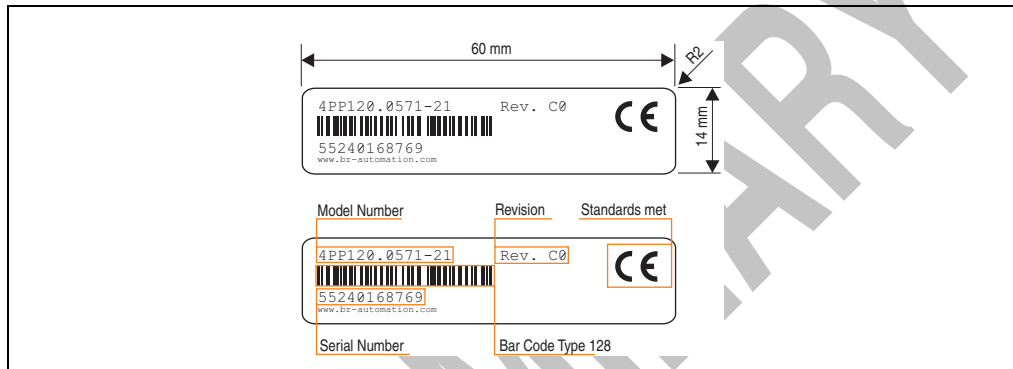
Design / Dimensions

Figure 12: Design / dimensions serial number label

This page is only used as a place holder.

Chapter 2
Technical Data

2.3 Device 4PP120.0571-01

Figure 13: Front view 4PP120.0571-01
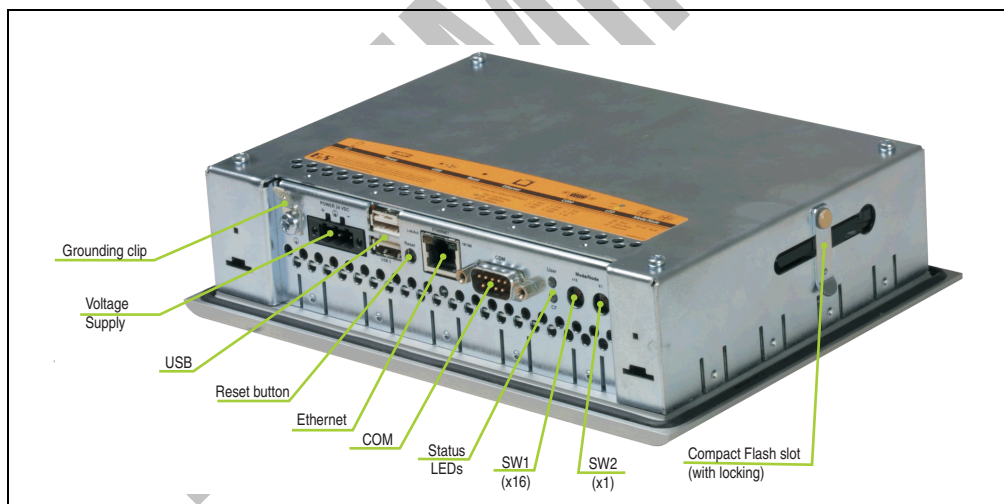
Figure 14: Rear view 4PP120.0571-01

2.3.1 Technical Data

Features	4PP120.0571-01
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. D0 - previously DP83615) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	Analog, resistive (Gunze)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 15: Technical data 4PP120.0571-01

Chapter 2
Technical Data

Features	4PP120.0571-01
Ground Resistance	0 Ohm
Power Consumption	Approx. 10 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.4 kg
Outer Dimensions in mm (WxHxD)	212 x 156 x 55.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	
	0 to 50° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 15: Technical data 4PP120.0571-01 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

2.3.2 Dimensions

Figure 15: Dimensions 4PP120.0571-01

2.3.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 15 "Dimensions 4PP120.0571-01" on Page 42) For further information regarding mounting, see chapter 3 "Installation" on Page 247.

Figure 16: Cutout dimensions

2.3.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD B/W QVGA 5.7" T MH
4	Retaining clips included

Table 16: Delivery 4PP120.0571-01

2.4 Device 4PP120.0571-21

Figure 17: Front view 4PP120.0571-21
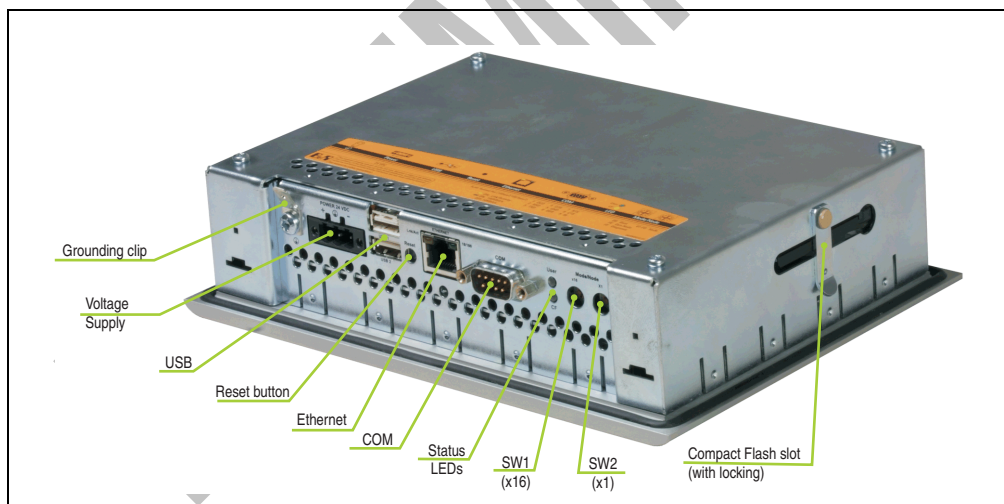
Figure 18: Rear view 4PP120.0571-21

2.4.1 Technical Data

Features	4PP120.0571-21
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83815 (starting from rev. D0 - previously DP83615) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	Analog, resistive (Gunze)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 17: Technical data 4PP120.0571-21

Chapter 2
Technical Data

Features	4PP120.0571-21
Ground Resistance	0 Ohm
Power Consumption	Approx. 10 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.4 kg
Outer Dimensions in mm (WxHxD)	212 x 156 x 55.5
Altitude	Max. 3,000 m

Environmental Temperature
  Operation
  Storage
	
	0 to 50° C
	-20° C to +60° C

Relative Humidity
  Operation
  Storage
	
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 17: Technical data 4PP120.0571-21 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

2.4.2 Dimensions

Figure 19: Dimensions 4PP120.0571-21

2.4.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 19 "Dimensions 4PP120.0571-21" on Page 46) For further information regarding mounting, see chapter 3 "Installation" on Page 247.

Figure 20: Cutout Dimensions

2.4.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD C QVGA 5.7" T MH
4	Retaining clips included

Table 18: Delivery 4PP120.0571-21

2.5 Device 4PP120.1043-31
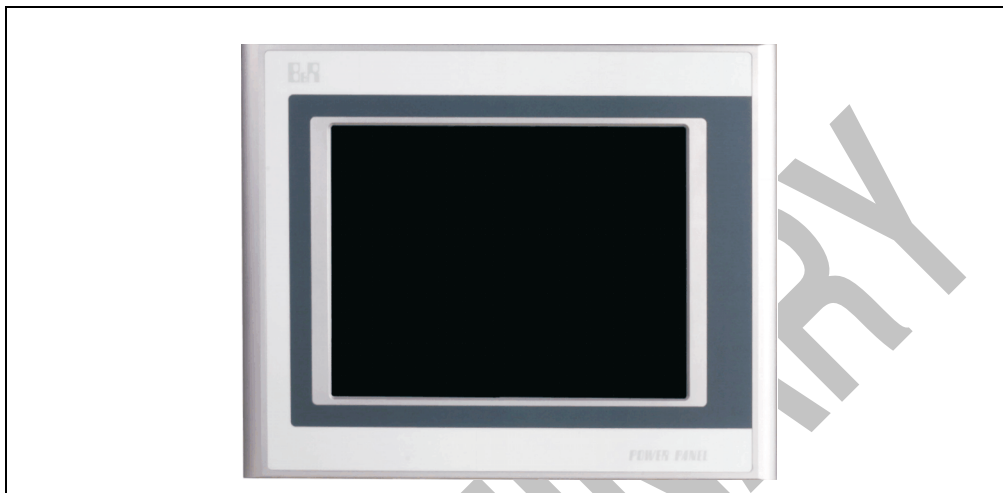
Figure 21: Front view 4PP120.1043-31
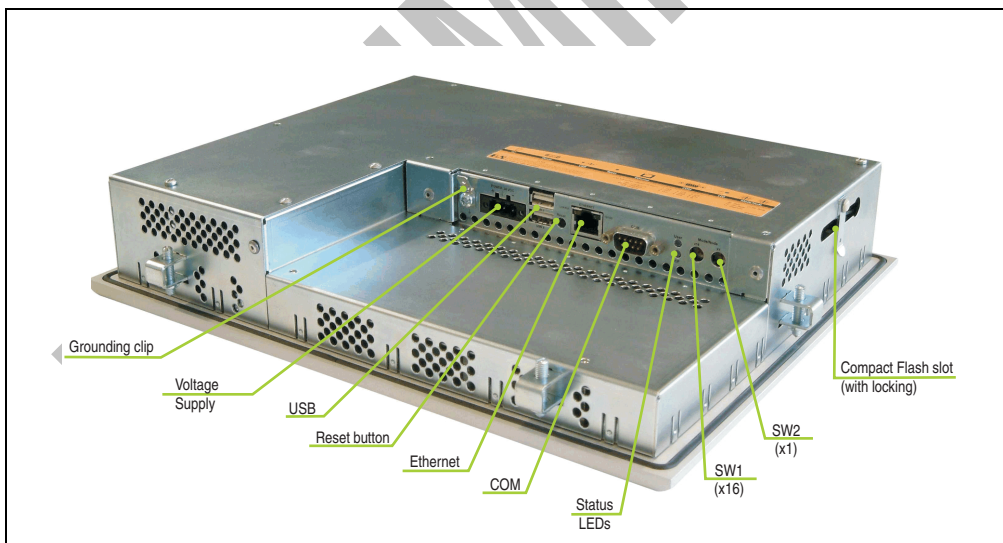
Figure 22: Rear view 4PP120.1043-31

2.5.1 Technical Data

Features	4PP120.1043-31
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. C7 - previously DP83615) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 19: Technical data 4PP120.1043-31

Features	4PP120.1043-31
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 15 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 3.7 kg
Outer Dimensions in mm (WxHxD)	323 x 260 x 65.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +70° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 19: Technical data 4PP120.1043-31 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
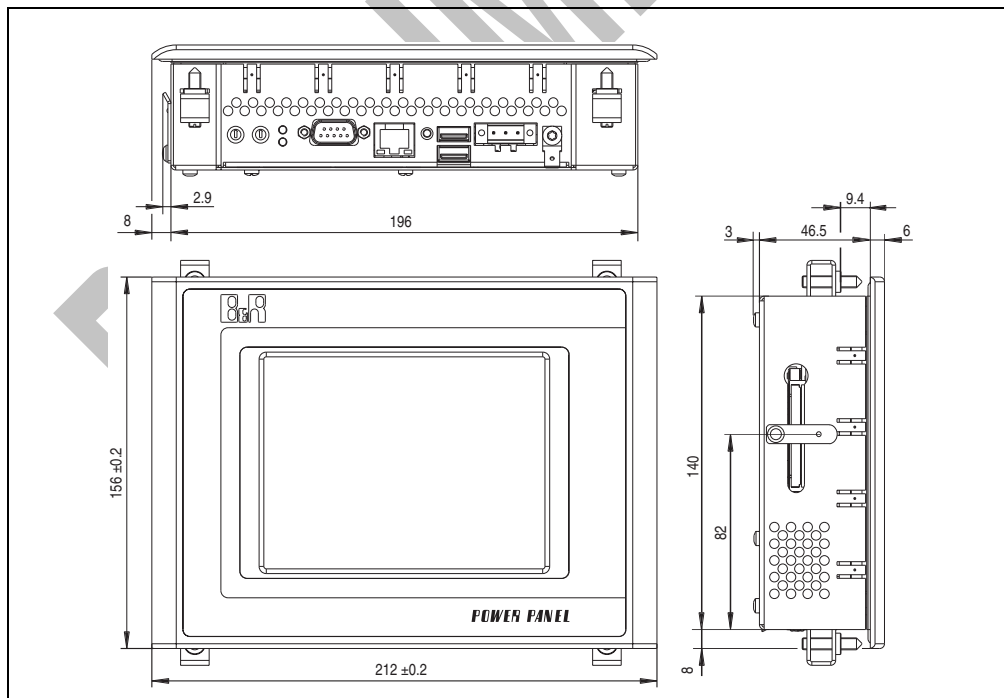
2.5.2 Dimensions

Figure 23: Dimensions 4PP120.1043-31

2.5.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 23 "Dimensions 4PP120.1043-31" on Page 50) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
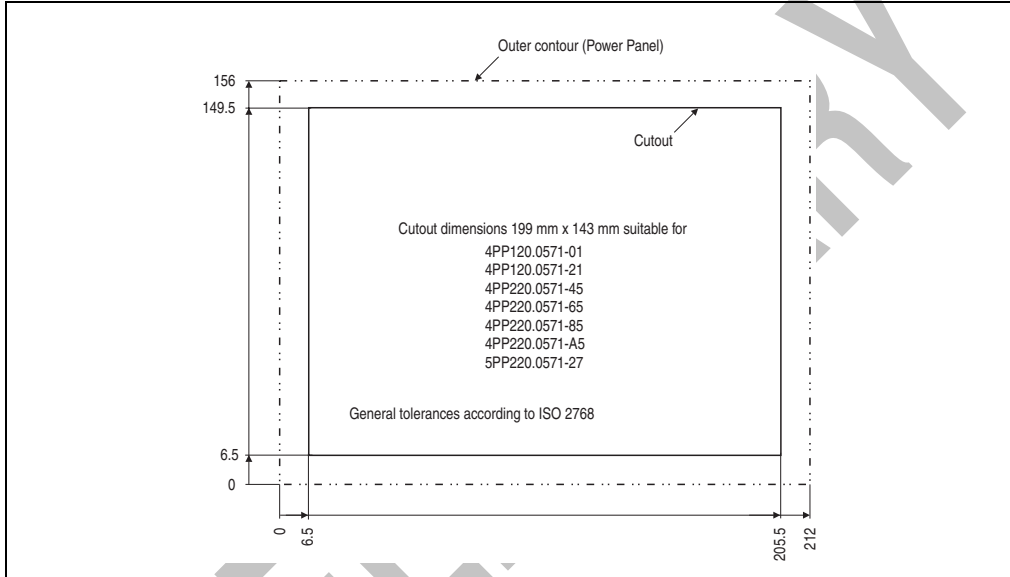

Figure 24: Cutout dimensions

2.5.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C VGA 10.4" T MH
6	Retaining clips included

Table 20: Delivery 4PP120.1043-31

2.6 Device 4PP120.1505-31

Figure 25: Front view 4PP120.1505-31
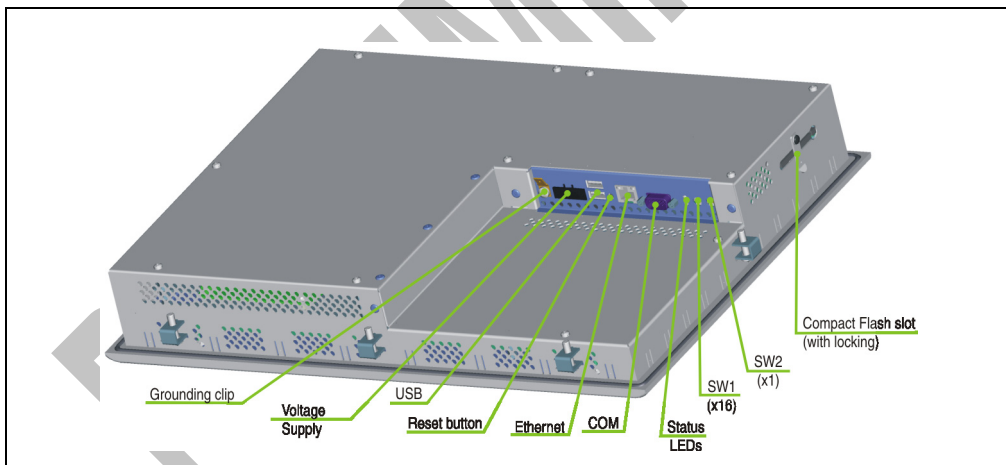
Figure 26: Rear view 4PP120.1505-31

2.6.1 Technical Data

Features	4PP120.1505-31
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
  Controller
  Connection
  Cabling
	MacPhyter DP83816 (starting from rev. E0 - previously DP83615) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
  Type
  Diagonal
  Color
  Resolution
  Background Lighting
    Brightness
    Half Brightness Time
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
  Technology
  Controller
	Analog, resistive (3M)
	Serial (Hampshire)

Front
  Frame
  Mylar
  Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
  Function Keys
  Function Keys with LEDs
  Softkeys
  Softkeys with LEDs
  System Keys
  System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 21: Technical data 4PP120.1505-31

Features	4PP120.1505-31
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 30 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 6.3 kg
Outer Dimensions in mm (WxHxD)	435 x 330 x 71.5
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 40° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 21: Technical data 4PP120.1505-31 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
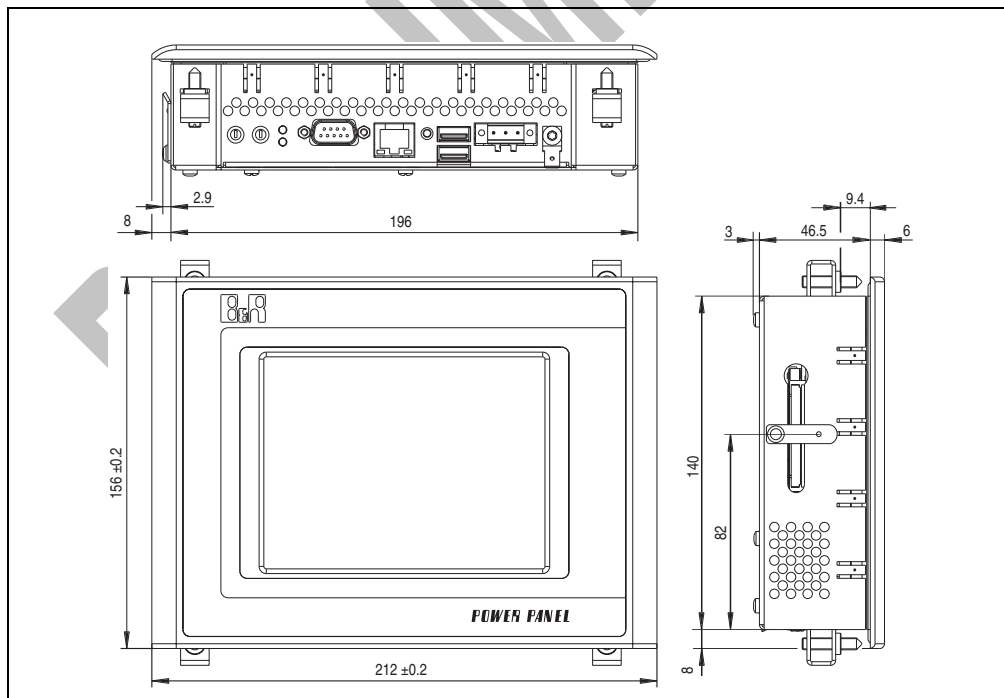
2.6.2 Dimensions

Figure 27: Dimensions 4PP120.1505-31

2.6.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 27 "Dimensions 4PP120.1505-31" on Page 54) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
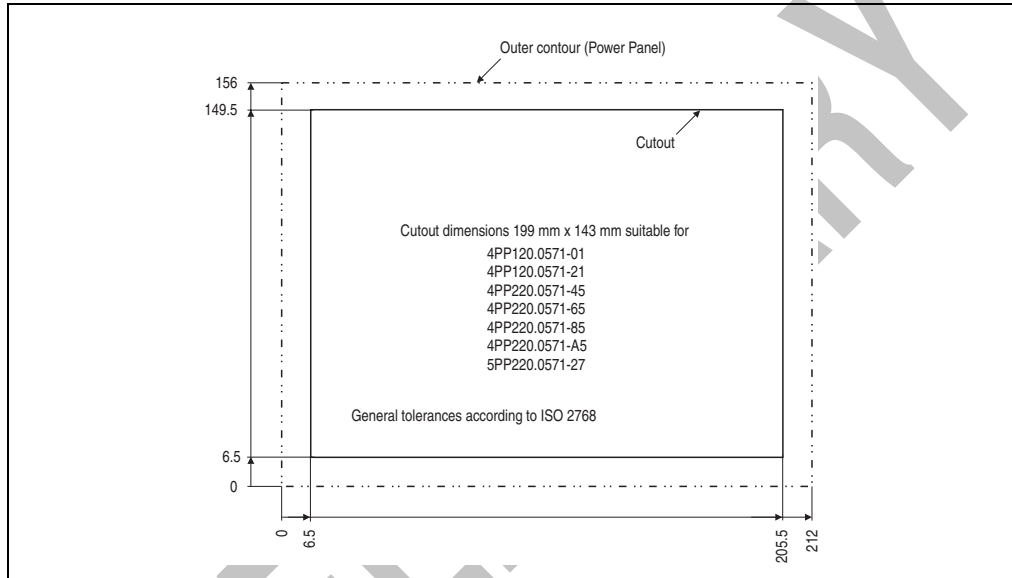

Figure 28: Cutout dimensions

2.6.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C XGA 15" T MH
8	Retaining clips included

Table 22: Delivery 4PP120.1505-31

2.7 Device 4PP151.0571-01

Figure 29: Front view 4PP151.0571-01
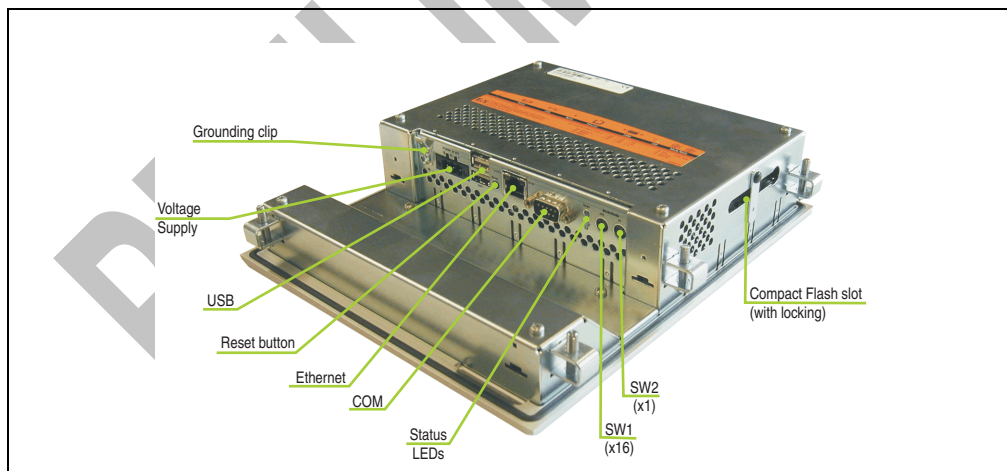
Figure 30: Rear view 4PP151.0571-01

2.7.1 Technical Data

Features	4PP151.0571-01
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
   Controller
   Connection
   Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
     Brightness
     Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
   Technology
   Controller
	-

Front
   Frame
   Mylar
   Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	-
	16
	-
	6
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 23: Technical data 4PP151.0571-01

Features	4PP151.0571-01
Ground Resistance	0 Ohm
Power Consumption	Approx. 13 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2 kg
Outer Dimensions in mm (WxHxD)	212 x 245 x 55.5
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 23: Technical data 4PP151.0571-01 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
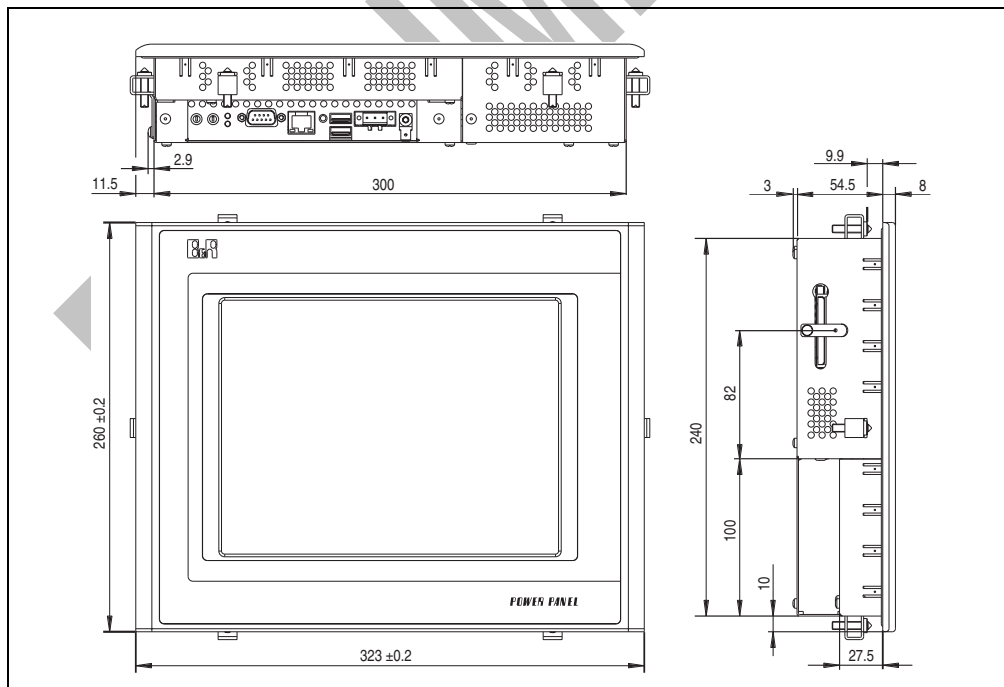
2.7.2 Dimensions
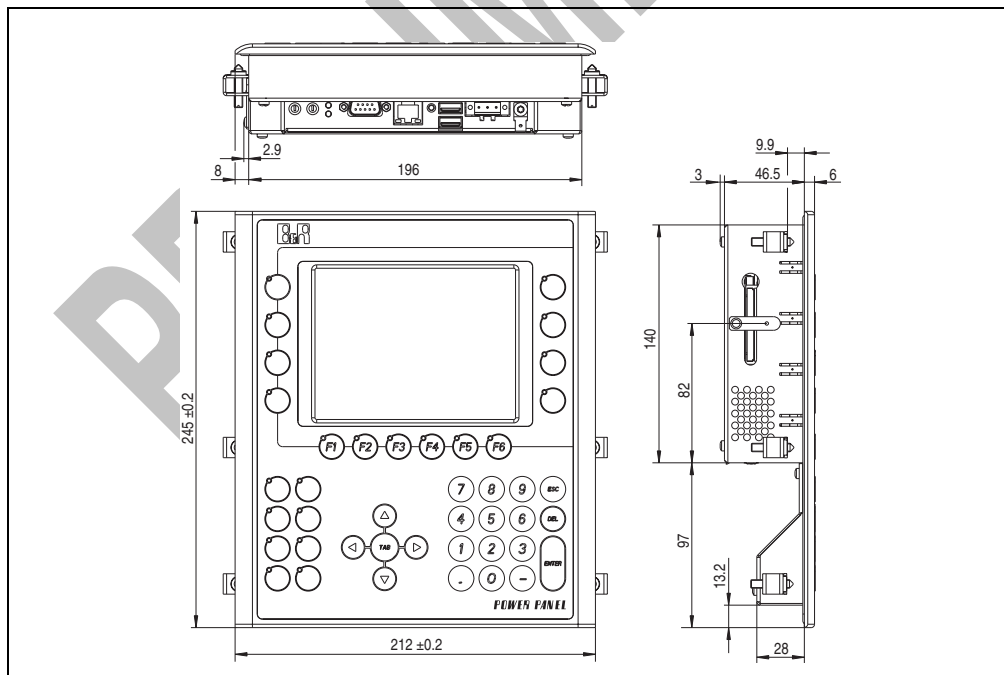
Figure 31: Dimensions 4PP151.0571-01

2.7.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 31 "Dimensions 4PP151.0571-01" on Page 58) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
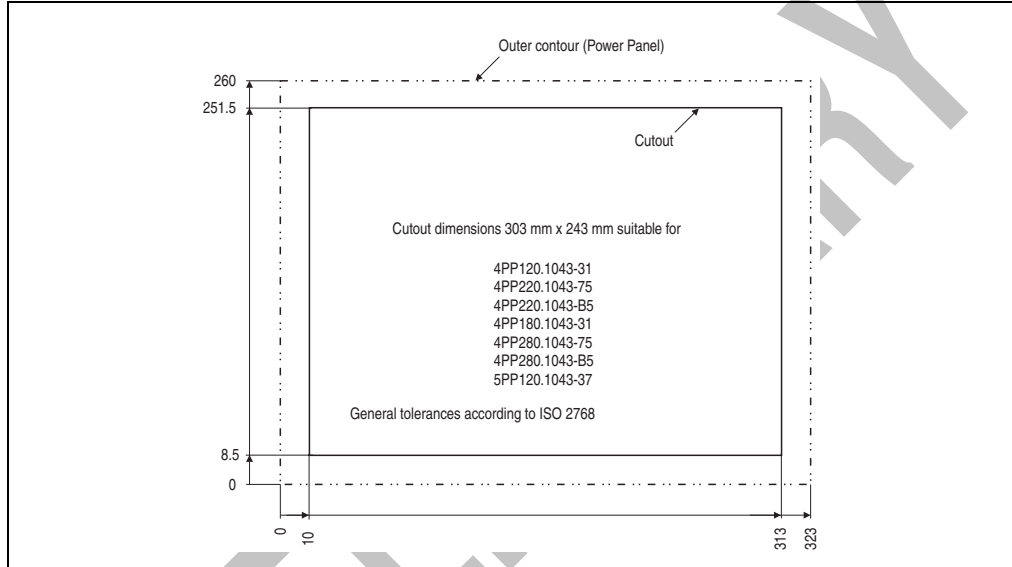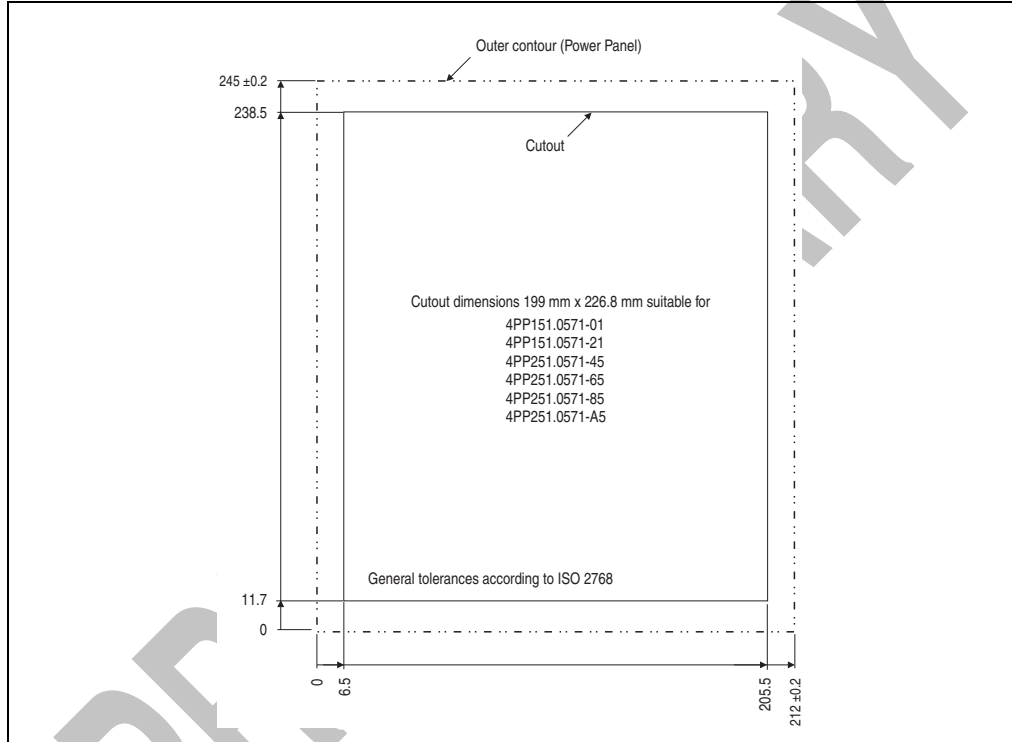

Figure 32: Cutout dimensions

2.7.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 151 LCD B/W QVGA 5.7" F MH
6	Retaining clips included
4	Legend strips (already inserted in the front)

Table 24: Delivery 4PP151.0571-01

2.8 Device 4PP151.0571-21

Figure 33: Front view 4PP151.0571-21
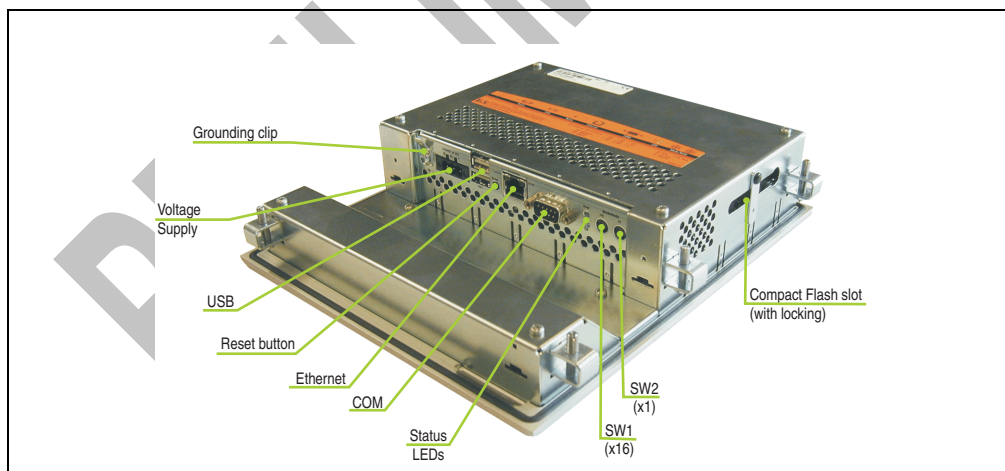
Figure 34: Rear view 4PP151.0571-21

2.8.1 Technical Data

Features	4PP151.0571-21
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
   Controller
   Connection
   Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
   Technology
   Controller
	-

Front
   Frame
   Mylar
   Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	-
	16
	-
	6
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 25: Technical data 4PP151.0571-21

Features	4PP151.0571-21
Ground Resistance	0 Ohm
Power Consumption	Approx. 13 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2 kg
Outer Dimensions in mm (WxHxD)	212 x 245 x 55.5
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	 0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	 5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 25: Technical data 4PP151.0571-21 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
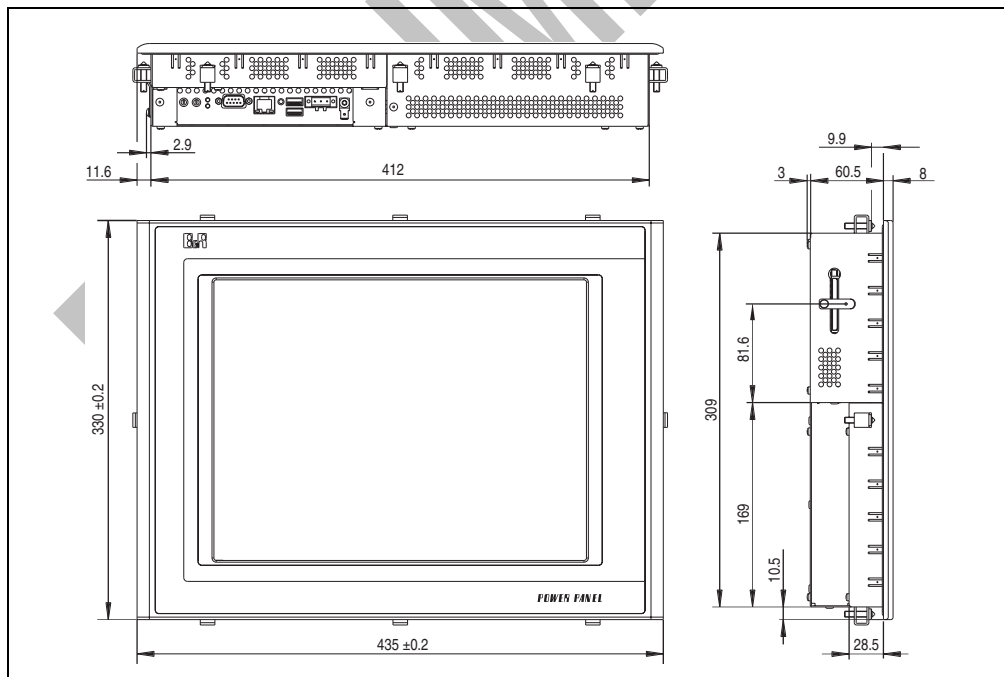
2.8.2 Dimensions

Figure 35: Dimensions 4PP151.0571-21

2.8.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 35 "Dimensions 4PP151.0571-21" on Page 62) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
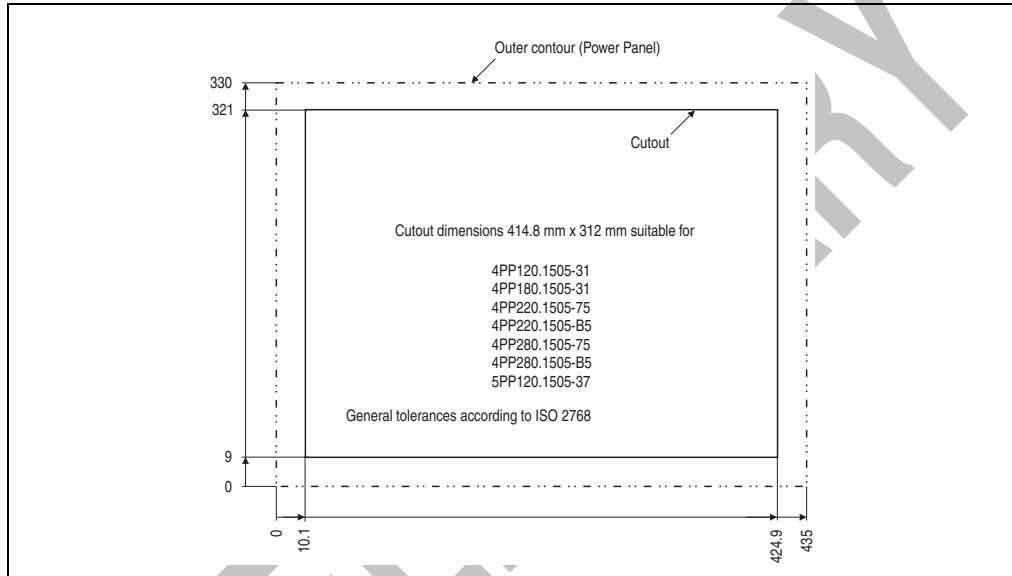

Figure 36: Cutout dimensions

2.8.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD C QVGA 5.7" T MH
6	Retaining clips included
4	Legend strips (inserted in the front)

Table 26: Delivery 4PP151.0571-21

Features	4PP151.1505-31
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
  Type
  Diagonal
  Color
  Resolution
  Background Lighting
    Brightness
    Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
  Technology
  Controller
	-

Front
  Frame
  Mylar
  Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
  Function Keys
  Function Keys with LEDs
  Softkeys
  Softkeys with LEDs
  System Keys
  System Keys with LEDs
	
	-
	20
	-
	12
	92
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 30 Watt[1]

Table 27: Technical data 4PP151.1505-31

Features	4PP151.1505-31
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 7.6 kg
Outer Dimensions in mm (WxHxD)	435 x 430 x 71.5
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 40° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 27: Technical data 4PP151.1505-31 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
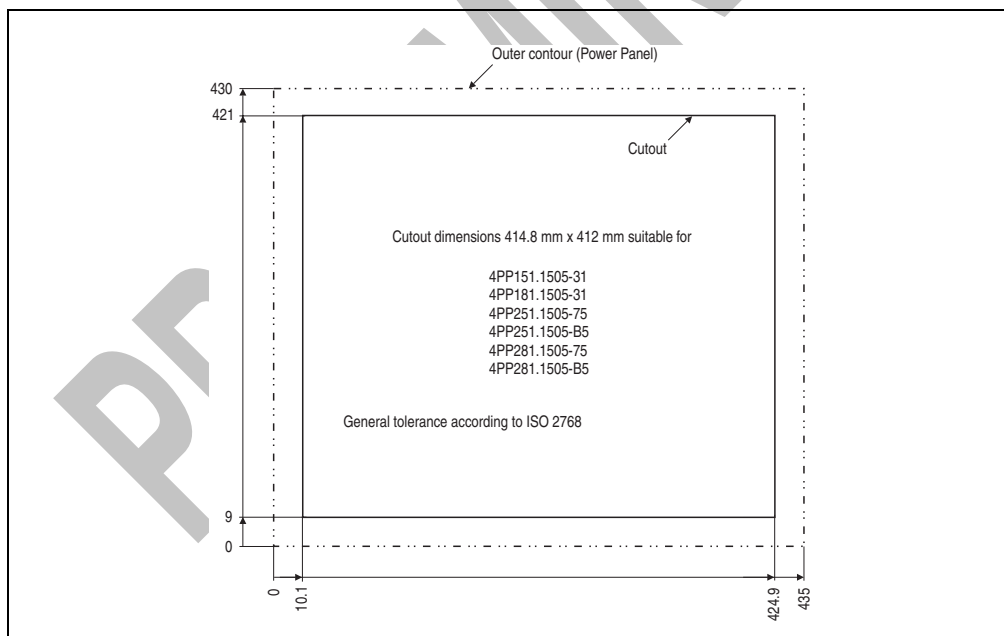
Figure 37: Cutout dimensions

Chapter 2
Technical Data

2.9 Device 4PP152.0571-01

Figure 38: Front view 4PP152.0571-01
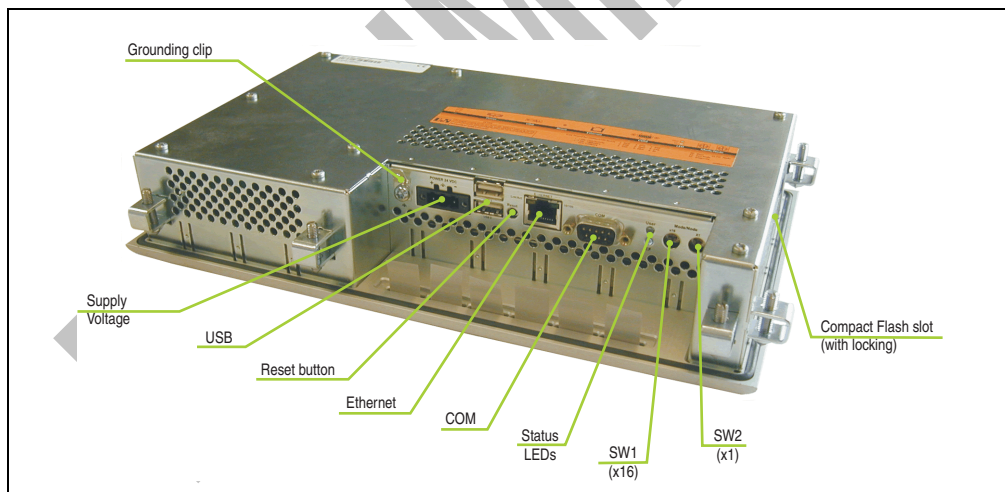
Figure 39: Rear view 4PP152.0571-01

2.9.1 Technical Data

Features	4PP152.0571-01
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	20
	-
	-
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 28: Technical data 4PP152.0571-01

Features	4PP152.0571-01
Ground Resistance	0 Ohm
Power Consumption	Approx. 13 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.2 kg
Outer Dimensions in mm (WxHxD)	302 x 187 x 55.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 28: Technical data 4PP152.0571-01 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
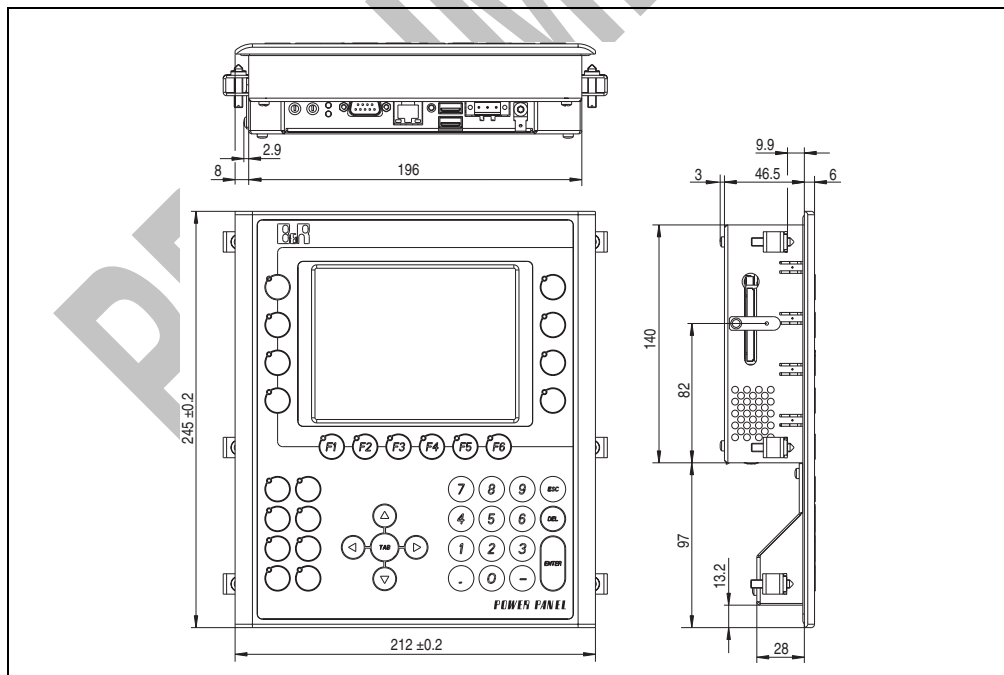
2.9.2 Dimensions
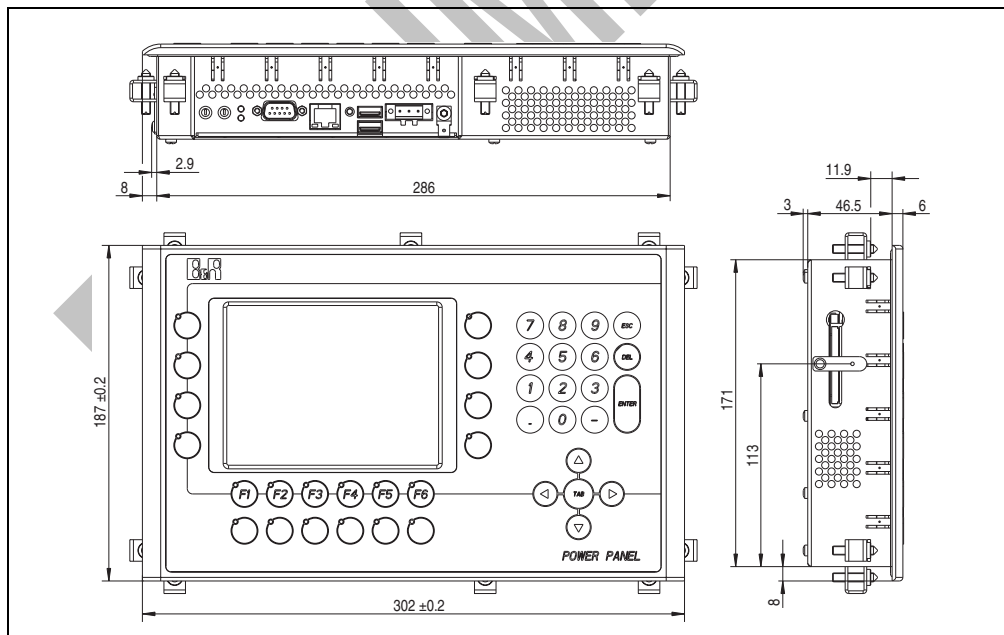
Figure 40: Dimensions 4PP152.0571-01

2.9.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 40 "Dimensions 4PP152.0571-01" on Page 68) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
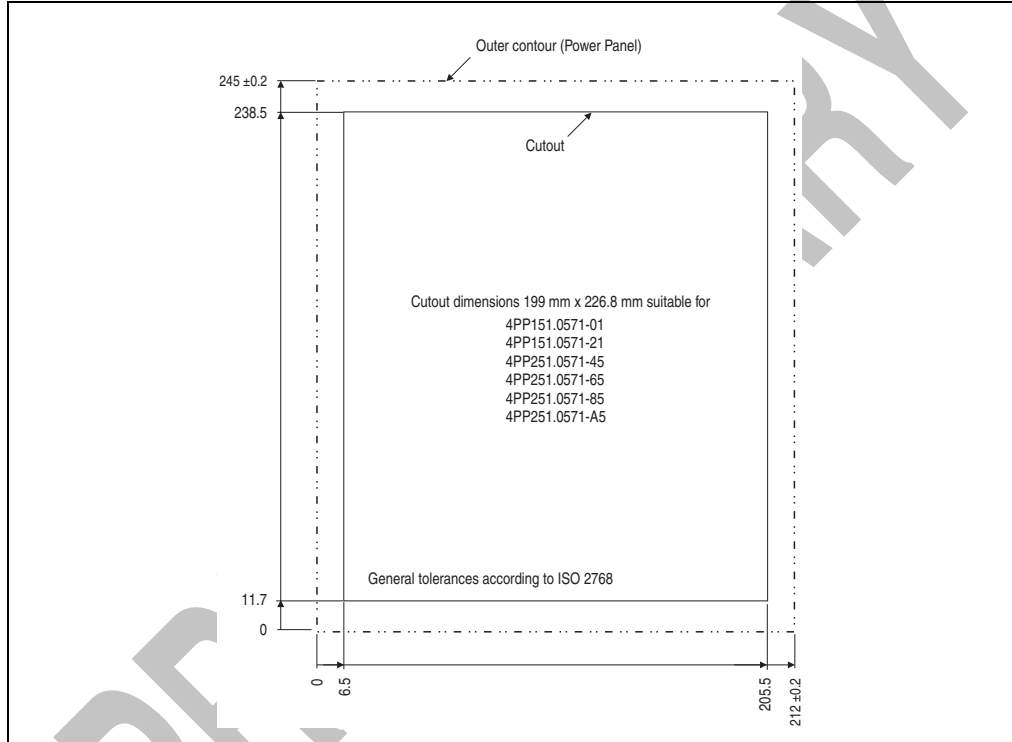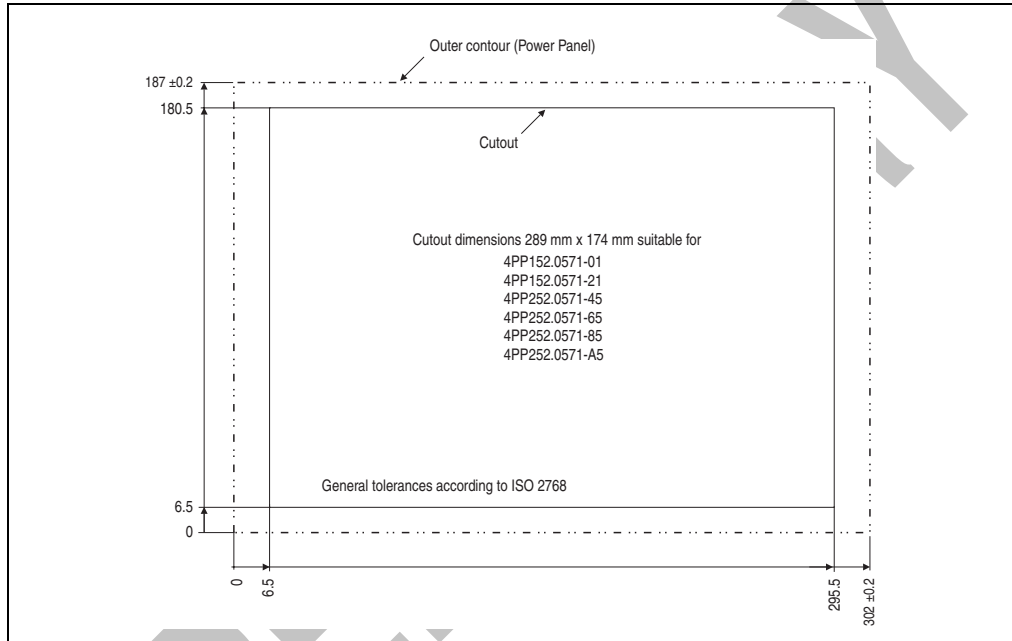

Figure 41: Cutout dimensions

2.9.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 152 LCD B/W QVGA 5.7" F MH
10	Retaining clips included
8	Legend strips (inserted in the front)

Table 29: Delivery 4PP152.0571-01

2.10 Device 4PP152.0571-21
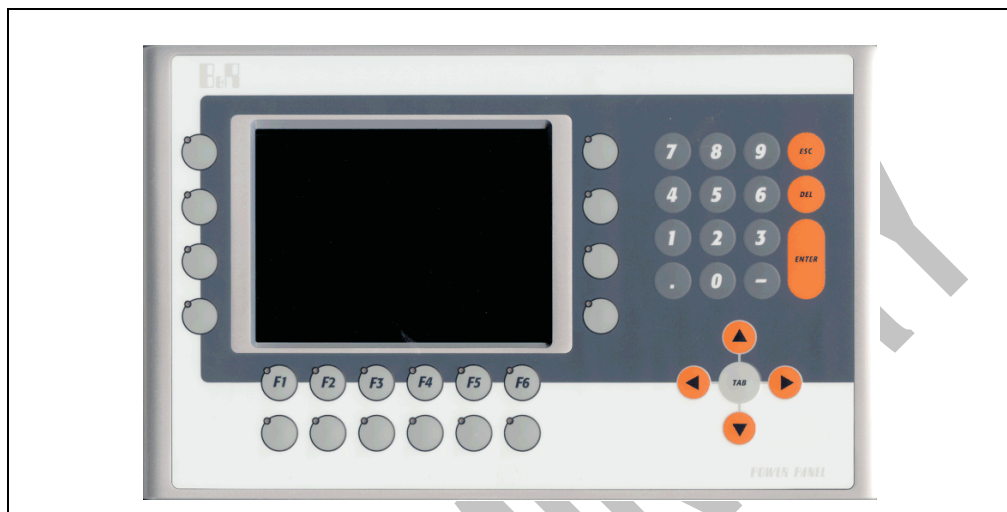
Figure 42: Front view 4PP152.0571-21
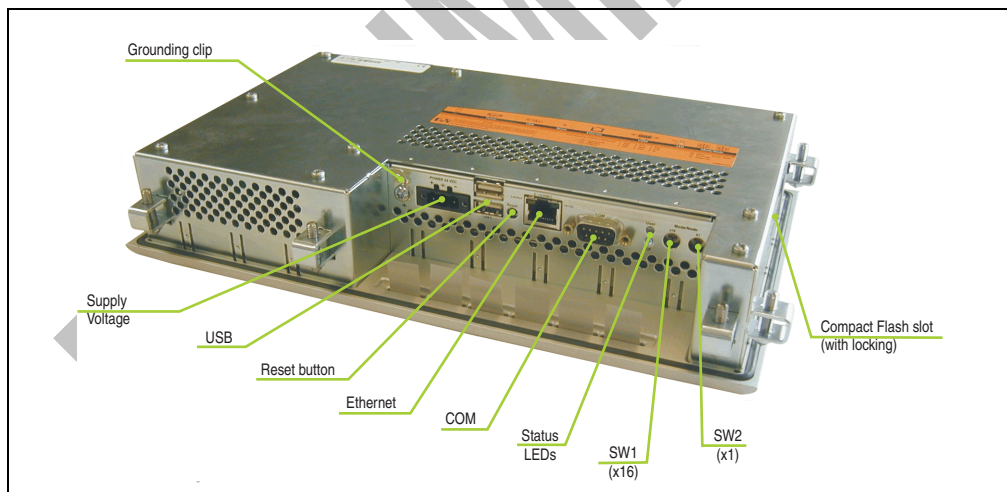
Figure 43: Rear view 4PP152.0571-21

2.10.1 Technical Data

Features	4PP152.0571-21
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
   Controller
   Connection
   Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
   Technology
   Controller
	-

Front
   Frame
   Mylar
   Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	
	-
	20
	-
	-
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 30: Technical data 4PP152.0571-21

Chapter 2
Technical Data

Features	4PP152.0571-21
Ground Resistance	0 Ohm
Power Consumption	Approx. 13 Watt[1]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.2 kg
Outer dimensions in mm (WxHxD)	302 x 187 x 55.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 30: Technical data 4PP152.0571-21 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

2.10.2 Dimensions
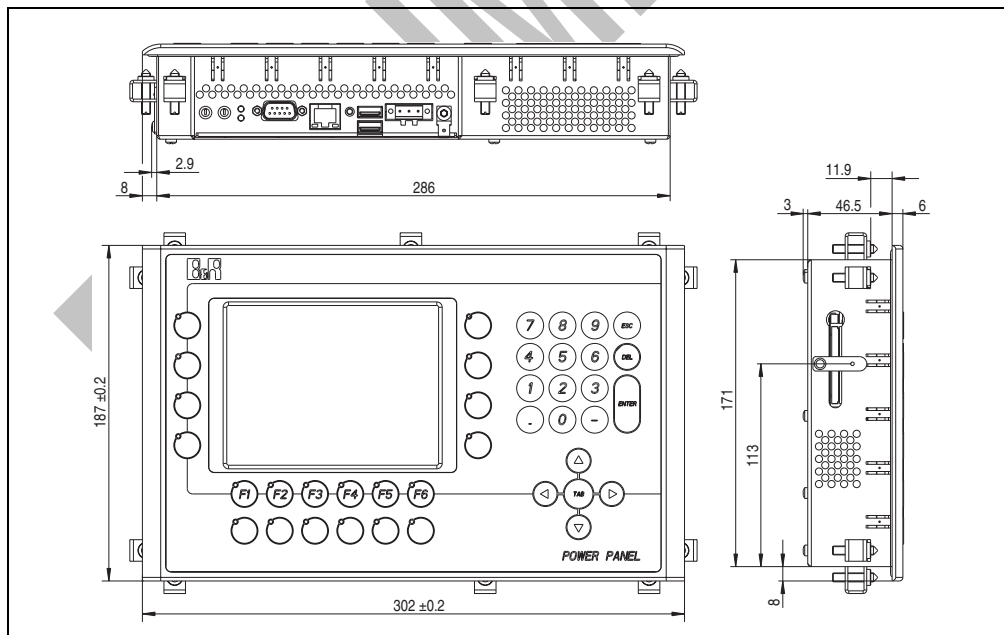
Figure 44: Dimensions 4PP152.0571-21

2.10.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 44 "Dimensions 4PP152.0571-21" on Page 72) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
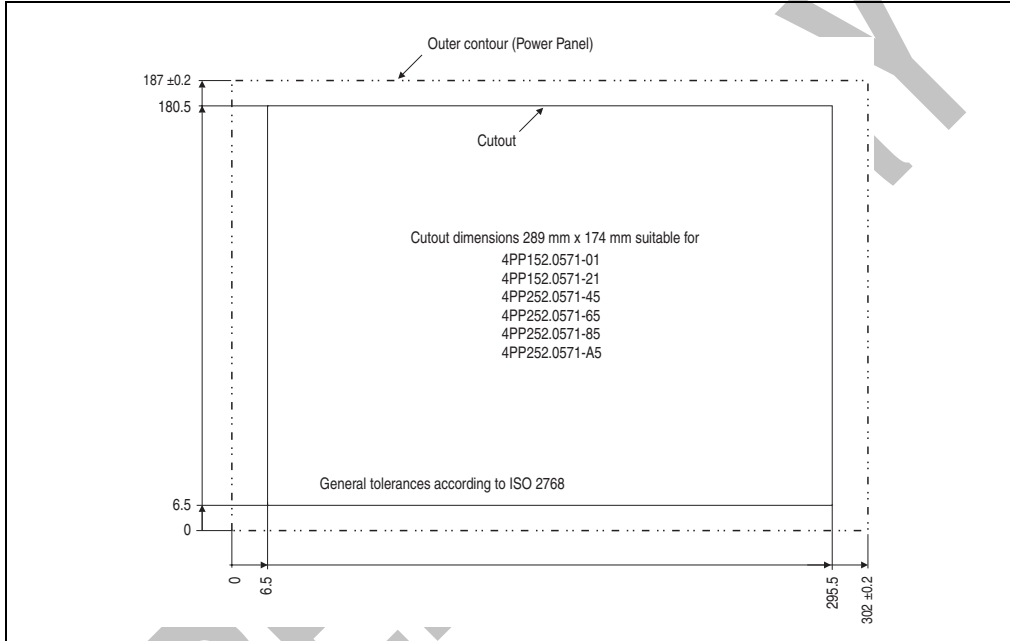
Figure 45: Cutout dimensions

2.10.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 152 LCD C QVGA 5.7" F MH
10	Retaining clips included
8	Legend strips (inserted in the front)

Table 31: Delivery 4PP152.0571-21

Features	4PP181.1505-31
Boot Loader / Operating System	Automation Runtime

Table 32: Technical data 4PP181.1505-31

Features	4PP181.1505-31
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, not battery backed
Battery	-

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	20
	-
	12
	92
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 30 Watt[1]

Table 32: Technical data 4PP181.1505-31 (Forts.)

Features	4PP181.1505-31
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 7.6 kg
Outer Dimensions in mm (WxHxD)	435 x 430 x 71.5
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 40° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 32: Technical data 4PP181.1505-31 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
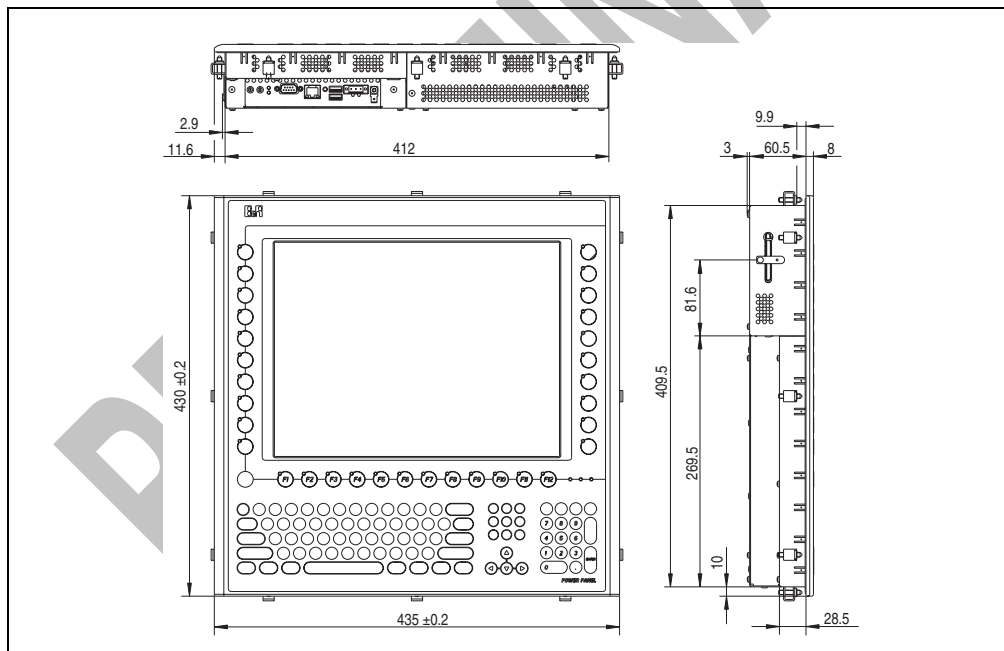
Figure 46: Dimensions 4PP181.1505-31

Chapter 2
Technical Data
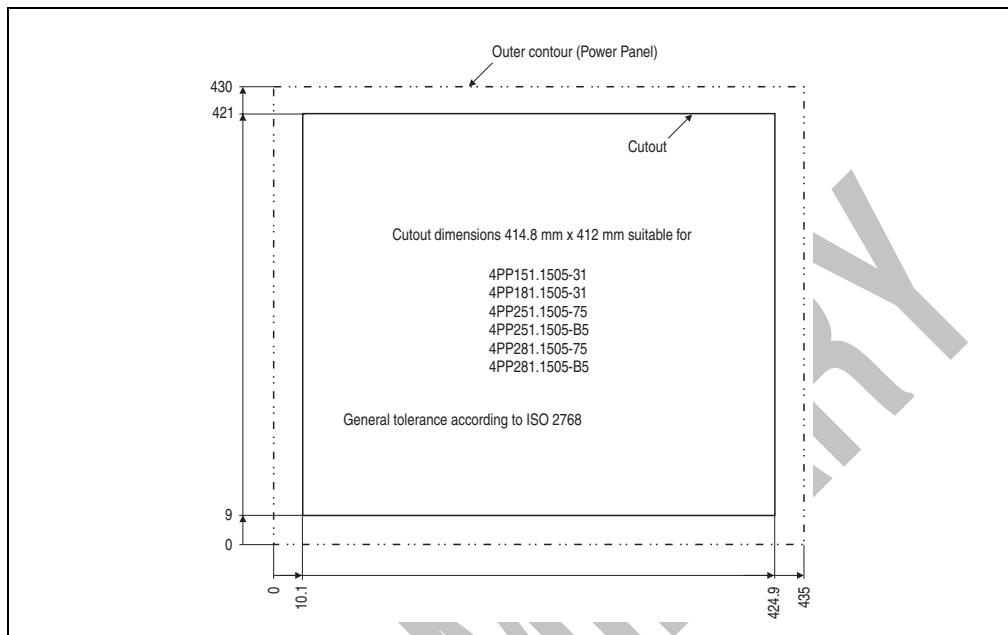
Figure 47: Cutout dimensions

3. Power Panel 200 with Automation Runtime

3.1 Interface Descriptions

In the following section, a description is given for all interfaces and plugs which a Power Panel 200 device with Automation Runtime can have.

3.1.1 Supply Voltage

Input Voltage: 24 VDC ± 25%; electrically isolated

The 3-pin socket required for the supply voltage connection is not contained in the delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The cable required for the connection must be supplied by the customer (see also section "TB103 3-pin Supply Voltage Connector", on page 324).

The supply voltage is internally protected, so that the device cannot be damaged if there is an overload or if the voltage supply is connected incorrectly.

The pin assignments can be found either in the following table or printed onto the Power Panel plate or device label (see section 3.2.2 "Device Label" on Page 83).

Supply Voltage		
Pin	**Description**	
1	+	
2	Ground	
3	-	
Accessories		
0TB103.9	Plug 24 V 5.08 3p screw clamps	
0TB103.91	Plug 24 V 5.08 3p cage clamps	
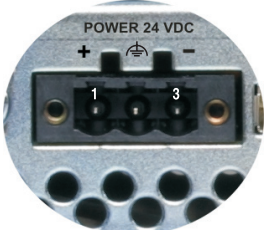
Figure 48: Supply voltage connection

Warning!

The pin's connection to the ground (functional ground) should be as short as possible. If the Power Panel is installed in a switching cabinet, the connection cable should not be longer than 15 cm.

3.1.2 Grounding Clip

Should be connected with ground using the shortest route possible.
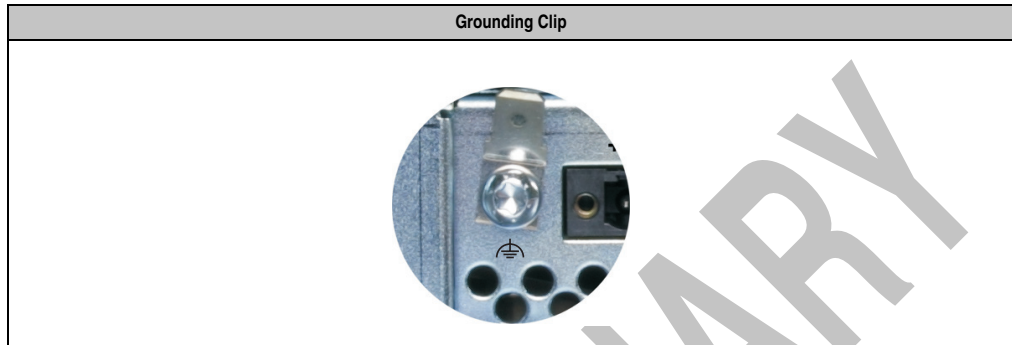
Grounding Clip

Figure 49: Grounding clip

3.1.3 COM Interface

The Power Panel is equipped with a PC compatible serial interface with 16 bytes FIFO. This non-electrically isolated interface is primarily intended for programming the Power Panel devices using Automation Studio.

The RS232 can also be used as a general interface (e.g. third-party connection, bar code reader, etc.).

Serial Interface		
RS232 Interface modem capable, not electrically isolated Up to 115 kBaud		9-pin DSUB connector
Pin	**RS232**	
1	DCD	
2	RXD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 33: COM pin assignment

3.1.4 USB port

The Power Panel is equipped with a USB (Universal Serial Bus) Host controller with two USB ports.

Universal Serial Bus
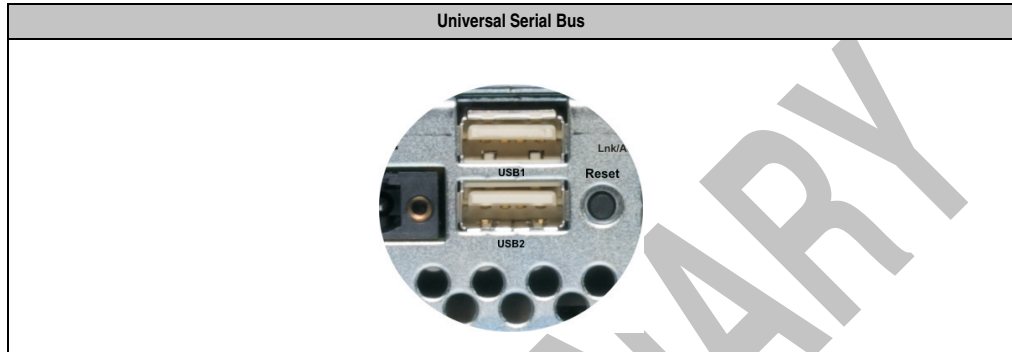
Figure 50: USB port

Technical Data for USB Port	
Transfer Rate	1.5 MBit/s to 12 MBit/s
Power Supplies	500 mA for each port
Maximum Cable Length	5 m (can be extended using a USB hub)

Table 34: Technical data for USB connection

Warning!

Only USB devices tested and verified by B&R, which can be found in chapter "Accessories", on page 321, are allowed to be connected to the USB interface.

Warning!

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

3.1.5 Mode / Node Switch

The Power Panel devices are equipped with 2 hex switches, which are used as an operating mode switch. Switch positions 01 up to FD are available for any purpose in an application. The switch position can be evaluated by an application program.
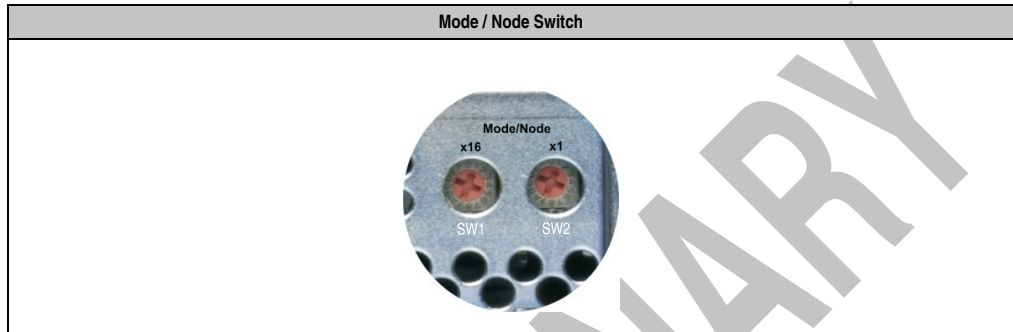
Mode / Node Switch

Figure 51: Mode / node switch

Switch Position		Function	Description
SW1 (x16)	SW2 (x1)	Operating Mode Switch	
0	0	Boot	Automation Runtime boot mode for operating system (firmware) upgrade (default Automation Runtime). With this mode, a new or missing operating system can be downloaded.
0 to F	0 to F	Node	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation) Freely available for use in an application e.g. setting the INA2000 node number for the Ethernet interface.
F	E	Dyn. Mode	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation). Device addresses can be defined by the software.
F	F	Diagnosis	Automation Runtime Diagnose Mode (Compact Flash Automation Runtime or Terminal Operation).

Table 35: Switch settings for the Mode / Node switch

3.1.6 Status LEDs

Power Panels are equipped with two status LEDs, which are visible on the outside.
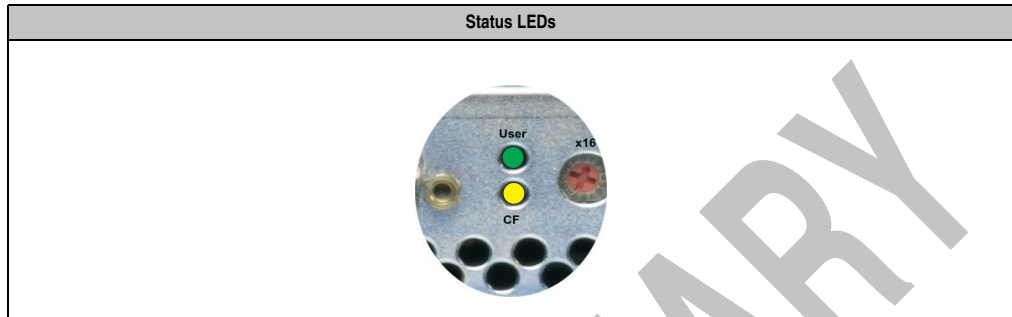
Status LEDs

LED	Color	Function
User	Green	Freely available for use in an application (corresponding libraries for Automation Studio in preparation)
CF	Yellow	Indicates that the Compact Flash card is being accessedt

Figure 52: Status LEDs

3.1.7 Ethernet Connection

Ethernet Connection
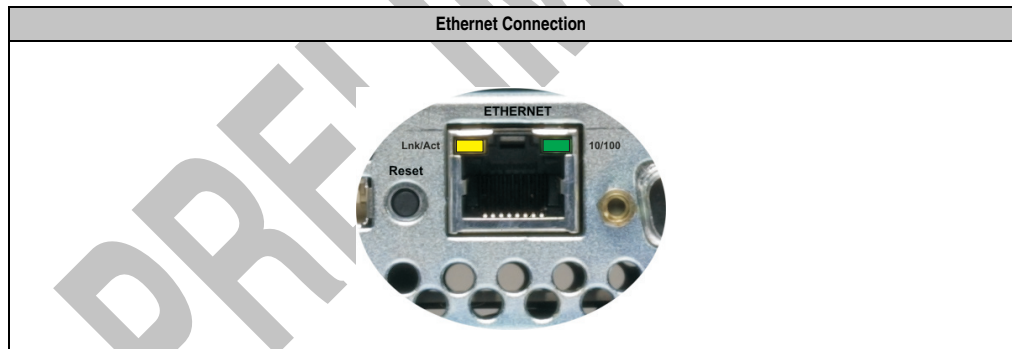
Figure 53: Ethernet connection

Ethernet	10/100 MBit/s [1]
Connection	RJ45 Twisted Pair (10BaseT/100BaseT)
Controller	MacPhyter DP83815 or DP83816 - depends on the revision
Cabling	S/STP (category 5)

Table 36: Ethernet controller

1) Both operating modes are possible. Switching takes place automatically

Chapter 2
Technical Data

The onboard Ethernet controller for Power Panel devices provides an RJ45 Twisted Pair connection, to which 2 LEDs are attached for status control:

LED	On	Done
Green	100 MBit/s	10 MBit/s
Yellow	Link	Activity (blinking)

Table 37: Status LEDs Ethernet controller

3.1.8 Reset Button

The reset button can be accessed through a small hole between the USB and the Ethernet connection. In order to avoid accidental activation, a reset can only be triggered with a pointed object.

Reset Button

Figure 54: Reset button

3.1.9 Compact Flash Slot

Power Panel devices are equipped with a Compact Flash slot which is accessible from the side. Compact Flash cards of type I are supported.

Figure 55: Compact Flash slot

It is possible to protect the Compact Flash slot using a safety clip. By pressing the ejector (using a pointed object is the best way to do this) the Compact Flash card can be changed quickly and safely.

Caution!

Changing the Compact Flash card can only take place without power applied! As a safety measure, a sticker will also be attached to Power Panel devices.

3.2 Label

3.2.1 Safety Sticker

A safety sticker is attached over the Compact Flash slot, which advises that the power must be switched off for the Power Panel device (depending on the revision) when inserting or removing a Compact Flash card.

An ESD warning sticker is attached next to the battery compartment. This indicates the components at risk from electrostatic discharge inside the Power Panel device.

Figure 56: Safety sticker

3.2.2 Device Label

The following label attached in a suitable location on the Power Panel, displays short definitions for all of the interfaces:
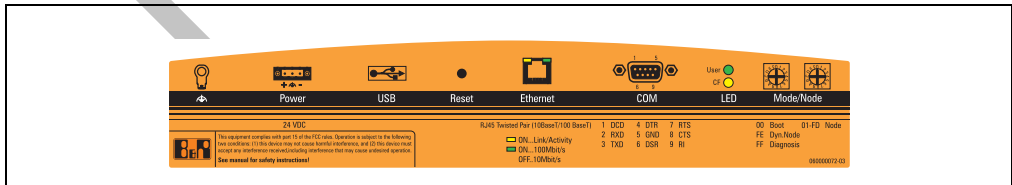
Figure 57: Device label

Chapter 2
Technical Data

3.2.3 Serial Number Label

General Information

Each B&R device is assigned a unique serial number label with bar code, which allows the device to be clearly identified.
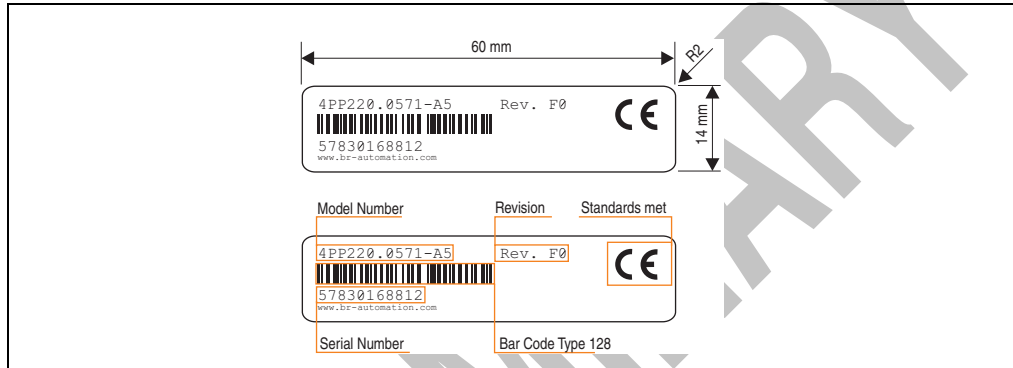
Design / Dimensions

Figure 58: Design / Dimensions serial number label

This page is only used as a place holder.

Chapter 2
Technical Data

3.3 Device 4PP210.0000-95
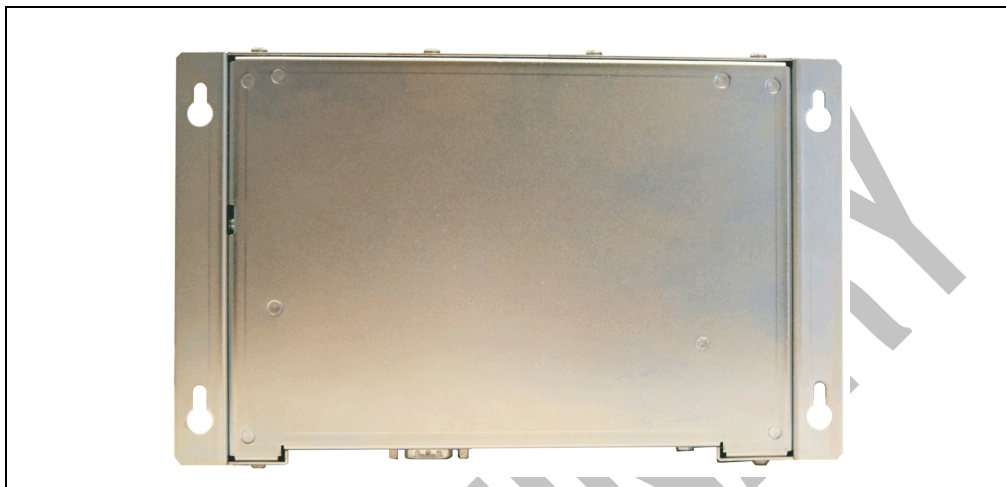
Figure 59: Front view 4PP210.0000-95

aPCI slot 2

aPCI slot 1

Battery compartment

Compact Flash slot
(with locking)

Grounding clip

Voltage
Supply

USB

Reset button

Ethernet

COM

Status
LEDs

SW1
(x16)

SW2
(x1)

Holding clip
for mounting
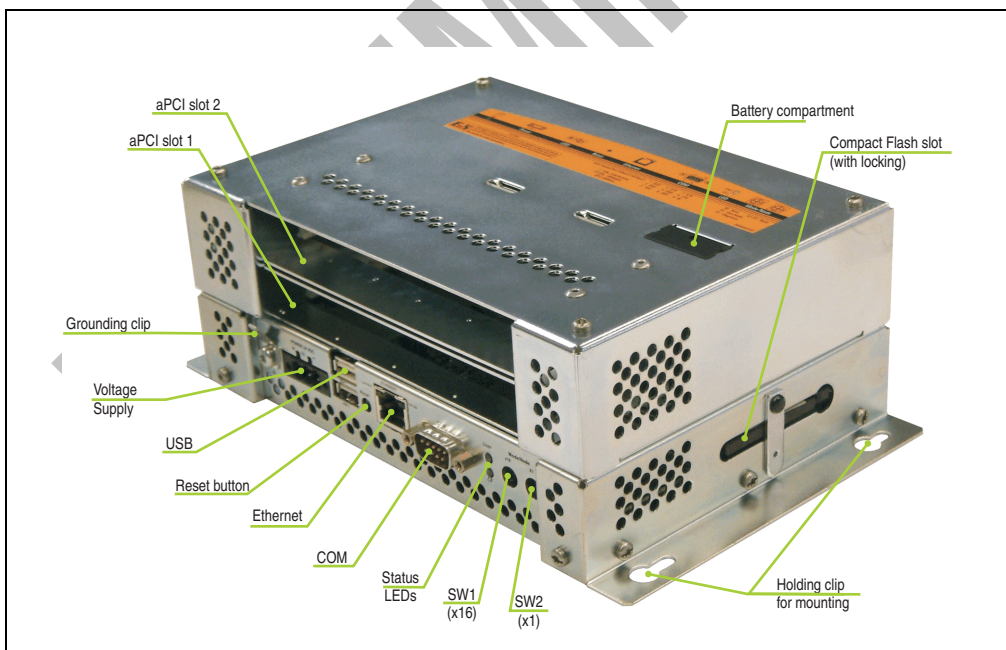
Figure 60: Rear view 4PP210.0000-95

3.3.1 Technical Data

Features	4PP210.0000-95
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	4 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	-
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. E0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	-
	-
	-
	-
	
	-
	-

Touch Screen
    Technology
    Controller
	-
	-

Front
    Frame
    Mylar
    Gasket
	-
	-
	-
	-

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 38: Technical data 4PP210.0000-95

Features	4PP210.0000-95
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 20 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card)
Housing	Metal
Weight	Approx. 1.4 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	230 x 146 x 80.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +80° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 38: Technical data 4PP210.0000-95 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.3.2 Dimensions

Figure 61: Dimensions 4PP210.0000-95

3.3.3 Drilling Template

For mounting, the drillings must be made according to the following diagram. For further information regarding mounting, see chapter 3 "Installation" on Page 247.

Figure 62: Cutout dimensions

3.3.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 210 Controller MH 2aPCI
1	Lithium battery 3 V / 950 mAh included

Table 39: Delivery 4PP210.0000-95

3.4 Device 4PP220.0571-45

Figure 63: Front view 4PP220.0571-45
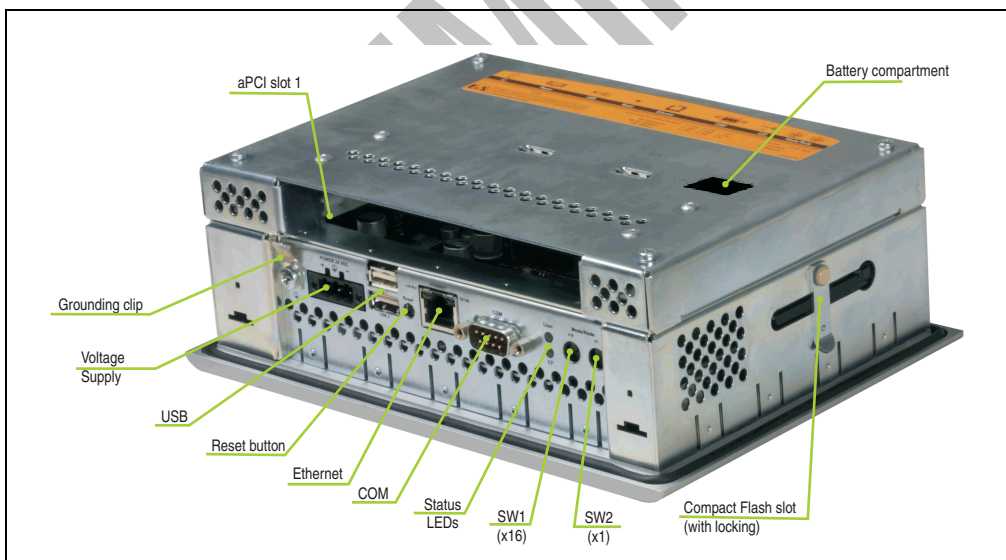
Figure 64: Rear view 4PP220.0571-45

3.4.1 Technical Data

Features	4PP220.0571-45
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	Analog, resistive (Gunze)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 40: Technical data 4PP220.0571-45

Features	4PP220.0571-45
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.7 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	212 x 156 x 76
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 40: Technical data 4PP220.0571-45 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.4.2 Dimensions

Figure 65: Dimensions 4PP220.0571-45

3.4.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 65 "Dimensions 4PP220.0571-45" on Page 92) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
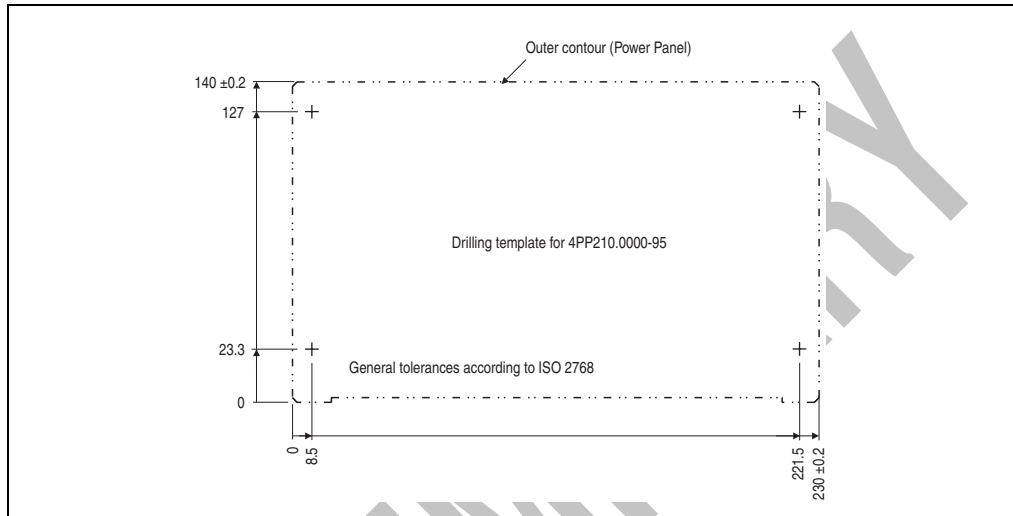

Figure 66: Cutout dimensions

3.4.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD B/W QVGA 5.7" T MH 1aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 41: Delivery 4PP220.0571-45

## 3.5 Device 4PP220.0571-65

Figure 67: Front view 4PP220.0571-65
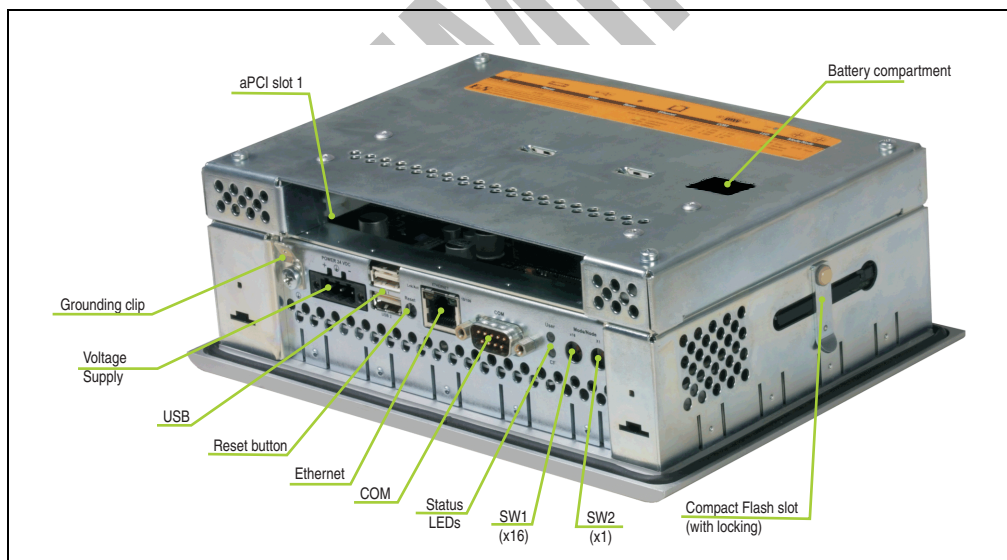
Figure 68: Rear view 4PP220.0571-65

3.5.1 Technical Data

Features	4PP220.0571-65
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	4 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	2 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)
Ethernet 　Controller 　Connection 　Cabling	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s RJ 45 Twisted Pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)
Display 　Type 　Diagonal 　Color 　Resolution 　Background Lighting 　　Brightness 　　Half Brightness Time	 LCD 5.7" 256 colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen 　Technology 　Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front 　Frame 　Mylar 　Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys 　Function Keys 　Function Keys with LEDs 　Softkeys 　Softkeys with LEDs 　System Keys 　System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 42: Technical data 4PP220.0571-65

Chapter 2
Technical Data

Features	4PP220.0571-65
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.7 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	212 x 156 x 76
Altitude	Max. 3,000 m

Environmental Temperature
  Operation
  Storage
	0 to 50° C
	-20° C to +60° C

Relative Humidity
  Operation
  Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 42: Technical data 4PP220.0571-65 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
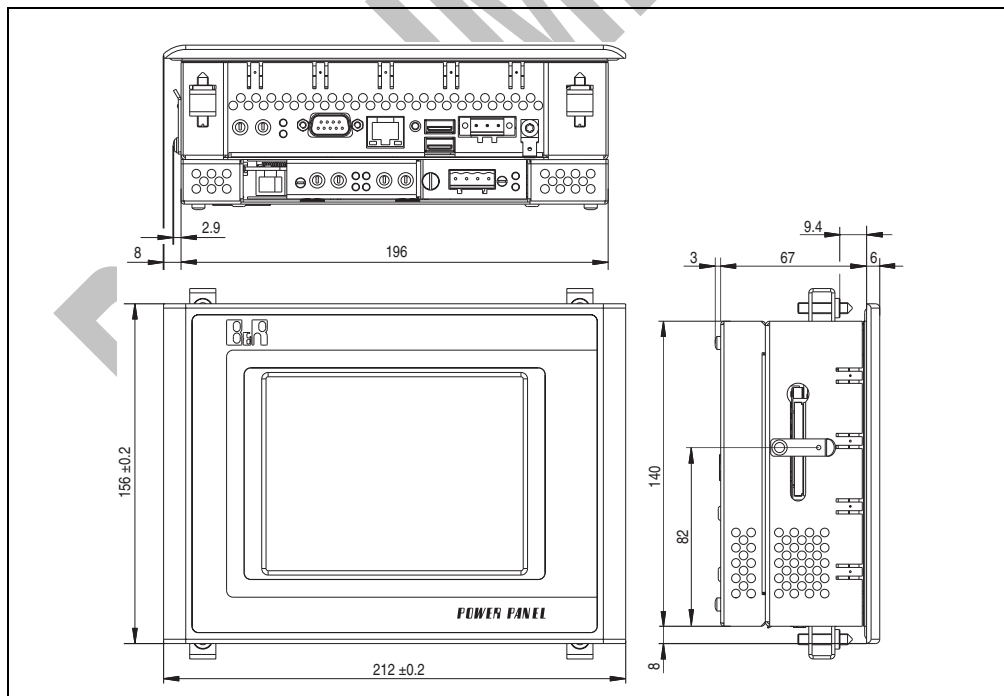
3.5.2 Dimensions
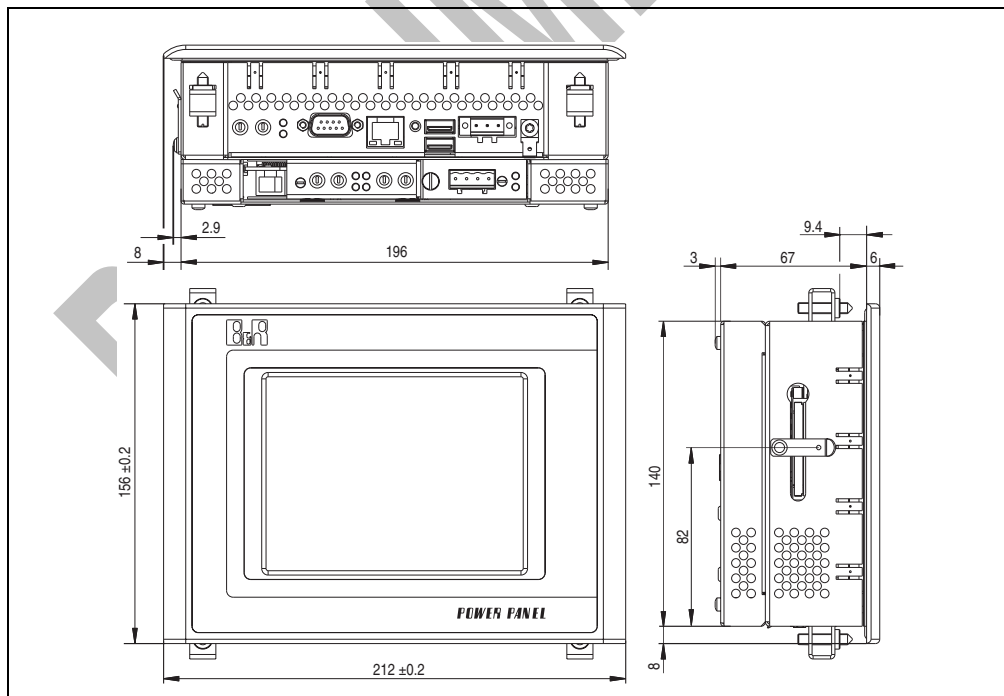
Figure 69: Dimensions 4PP220.0571-65

3.5.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 69 "Dimensions 4PP220.0571-65" on Page 96) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
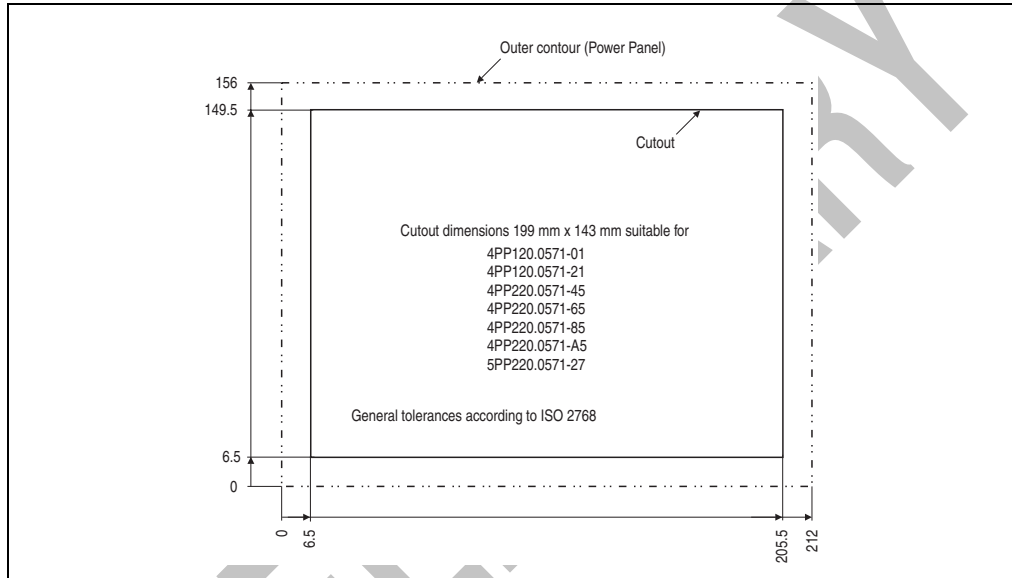

Figure 70: Cutout dimensions

3.5.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD C QVGA 5.7" T MH 1aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 43: Delivery 4PP220.0571-65

## 3.6 Device 4PP220.0571-85

Figure 71: Front view 4PP220.0571-85
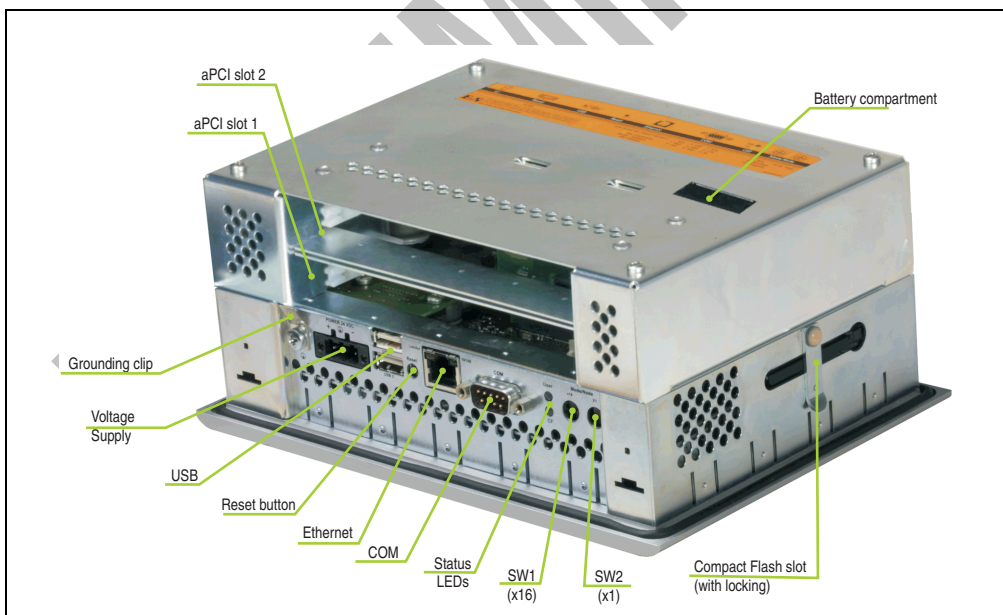
Figure 72: Rear view 4PP220.0571-85

3.6.1 Technical Data

Features	4PP220.0571-85
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (Gunze)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 44: Technical data 4PP220.0571-85

Features	4PP220.0571-85
Ground Resistance	$\geq$ 47 kOhm
Power Consumption	Approx. 20 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	212 x 156 x 98
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 44: Technical data 4PP220.0571-85 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.6.2 Dimensions
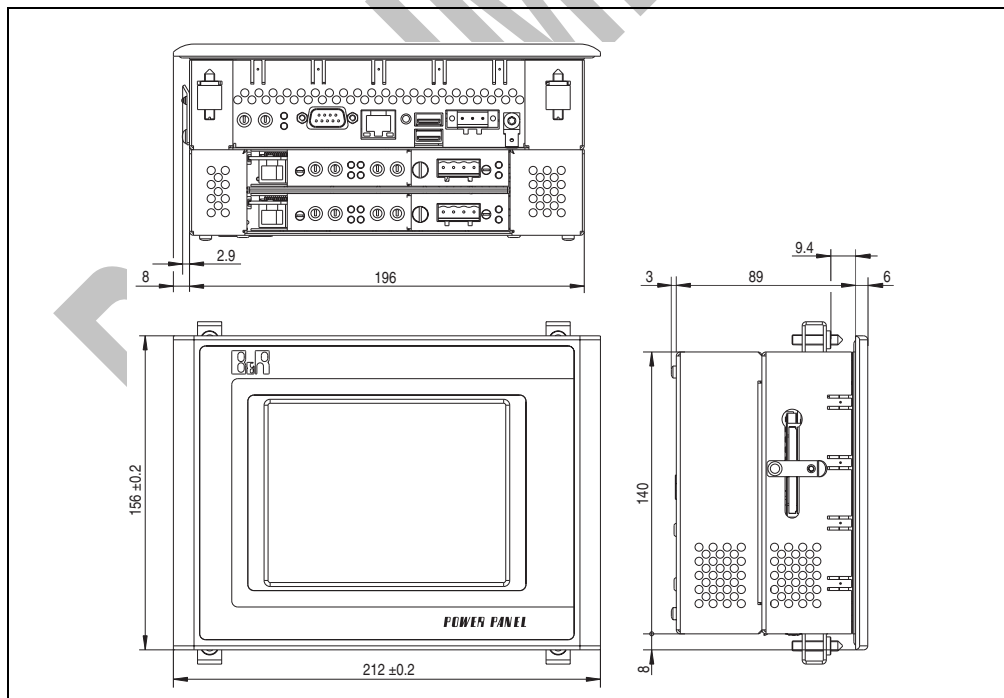
Figure 73: Dimensions 4PP220.0571-85

3.6.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 73 "Dimensions 4PP220.0571-85" on Page 100) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
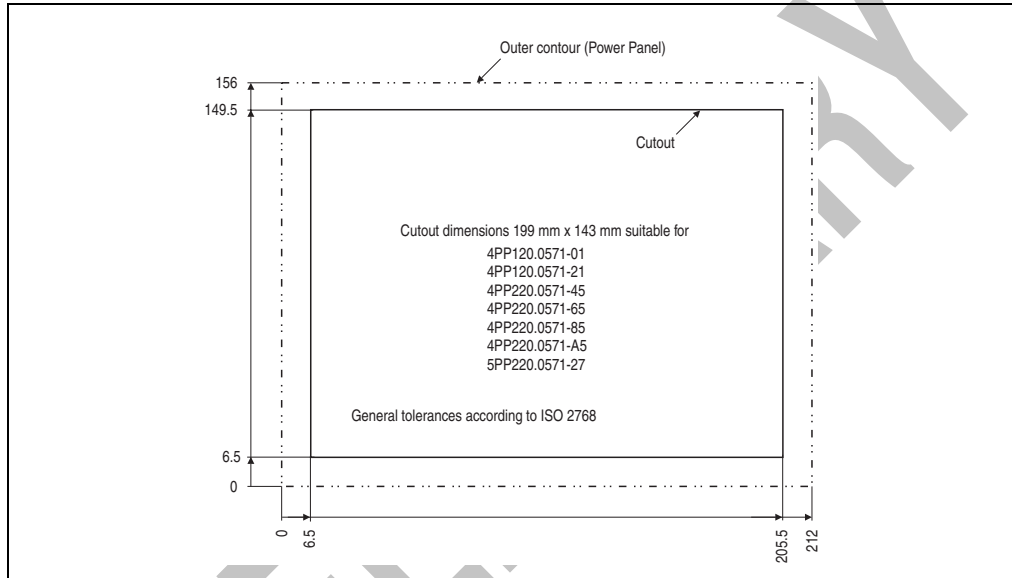
Figure 74: Cutout dimensions

3.6.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD B/W QVGA 5.7" T MH 2aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 45: Delivery 4PP220.0571-85

## 3.7 Device 4PP220.0571-A5

Figure 75: Front view 4PP220.0571-A5
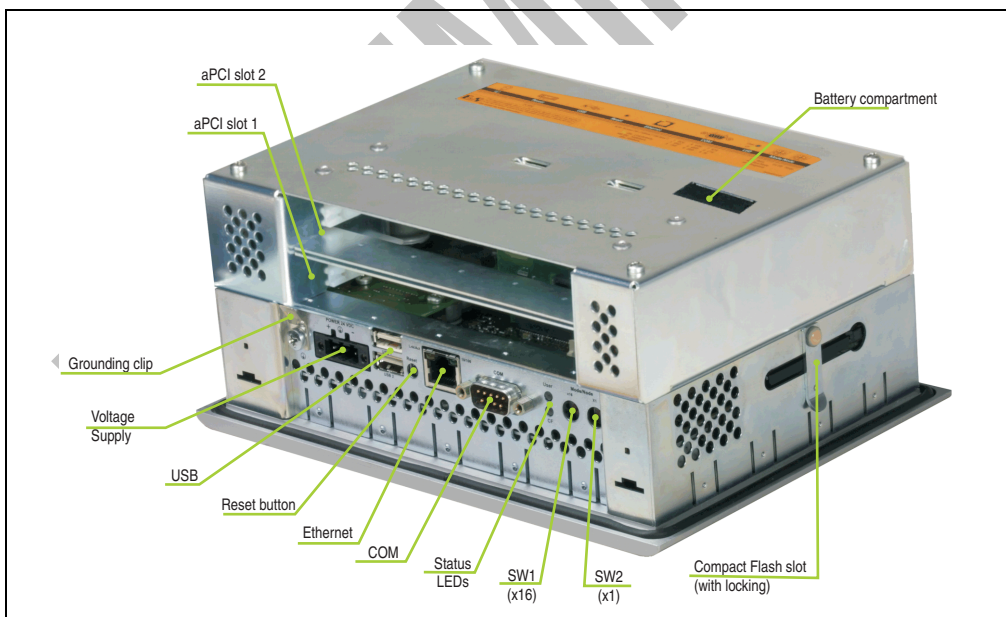
Figure 76: Rear view 4PP220.0571-A5

3.7.1 Technical Data

Features	4PP220.0571-A5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	Gunze analog, resistive
	Hampshire, serial

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 46: Technical data 4PP220.0571-A5

Features	4PP220.0571-A5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 20 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	212 x 156 x 98
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 46: Technical data 4PP220.0571-A5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.7.2 Dimensions
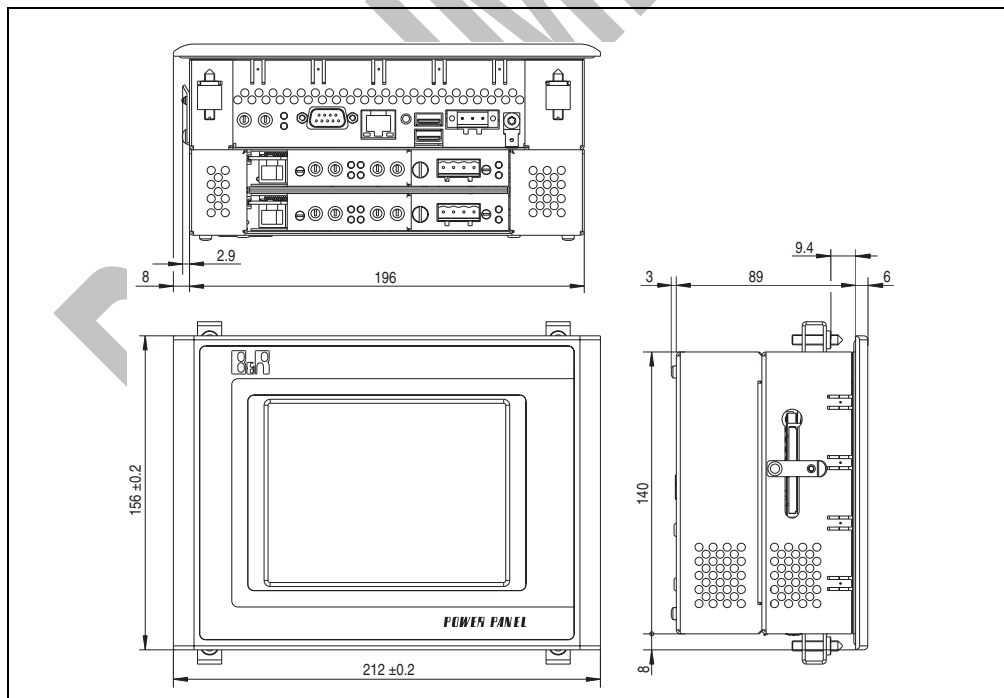
Figure 77: Dimensions 4PP220.0571-A5

3.7.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 77 "Dimensions 4PP220.0571-A5" on Page 104) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
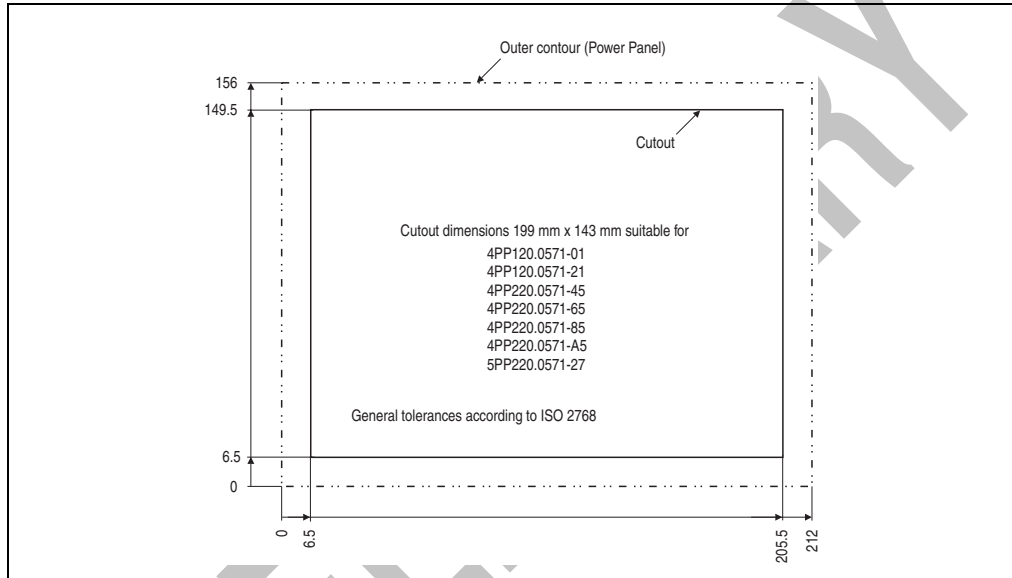

Figure 78: Cutout dimensions

3.7.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD C QVGA 5.7" T MH 2aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 47: Delivery 4PP220.0571-A5

3.8 Device 4PP220.1043-75

Figure 79: Front view 4PP220.1043-75
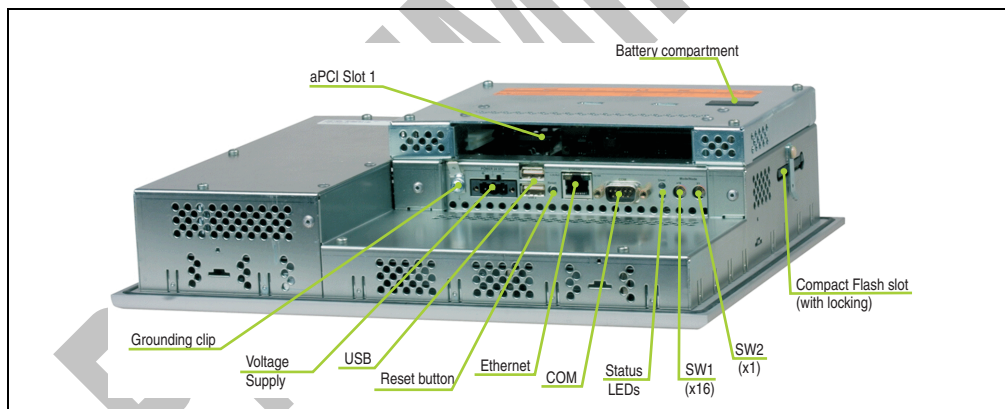
Figure 80: Rear view 4PP220.1043-75

3.8.1 Technical Data

Features	4PP220.1043-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. F0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 48: Technical data 4PP220.1043-75

Features	4PP220.1043-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 20 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 3.9 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 260 x 86
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 48: Technical data 4PP220.1043-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.8.2 Dimensions
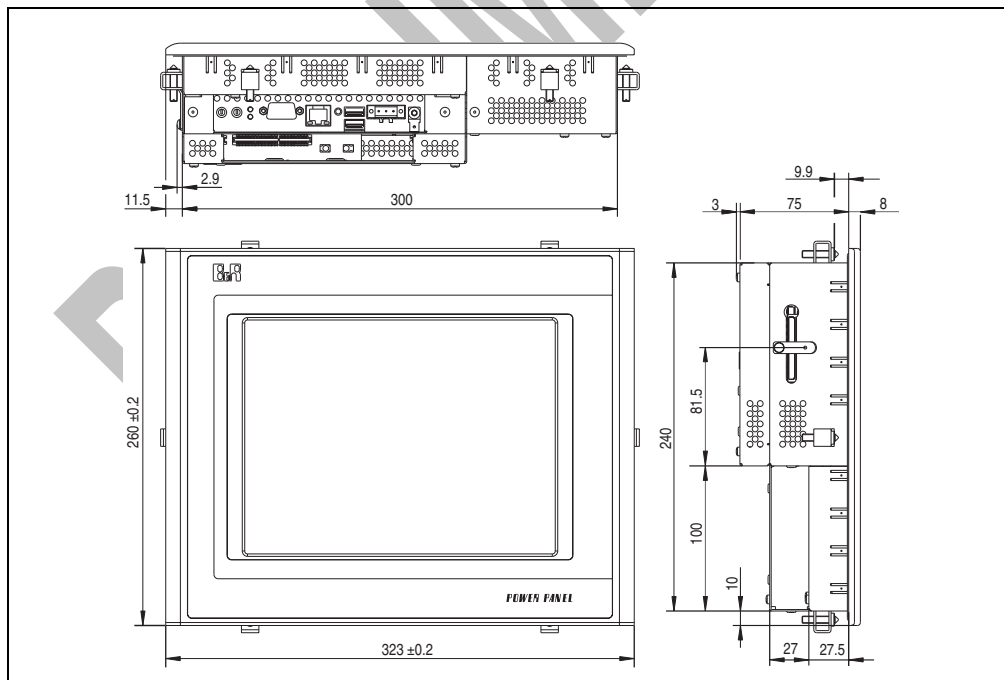
Figure 81: Dimensions 4PP220.1043-75

3.8.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 81 "Dimensions 4PP220.1043-75" on Page 108) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
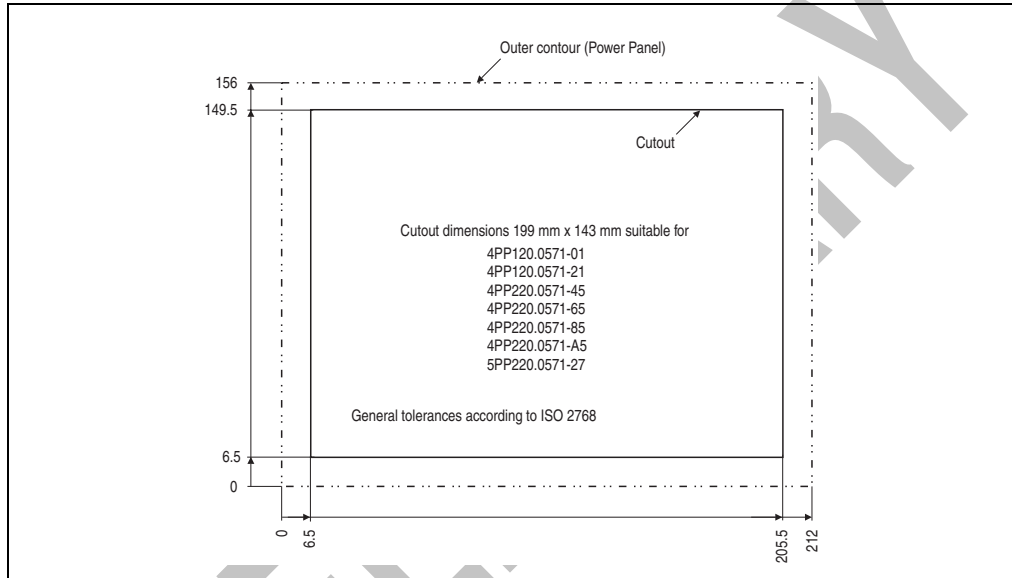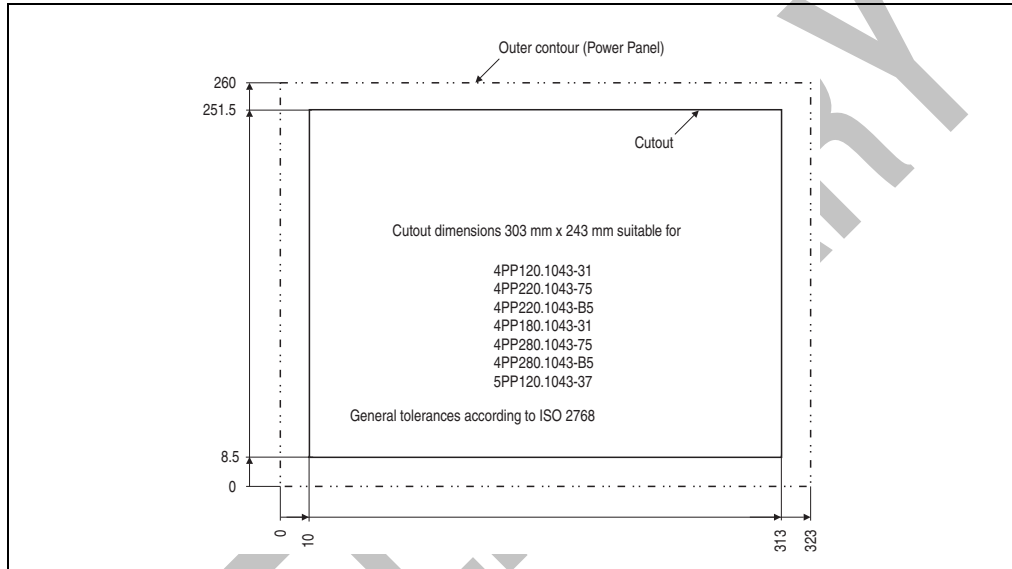

Figure 82: Cutout dimensions

3.8.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C VGA 10.4" T MH 1aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 49: Delivery 4PP220.1043-75

3.9 Device 4PP220.1043-B5

Figure 83: Front view 4PP220.1043-B5
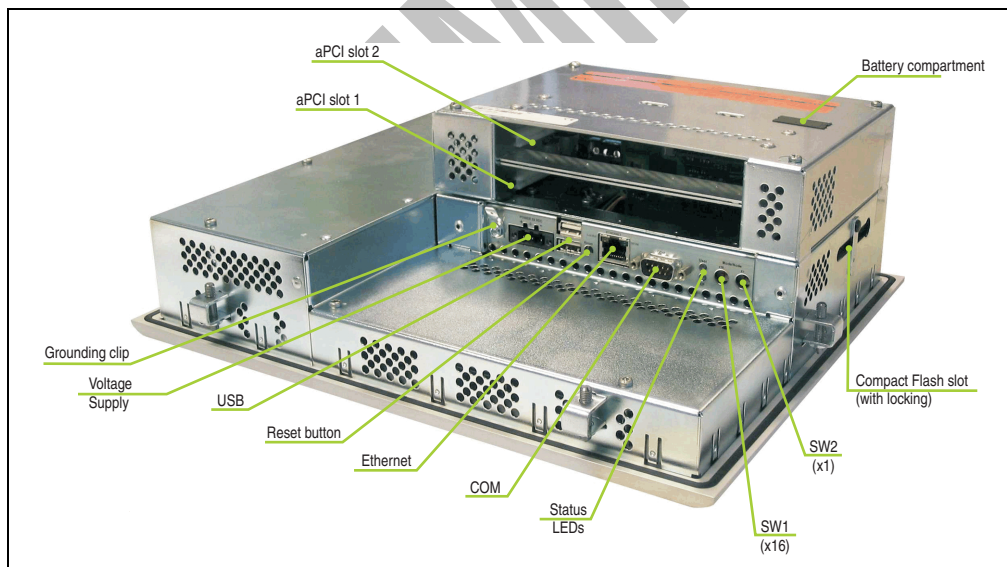
Figure 84: Rear view 4PP220.1043-B5

3.9.1 Technical Data

Features	4PP220.1043-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)
Ethernet Controller Connection Cabling	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s RJ 45 Twisted Pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
 Type
 Diagonal
 Color
 Resolution
 Background Lighting
  Brightness
  Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 50: Technical data 4PP220.1043-B5

Features	4PP220.1043-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 25 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 4.2 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 260 x 108
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 50: Technical data 4PP220.1043-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.9.2 Dimensions
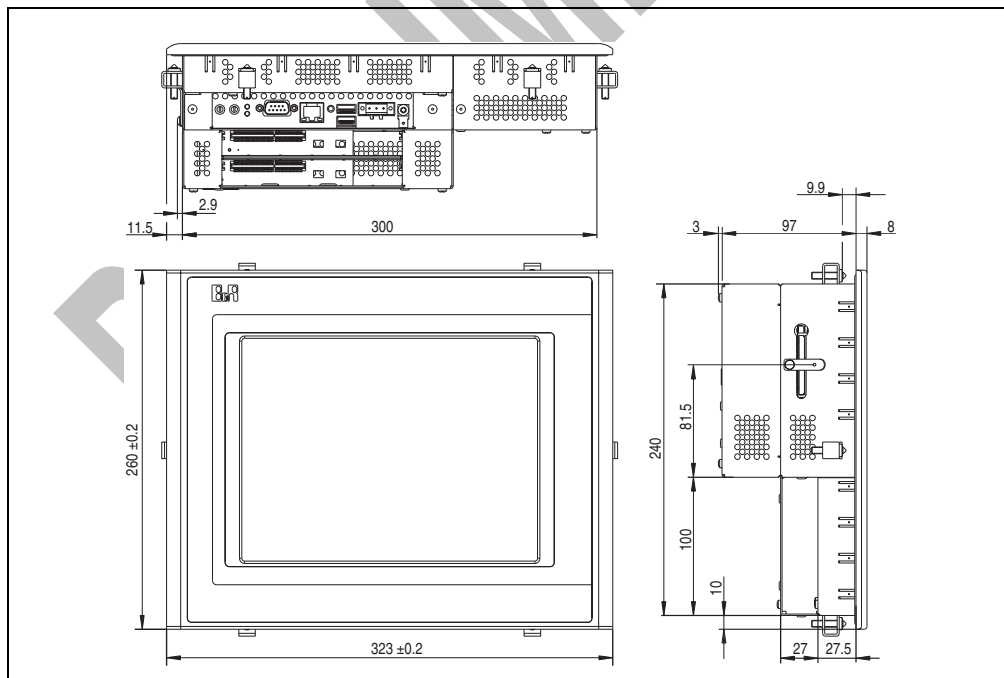
Figure 85: Dimensions 4PP220.1043-B5

3.9.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 85 "Dimensions 4PP220.1043-B5" on Page 112) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
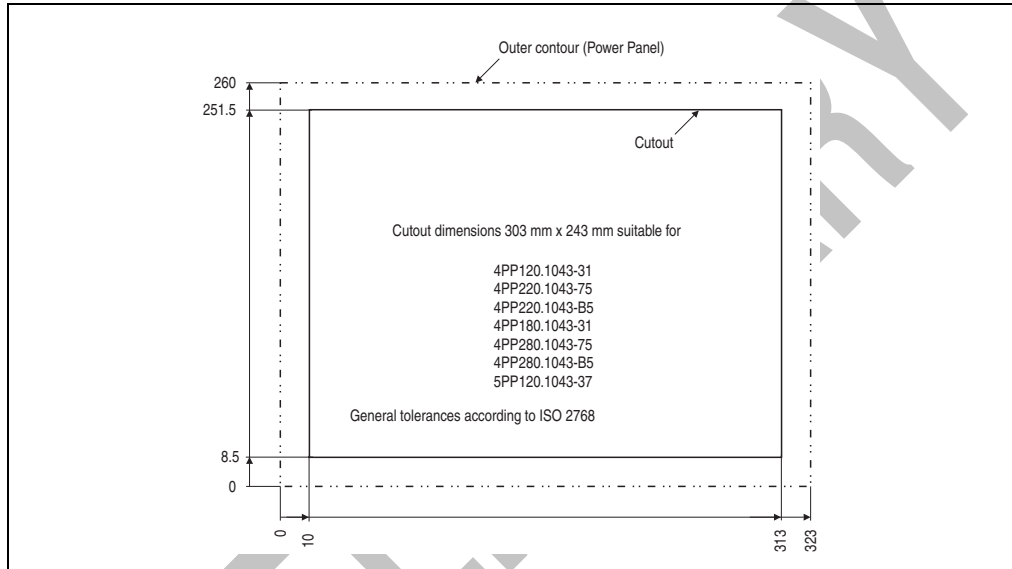
Figure 86: Cutout dimensions

3.9.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C VGA 10.4" T MH 2aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 51: Delivery 4PP220.1043-B5

3.10 Device 4PP220.1505-75

Figure 87: Front view 4PP220.1505-75
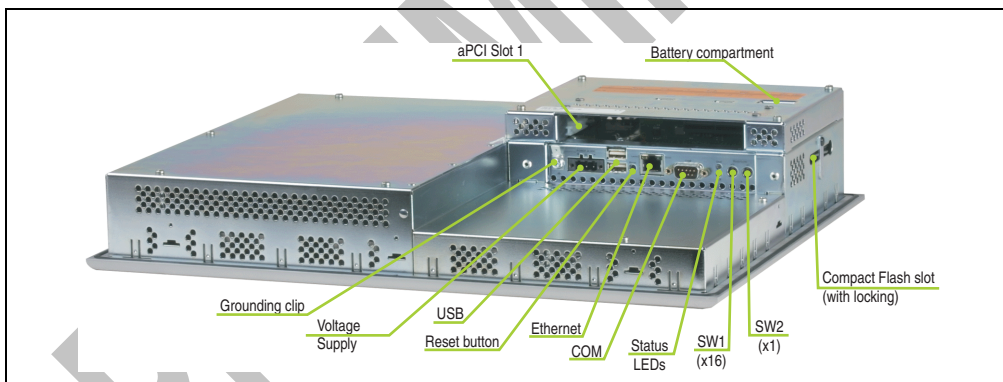
Figure 88: Rear view 4PP220.1505-75

3.10.1 Technical Data

Features	4PP220.1505-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 52: Technical data 4PP220.1505-75

Features	4PP220.1505-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 35 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 6.7 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	435 x 330 x 86
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 45° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 52: Technical data 4PP220.1505-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.10.2 Dimensions
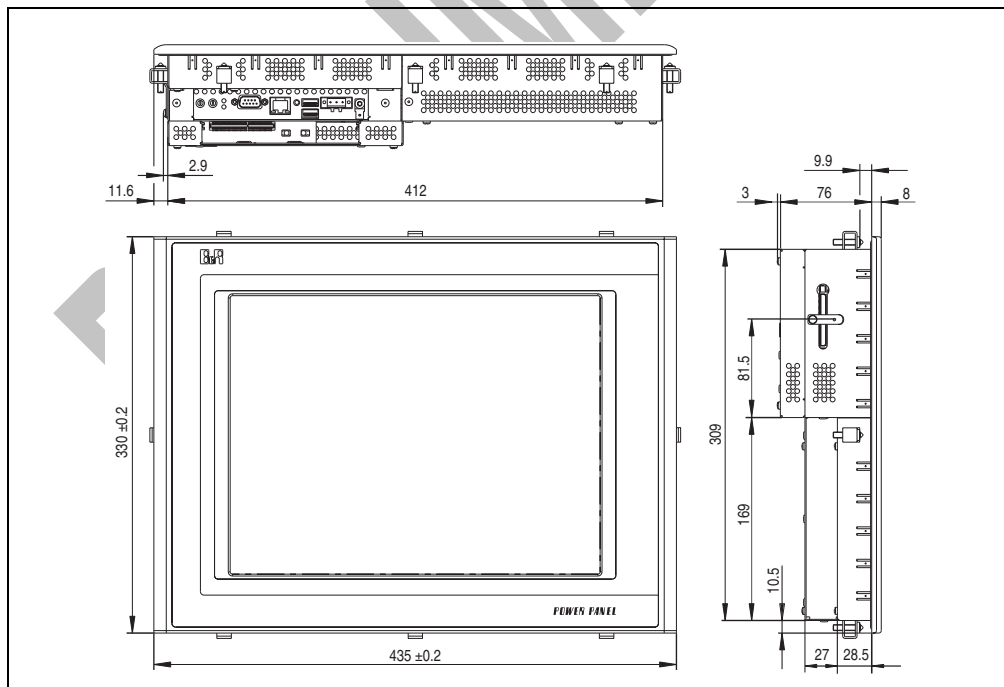
Figure 89: Dimensions 4PP220.1505-75

3.10.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 89 "Dimensions 4PP220.1505-75" on Page 116) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
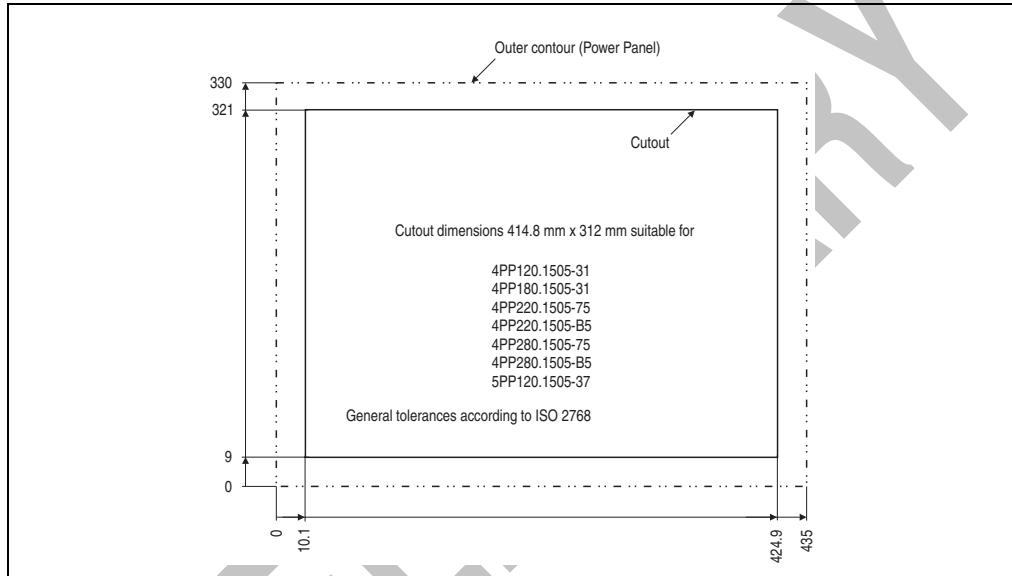
Figure 90: Cutout dimensions

3.10.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C XGA 15" T MH 1aPCI
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 53: Delivery 4PP220.1505-75

3.11 Device 4PP220.1505-B5

Figure 91: Front view 4PP220.1505-B5

Figure 92: Rear view 4PP220.1505-B5

3.11.1 Technical Data

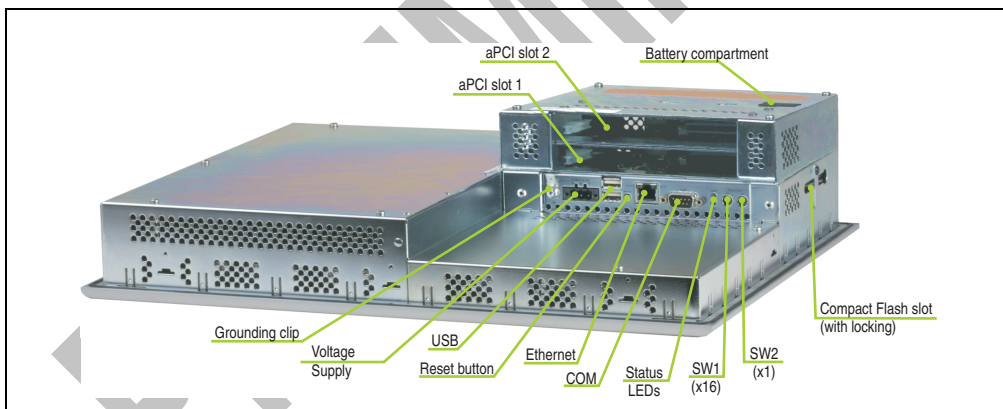| Features	4PP220.1505-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (Lithium, 950mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. G0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 54: Technical data 4PP220.1505-B5

Features	4PP220.1505-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 40 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 6.8 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	435 x 330 x 109
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	 0 to 45° C -20° C to +60° C
Relative Humidity Operation Storage	 5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 54: Technical data 4PP220.1505-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.11.2 Dimensions
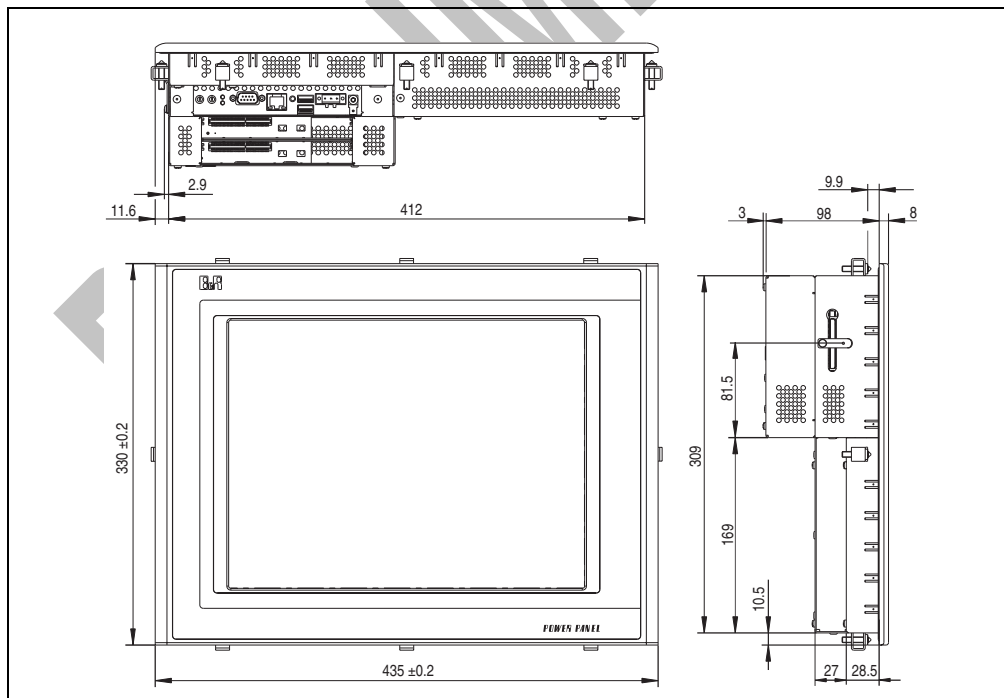
Figure 93: Dimensions 4PP220.1505-B5

3.11.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 93 "Dimensions 4PP220.1505-B5" on Page 120) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
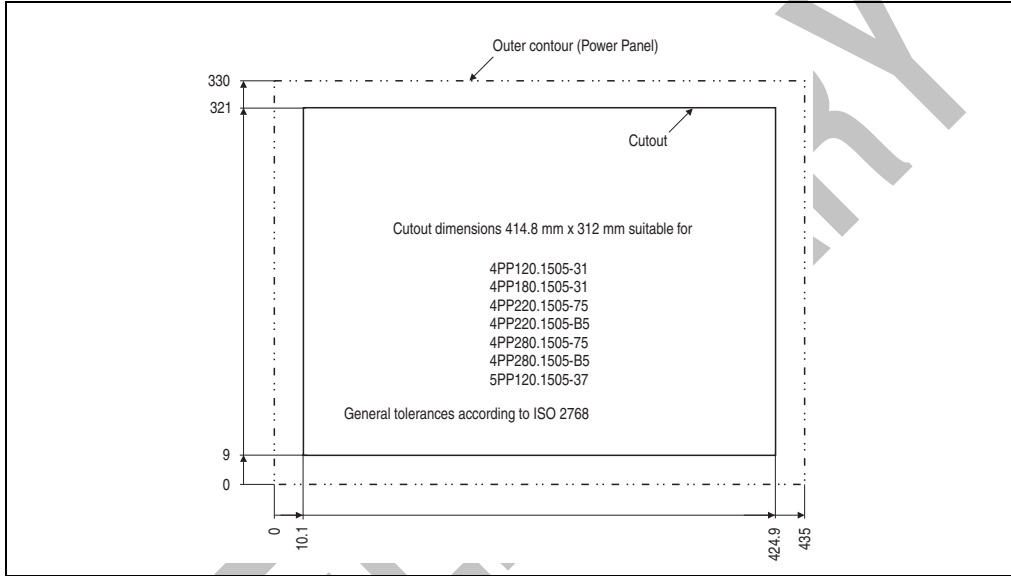
Figure 94: Cutout dimensions

3.11.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C XGA 15" T MH 2aPCI
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 55: Delivery 4PP220.1505-B5

3.12 Device 4PP251.0571-45

Figure 95: Front view 4PP251.0571-45

Figure 96: Rear view 4PP251.0571-45

3.12.1 Technical Data

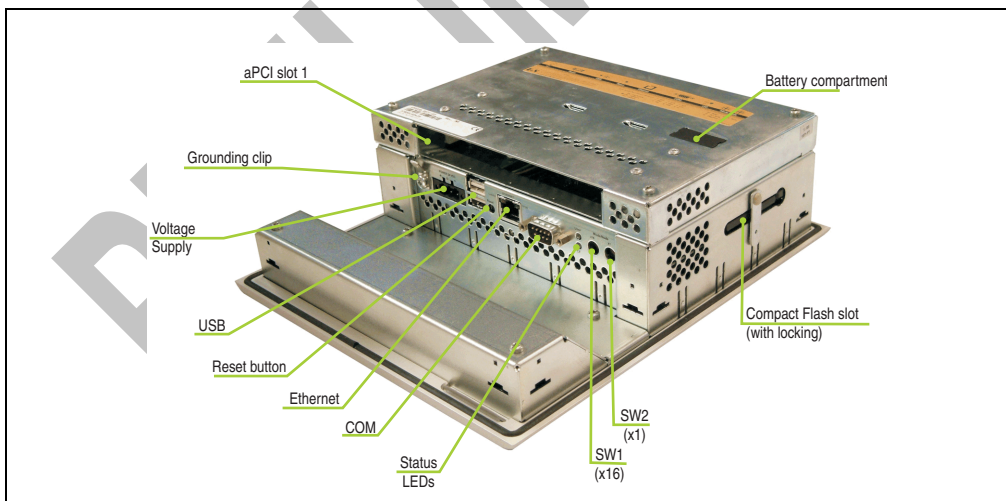| Features	4PP251.0571-45
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	16
	-
	6
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 56: Technical data 4PP251.0571-45

Features	4PP251.0571-45
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 18 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.4 kg (without aPCi interface modules)
Outer Dimensions in mm (WxHxD)	212 x 245 x 76
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 56: Technical data 4PP251.0571-45 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.12.2 Dimensions
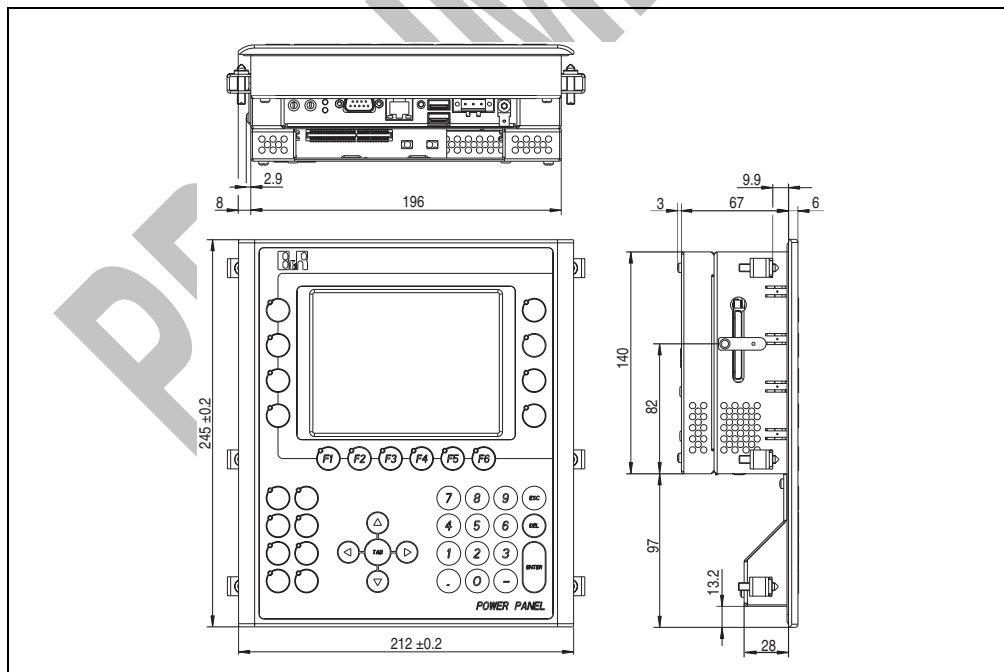
Figure 97: Dimensions 4PP251.0571-45

3.12.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 97 "Dimensions 4PP251.0571-45" on Page 124) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
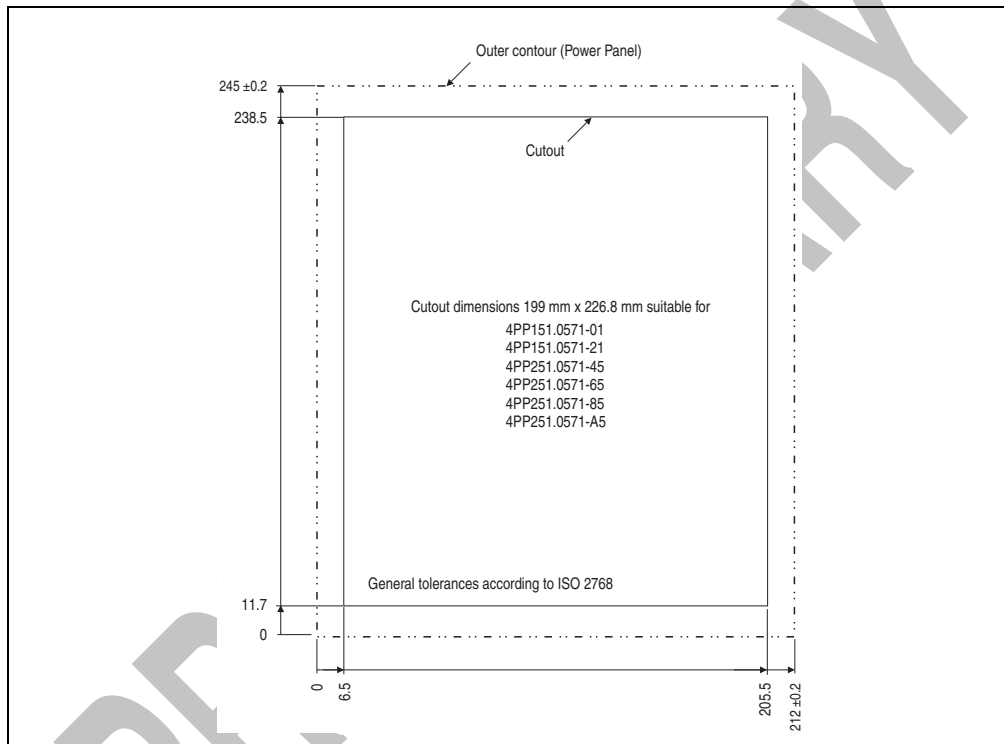
Figure 98: Cutout dimensions

3.12.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 LCD B/W QVGA 5.7" F MH 1aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)

Table 57: Delivery 4PP251.0571-45

3.13 Device 4PP251.0571-65

Figure 99: Front view 4PP251.0571-65

Figure 100: Rear view 4PP251.0571-65

3.13.1 Technical Data

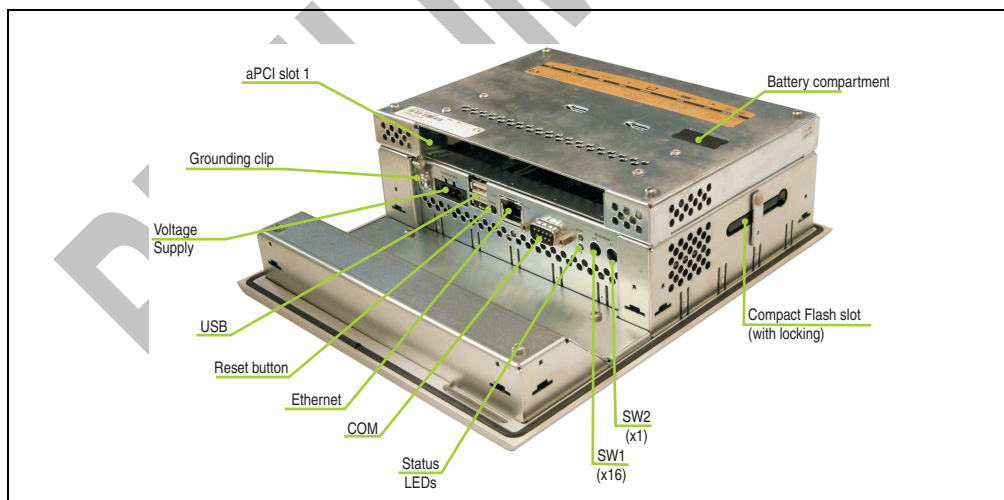| Features	4PP251.0571-65
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (Lithium, 950mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	
	-
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	16
	-
	6
	20
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 58: Technical data 4PP251.0571-65

Chapter 2
Technical Data

Features	4PP251.0571-65
Ground Resistance	$\geq$ 47 kOhm
Power Consumption	Approx. 18 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.4 kg (without interface modules)
Outer Dimensions in mm (WxHxD)	212 x 245 x 76
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 58: Technical data 4PP251.0571-65 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
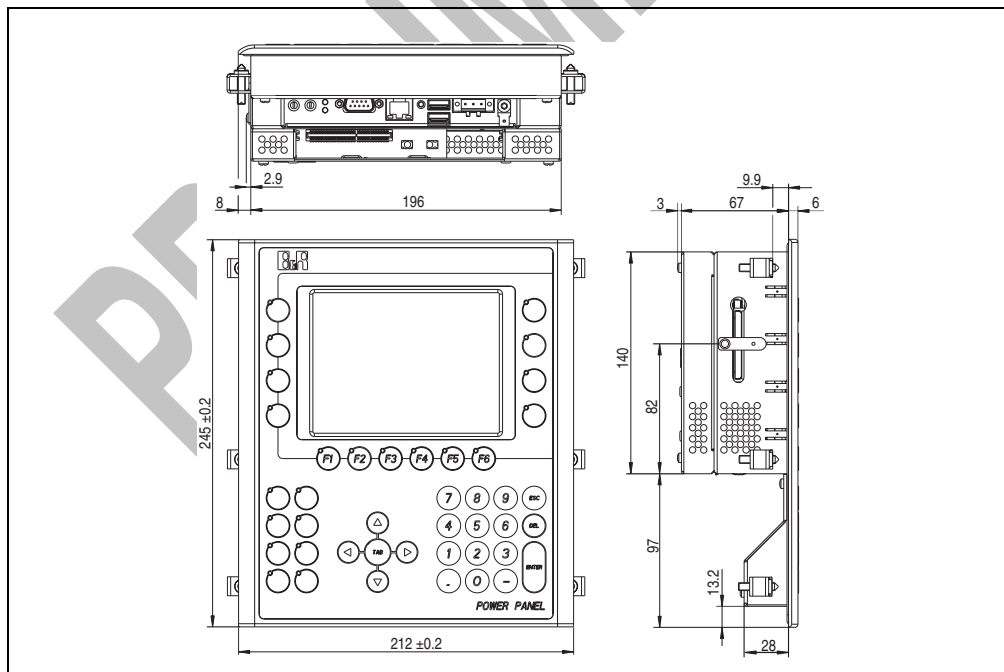
3.13.2 Dimensions

Figure 101: Dimensions 4PP251.0571-65

3.13.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 101 "Dimensions 4PP251.0571-65" on Page 128) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
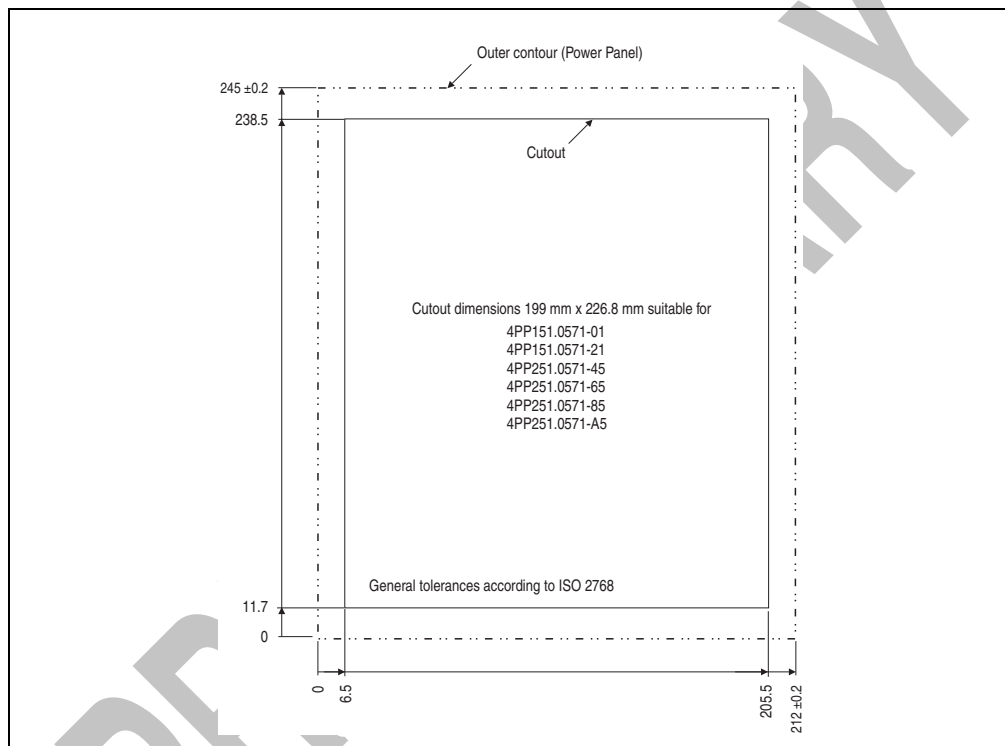
Figure 102: Cutout dimensions

3.13.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 LCD C QVGA 5.7" F MH 1aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)

Table 59: Delivery 4PP251.0571-65

3.14 Device 4PP251.0571-85

Figure 103: Front view 4PP251.0571-85

Figure 104: Rear view 4PP251.0571-85

3.14.1 Technical Data

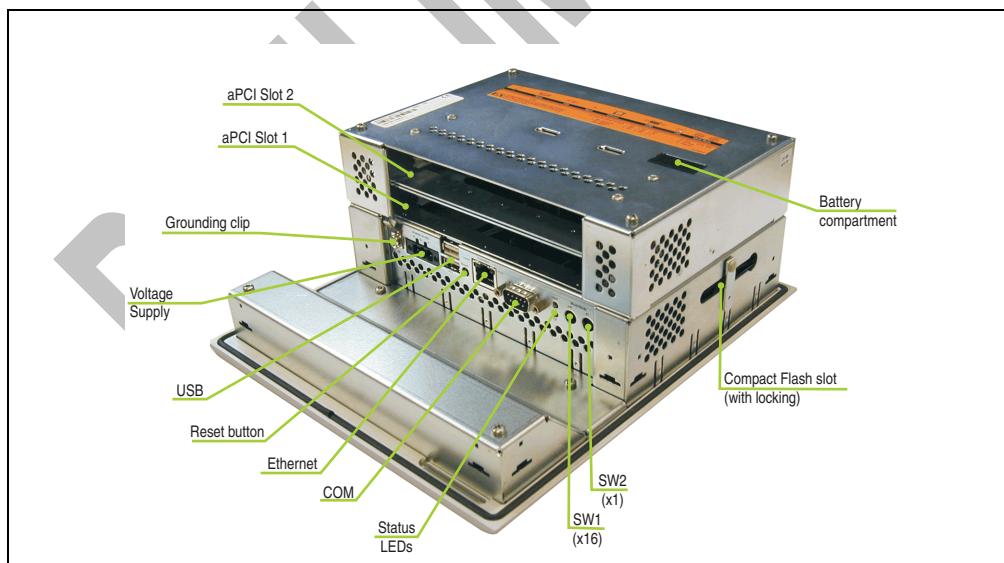| Features	4PP251.0571-85
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)
Ethernet 　　Controller 　　Connection 　　Cabling	 MacPhyter DP83816 (on-board); 10/100 Mbit/s RJ 45 Twisted Pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)
Display 　　Type 　　Diagonal 　　Color 　　Resolution 　　Background Lighting 　　　　Brightness 　　　　Half Brightness Time	 LCD 5.7" 8 shades of gray QVGA, 320 x 240 pixels 140 cd/m² 50,000 hours
Touch Screen 　　Technology 　　Controller	-
Front 　　Frame 　　Mylar 　　Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys 　　Function Keys 　　Function Keys with LEDs 　　Softkeys 　　Softkeys with LEDs 　　System Keys 　　System Keys with LEDs	 - 16 - 6 20 -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 60: Technical data 4PP251.0571-85

Features	4PP251.0571-85
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.7 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	212 x 245 x 98
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 60: Technical data 4PP251.0571-85 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
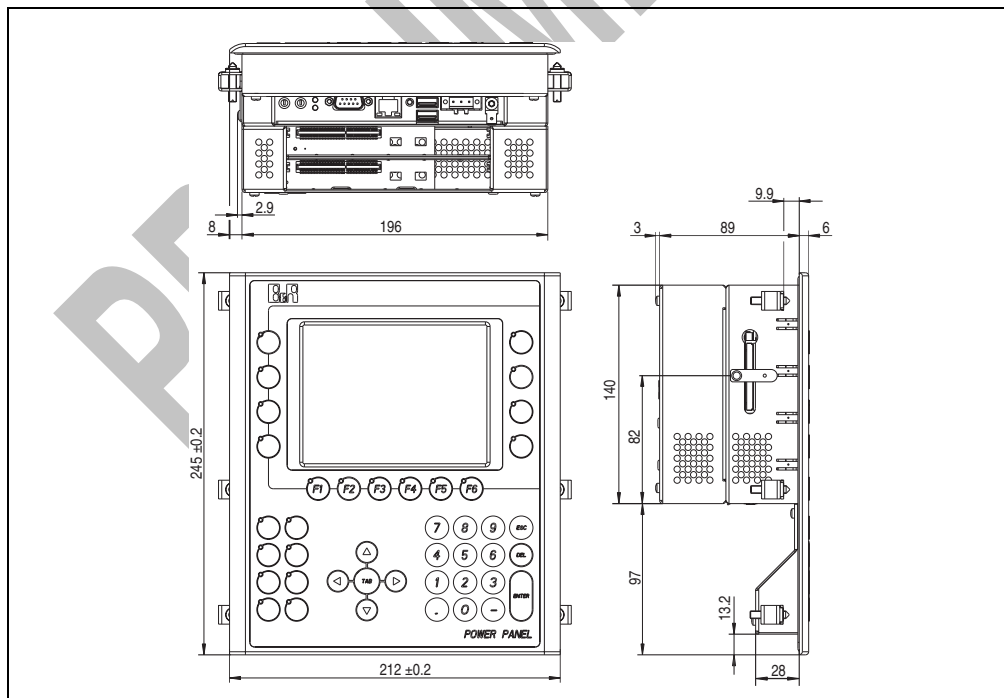
3.14.2 Dimensions

Figure 105: Dimensions 4PP251.0571-85

3.14.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 105 "Dimensions 4PP251.0571-85" on Page 132) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
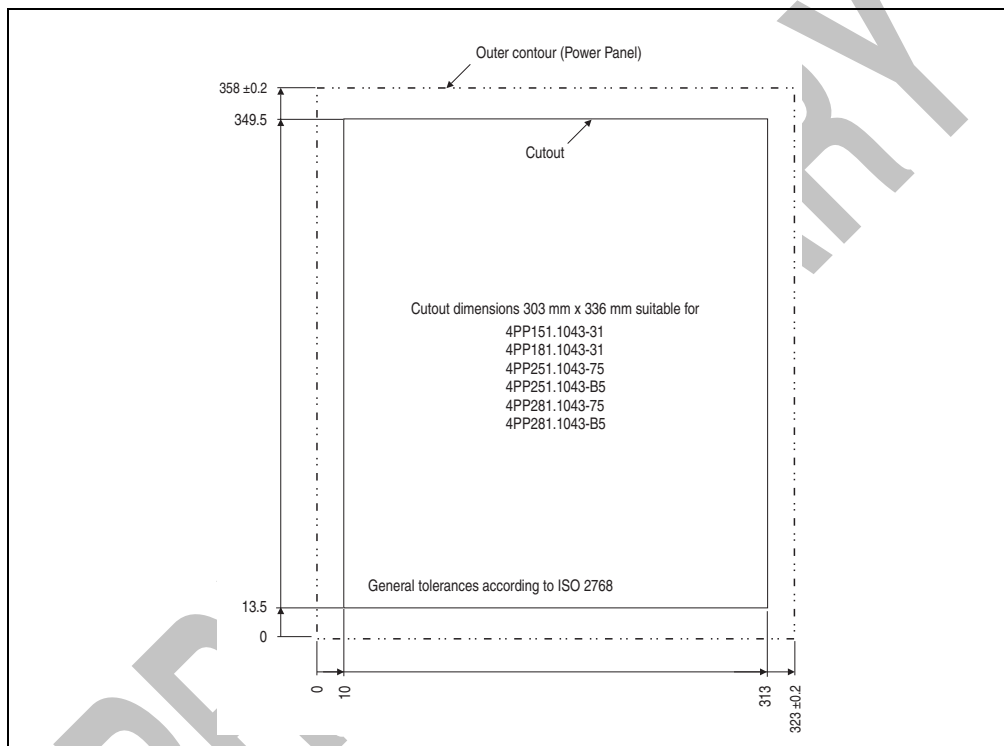
Figure 106: Cutout dimensions

3.14.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 LCD B/W QVGA 5.7" F MH 2aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)

Table 61: Delivery 4PP251.0571-85

3.15 Device 4PP251.0571-A5

Figure 107: Front view 4PP251.0571-A5

Figure 108: Rear view 4PP251.0571-A5

3.15.1 Technical Data

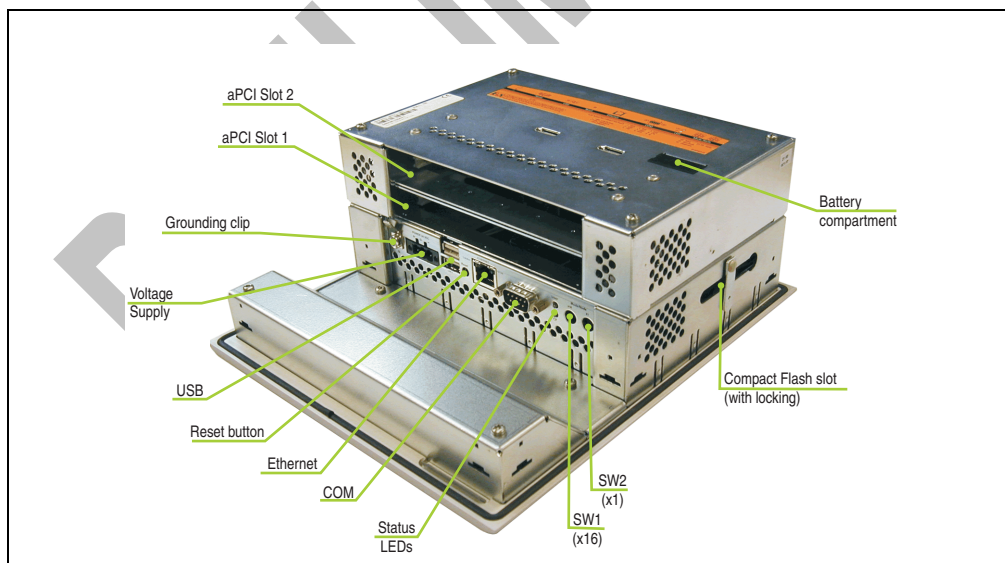| Features	4PP251.0571-A5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (Lithium, 950mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	
	-
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	16
	-
	6
	20
	-

Supply Voltage	24 VDC ± 25%, electrically isolated

Table 62: Technical data 4PP251.0571-A5

Chapter 2
Technical Data

Features	4PP251.0571-A5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.7 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	212 x 245 x 98
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	 0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	 5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 62: Technical data 4PP251.0571-A5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
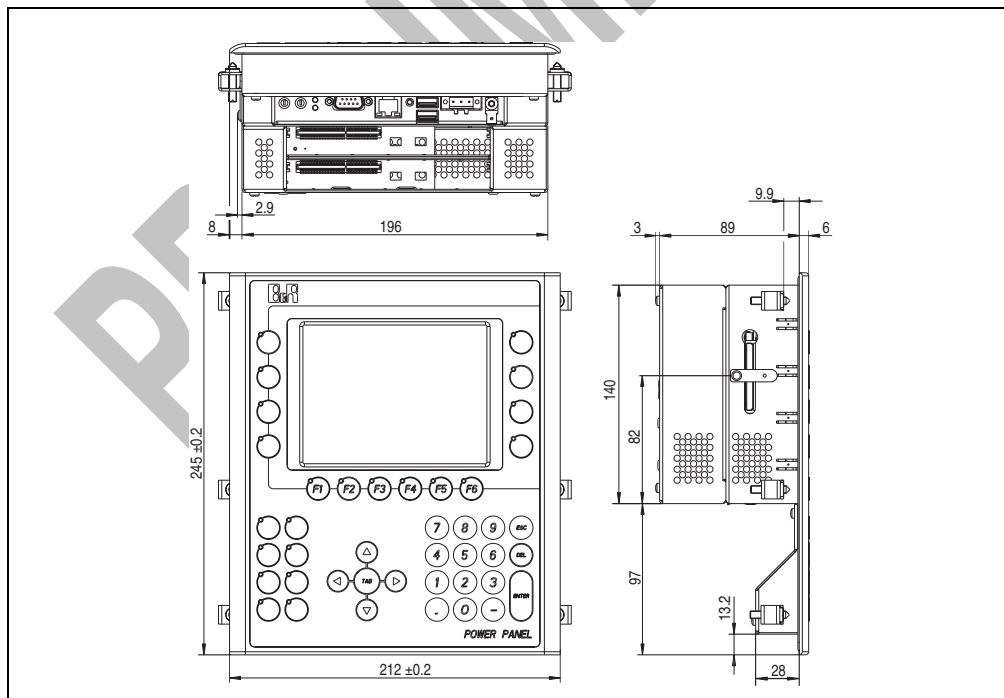
3.15.2 Dimensions

Figure 109: Dimensions 4PP220.0571-A5

3.15.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 109 "Dimensions 4PP220.0571-A5" on Page 136) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
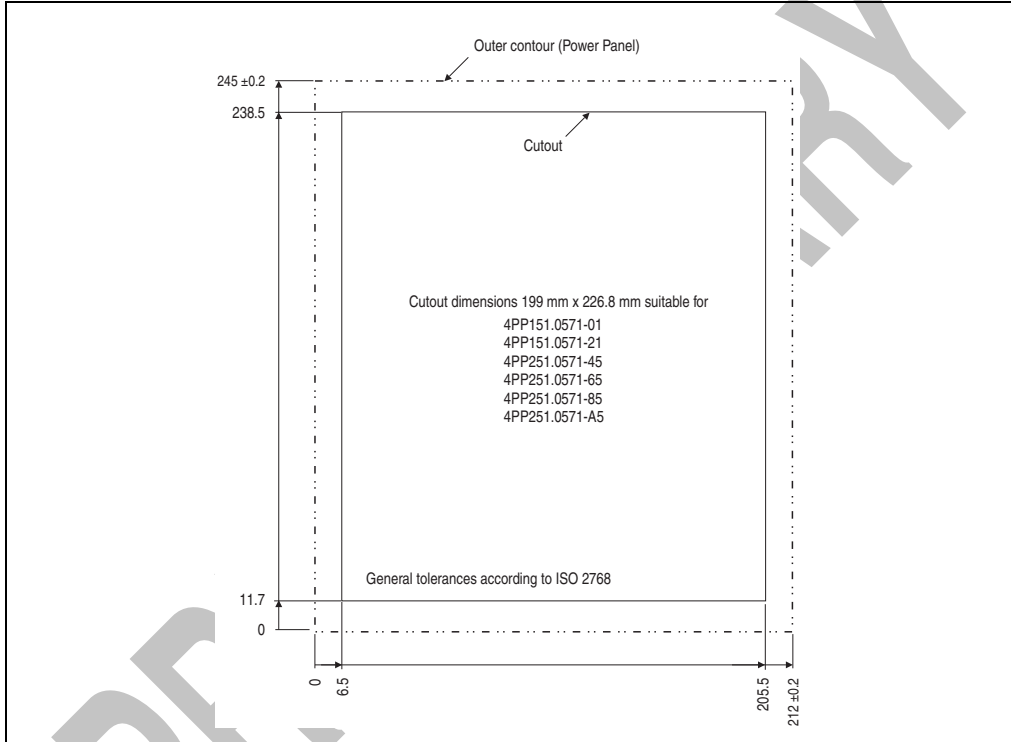

Figure 110: Cutout dimensions

3.15.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 LCD C QVGA 5.7" F MH 2aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)

Table 63: Delivery 4PP251.0571-A5

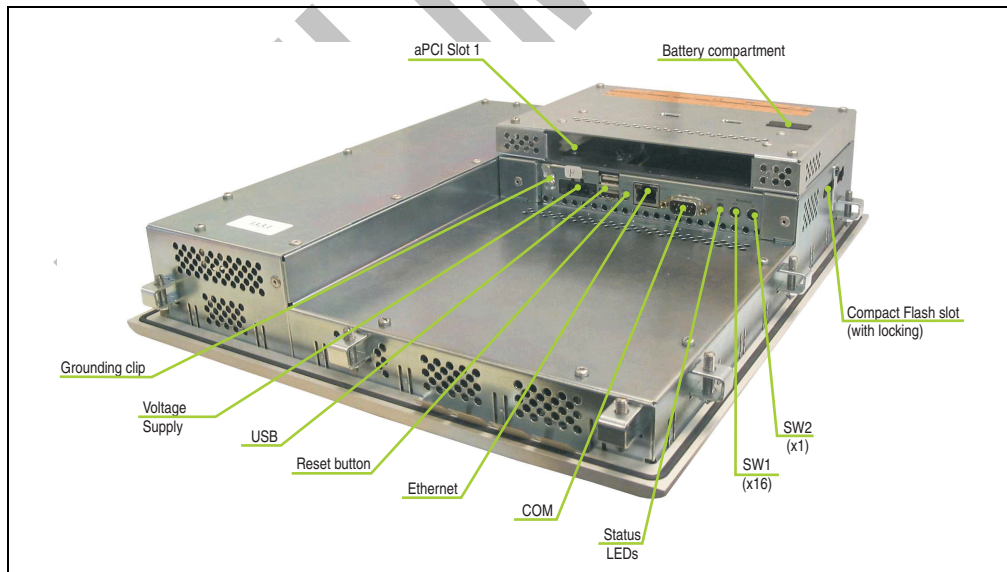## 3.16 Device4PP251.1043-75

Figure 111: Front view 4PP251.1043-75

Figure 112: Rear view 4PP251.1043-75

3.16.1 Technical Data

Features	4PP251.1043-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	28
	-
	10
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 64: Technical data 4PP251.1043-75

Features	4PP251.1043-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 358 x 86
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +70° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 64: Technical data 4PP251.1043-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
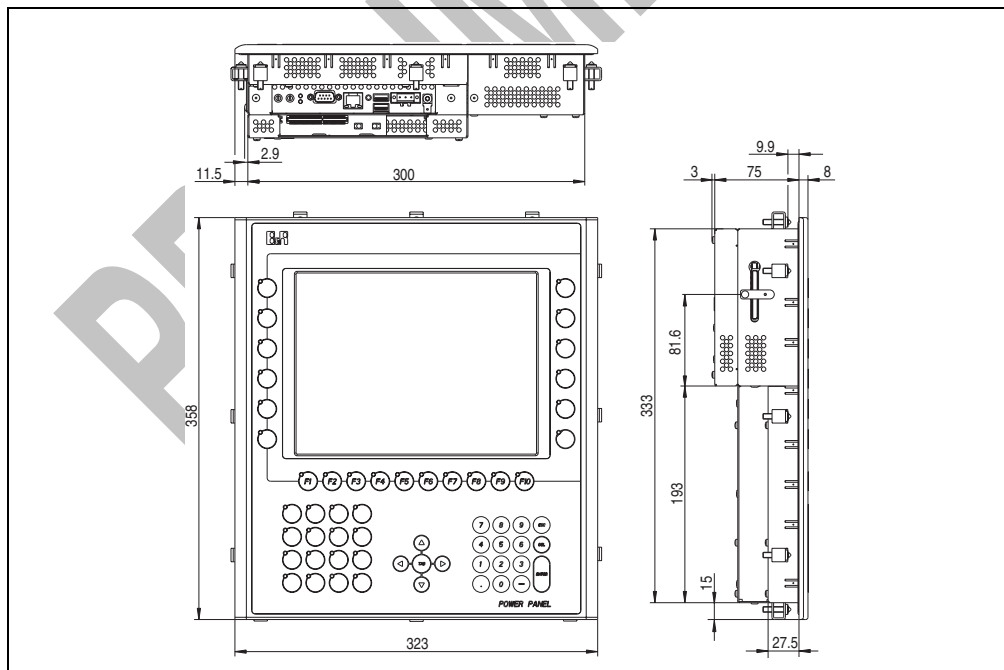
3.16.2 Dimensions

Figure 113: Dimensions 4PP251.1043-75

3.16.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 113 "Dimensions 4PP251.1043-75" on Page 140) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
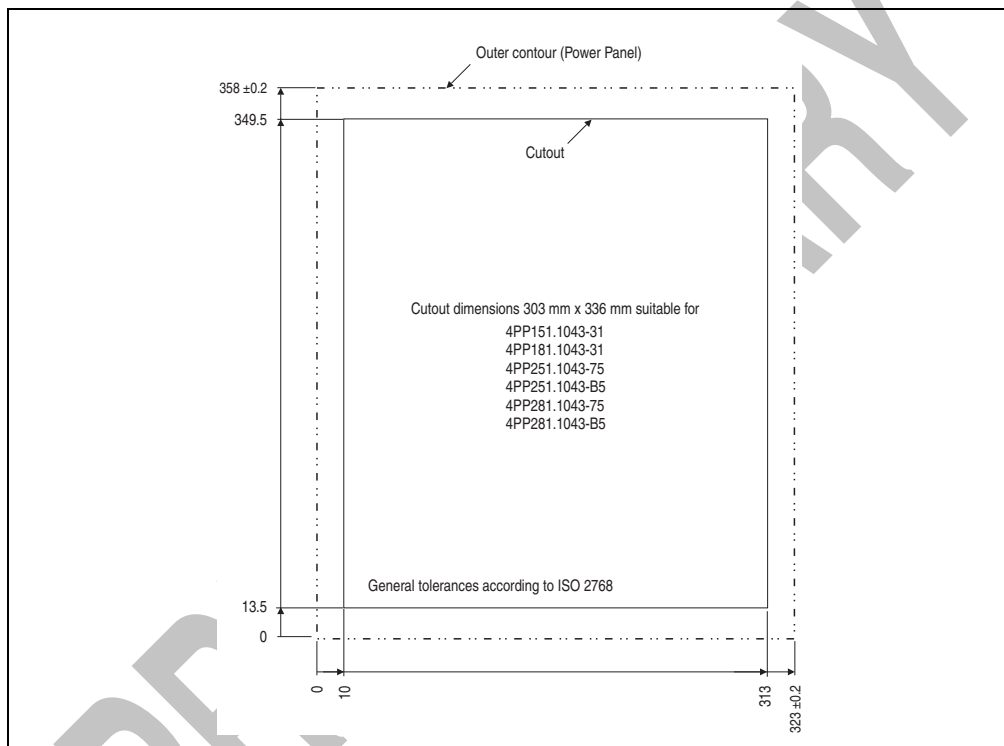

Figure 114: Cutout dimensions

3.16.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 TFT C VGA 10.4" F MH 1aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)

Table 65: Delivery 4PP251.1043-75

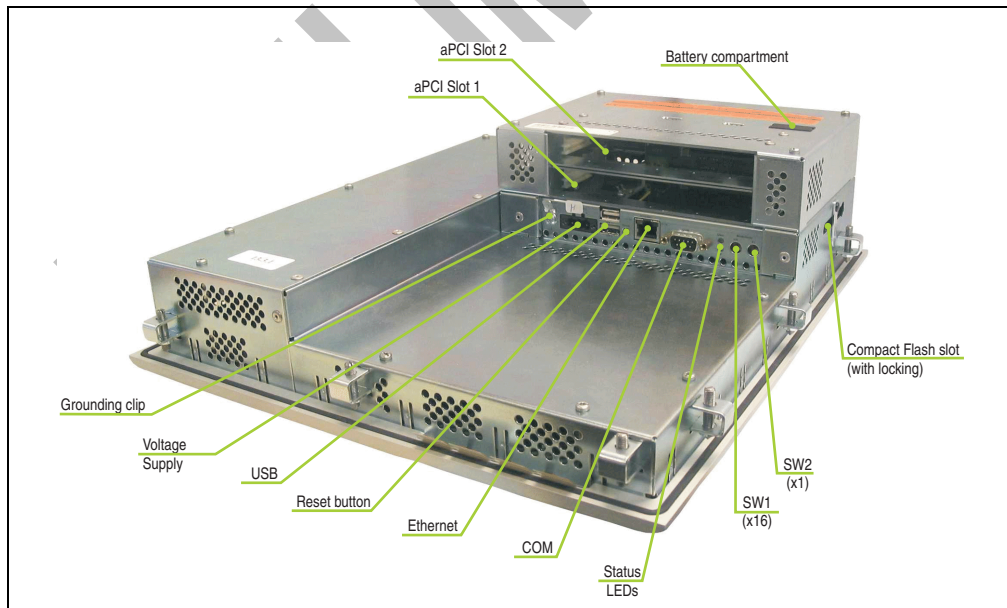## 3.17 Device4PP251.1043-B5

Figure 115: Front view 4PP251.1043-B5

Figure 116: Rear view 4PP251.1043-B5

3.17.1 Technical Data

Features	4PP251.1043-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	28
	-
	10
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 66: Technical data 4PP251.1043-B5

Features	4PP251.1043-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5.3 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 358 x 108
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 66: Technical data 4PP251.1043-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
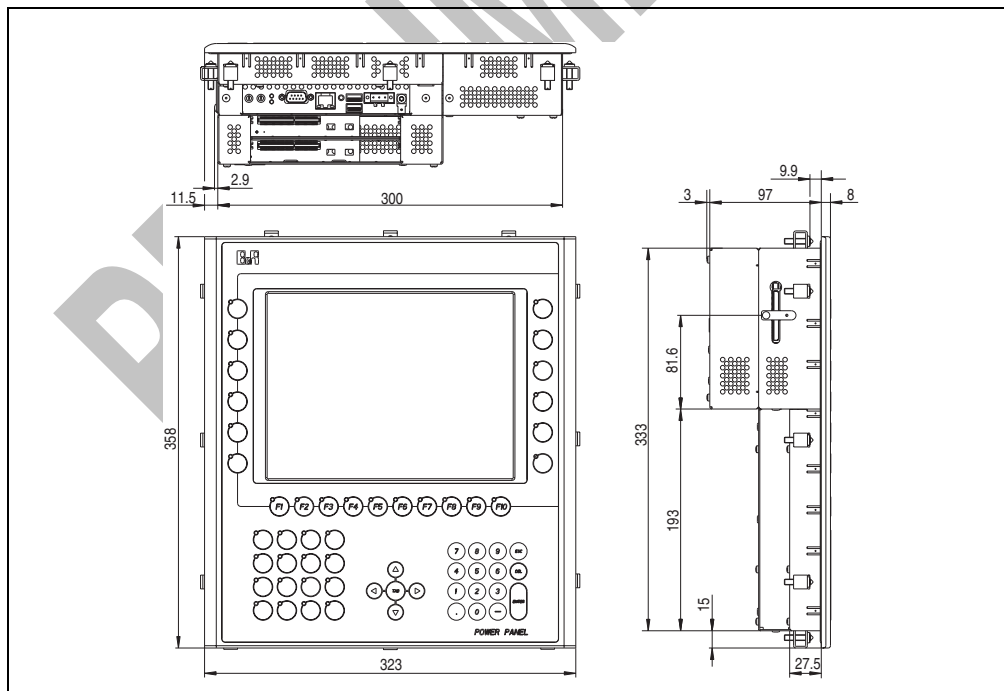
3.17.2 Dimensions

Figure 117: Dimensions 4PP251.1043-B5

3.17.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 117 "Dimensions 4PP251.1043-B5" on Page 144) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
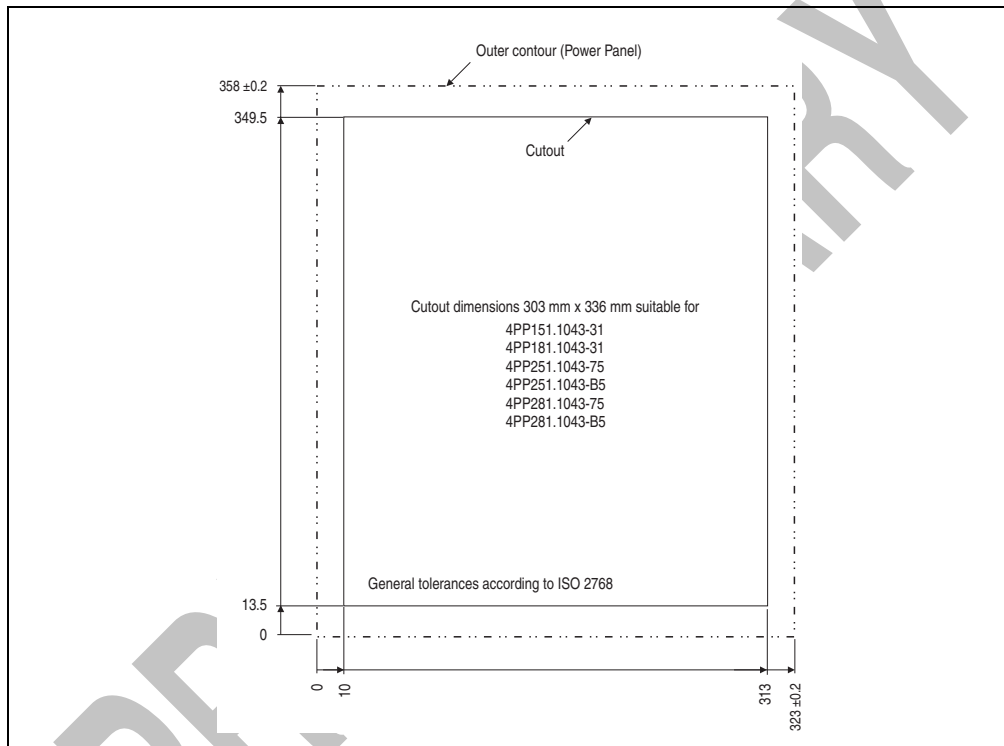

Figure 118: Cutout dimensions

3.17.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 TFT C VGA 10.4" F MH 2aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)

Table 67: Delivery 4PP251.1043-B5
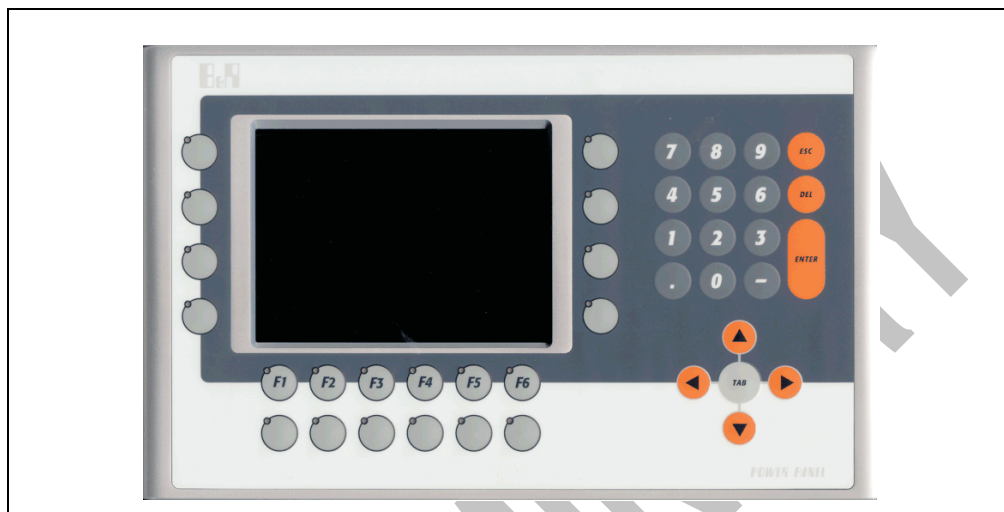
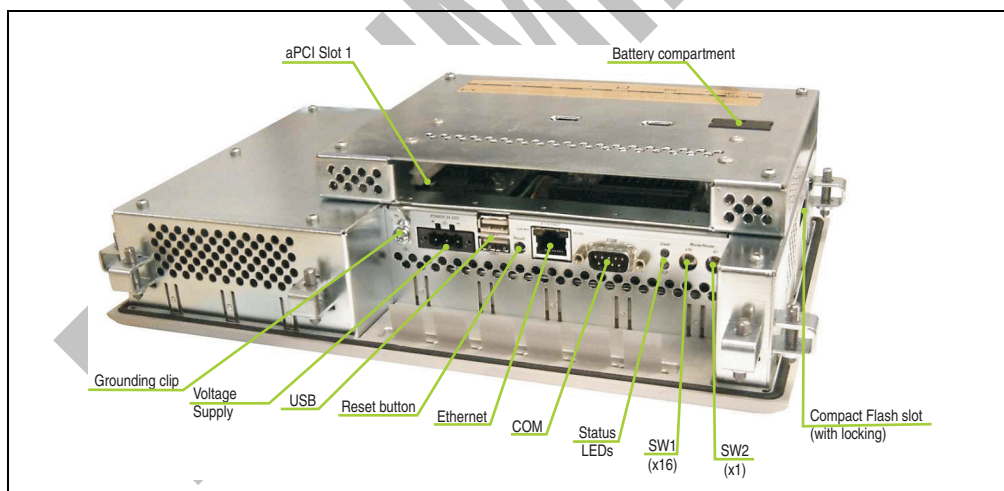## 3.18 Device 4PP252.0571-45

Figure 119: Front view 4PP252.0571-45

Figure 120: Rear view 4PP252.0571-45

3.18.1 Technical Data

Features	4PP252.0571-45
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
   Controller
   Connection
   Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
   Technology
   Controller
	-

Front
   Frame
   Mylar
   Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	
	-
	20
	-
	-
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 68: Technical data 4PP252.0571-45

Features	4PP252.0571-45
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 18 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.6 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	302 x 187 x 76
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 68: Technical data 4PP252.0571-45 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
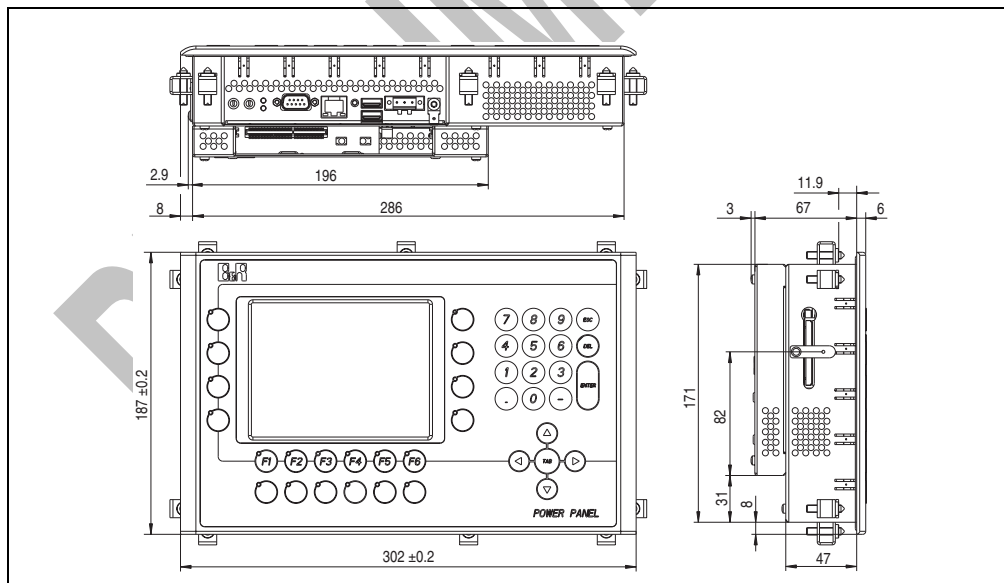
3.18.2 Dimensions

Figure 121: Dimensions 4PP252.0571-45

3.18.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 121 "Dimensions 4PP252.0571-45" on Page 148) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
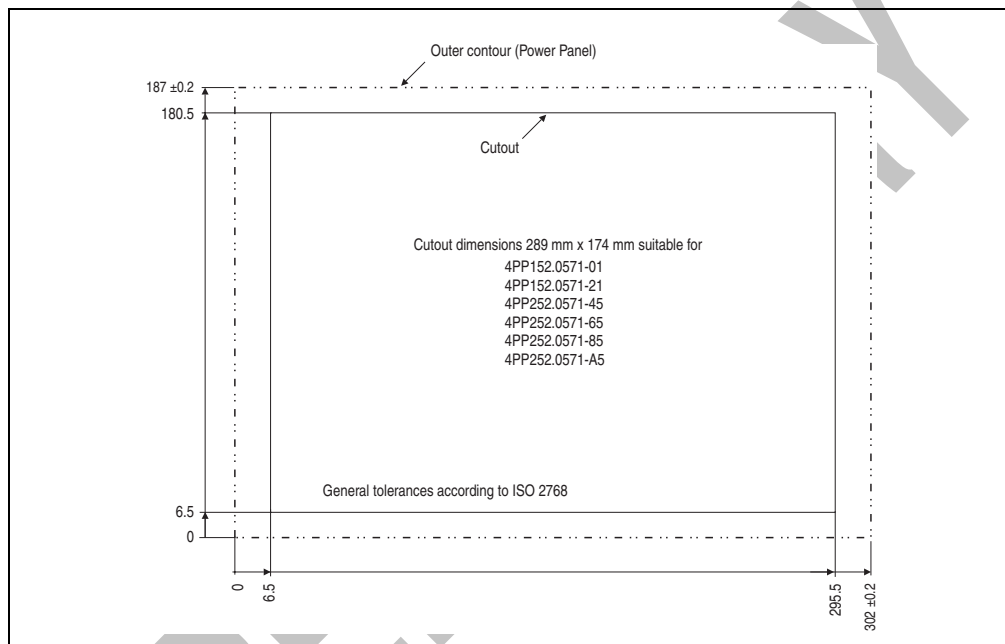

Figure 122: Cutout dimensions

3.18.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 252 LCD B/W QVGA 5.7" F MH 1aPCI
10	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
8	Legend strips (inserted in the front)

Table 69: Delivery 4PP252.0571-45

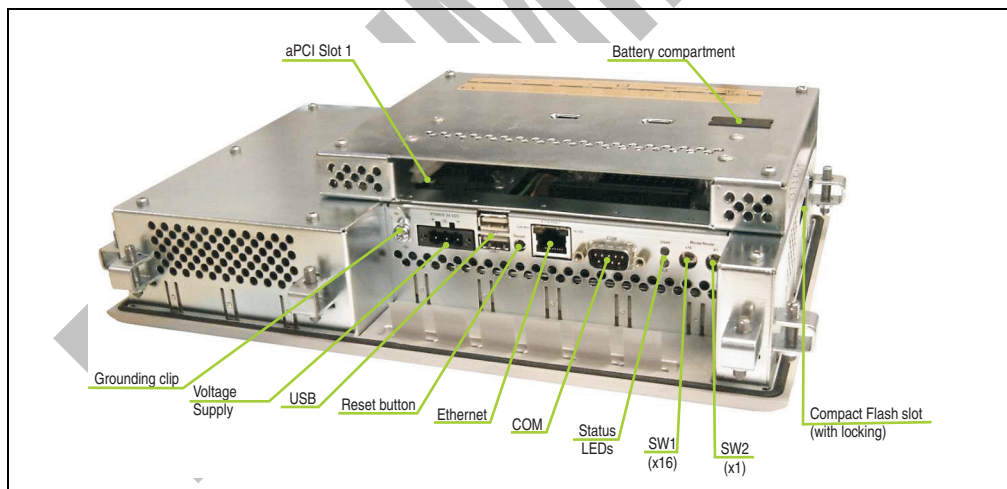## 3.19 Device 4PP252.0571-65

Figure 123: Front view 4PP252.0571-65

Figure 124: Rear view 4PP252.0571-65

3.19.1 Technical Data

Features	4PP252.0571-65
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	20
	-
	-
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 70: Technical data 4PP252.0571-65

Features	4PP252.0571-65
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 18 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.6 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	302 x 187 x 76
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 70: Technical data 4PP252.0571-65 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
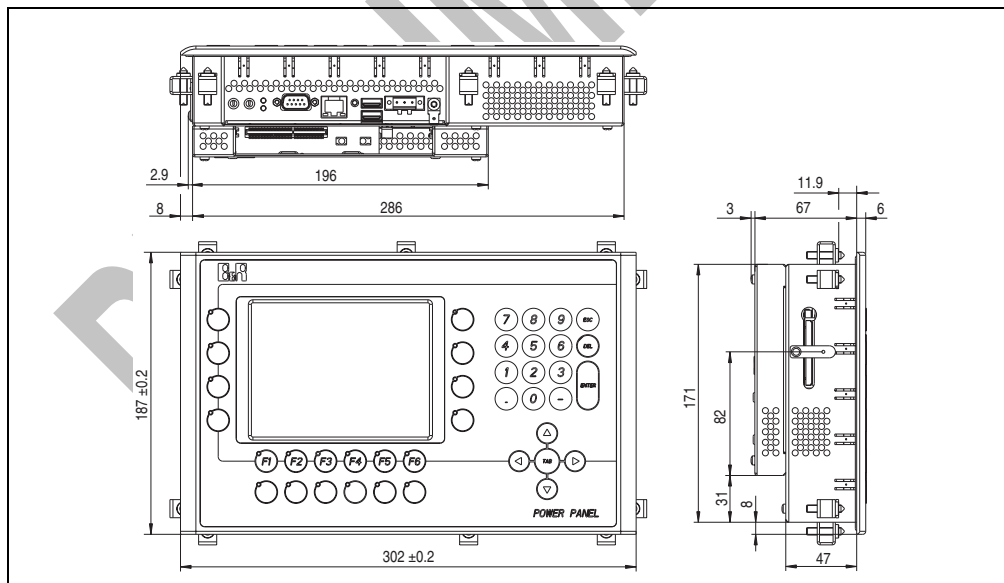
3.19.2 Dimensions

Figure 125: Dimensions 4PP252.0571-65

3.19.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 125 "Dimensions 4PP252.0571-65" on Page 152) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
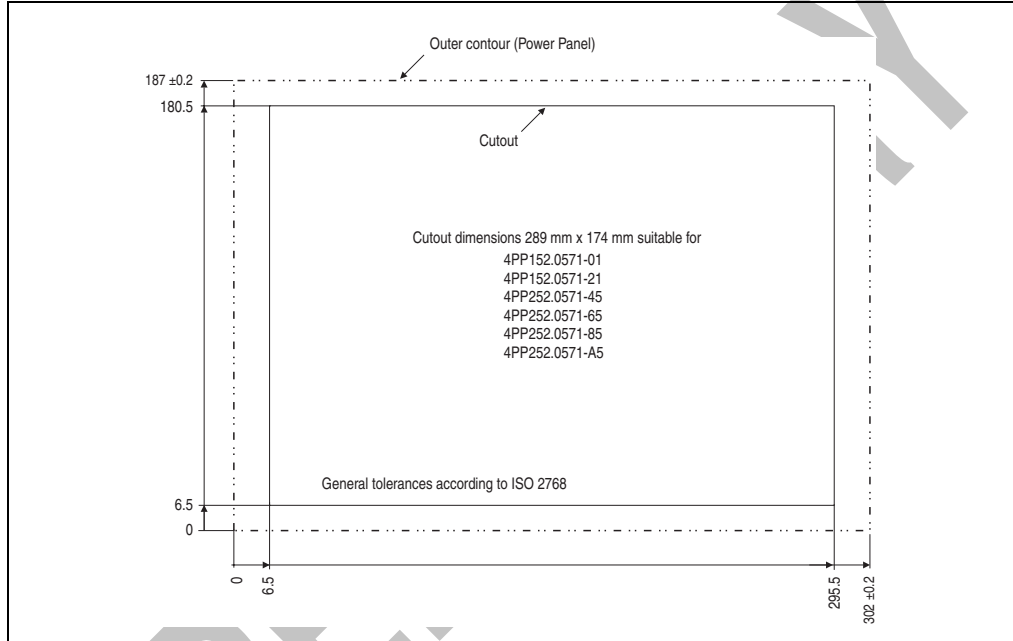

Figure 126: Cutout dimensions

3.19.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 252 LCD C QVGA 5.7" F MH 1aPCI
10	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
8	Legend strips (inserted in the front)

Table 71: Delivery 4PP252.0571-65

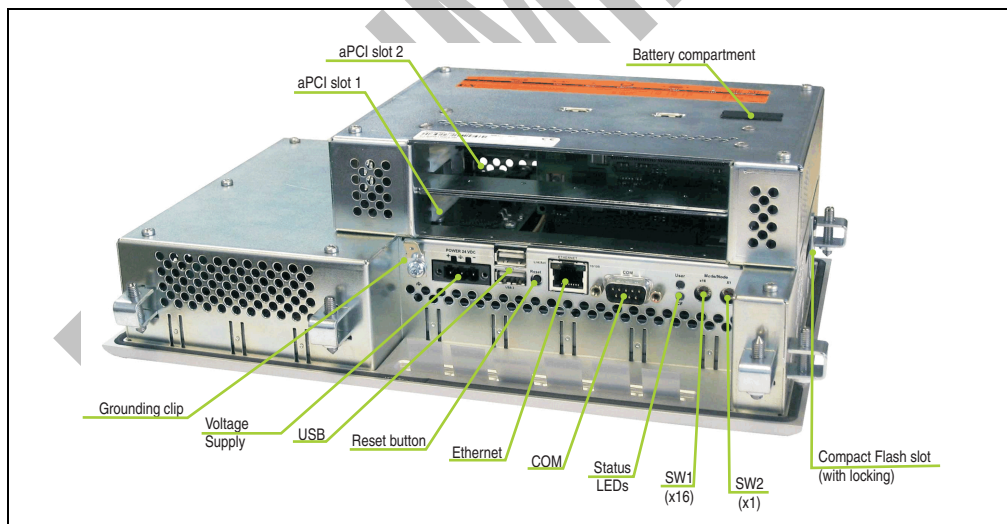## 3.20 Device 4PP252.0571-85

Figure 127: Front view 4PP252.0571-85

Figure 128: Rear view 4PP252.0571-85

3.20.1 Technical Data

Features	4PP252.0571-85
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
       Brightness
       Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	20
	-
	-
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 72: Technical data 4PP252.0571-85

Features	4PP252.0571-85
Ground Resistance	$\geq$ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.9 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	302 x 187 x 98
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 72: Technical data 4PP252.0571-85 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.20.2 Dimensions
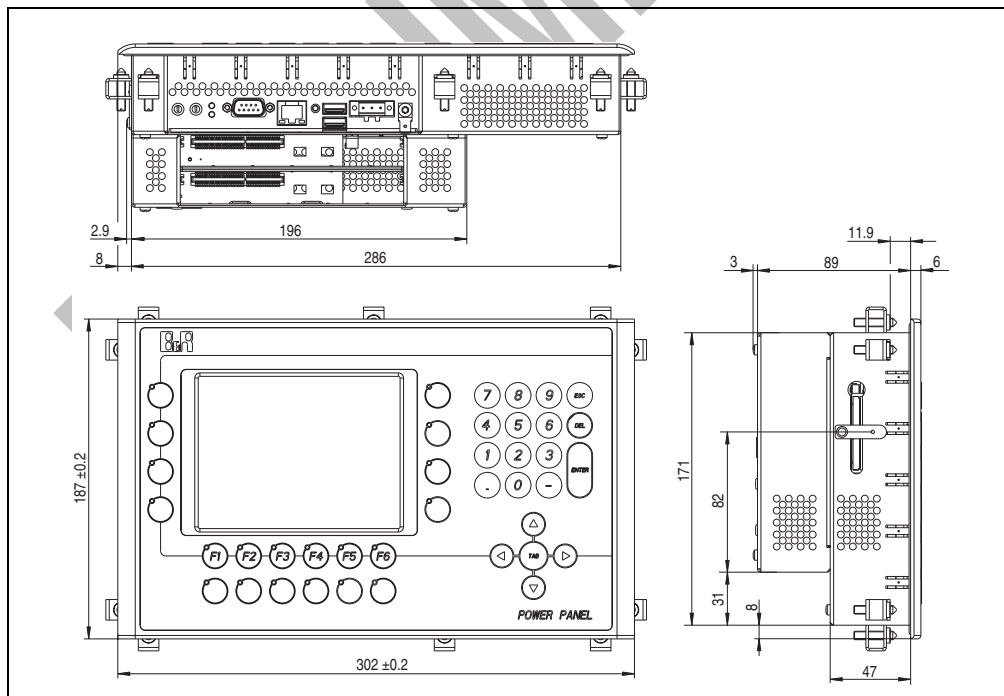
Figure 129: Dimensions 4PP252.0571-85

3.20.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 129 "Dimensions 4PP252.0571-85" on Page 156) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
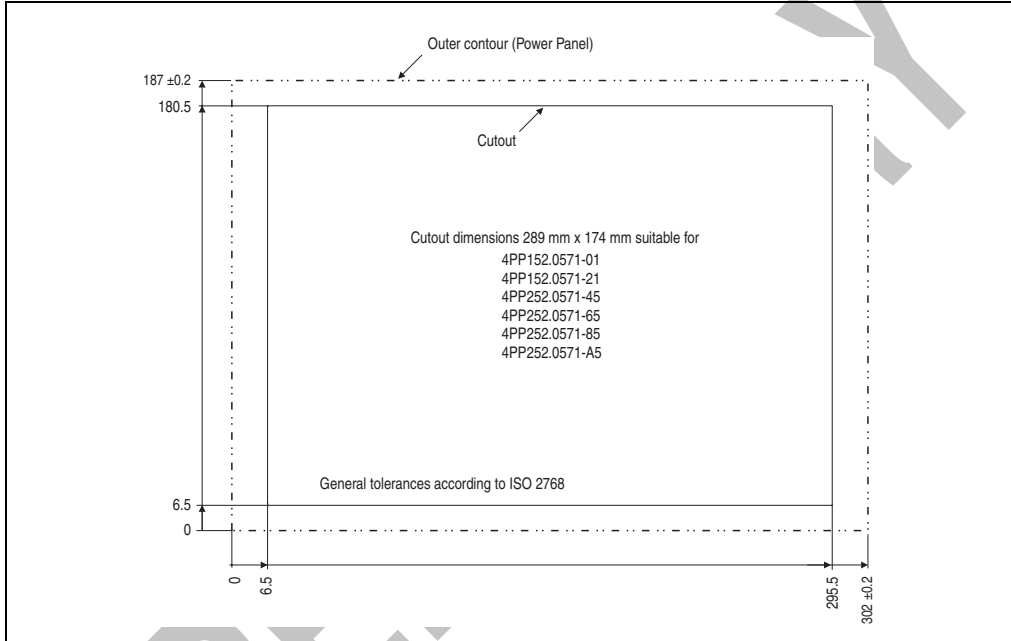

Figure 130: Cutout dimensions

3.20.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 252 LCD B/W QVGA 5.7" F MH 2aPCI
10	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
8	Legend strips (inserted in the front)

Table 73: Delivery 4PP252.0571-85

3.21 Device 4PP252.0571-A5
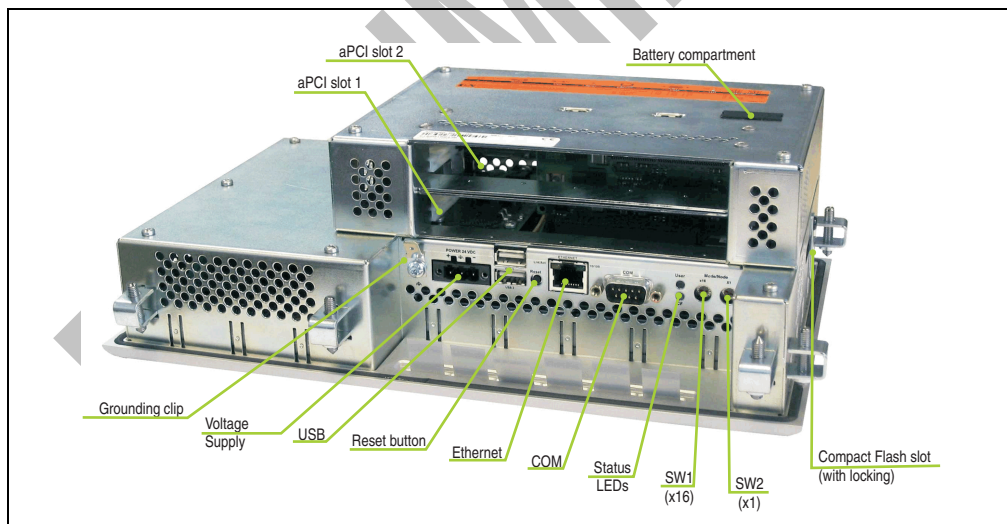

Figure 131: Front view 4PP252.0571-A5

Figure 132: Rear view 4PP252.0571-A5

3.21.1 Technical Data

Features	4PP252.0571-A5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	LCD
	5.7"
	256 colors
	QVGA, 320 x 240 pixels
	
	150 cd/m²
	50,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	20
	-
	-
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 74: Technical data 4PP252.0571-A5

Features	4PP252.0571-A5
Ground Resistance	$\geq$ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.9 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	302 x 187 x 98
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 74: Technical data 4PP252.0571-A5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.21.2 Dimensions
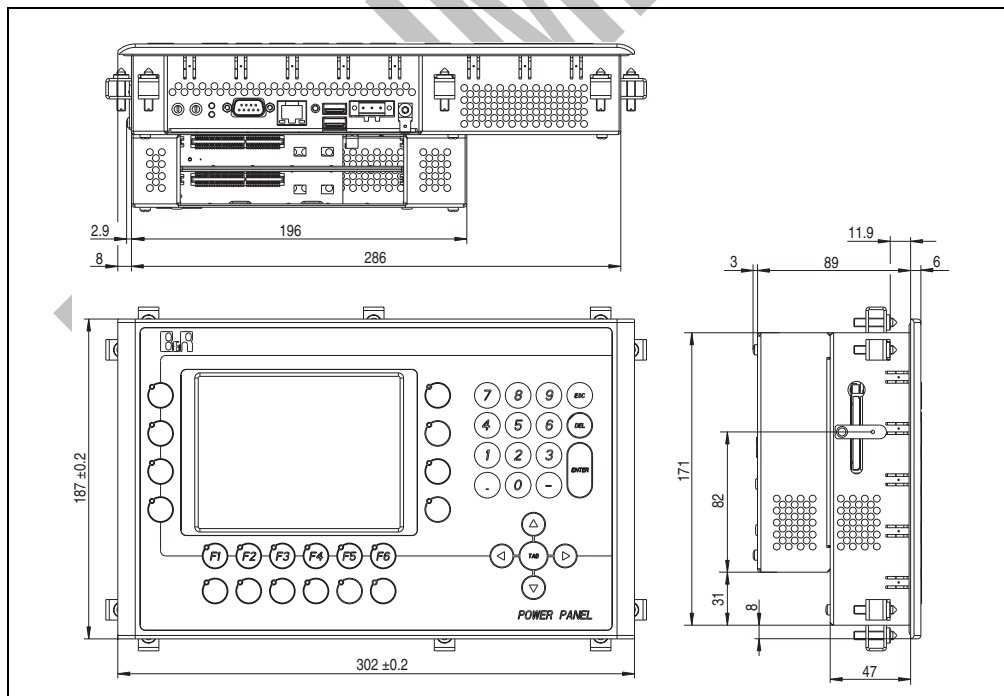
Figure 133: Dimensions 4PP252.0571-A5

3.21.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 133 "Dimensions 4PP252.0571-A5" on Page 160) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
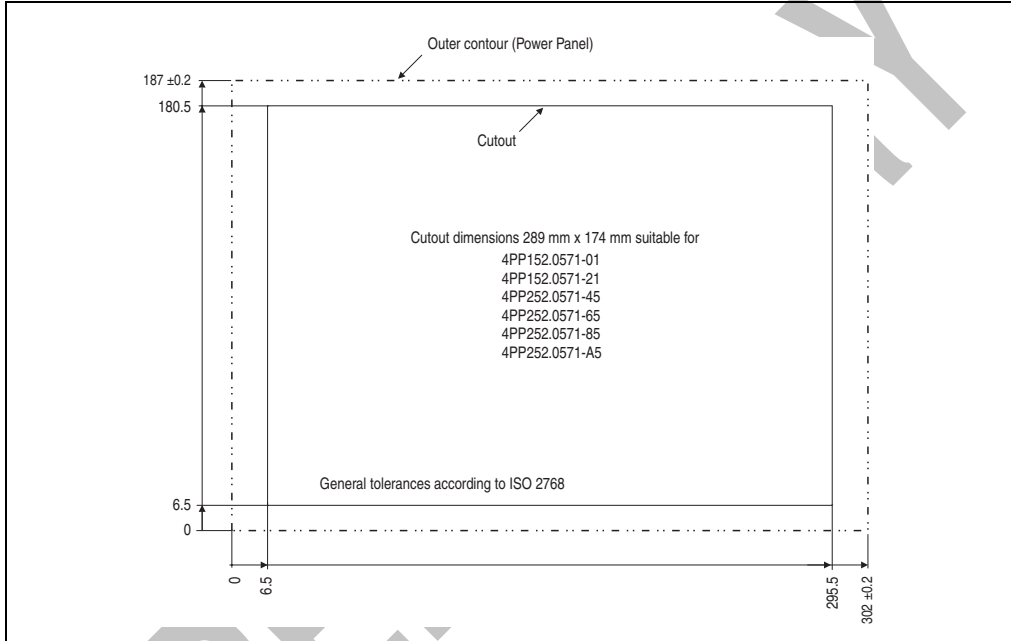
Figure 134: Cutout dimensions

3.21.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 252 LCD C QVGA 5.7" F MH 2aPCI
10	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
8	Legend strips (inserted in the front)

Table 75: Delivery 4PP252.0571-A5

3.22 Device 4PP252.1043-75

Figure 135: Front view 4PP252.1043-75
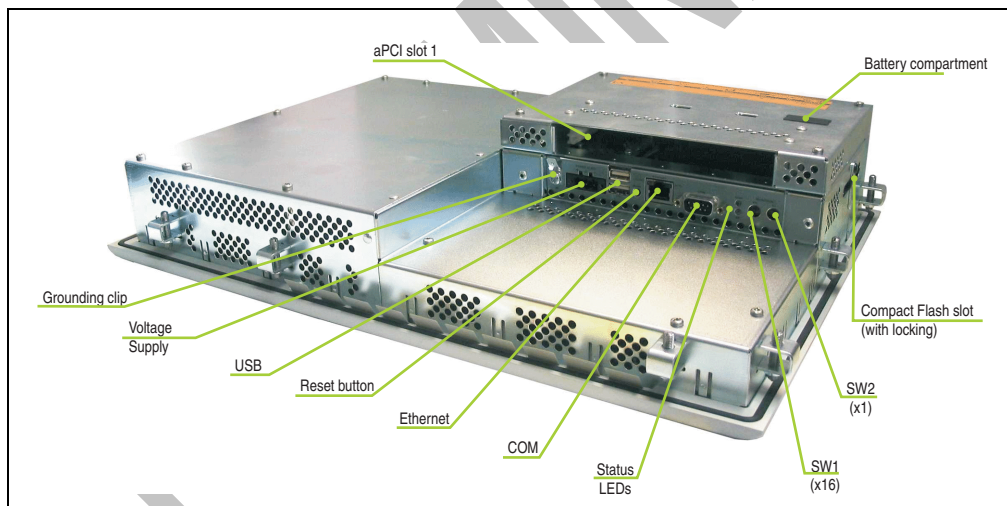
Figure 136: Rear view 4PP252.1043-75

3.22.1 Technical Data

Features	4PP252.1043-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	32
	-
	-
	20
	12

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 76: Technical data 4PP252.1043-75

Features	4PP252.1043-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5.2 kg (without aPCI interface modules)
Outer dimensions in mm (WxHxD)	423 x 288 x 86
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 76: Technical data 4PP252.1043-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.22.2 Dimensions
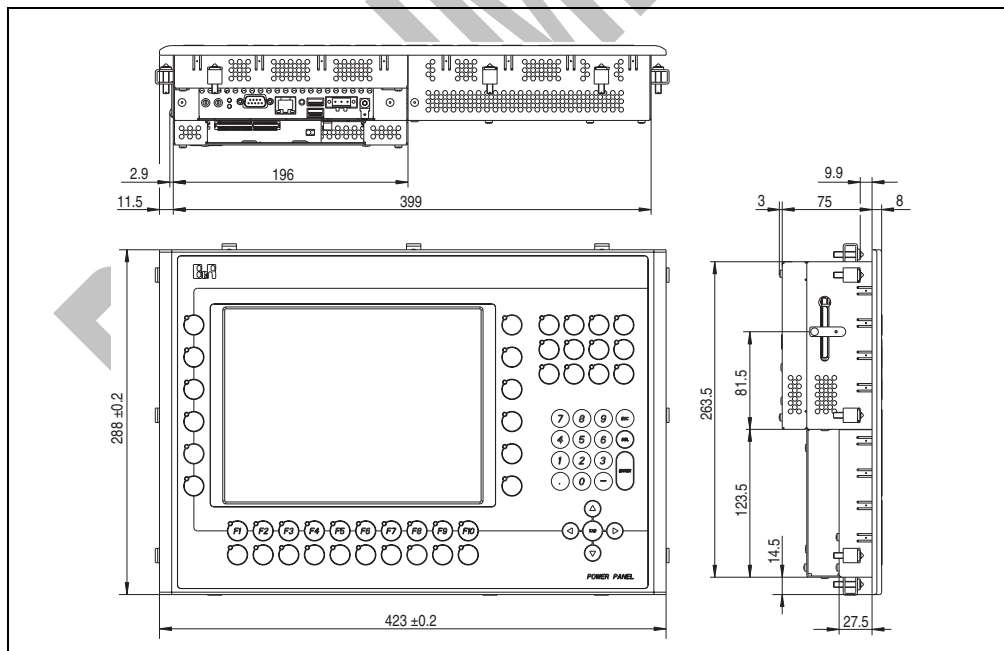
Figure 137: Dimensions 4PP252.1043-75

3.22.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 137 "Dimensions 4PP252.1043-75" on Page 164) For further information regarding mounting, see chapter 3 "Installation" on Page 247.

Chapter 2
Technical Data

Outer contour (Power Panel)

288 ±0.2
279.5

Cutout

Cutout dimensions 402 mm x 266.5 mm suitable for
4PP152.1043-31
4PP182.1043-31
4PP252.1043-75
4PP252.1043-B5
4PP282.1043-75
4PP282.1043-B5

General tolerances according to ISO 2768

13
0

0
10

412
423 ±0.2
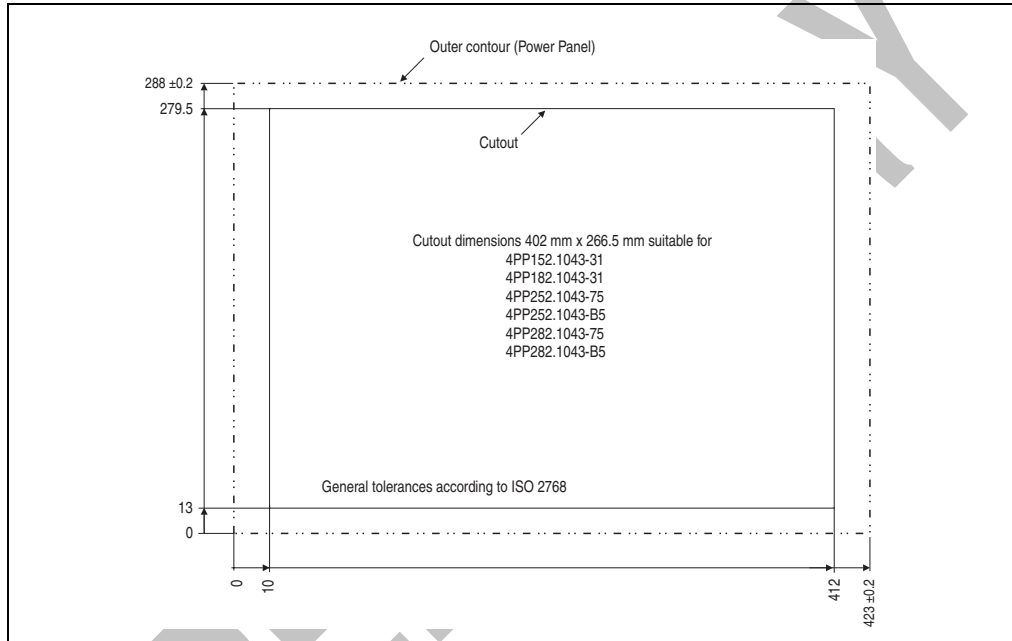
Figure 138: Cutout dimensions

3.22.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 252 TFT C VGA 10.4" F MH 1aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
16	Legend strips (inserted in the front)

Table 77: Delivery 4PP252.1043-75

3.23 Device 4PP252.1043-B5

Figure 139: Front view 4PP252.1043-B5
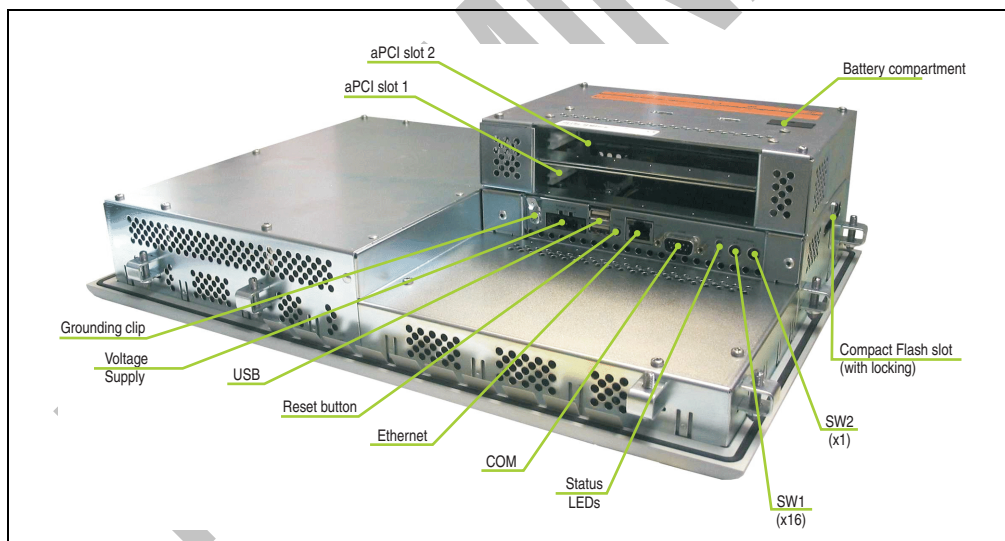
Figure 140: Rear view 4PP252.1043-B5

3.23.1 Technical Data

| Features	4PP252.1043-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	-

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	32
	-
	-
	20
	12

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 78: Technical data 4PP252.1043-B5

Features	4PP252.1043-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 28 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5.5 kg (without aPCI interface modules)
Outer dimensions in mm (WxHxD)	423 x 288 x 108
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 78: Technical data 4PP252.1043-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.23.2 Dimensions
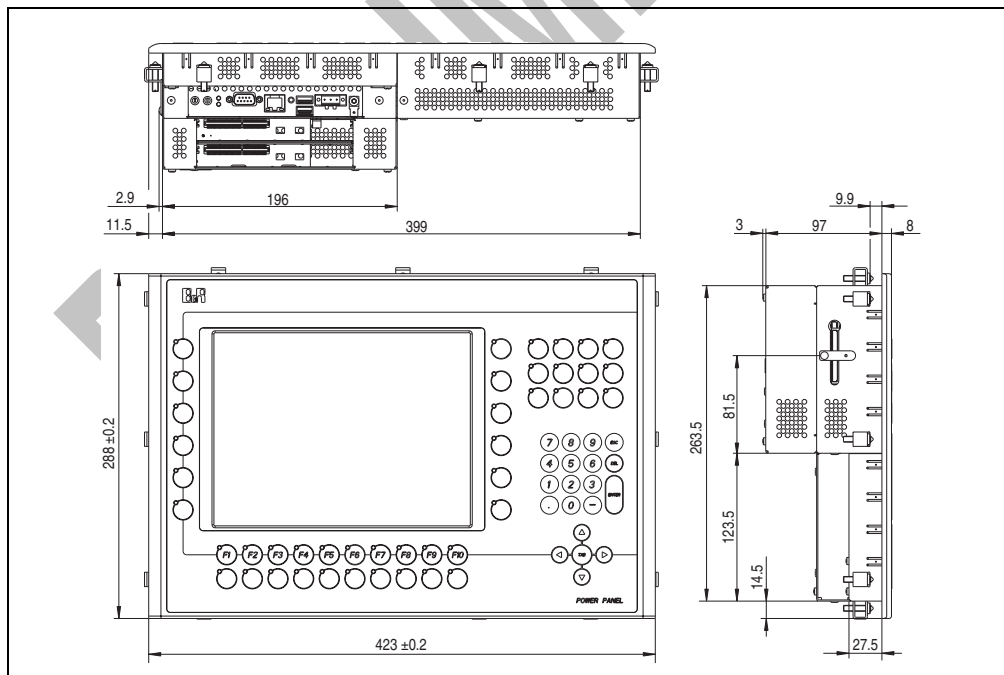
Figure 141: Dimensions 4PP252.1043-B5

3.23.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 141 "Dimensions 4PP252.1043-B5" on Page 168) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
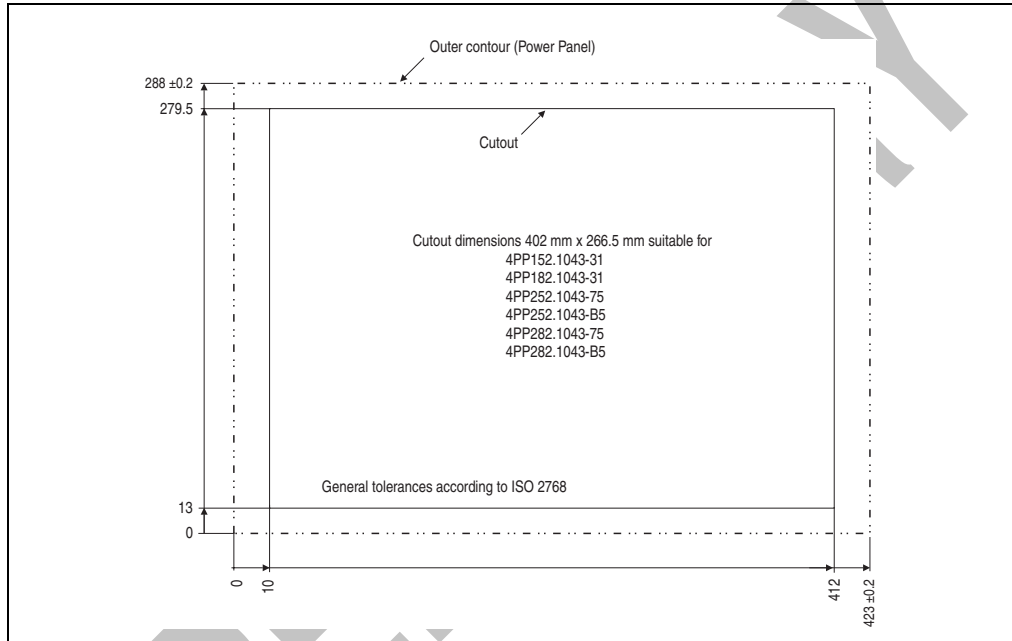
Figure 142: Cutout dimensions

3.23.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 252 TFT C VGA 10.4" F MH 2aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
16	Legend strips (inserted in the front)

Table 79: Delivery 4PP252.1043-B5

3.24 Device 4PP280.1043-75
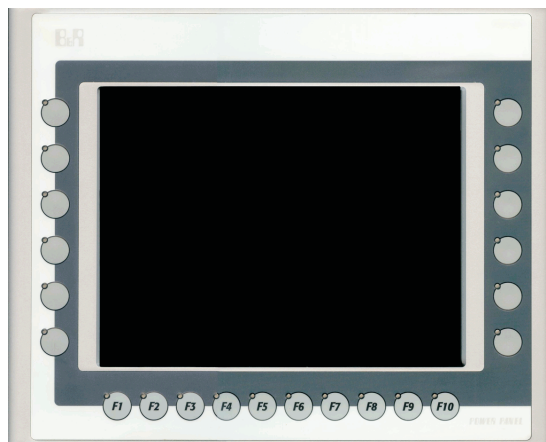
Figure 143: Front view 4PP280.1043-75
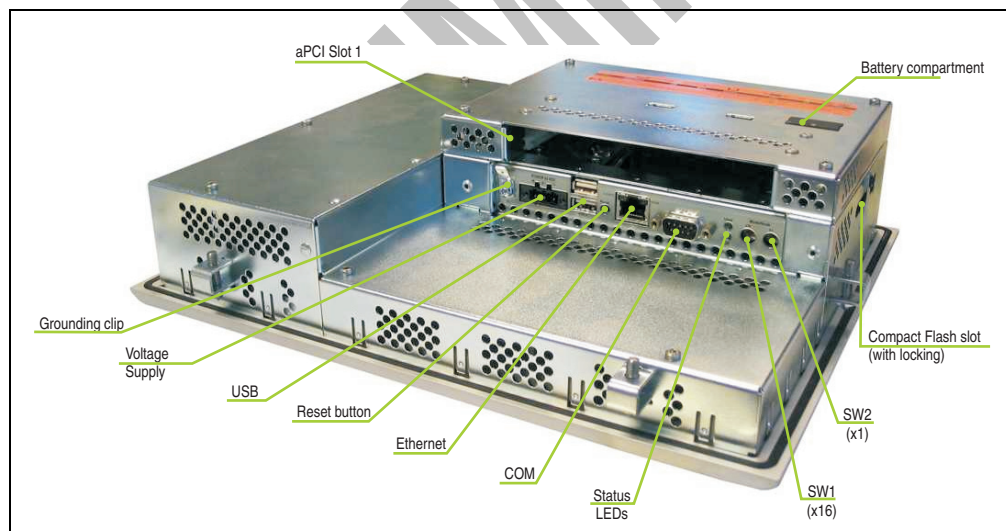
Figure 144: Rear view 4PP280.1043-75

3.24.1 Technical Data

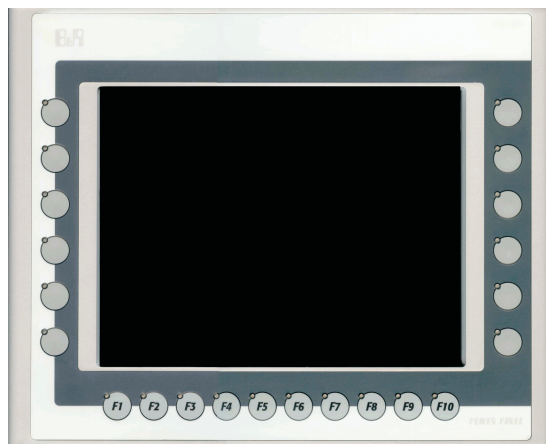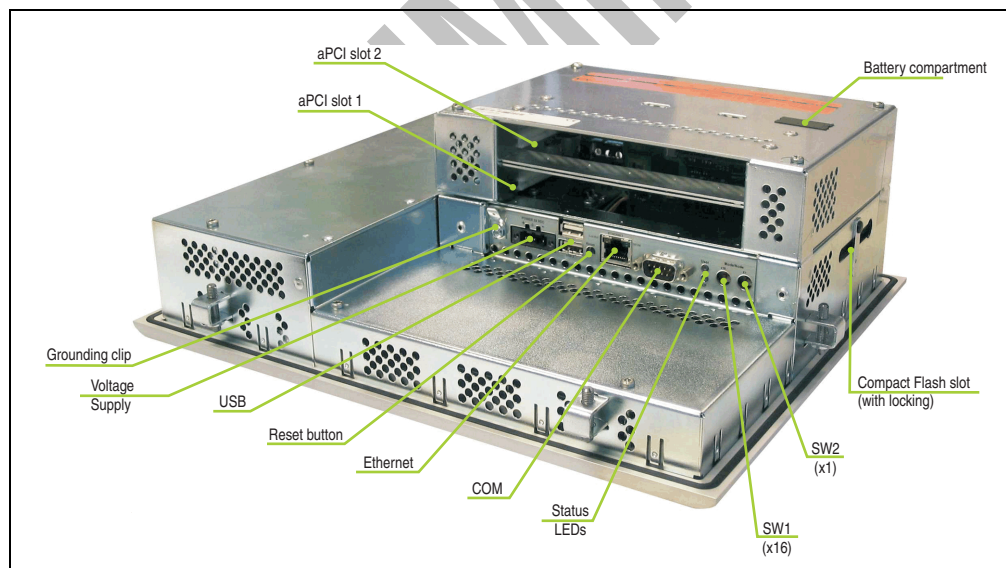| Features	4PP280.1043-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (Lithium, 950mAh, can be exchanged from the outside)

Ethernet
   Controller
   Connection
   Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
   Technology
   Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
   Frame
   Mylar
   Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	
	-
	12
	-
	10
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 80: Technical data 4PP280.1043-75

Chapter 2
Technical Data

Features	4PP280.1043-75
Ground Resistance	$\geq$ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 3.9 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 260 x 86
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 80: Technical data 4PP280.1043-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.24.2 Dimensions
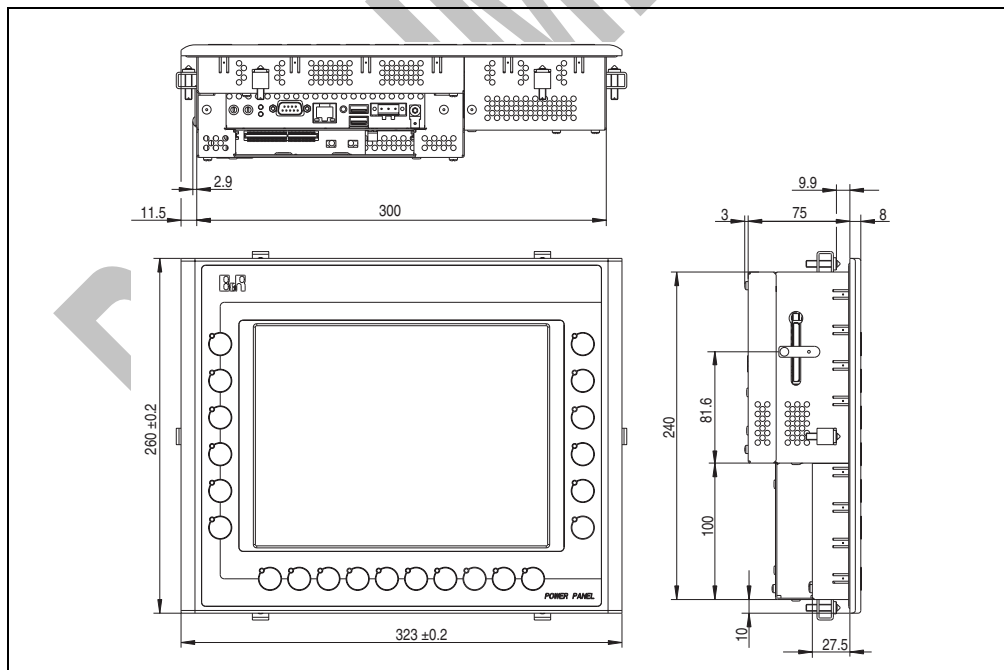
Figure 145: Dimensions 4PP280.1043-75

3.24.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure145 "Dimensions 4PP280.1043-75" on Page 172) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
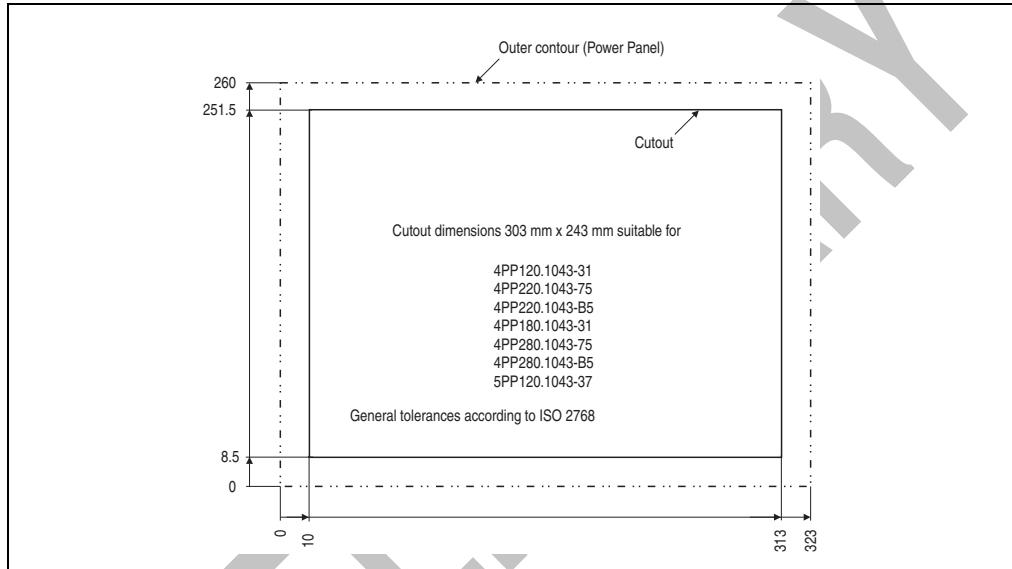
Figure 146: Cutout dimensions

3.24.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 280 TFT C VGA 10.4" FT MH 1aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 81: Delivery 4PP280.1043-75

3.25 Device 4PP280.1043-B5

Figure 147: Front view 4PP280.1043-B5

Figure 148: Rear view 4PP280.1043-B5

3.25.1 Technical Data

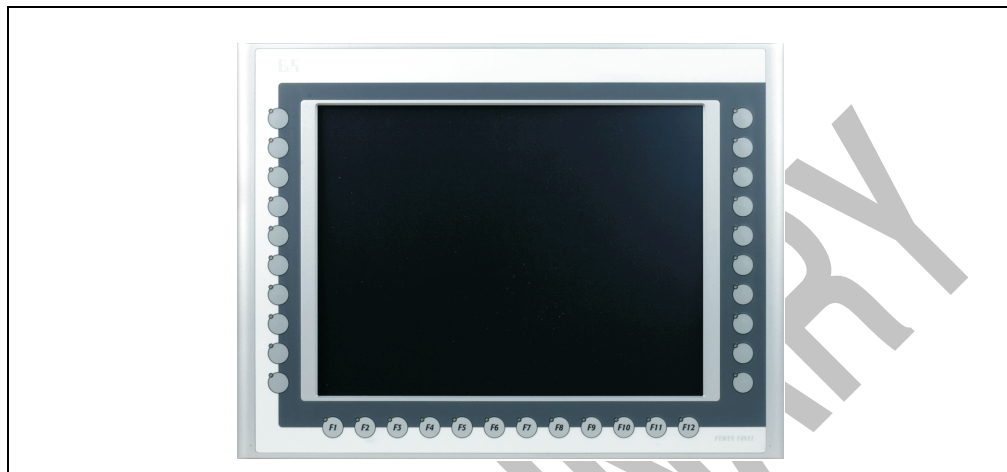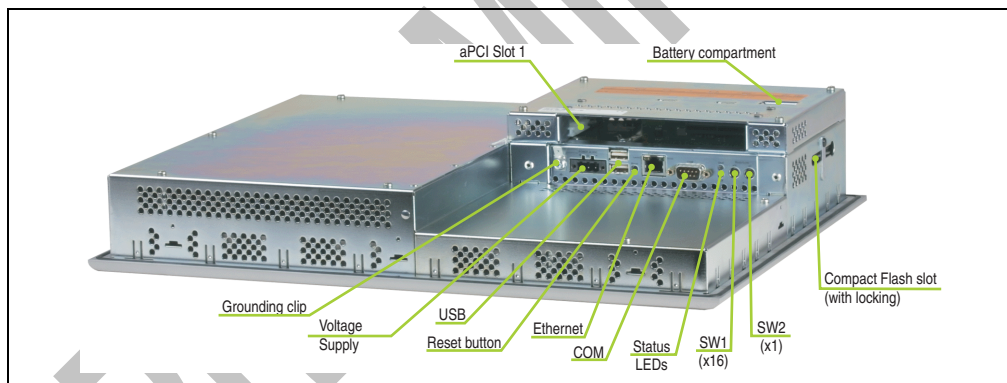| Features	4PP280.1043-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	12
	-
	10
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 82: Technical data 4PP280.1043-B5

Chapter 2
Technical Data

Features	4PP280.1043-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 4.2 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 260 x 108
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	
	0 to 50° C
	-20° C to +70° C

Relative Humidity
    Operation
    Storage
	
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 82: Technical data 4PP280.1043-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.25.2 Dimensions
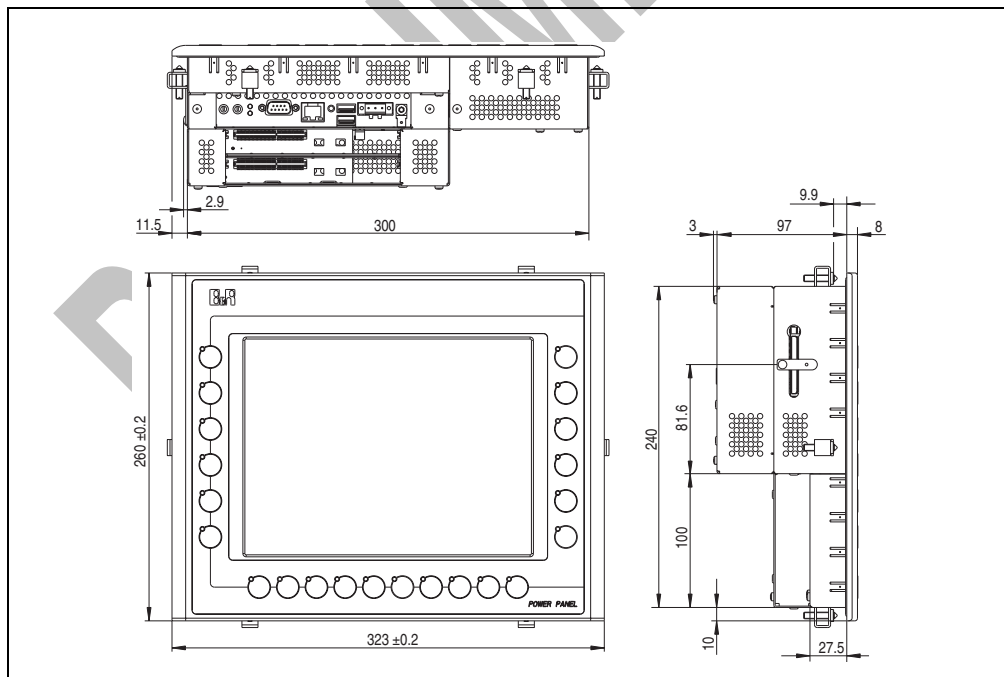
Figure 149: Dimensions 4PP280.1043-B5

3.25.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 149 "Dimensions 4PP280.1043-B5" on Page 176) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
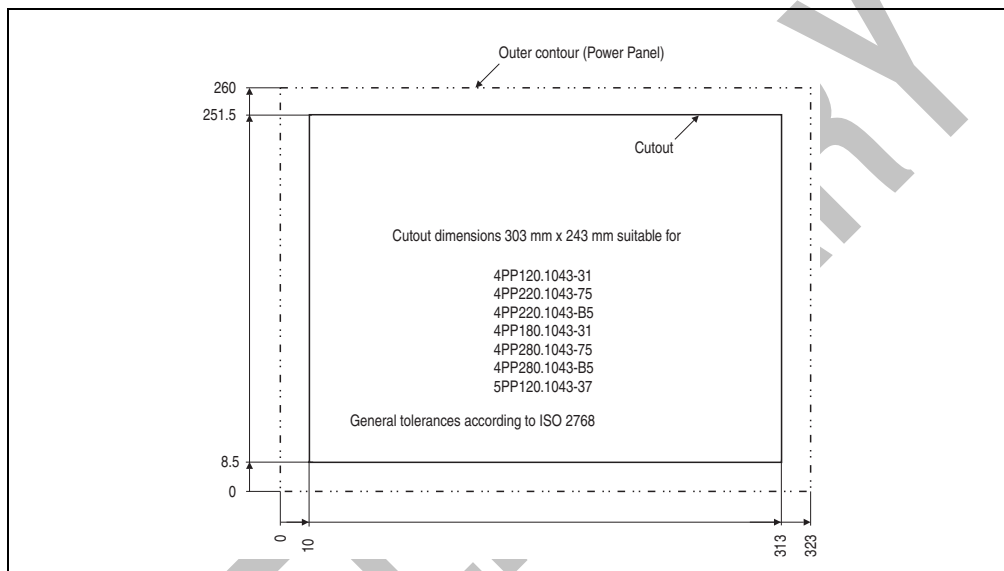
Figure 150: Cutout dimensions

3.25.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 280 TFT C VGA 10.4" FT MH 2aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 83: Delivery 4PP280.1043-B5

3.26 Device 4PP280.1505-75

Figure 151: Front view 4PP280.1505-75

Figure 152: Rear view 4PP280.1505-75

3.26.1 Technical Data

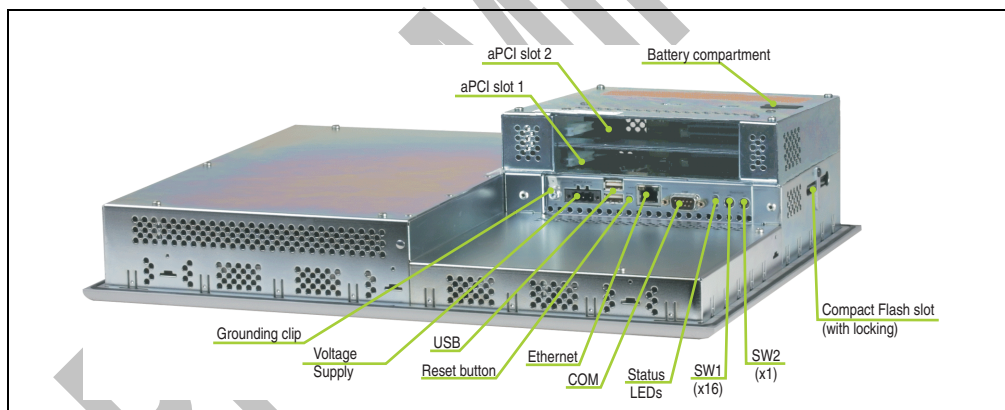| Features	4PP280.1505-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	20
	-
	12
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 84: Technical data 4PP280.1505-75

Features	4PP280.1505-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 38 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 6.5 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	435 x 330 x 87
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 45° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 84: Technical data 4PP280.1505-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.26.2 Dimensions
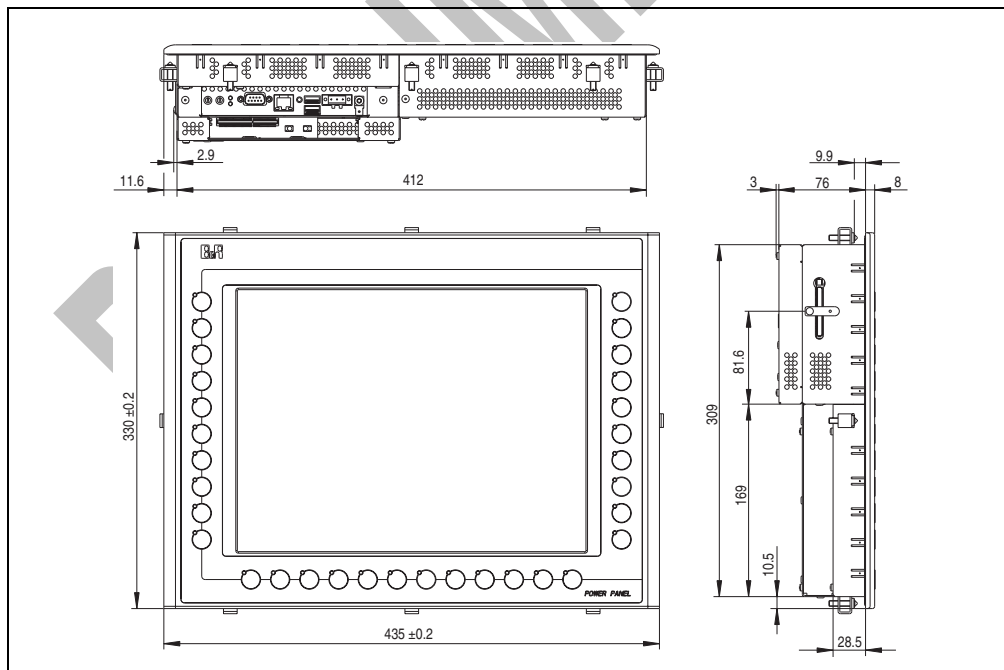
Figure 153: Dimensions 4PP280.1505-75

3.26.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 153 "Dimensions 4PP280.1505-75" on Page 180) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
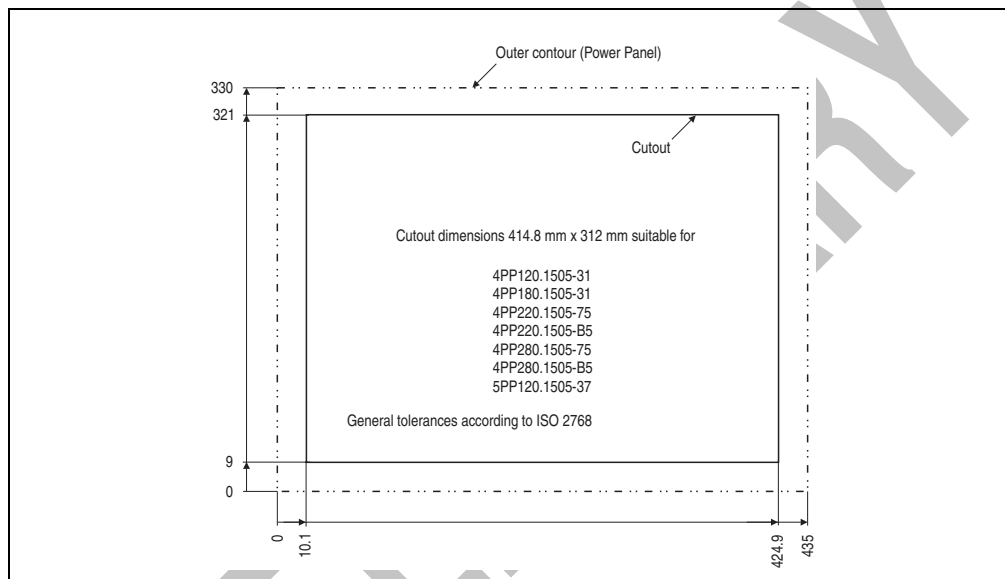
Figure 154: Cutout dimensions

3.26.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 280 TFT C XGA 15" FT MH 1aPCI
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 85: Delivery 4PP280.1505-75

3.27 Device 4PP280.1505-B5

Figure 155: Front view 4PP280.1505-B5

Figure 156: Rear view 4PP280.1505-B5

3.27.1 Technical Data

| Features	4PP280.1505-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	20
	-
	12
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 86: Technical data 4PP280.1505-B5

Chapter 2
Technical Data

Features	4PP280.1505-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 43 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 6.8 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	435 x 330 x 109
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	
	0 to 45° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 86: Technical data 4PP280.1505-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
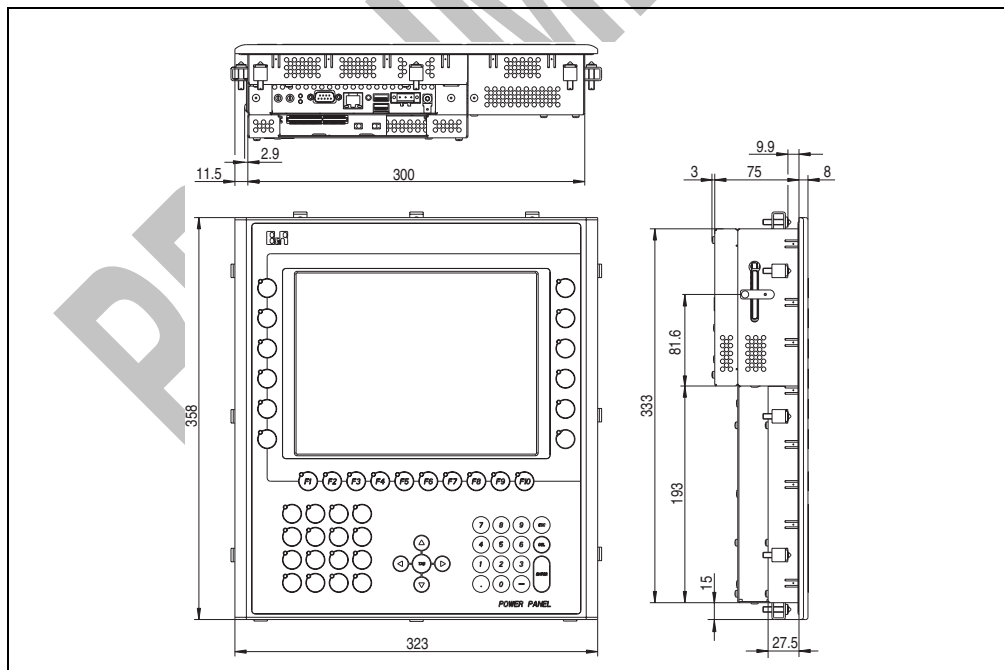
3.27.2 Dimensions
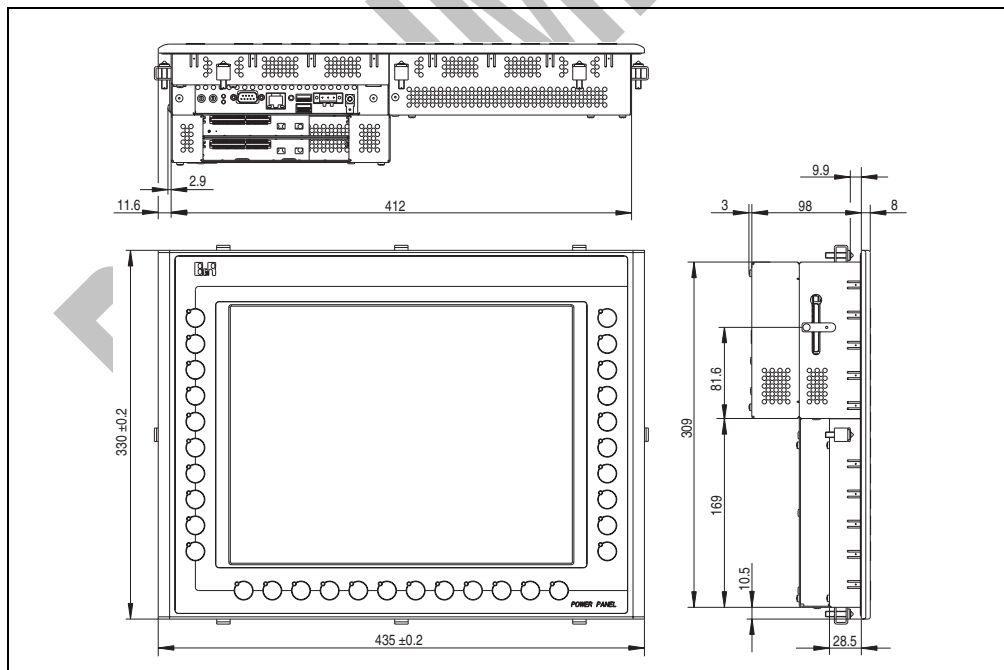
Figure 157: Dimensions 4PP280.1505-B5

3.27.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 157 "Dimensions 4PP280.1505-B5" on Page 184) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
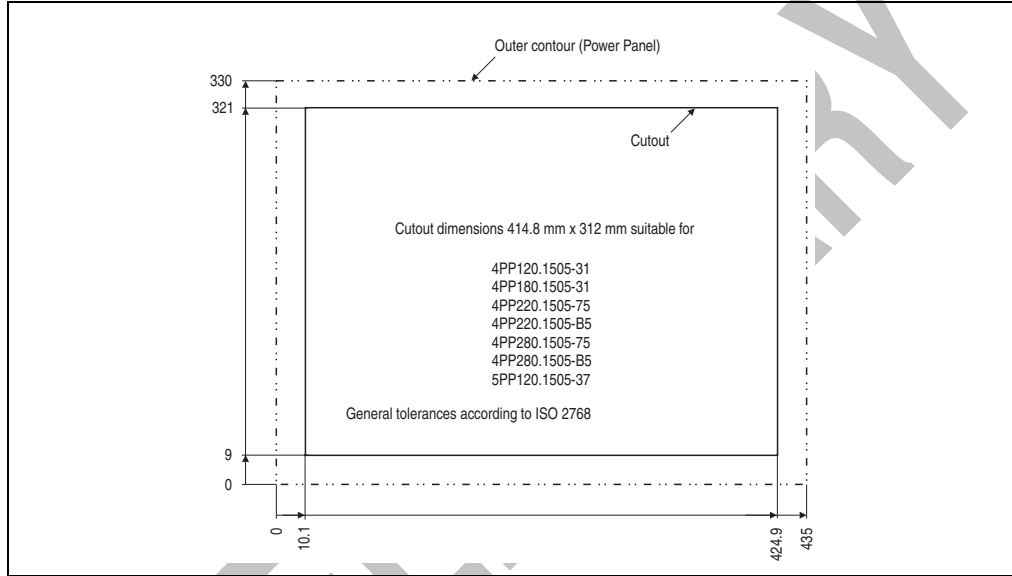
Figure 158: Cutout dimensions

3.27.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 280 TFT C XGA 15" FT MH 2aPCI
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 87: Delivery 4PP280.1505-B5

3.28 Device 4PP281.1043-75

Figure 159: Front view 4PP281.1043-75
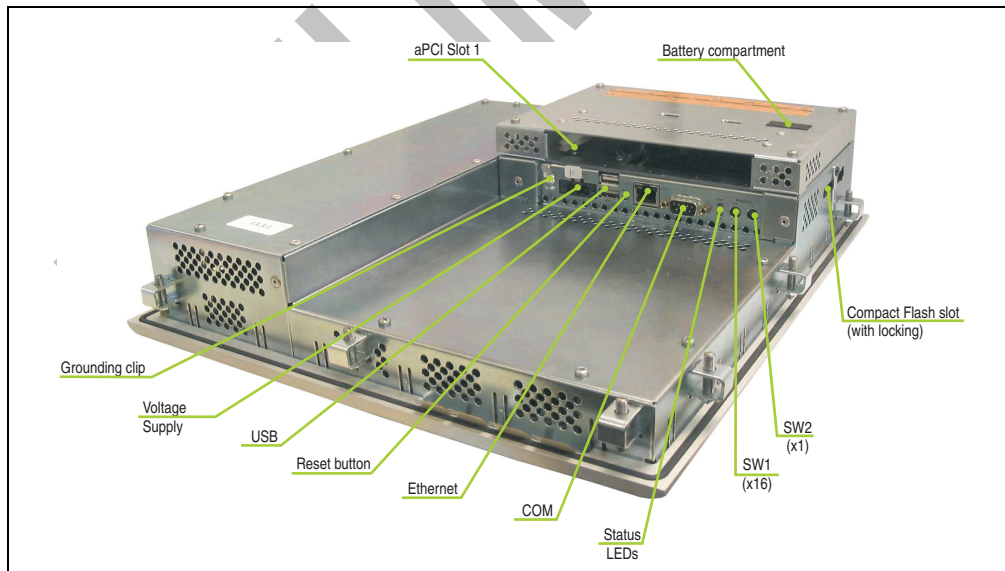
Figure 160: Rear view 4PP281.1043-75

3.28.1 Technical Data

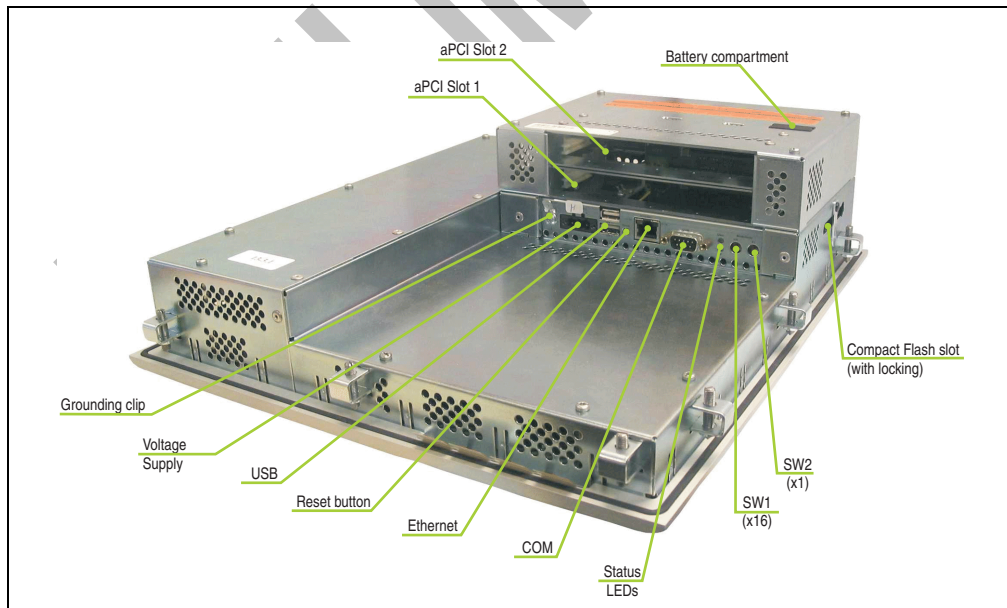| Features	4PP281.1043-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
  Controller
  Connection
  Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
  Type
  Diagonal
  Color
  Resolution
  Background Lighting
    Brightness
    Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
  Technology
  Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
  Frame
  Mylar
  Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
  Function Keys
  Function Keys with LEDs
  Softkeys
  Softkeys with LEDs
  System Keys
  System Keys with LEDs
	
	-
	28
	-
	10
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 88: Technical data 4PP281.1043-75

Chapter 2
Technical Data

Features	4PP281.1043-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 358 x 65.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +70° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 88: Technical data 4PP281.1043-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
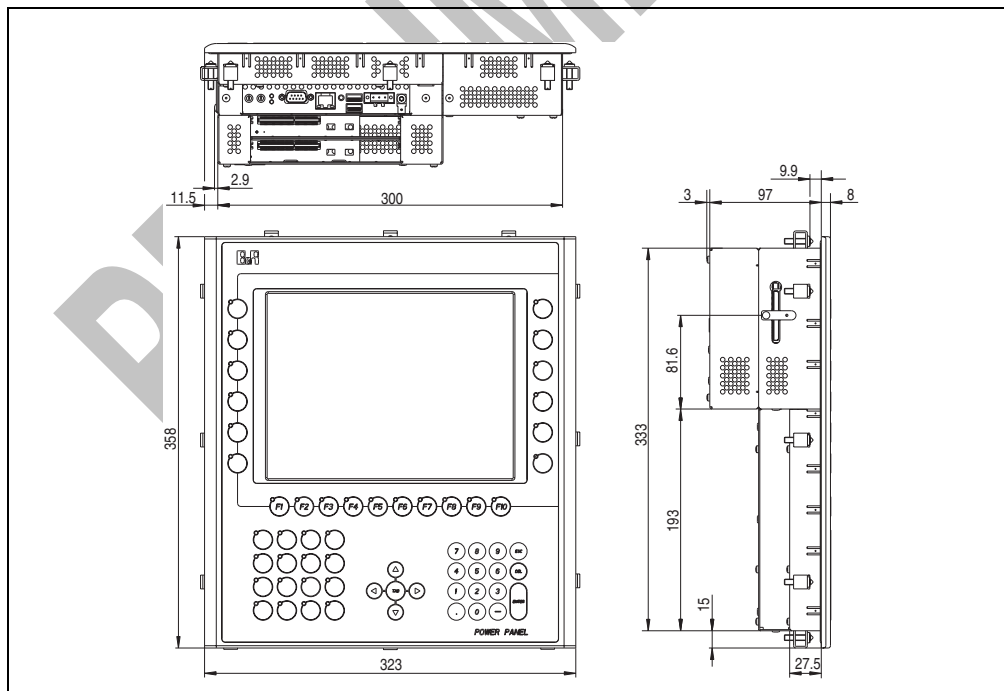
3.28.2 Dimensions

Figure 161: Dimensions 4PP281.1043-75

3.28.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 161 "Dimensions 4PP281.1043-75" on Page 188) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
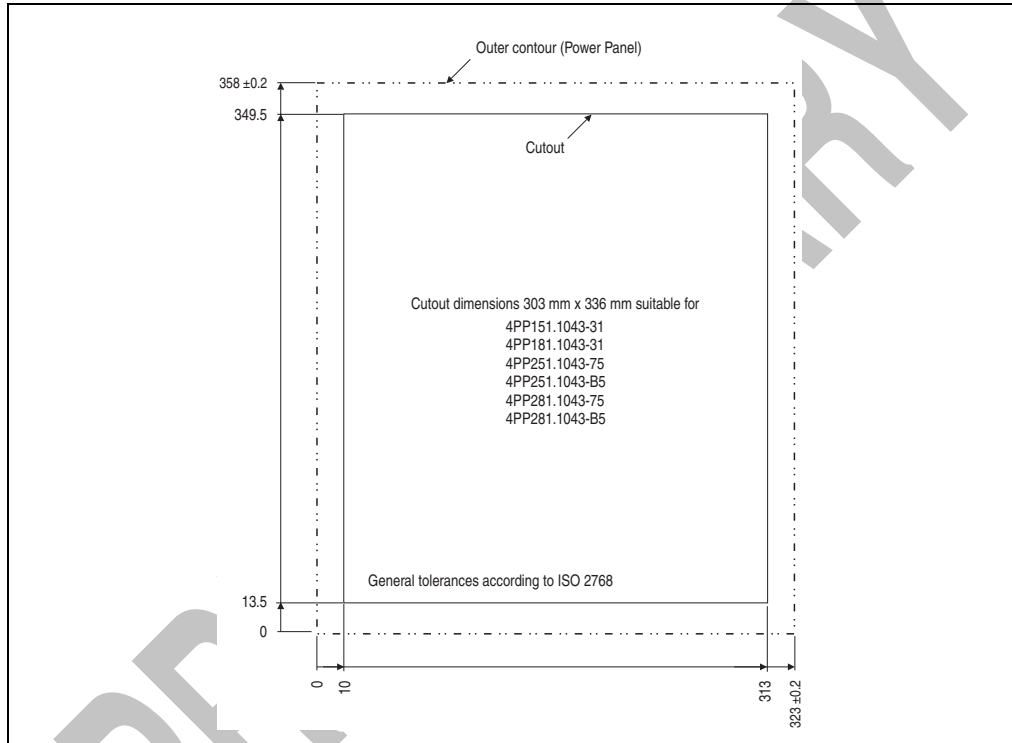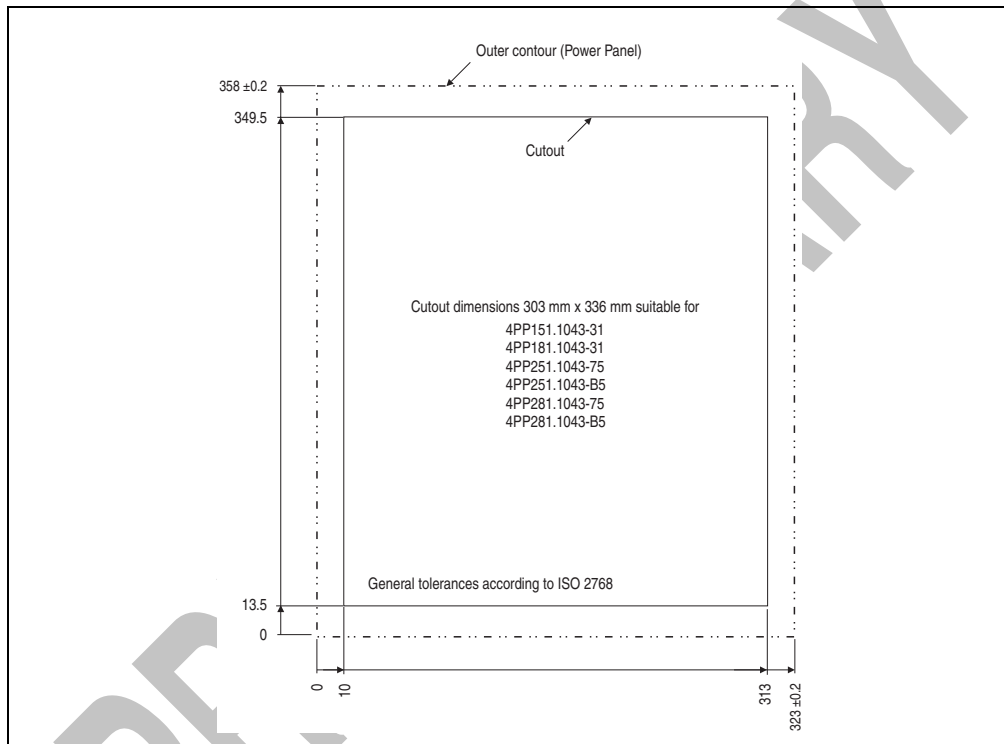
Figure 162: Cutout dimensions

3.28.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 281 TFT C VGA 10.4" FT MH 1aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 89: Delivery 4PP281.1043-75

## 3.29 Device 4PP281.1043-B5

Figure 163: Front view 4PP281.1043-B5

Figure 164: Rear view 4PP281.1043-B5

3.29.1 Technical Data

Features	4PP281.1043-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	28
	-
	10
	20
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 90: Technical data 4PP281.1043-B5

Features	4PP281.1043-B5
Ground Resistance	$\geq$ 47 kOhm
Power Consumption	Approx. 28 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5.3 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	323 x 358 x 108
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 90: Technical data 4PP281.1043-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
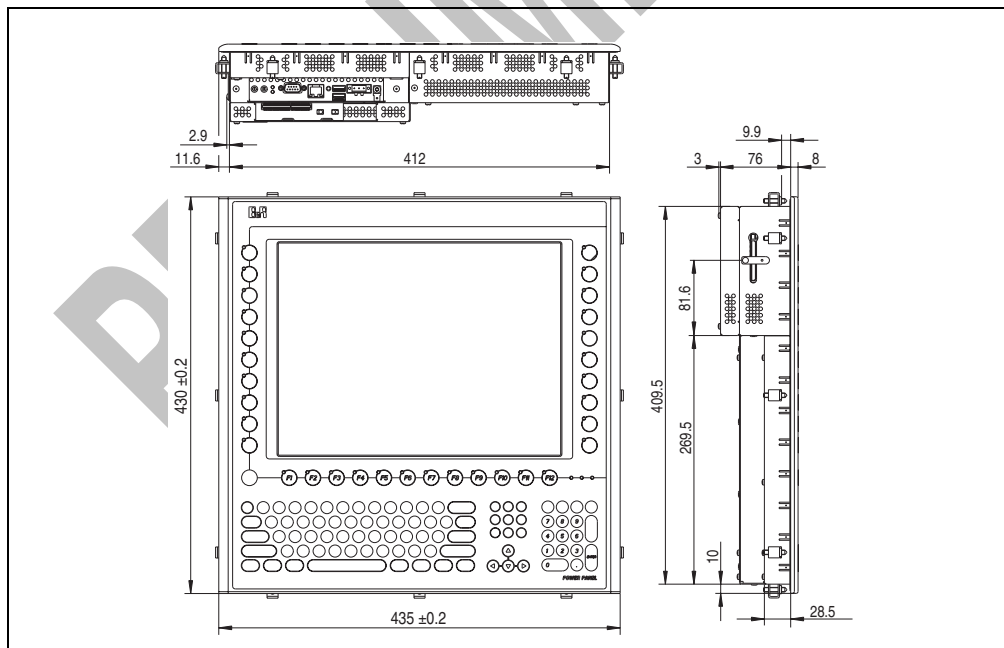
3.29.2 Dimensions

Figure 165: Dimensions 4PP281.1043-B5

3.29.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 165 "Dimensions 4PP281.1043-B5" on Page 192) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
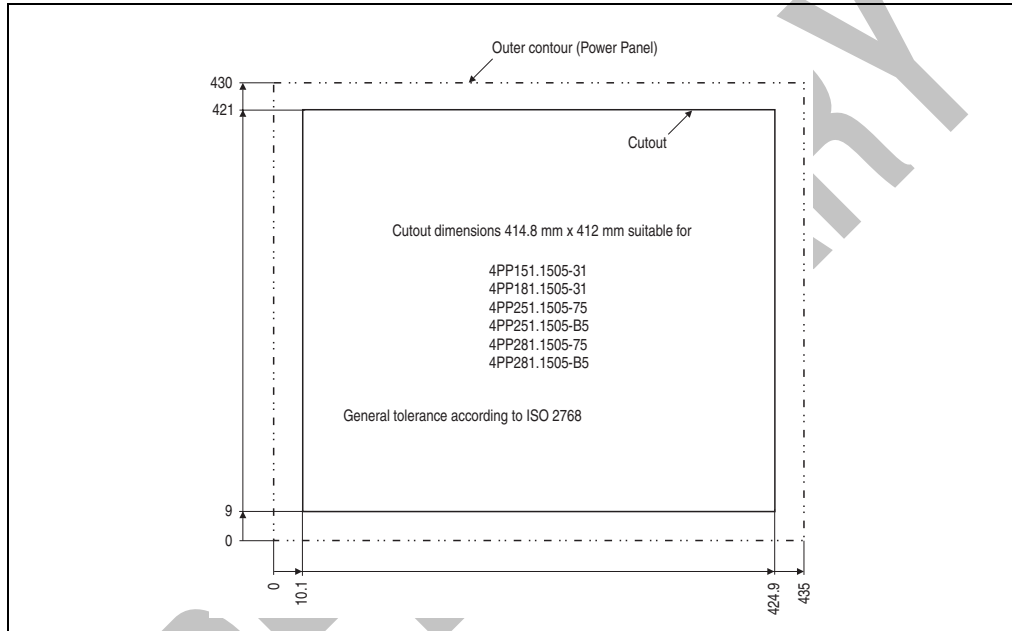

Figure 166: Cutout dimensions

3.29.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 281 TFT C VGA 10.4" FT MH 2aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 91: Delivery 4PP281.1043-B5

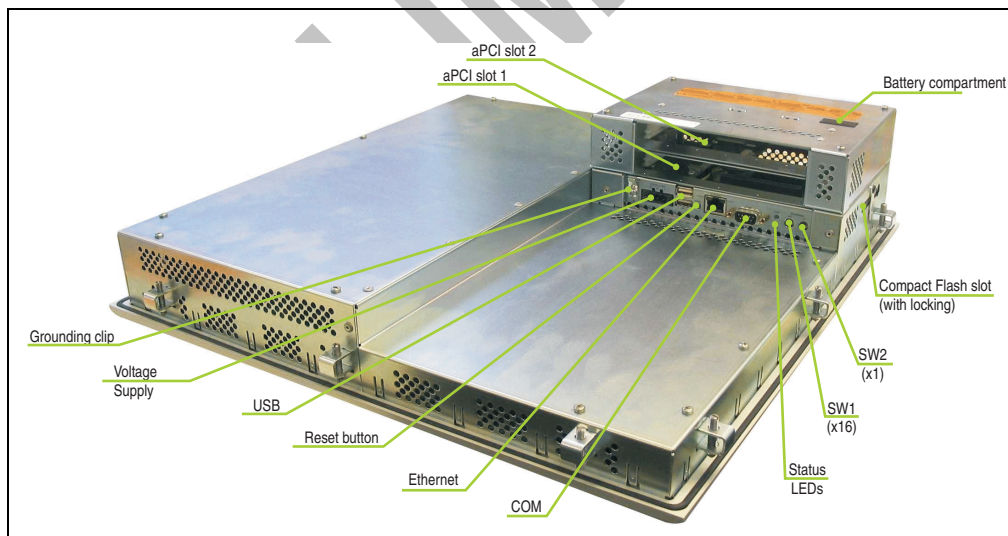## 3.30 Device 4PP281.1505-75
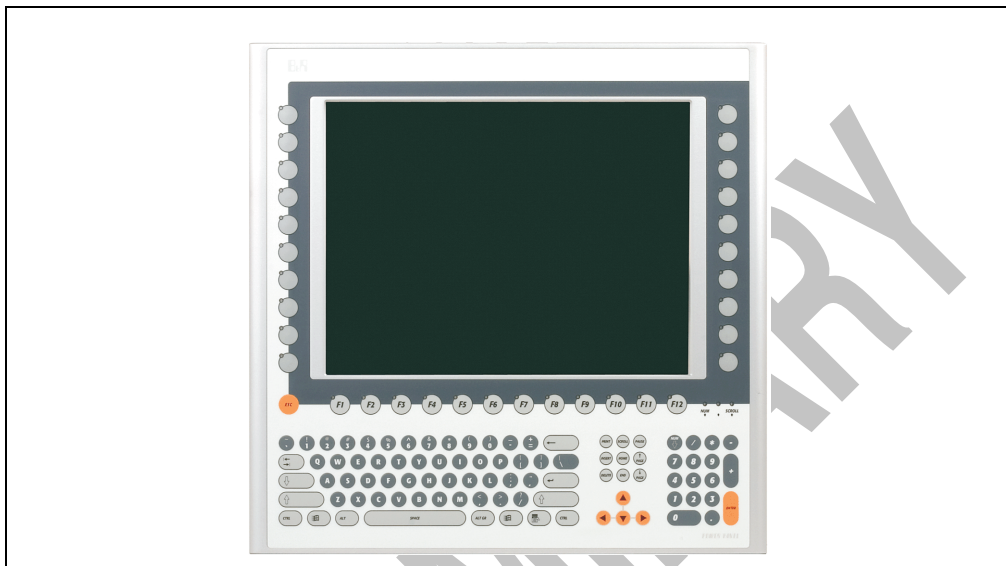
Figure 167: Front view 4PP281.1505-75
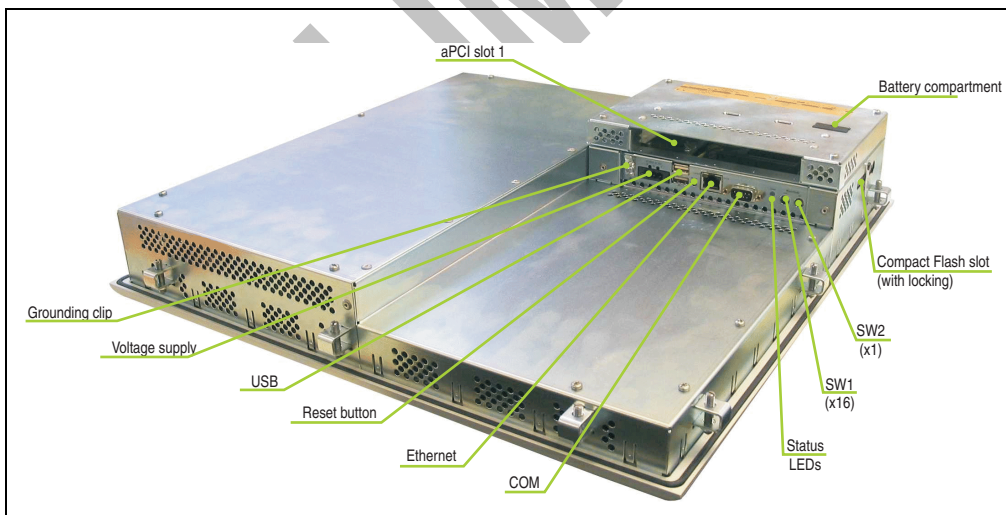
Figure 168: Rear view 4PP281.1505-75

3.30.1 Technical Data

Features	4PP281.1505-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	
	-
	20
	-
	12
	92
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 92: Technical data 4PP281.1505-75

Features	4PP281.1505-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 30 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 8 kg
Outer Dimensions in mm (WxHxD)	435 x 430 x 87
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	 0 to 40° C -20° C to +60° C
Relative Humidity Operation Storage	 5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 92: Technical data 4PP281.1505-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
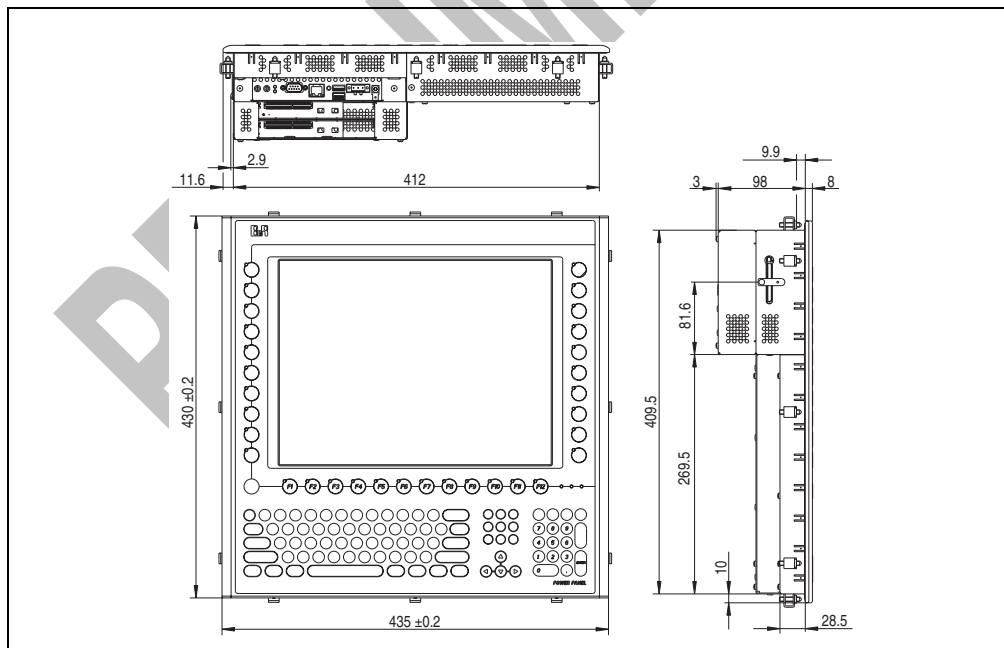
3.30.2 Dimensions

Figure 169: Dimensions 4PP281.1505-75

3.30.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure169 "Dimensions 4PP281.1505-75" on Page 196) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
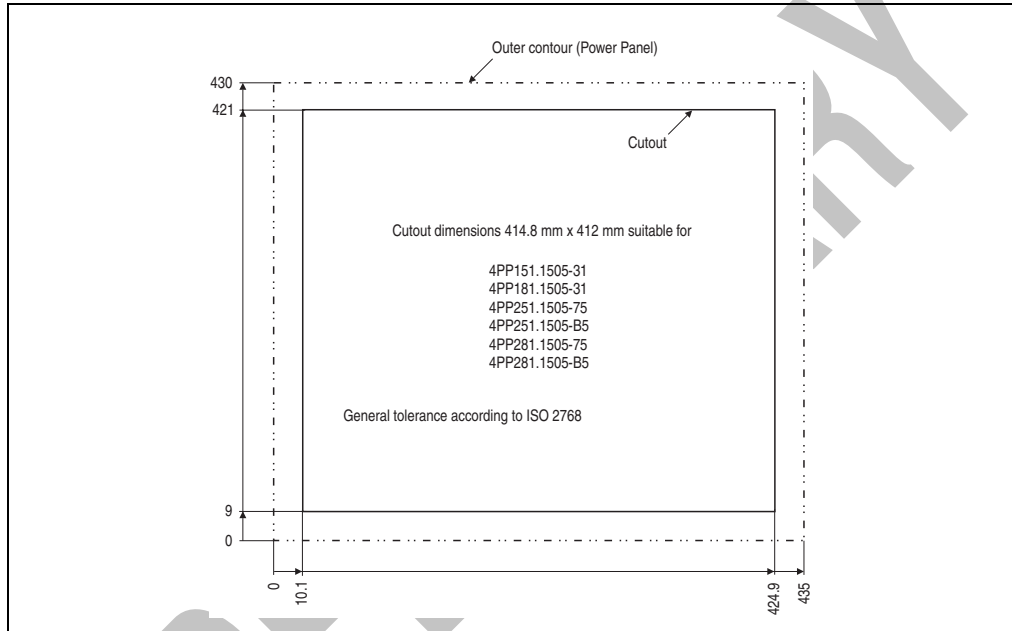

Figure 170: Cutout dimensions

3.30.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 TFT C XGA 15" FT MH 1aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 93: Delivery 4PP281.1505-75

## 3.31 Device 4PP281.1505-B5
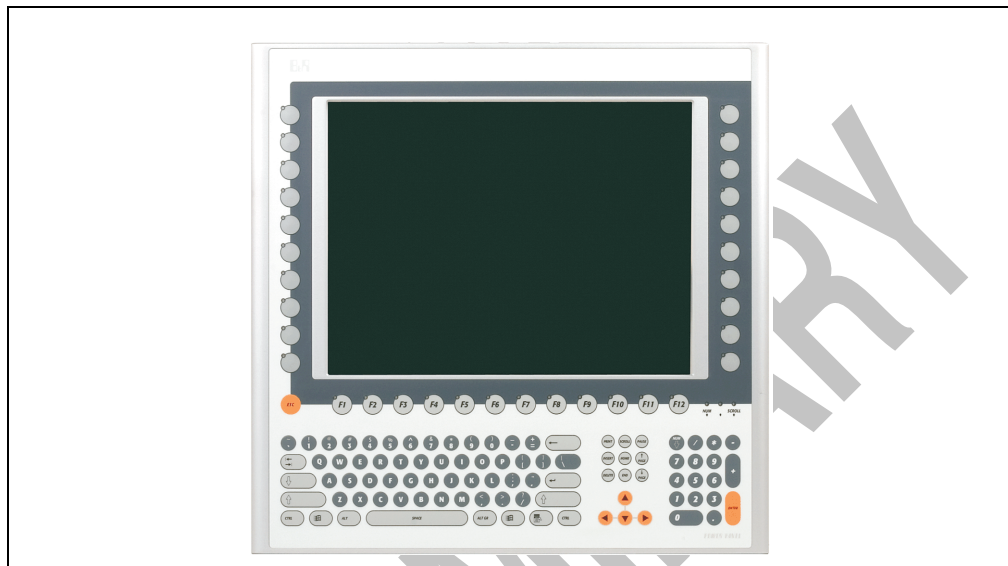
Figure 171: Front view 4PP281.1505-B5

Figure 172: Rear view 4PP281.1505-B5

3.31.1 Technical Data

Features	4PP281.1505-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
   Controller
   Connection
   Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	
	TFT
	15 in
	256 colors
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
   Technology
   Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
   Frame
   Mylar
   Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	
	-
	20
	-
	12
	92
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 94: Technical data 4PP281.1505-B5

Chapter 2
Technical Data

Features	4PP281.1505-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 30 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 8.3 kg
Outer Dimensions in mm (WxHxD)	435 x 430 x 109
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 40° C -20° C to +60° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 94: Technical data 4PP281.1505-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
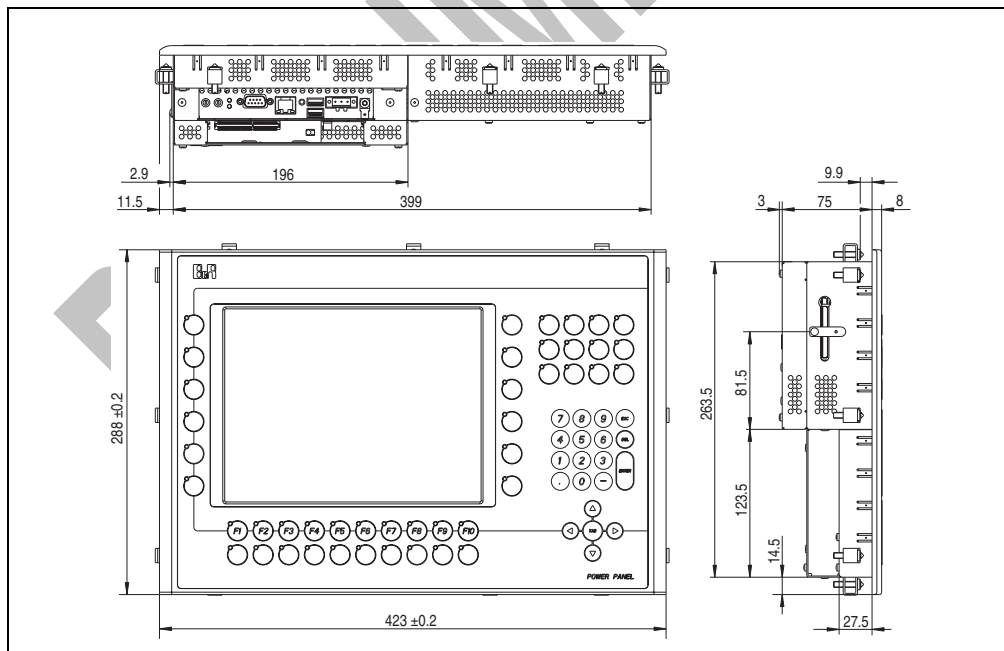
3.31.2 Dimensions

Figure 173: Dimensions 4PP281.1505-B5

3.31.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 173 "Dimensions 4PP281.1505-B5" on Page 200) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
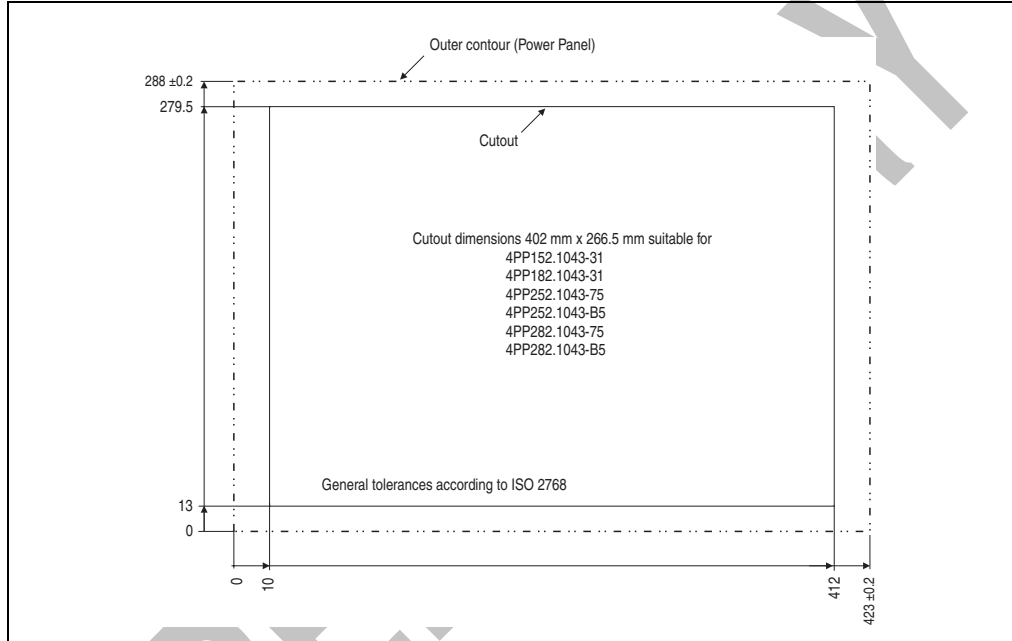

Figure 174: Cutout dimensions

3.31.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 TFT C XGA 15" FT MH 2aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
2	Legend strips (inserted in the front)

Table 95: Delivery 4PP281.1505-B5

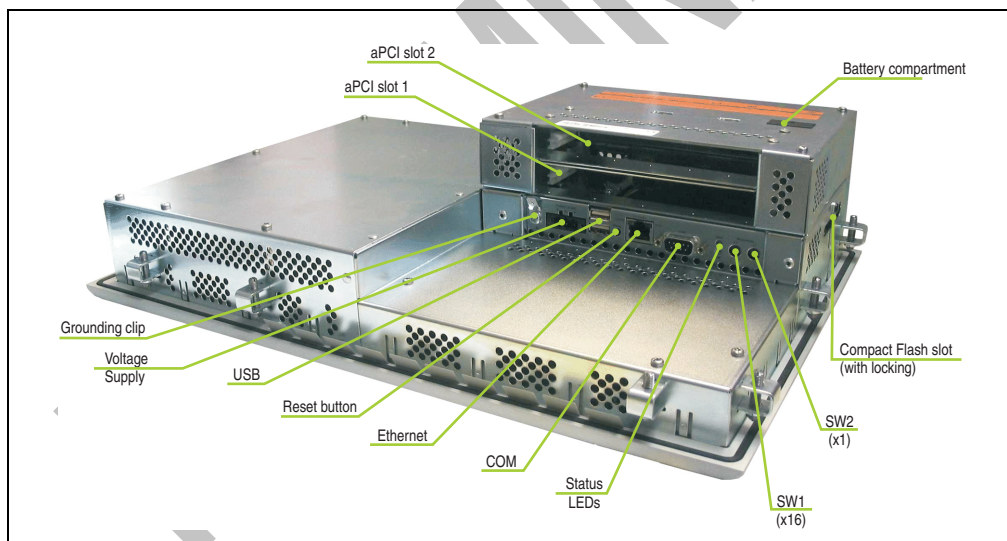## 3.32 Device 4PP282.1043-75

Figure 175: Front view 4PP282.1043-75
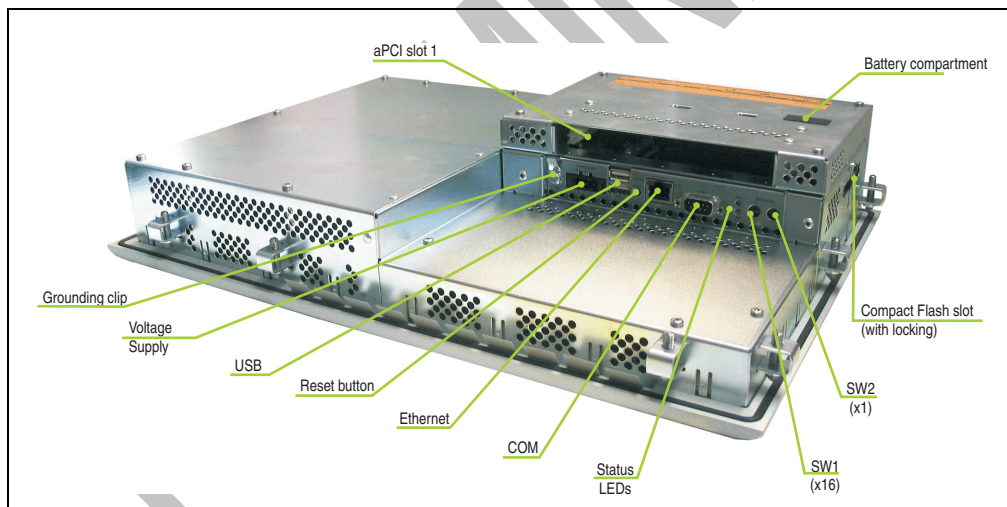
Figure 176: Rear view 4PP282.1043-75

3.32.1 Technical Data

Features	4PP282.1043-75
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
   Controller
   Connection
   Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	1 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
   Technology
   Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
   Frame
   Mylar
   Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	
	-
	32
	-
	-
	20
	12

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 96: Technical data 4PP282.1043-75

Features	4PP282.1043-75
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 23 Watt [1] with inserted aPCI interface module
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5.2 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	423 x 288 x 86
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 96: Technical data 4PP282.1043-75 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).
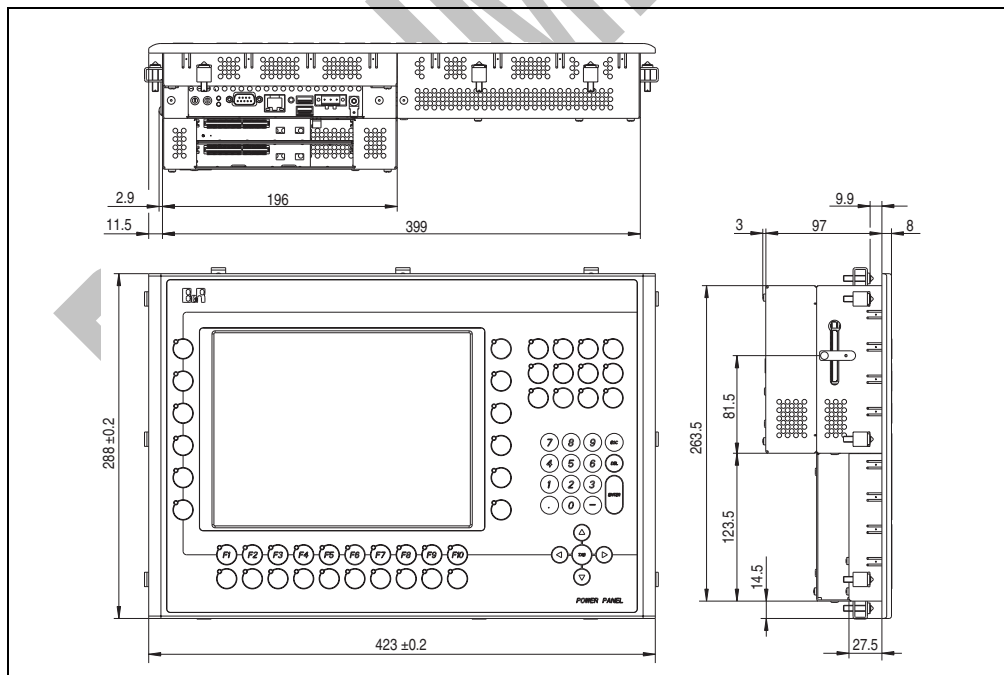
3.32.2 Dimensions

Figure 177: Dimensions 4PP282.1043-75

3.32.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 177 "Dimensions 4PP282.1043-75" on Page 204) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
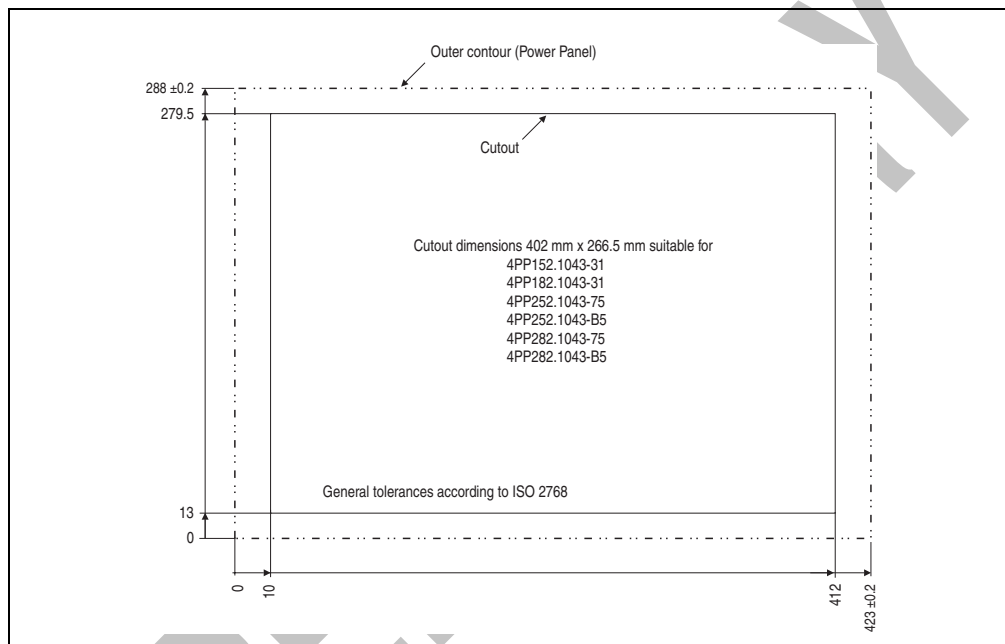

Figure 178: Cutout dimensions

3.32.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 282 TFT C VGA 10.4" FT MH 1aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
16	Legend strips (inserted in the front)

Table 97: Delivery 4PP282.1043-75

3.33 Device 4PP282.1043-B5

Figure 179: Front view 4PP282.1043-B5

Figure 180: Rear view 4PP282.1043-B5

3.33.1 Technical Data

Features	4PP282.1043-B5
Boot Loader / Operating System	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	Yes (256 kByte on-board, battery buffered)
Watch Dog	Yes (SMC internal)
Power Fail Logic	Yes (SMC 10 ms buffer time)
Real-time Clock	Yes, not battery backed
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
   Controller
   Connection
   Cabling
	
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	2 piece (See B&R System 2005 Manual for available aPCI interface modules)

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	
	TFT
	10.4 in
	256 colors
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
   Technology
   Controller
	
	Analog, resistive (3M)
	Serial (Hampshire)

Front
   Frame
   Mylar
   Gasket
	
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	
	-
	32
	-
	-
	20
	12

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 98: Technical data 4PP282.1043-B5

Features	4PP282.1043-B5
Ground Resistance	≥ 47 kOhm
Power Consumption	Approx. 28 Watt [1] with inserted aPCI interface modules
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 5.5 kg (without aPCI interface modules)
Outer Dimensions in mm (WxHxD)	423 x 288 x 108
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	0 to 50° C -20° C to +70° C
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 98: Technical data 4PP282.1043-B5 (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.33.2 Dimensions

Figure 181: Dimensions 4PP282.1043-B5

3.33.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 181 "Dimensions 4PP282.1043-B5" on Page 208) For further information regarding mounting, see chapter 3 "Installation" on Page 247.

Figure 182: Cutout dimensions

3.33.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 282 TFT C VGA 10.4" FT MH 2aPCI
12	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
16	Legend strips (inserted in the front)

Table 99: Delivery 4PP282.1043-B5

4. Power Panel 100 with BIOS

4.1 Interface Descriptions

In the following section, a description is given for all interfaces and plugs which a Power Panel can have.

4.1.1 Supply Voltage

Input Voltage: 24 VDC ± 25%, not electrically isolated

The 3-pin socket required for the supply voltage connection is not contained in the delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The cable required for the connection must be supplied by the customer (see also section "TB103 3-pin Supply Voltage Connector", on page 324).

The supply voltage is internally protected, so that the device cannot be damaged if there is an overload or if the voltage supply is connected incorrectly.

The pin assignments can be found either in the following table or printed onto the Power Panel plate or device label (see section 4.2.2 "Device Label" on Page 216).

Supply Voltage		
Pin	**Description**	
1	+	
2	Ground	
3	-	
Accessories		
0TB103.9	Plug 24 V 5.08 3p screw clamps	
0TB103.91	Plug 24 V 5.08 3p cage clamps	
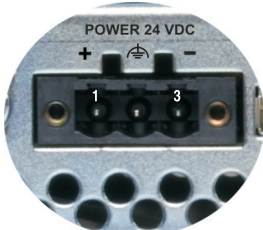
Figure 183: Supply voltage connection

Warning!

The pin's connection to the ground (functional ground) should be as short as possible. If the Power Panel is installed in a switching cabinet, the connection cable should not be longer than 15 cm.

4.1.2 Grounding Clip

Should be connected with ground using the shortest route possible.
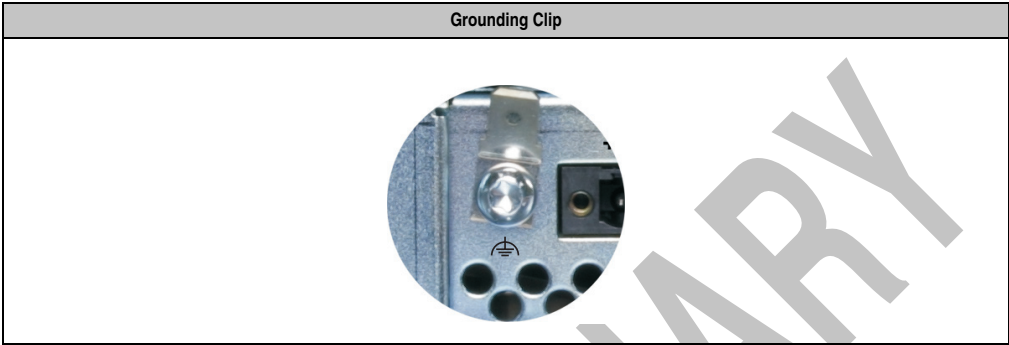
Grounding Clip

Figure 184: Grounding clip

4.1.3 COM Interface

The Power Panel is equipped with a PC compatible serial interface with 16 bytes FIFO.

The RS232 can also be used as a general interface (e.g. third-party connection, bar code reader, etc.).

Serial Interface	
RS232 Interface modem capable, not electrically isolated Up to 115 kBaud	9-pin DSUB connector
Pin / **RS232**	

Pin	RS232
1	DCD
2	RXD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Table 100: COM pin assignment

4.1.4 USB port

The Power Panel is equipped with a USB (Universal Serial Bus) Host controller with two USB ports.

Universal Serial Bus
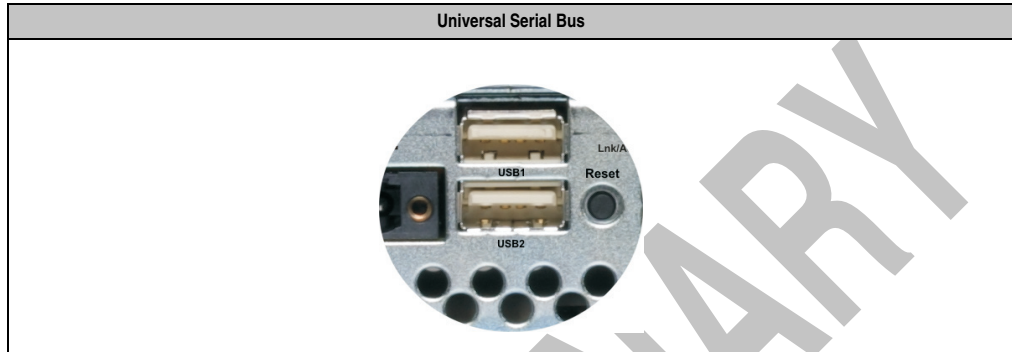
Figure 185: USB port connection

Technical Data for USB Port	
Transfer Rate	1.5 MBit/s to 12 MBit/s
Power Supplies	500 mA for each port
Maximum Cable Length	5 m (can be extended using a USB hub)

Table 101: Technical data for USB connection

Warning!

Only USB devices tested and verified by B&R, which can be found in chapter "Accessories", on page 321, are allowed to be connected to the USB interface.

Warning!

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

4.1.5 Mode / Node switch

The Power Panel devices are equipped with 2 hex switches, which are used as an operating mode switch. Switch positions 01 up to FF are available for any purpose in an application. The switch position can be evaluated by an application program.

Mode / Node Switch

Figure 186: Mode / node switch

Switch Position		Function	Description
SW1 (x16)	SW2 (x1)	Operating mode switch	
0	0	Service Mode	• The resolution for the display used is automatically set (see also section "Video and Flat Panel Configuration", on page 262). • Contrast and brightness settings for the display are set to default values (see also section "Video and Flat Panel Configuration", on page 262). • Legacy USB support is always set to "enabled", independent of the BIOS setting (see section "Advanced BIOS Features", on page 267). • With incorrect factory settings (e.g. if the checksum is wrong), the Power Panel boots but the display is not initialized. This error is signalized by a continuous **lighting of the user LED** . Video output is then only possible using the REMHOST utility (see section "REMHOST", on page 308). • When switching on the Power Panel, the Power Panel can be controlled by the user using a serial connection to a PC and using the REMHOST tool e.g. making changes in the BIOS. REMHOST supports only text mode for video output. This means that the output of programs, which are directly recorded in the video memory are not correctly displayed. • The Power Panel attempts to establish a connection to the REMHOST utility (a "ping" is sent to the serial interface).
x	x	Other switch positions have no significance	

Table 102: Switch settings for the Mode / Node switch

4.1.6 Status LEDs

Power Panels are equipped with two status LEDs, which are visible on the outside.
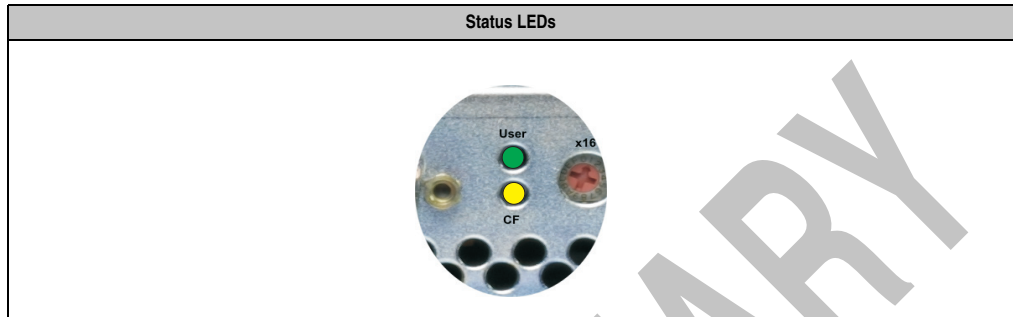
Status LEDs

LED	Color	Function
User	Green	Freely available for use in an application
CF	Yellow	Indicates that the Compact Flash card is being accessedt

Table 103: Status LEDs

4.1.7 Ethernet Connection

Ethernet Connection
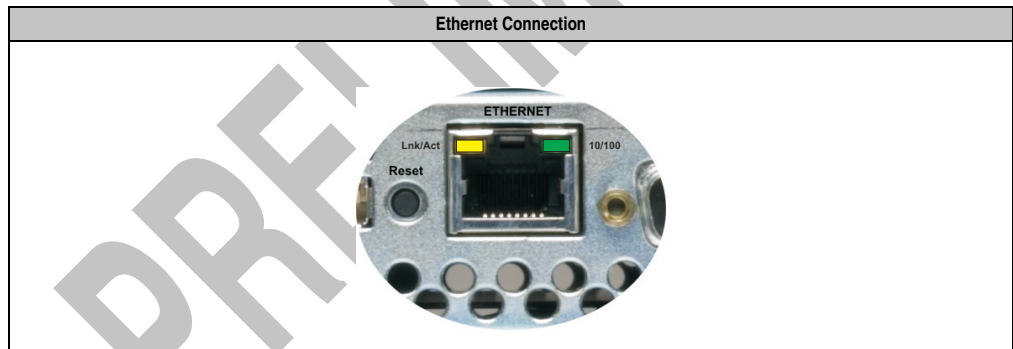
Figure 187: Ethernet connection

Ethernet	10/100 MBit/s [1]
Connection	RJ45 Twisted Pair (10BaseT/100BaseT)
Controller	MacPhyter DP83815 or DP83816 - depends on the revision
Cabling	S/STP (category 5)

Table 104: Ethernet controller

1) Both operating modes are possible. Switching takes place automatically

The onboard Ethernet controller for Power Panel devices provides an RJ45 Twisted Pair connection, to which 2 LEDs are attached for status control:

LED	On	Done
Green	100 MBit/s	10 MBit/s
Yellow	Link	Activity (blinking)

Table 105: Status LEDs Ethernet controller

4.1.8 Reset Button

The reset button can be accessed through a small hole between the USB and the Ethernet connection. In order to avoid accidental activation, a reset can only be triggered with a pointed object.

Reset Button

Figure 188: Reset Button

4.1.9 Compact Flash Slot

Power Panel devices are equipped with a Compact Flash slot which is accessible from the side. Compact Flash cards of type I are supported.

Figure 189: Compact Flash slot

It is possible to protect the Compact Flash slot using a safety clip. By pressing the ejector (using a pointed object is the best way to do this) the Compact Flash card can be changed quickly and safely.

Caution!

Changing the Compact Flash card can only take place without power applied! As a safety measure, a sticker will also be attached to Power Panel devices.

4.2 Label

4.2.1 Safety Sticker

A safety sticker is attached over the Compact Flash slot, which advises that the power must be switched off for the Power Panel device (depending on the revision) when inserting or removing a Compact Flash card.

An ESD warning sticker is attached next to the battery compartment. This indicates the components at risk from electrostatic discharge inside Power Panel devices.
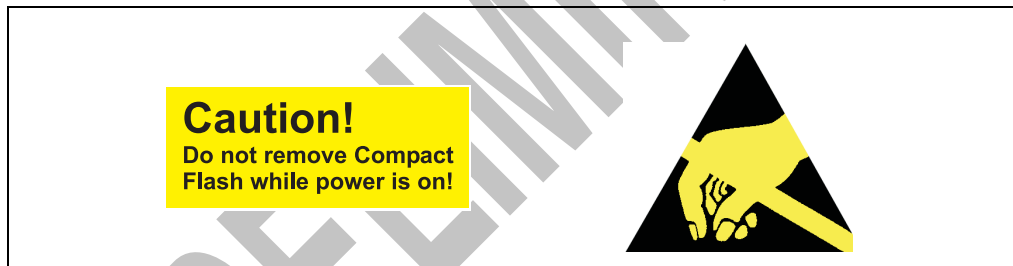
Figure 190: Safety sticker

4.2.2 Device Label

The following label attached in a suitable location on the Power Panel, displays short definitions for all of the interfaces:
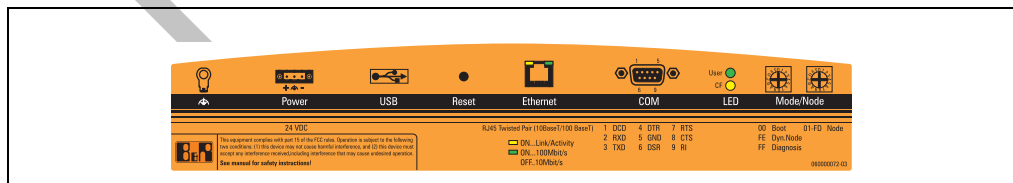
Figure 191: Device label

4.2.3 Serial Number Label

General Information

Each B&R device is assigned a unique serial number label with bar code, which allows the device to be clearly identified.
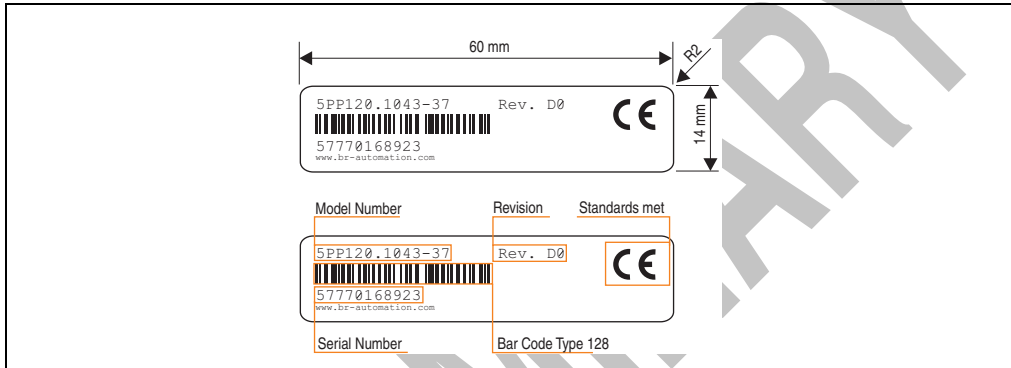
Design / Dimensions

Figure 192: Design / dimensions for serial number label

4.3 Device 5PP120.0571-27

Figure 193: Front view 5PP120.0571-27
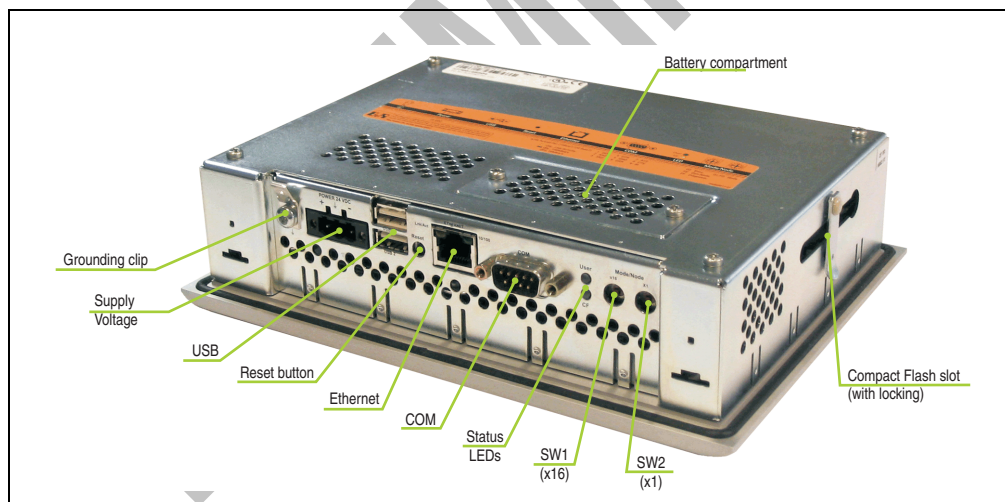
Figure 194: Rear view 5PP120.0571-27

4.3.1 Technical Data

Features	5PP120.0571-27
Boot Loader / Operating System	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)
Ethernet Controller Connection Cabling	MacPhyter DP83816 (starting from rev. D0 - previously DP83815) (on-board); 10/100 Mbit/s RJ 45 Twisted Pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-
Display Type Diagonal Color Resolution Background Lighting Brightness Half Brightness Time	LCD 14.48 cm 512 colors [1] QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	- - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 106: Technical data 5PP120.0571-27

Chapter 2
Technical Data

Features	5PP120.0571-27
Ground Resistance	0 Ohm
Power Consumption	Approx. 10 Watt[2]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Front design	Bright gray, anodized aluminum
Weight	Approx. 1.4 kg
Outer Dimensions in mm (WxHxD)	212 x 156 x 55.5
Altitude	Max. 3,000 m
Environmental Temperature Operation Storage	 0 to 50° C -20° C to +60° C
Relative Humidity Operation Storage	 5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing

Table 106: Technical data 5PP120.0571-27 (Forts.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.

2) The starting current can amount to around 20 A for a short period (approx.1 ms).

4.3.2 Dimensions
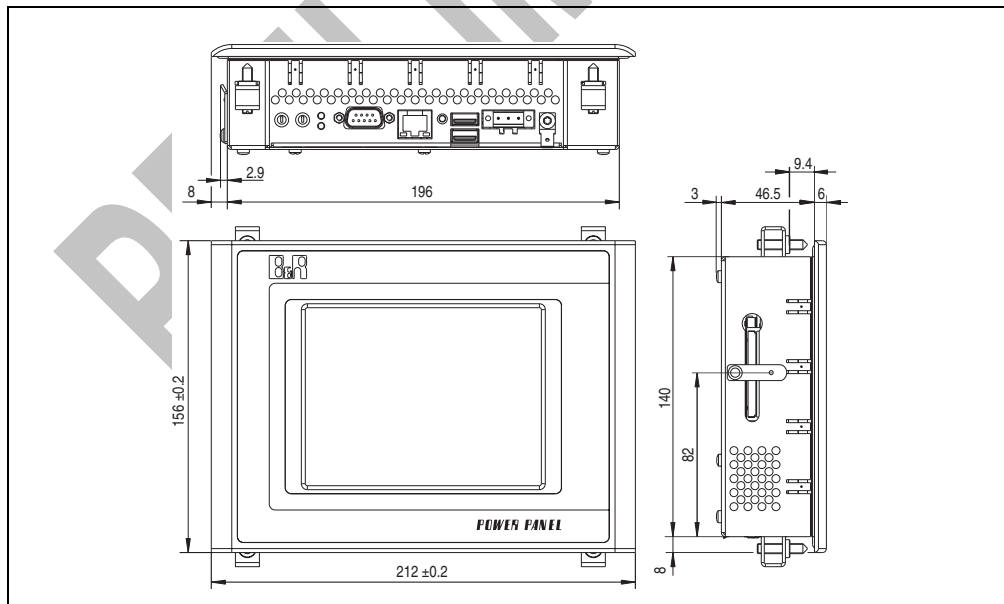
Figure 195: Dimensions 5PP120.0571-27

4.3.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 195 "Dimensions 5PP120.0571-27" on Page 220) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
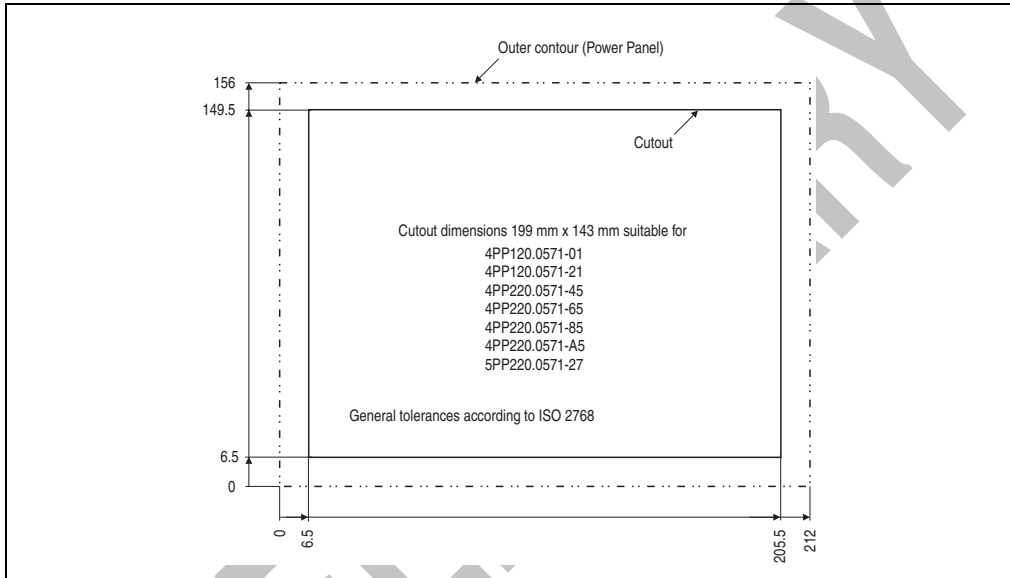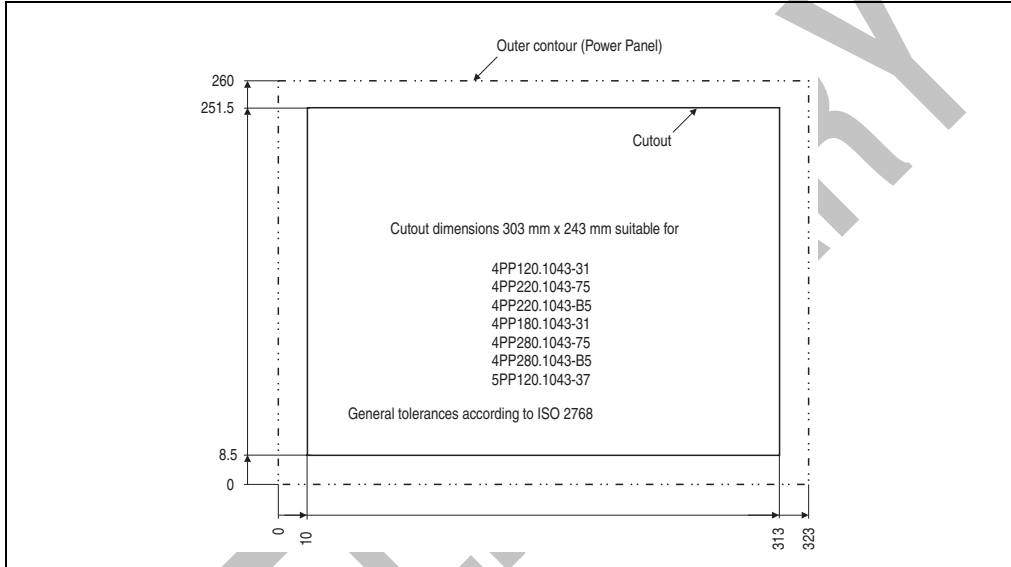

Figure 196: Cutout Dimensions

4.3.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD C QVGA 5.7" T MH
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 107: Delivery 5PP120.0571-27

## 4.4 Device 5PP120.1043-37

Figure 197: Front view 5PP120.1043-37
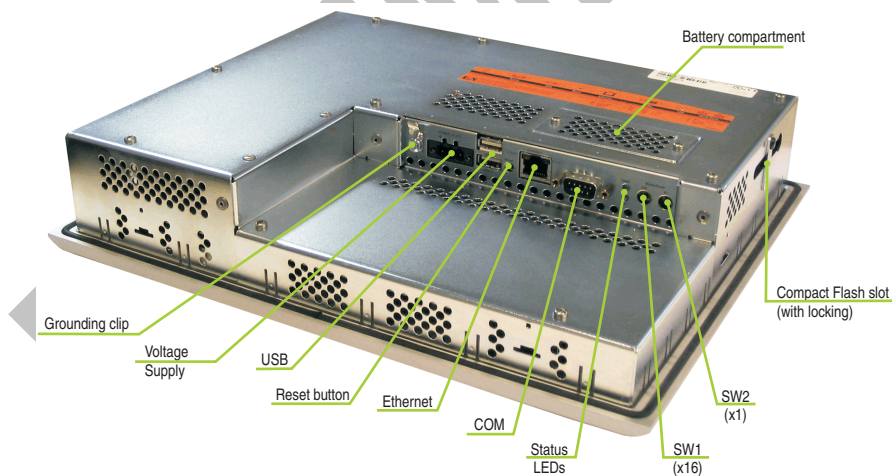
Figure 198: Rear view 5PP120.1043-37

4.4.1 Technical Data

Features	5PP120.1043-37
Boot Loader / Operating System	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. D0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	TFT
	26.42 cm
	262,144 colors [1]
	VGA, 640 x 480 pixels
	
	350 cd/m²
	55,000 hours

Touch Screen
    Technology
    Controller
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 108: Technical data 5PP120.1043-37

Features	5PP120.1043-37
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 15 Watt[2]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 3.7 kg
Outer Dimensions in mm (WxHxD)	323 x 260 x 65.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +70° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 108: Technical data 5PP120.1043-37 (Forts.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.

2) The starting current can amount to around 20 A for a short period (approx.1 ms).

4.4.2 Dimensions
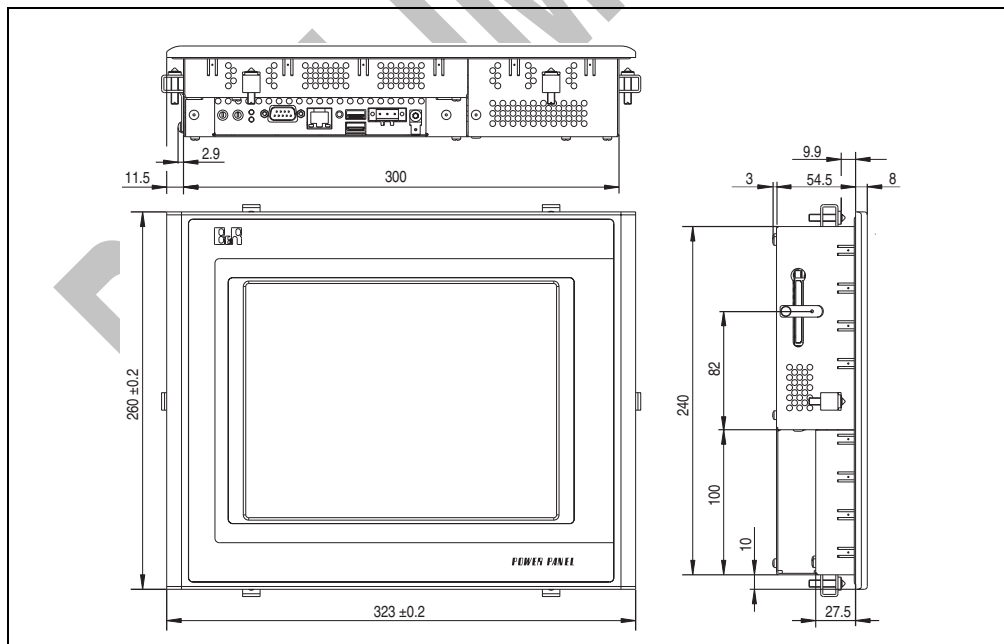
Figure 199: Dimensions 5PP120.1043-37

4.4.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 199 "Dimensions 5PP120.1043-37" on Page 224) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
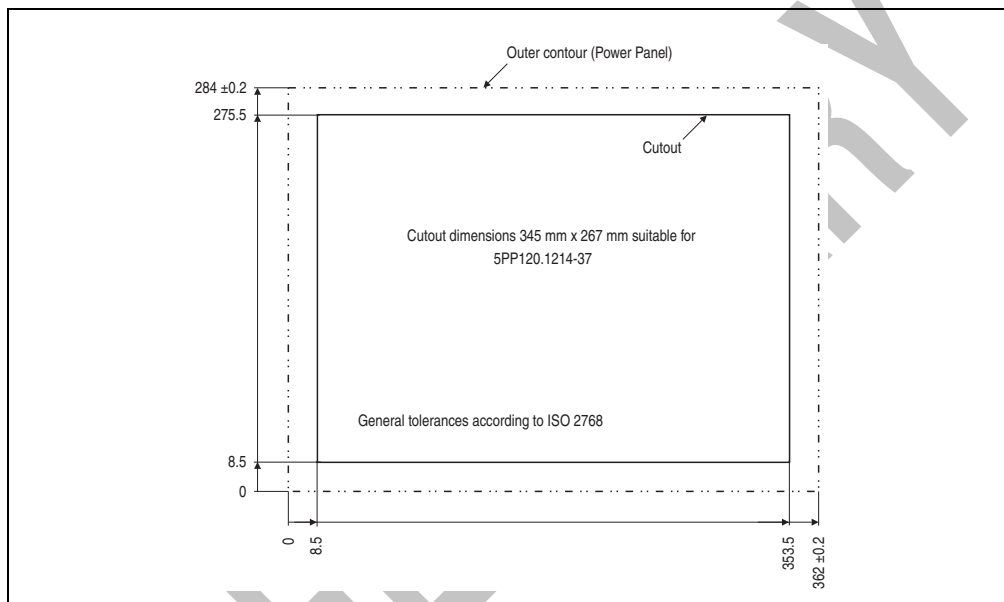

Figure 200: Cutout Dimensions

4.4.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C VGA 10.4" T MH
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 109: Delivery 5PP120.1043-37

4.5 Device 5PP120.1214-37

Figure 201: Front view 5PP120.1214-37
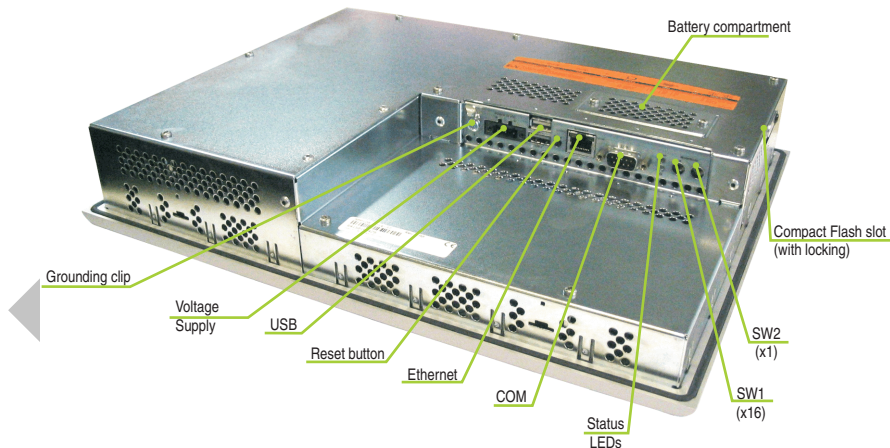
Figure 202: Rear view 5PP120.1214-37

4.5.1 Technical Data

Features	5PP120.1214-37
Boot Loader / Operating System	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
   Controller
   Connection
   Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
   Type
   Diagonal
   Color
   Resolution
   Background Lighting
      Brightness
      Half Brightness Time
	TFT
	30.73 cm
	262,144 colors [1]
	VGA, 800 x 600 pixels
	
	350 cd/m²
	50,000 hours

Touch Screen
   Technology
   Controller
	Analog, resistive (3M)
	Serial (Hampshire)

Front
   Frame
   Mylar
   Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
   Function Keys
   Function Keys with LEDs
   Softkeys
   Softkeys with LEDs
   System Keys
   System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 110: Technical data 5PP120.1214-37

Features	5PP120.1214-37
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 15 Watt[2]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 4.1 kg
Outer Dimensions in mm (WxHxD)	362 x 284 x 65.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	
	0 to 45° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 110: Technical data 5PP120.1214-37 (Forts.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.

2) The starting current can amount to around 20 A for a short period (approx.1 ms).

4.5.2 Dimensions
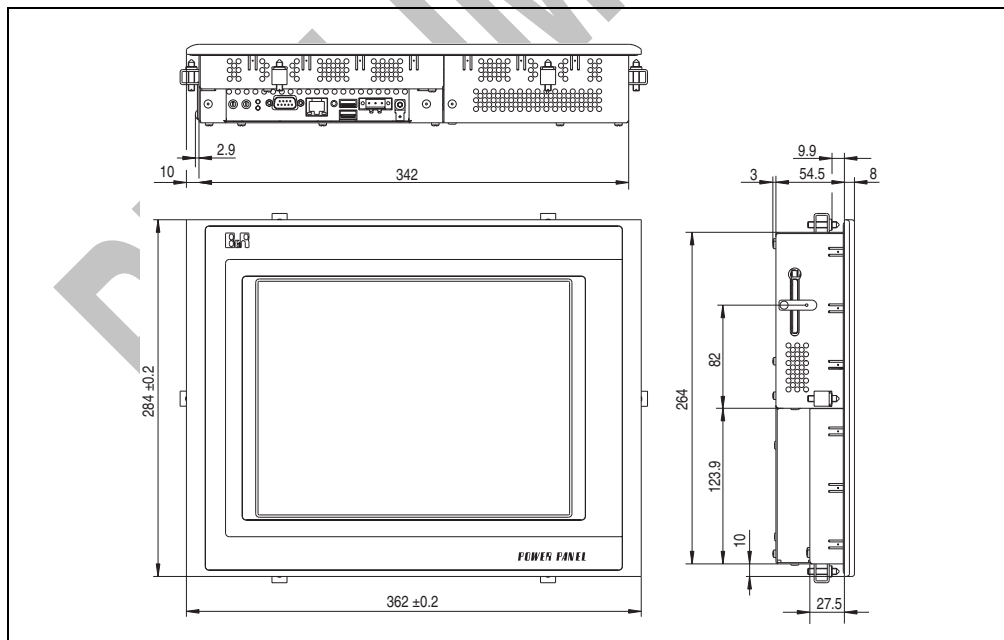
Figure 203: Dimensions 5PP120.1214-37

4.5.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 203 "Dimensions 5PP120.1214-37" on Page 228) For further information regarding mounting, see chapter 3 "Installation" on Page 247.
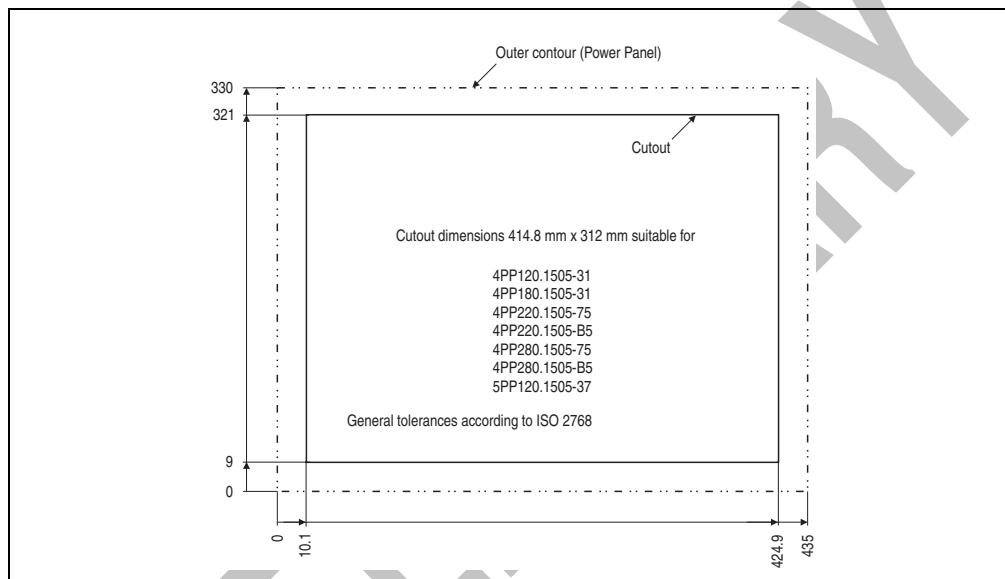

Figure 204: Cutout Dimensions

4.5.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C VGA 12.1" T MH
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 111: Delivery 5PP120.1214-37

4.6 Device 5PP120.1505-37

Figure 205: Front view 5PP120.1505-37
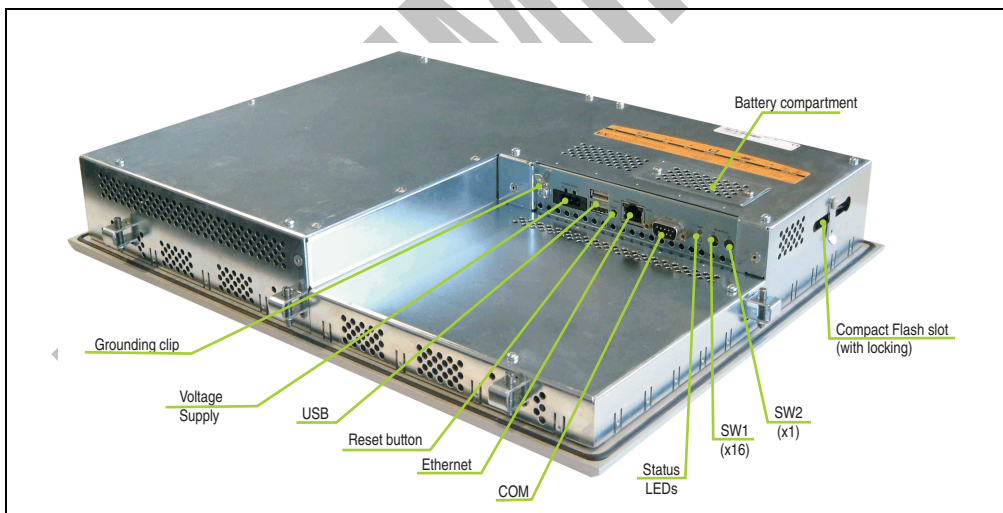
Figure 206: Rear view 5PP120.1505-37

4.6.1 Technical Data

Features	5PP120.1505-37
Boot Loader / Operating System	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM	-
Watch Dog	-
Power Fail Logic	-
Real-time Clock	Yes, battery buffered
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (starting from rev. D0 - previously DP83815) (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)

Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode / Node Switch	2 pcs., each 16 digits
aPCI Slots	-

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	TFT
	15 in
	262,144 colors [1]
	XGA, 1024 x 768 pixels
	
	330 cd/m²
	35,000 hours

Touch Screen
    Technology
    Controller
	Analog, resistive (3M)
	Serial (Hampshire)

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-

Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 112: Technical data 5PP120.1505-37

Features	5PP120.1505-37
Ground Resistance	≤ 24 kOhm
Power Consumption	Approx. 30 Watt[2]
Protection	IP20 back side (only with inserted Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 6.3 kg
Outer Dimensions in mm (WxHxD)	435 x 330 x 71.5
Altitude	Max. 3,000 m

Environmental Temperature
    Operation
    Storage
	0 to 45° C
	-20° C to +60° C

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing

Table 112: Technical data 5PP120.1505-37 (Forts.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.

2) The starting current can amount to around 20 A for a short period (approx.1 ms).

4.6.2 Dimensions
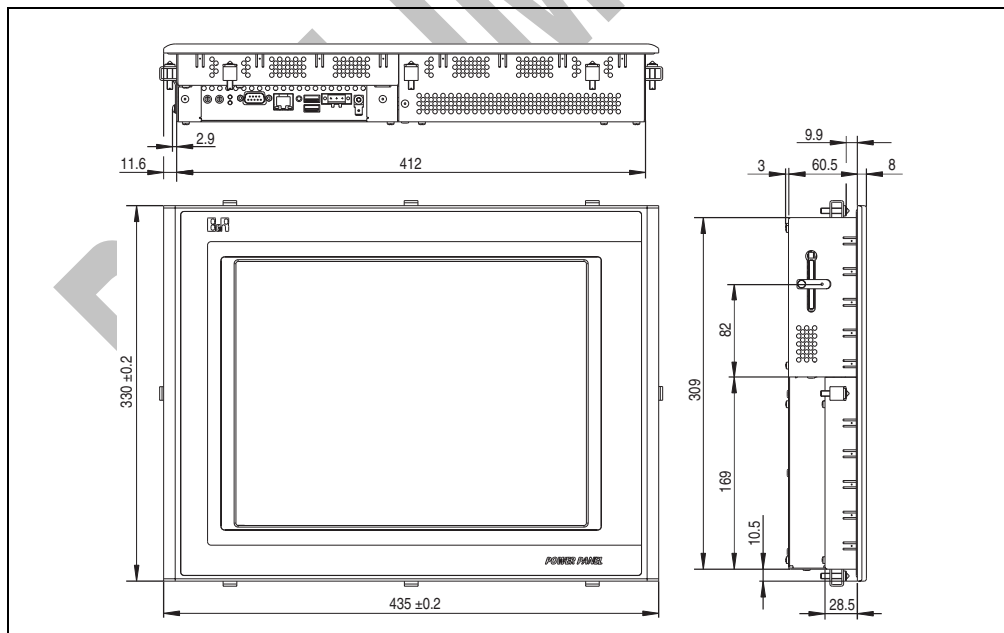
Figure 207: Dimensions 5PP120.1505-37

4.6.3 Cutout Installation

The cutout hole is to be made according to the following dimensions for cutout installation. The device must be mounted using retaining clips included in the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see figure 207 "Dimensions 5PP120.1505-37" on Page 232) For further information regarding mounting, see chapter 3 "Installation" on Page 247.

Figure 208: Cutout Dimensions

4.6.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C XGA 15" T MH
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 113: Delivery 5PP120.1505-37

5. Power Panel Light / Compact

Power Panel 200 Light / Compact series devices have QVGA operating units with an integrated controller.

Power Panel 200 light devices are primarily intended for applications which rely on CAN bus or X2X interfaces for connecting peripherals without requiring Ethernet.
Devices from the compact series are equipped additionally with a 10/100 Ethernet interface, making themselves available anywhere where a network connection to a higher-level computer is required.

Power Panel devices are delivered as B&R Sets, i.e. already with an inserted aPCI module. The following QVGA Power Panel Light / Compact versions are available:

5.1 Power Panel 200 Light / Compact
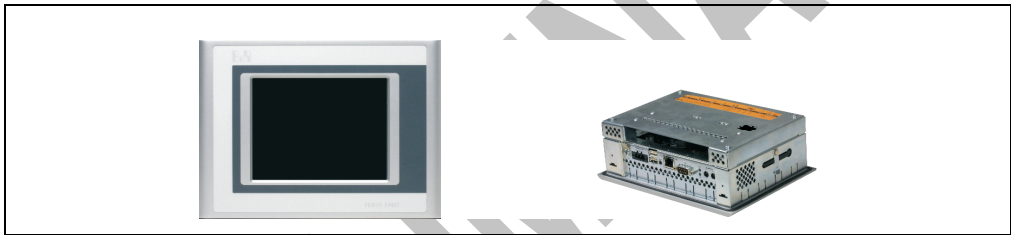
Figure 209: Power Panel_200 Light / Compact

5.1.1 Technical Data for Power Panel 200 Light

Features	4PP220:0571-L05	4PP220:0571-L45	4PP220:0571-L25	4PP220:0571-L65
Boot Loader / Operating System	Automation Runtime			
Processor	Geode SC2200 266 MHz, MMX compatible			
Flash	2 MB, onboard, for firmware			
Main Memory	64 MB DRAM			
Graphic Memory	4 MB shared memory (reserved by the main memory)			
SRAM	Yes (256 kByte on-board, battery buffered)			
Watch Dog	Yes (SMC internal)			
Power Fail Logic	Yes (SMC 10 ms buffer time)			
Real-time Clock	Yes, battery buffered			
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)			

Ethernet
    Controller
    Connection
    Cabling
	-
	-
	-
	-			

Table 114: Technical data for Power Panel 200 light

Features	4PP220:0571-L05	4PP220:0571-L45	4PP220:0571-L25	4PP220:0571-L65
Compact Flash Slot	1 slot for type I Compact Flash cards			
Serial Interface	RS232; modem capable; not electrically isolated			
USB	2x USB 1.1, connection type A			
LEDs	1 LED user (green), 1 LED CF (yellow)			
Mode / Node Switch	2 pcs., each 16 digits			
aPCI Slots	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted
Display 　Type 　Diagonal 　Color 　Resolution 　Background Lighting 　　Brightness 　　Half Brightness Time	LCD 5.7" 8 shades of gray QVGA, 320 x 240 pixels 140 cd/m² 50,000 hours		LCD 5.7" 256 colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours	
Touch Screen 　Technology 　Controller	Analog, resistive (Gunze) Serial (Hampshire)			
Front 　Frame 　Mylar 　Gasket	Aluminum anodized Polyester, light gray Flat gasket around display front			
Keys 　Function Keys 　Function Keys with LEDs 　Softkeys 　Softkeys with LEDs 　System Keys 　System Keys with LEDs	- - - - - -			
Supply Voltage	24 VDC ± 25%, electrically isolated			
Ground Resistance	≥ 47 kOhm			
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module			
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front			
Housing	Metal			
Weight	Approx. 1.9 kg (with aPCI interface module)			
Outer Dimensions in mm (WxHxD)	212 x 156 x 76			
Altitude	Max. 3,000 m			
Environmental Temperature 　Operation 　Storage	0 to 50° C -20° C to +60° C			
Relative Humidity 　Operation 　Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing			

Table 114: Technical data for Power Panel 200 light (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

Chapter 2
Technical Data

5.1.2 Technical Data for Power Panel 200 Compact

Features	4PP220:0571-C05	4PP220:0571-C45	4PP220:0571-C25	4PP220:0571-C65
Boot Loader / Operating System	Automation Runtime			
Processor	Geode SC2200 266 MHz, MMX compatible			
Flash	2 MB, onboard, for firmware			
Main Memory	64 MB DRAM			
Graphic Memory	4 MB shared memory (reserved by the main memory)			
SRAM	Yes (256 kByte on-board, battery buffered)			
Watch Dog	Yes (SMC internal)			
Power Fail Logic	Yes (SMC 10 ms buffer time)			
Real-time Clock	Yes, battery buffered			
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)			

Ethernet
    Controller
    Connection
    Cabling
	MacPhyter DP83816 (on-board); 10/100 Mbit/s
	RJ 45 Twisted Pair (10 BaseT / 100 BaseT)
	S/STP (category 5)			

Compact Flash Slot	1 slot for type I Compact Flash cards			
Serial Interface	RS232; modem capable; not electrically isolated			
USB	2x USB 1.1, connection type A			
LEDs	1 LED user (green), 1 LED CF (yellow)			
Mode / Node Switch	2 pcs., each 16 digits			
aPCI Slots	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted

Display
    Type
    Diagonal
    Color
    Resolution
    Background Lighting
        Brightness
        Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours
			LCD
			5.7"
			256 colors
			QVGA, 320 x 240 pixels
			
			150 cd/m²
			50,000 hours	

Touch Screen
    Technology
    Controller
	Analog, resistive (Gunze)
	Serial (Hampshire)			

Front
    Frame
    Mylar
    Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front			

Keys
    Function Keys
    Function Keys with LEDs
    Softkeys
    Softkeys with LEDs
    System Keys
    System Keys with LEDs
	-
	-
	-
	-
	-
	-			

Table 115: Technical data for Power Panel 200 compact

Features	4PP220:0571-C05	4PP220:0571-C45	4PP220:0571-C25	4PP220:0571-C65
Supply Voltage	24 VDC ± 25%, electrically isolated			
Ground Resistance	≥ 47 kOhm			
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module			
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front			
Housing	Metal			
Weight	Approx. 1.9 kg (with aPCI interface module)			
Outer Dimensions in mm (WxHxD)	212 x 156 x 76			
Altitude	Max. 3,000 m			

Environmental Temperature
    Operation
    Storage
	0 to 50° C
	-20° C to +60° C			

Relative Humidity
    Operation
    Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing			

Table 115: Technical data for Power Panel 200 compact (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

5.1.3 Dimensions

These Power Panel versions are the same size as a Power Panel 220 device with an aPCI interface module. The dimensions can be found in the diagram 65 "Dimensions 4PP220.0571-45" on Page 92.

5.1.4 Cutout Installation

These Power Panel versions are the same size as a Power Panel 220 device with an aPCI interface module. The dimensions can be found in the diagram 66 "Cutout dimensions" on Page 93.

5.1.5 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel device (Power Panel 220 LCD B/W QVGA 5.7" T MH 1aPCI or Power Panel 220 LCD C QVGA 5.7" T MH 1aPCI)
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
1	aPCI interface module (3IF771.9 - aPCI interface 1x CAN or 3IF791.9 - aPCI interface 1x X2X-LINK)

Table 116: Delivery Power Panel 200 Light / Compact

5.2 Power Panel 251 Light / Compact

Figure 210: Power Panel_251 Light / Compact

5.2.1 Technical Data for Power Panel 251 Light

Features	4PP251:0571-L05	4PP251:0571-L45	4PP251:0571-L25	4PP251:0571-L65
Boot Loader / Operating System	Automation Runtime			
Processor	Geode SC2200 266 MHz, MMX compatible			
Flash	2 MB, onboard, for firmware			
Main Memory	64 MB DRAM			
Graphic Memory	4 MB shared memory (reserved by the main memory)			
SRAM	Yes (256 kByte on-board, battery buffered)			
Watch Dog	Yes (SMC internal)			
Power Fail Logic	Yes (SMC 10 ms buffer time)			
Real-time Clock	Yes, battery buffered			
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)			

Ethernet
    Controller
    Connection
    Cabling
	-
	-
	-
	-			

Compact Flash Slot	1 slot for type I Compact Flash cards			
Serial Interface	RS232; modem capable; not electrically isolated			
USB	2x USB 1.1, connection type A			
LEDs	1 LED user (green), 1 LED CF (yellow)			
Mode / Node Switch	2 pcs., each 16 digits			
aPCI Slots	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted

Table 117: Technical data for Power Panel 251 light

Features	4PP251:0571-L05	4PP251:0571-L45	4PP251:0571-L25	4PP251:0571-L65

Display
  Type
  Diagonal
  Color
  Resolution
  Background Lighting
    Brightness
    Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours
			LCD
			5.7"
			256 colors
			QVGA, 320 x 240 pixels
			
			150 cd/m²
			50,000 hours	

Touch Screen
  Technology
  Controller
	Analog, resistive (Gunze)
	Serial (Hampshire)			

Front
  Frame
  Mylar
  Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front			

Keys
  Function Keys
  Function Keys with LEDs
  Softkeys
  Softkeys with LEDs
  System Keys
  System Keys with LEDs
	-
	16
	-
	6
	20
	-			

Supply Voltage	24 VDC ± 25%, electrically isolated			
Ground Resistance	≥ 47 kOhm			
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module			
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front			
Housing	Metal			
Weight	Approx. 2.6 kg (with aPCi interface module)			
Outer Dimensions in mm (WxHxD)	212 x 245 x 76			
Altitude	Max. 3,000 m			

Environmental Temperature
  Operation
  Storage
	0 to 50° C
	-20° C to +60° C			

Relative Humidity
  Operation
  Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing			

Table 117: Technical data for Power Panel 251 light (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

5.2.2 Technical Data for Power Panel 251 Compact

Features	4PP251:0571-C05	4PP251:0571-C45	4PP251:0571-C25	4PP251:0571-C65
Boot Loader / Operating System	Automation Runtime			
Processor	Geode SC2200 266 MHz, MMX compatible			
Flash	2 MB, onboard, for firmware			
Main Memory	64 MB DRAM			
Graphic Memory	4 MB shared memory (reserved by the main memory)			
SRAM	Yes (256 kByte on-board, battery buffered)			
Watch Dog	Yes (SMC internal)			
Power Fail Logic	Yes (SMC 10 ms buffer time)			
Real-time Clock	Yes, battery buffered			
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)			
Ethernet 　Controller 　Connection 　Cabling	MacPhyter DP83816 (on-board); 10/100 Mbit/s RJ 45 Twisted Pair (10 BaseT / 100 BaseT) S/STP (category 5)			
Compact Flash Slot	1 slot for type I Compact Flash cards			
Serial Interface	RS232; modem capable; not electrically isolated			
USB	2x USB 1.1, connection type A			
LEDs	1 LED user (green), 1 LED CF (yellow)			
Mode / Node Switch	2 pcs., each 16 digits			
aPCI Slots	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted
Display 　Type 　Diagonal 　Color 　Resolution 　Background Lighting 　　Brightness 　　Half Brightness Time	LCD 5.7" 8 shades of gray QVGA, 320 x 240 pixels 140 cd/m² 50,000 hours		LCD 5.7" 256 colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours	
Touch Screen 　Technology 　Controller	Analog, resistive (Gunze) Serial (Hampshire)			
Front 　Frame 　Mylar 　Gasket	Aluminum anodized Polyester, light gray Flat gasket around display front			
Keys 　Function Keys 　Function Keys with LEDs 　Softkeys 　Softkeys with LEDs 　System Keys 　System Keys with LEDs	- 16 - 6 20 -			

Table 118: Technical data for Power Panel 251 Compact

Features	4PP251:0571-C05	4PP251:0571-C45	4PP251:0571-C25	4PP251:0571-C65
Supply Voltage	24 VDC ± 25%, electrically isolated			
Ground Resistance	≥ 47 kOhm			
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module			
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front			
Housing	Metal			
Weight	Approx. 2.6 kg (with aPCi interface module)			
Outer Dimensions in mm (WxHxD)	212 x 245 x 76			
Altitude	Max. 3,000 m			
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C			
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing			

Table 118: Technical data for Power Panel 251 Compact (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

5.2.3 Dimensions

These Power Panel versions are the same size as a Power Panel 220 device with an aPCI interface module. The dimensions can be found in the diagram 97 "Dimensions 4PP251.0571-45" on Page 124.

5.2.4 Cutout Installation

These Power Panel versions are the same size as a Power Panel 220 device with an aPCI interface module. The dimensions can be found in the diagram 98 "Cutout dimensions" on Page 125.

5.2.5 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel device (Power Panel 251 LCD B/W QVGA 5.7" F MH 1aPCI or Power Panel 251 LCD C QVGA 5.7" F MH 1aPCI)
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
4	Legend strips (inserted in the front)
1	aPCI interface module (3IF771.9 - aPCI interface 1x CAN or 3IF791.9 - aPCI interface 1x X2X-LINK)

Table 119: Delivery Power Panel 251 Light / Compact

Chapter 2
Technical Data

5.3 Power Panel 252 Light / Compact

Figure 211: Power Panel_252 Light / Compact

5.3.1 Technical Data for Power Panel 252 Light

Features	4PP252:0571-L05	4PP252:0571-L45	4PP252:0571-L25	4PP252:0571-L65
Boot Loader / Operating System	Automation Runtime			
Processor	Geode SC2200 266 MHz, MMX compatible			
Flash	2 MB, onboard, for firmware			
Main Memory	64 MB DRAM			
Graphic Memory	4 MB shared memory (reserved by the main memory)			
SRAM	Yes (256 kByte on-board, battery buffered)			
Watch Dog	Yes (SMC internal)			
Power Fail Logic	Yes (SMC 10 ms buffer time)			
Real-time Clock	Yes, battery buffered			
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)			

Ethernet
    Controller
    Connection
    Cabling
	-
	-
	-
	-			

Compact Flash Slot	1 slot for type I Compact Flash cards			
Serial Interface	RS232; modem capable; not electrically isolated			
USB	2x USB 1.1, connection type A			
LEDs	1 LED user (green), 1 LED CF (yellow)			
Mode / Node Switch	2 pcs., each 16 digits			
aPCI Slots	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted

Table 120: Technical data for Power Panel 252 light

Features	4PP252:0571-L05	4PP252:0571-L45	4PP252:0571-L25	4PP252:0571-L65

Display
  Type
  Diagonal
  Color
  Resolution
  Background Lighting
    Brightness
    Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours
			LCD
			5.7"
			256 colors
			QVGA, 320 x 240 pixels
			
			150 cd/m²
			50,000 hours	

Touch Screen
  Technology
  Controller
	Analog, resistive (Gunze)
	Serial (Hampshire)			

Front
  Frame
  Mylar
  Gasket
	Aluminum anodized
	Polyester, light gray
	Flat gasket around display front			

Keys
  Function Keys
  Function Keys with LEDs
  Softkeys
  Softkeys with LEDs
  System Keys
  System Keys with LEDs
	-
	20
	-
	-
	20
	-			

Supply Voltage	24 VDC ± 25%, electrically isolated			
Ground Resistance	≥ 47 kOhm			
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module			
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front			
Housing	Metal			
Weight	Approx. 2.8 kg (with aPCI interface module)			
Outer Dimensions in mm (WxHxD)	302 x 187 x 76			
Altitude	Max. 3,000 m			

Environmental Temperature
  Operation
  Storage
	0 to 50° C
	-20° C to +60° C			

Relative Humidity
  Operation
  Storage
	5 % to 85 %, non-condensing
	T <= 40° C: 5 % to 90 %, non-condensing
	T > 40° C: < 90 %, non-condensing			

Table 120: Technical data for Power Panel 252 light (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

5.3.2 Technical Data for Power Panel 252 Compact

Features	4PP252:0571-C05	4PP252:0571-C45	4PP252:0571-C25	4PP252:0571-C65
Boot Loader / Operating System	Automation Runtime			
Processor	Geode SC2200 266 MHz, MMX compatible			
Flash	2 MB, onboard, for firmware			
Main Memory	64 MB DRAM			
Graphic Memory	4 MB shared memory (reserved by the main memory)			
SRAM	Yes (256 kByte on-board, battery buffered)			
Watch Dog	Yes (SMC internal)			
Power Fail Logic	Yes (SMC 10 ms buffer time)			
Real-time Clock	Yes, battery buffered			
Battery	Yes (lithium, 950 mAh, can be exchanged from the outside)			
Ethernet Controller Connection Cabling	MacPhyter DP83816 (on-board); 10/100 Mbit/s RJ 45 Twisted Pair (10 BaseT / 100 BaseT) S/STP (category 5)			
Compact Flash Slot	1 slot for type I Compact Flash cards			
Serial Interface	RS232; modem capable; not electrically isolated			
USB	2x USB 1.1, connection type A			
LEDs	1 LED user (green), 1 LED CF (yellow)			
Mode / Node Switch	2 pcs., each 16 digits			
aPCI Slots	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted	1 piece CAN aPCI module (3IF771.9) inserted	1 piece X2X aPCI module (3IF791.9) inserted

Display
 Type
 Diagonal
 Color
 Resolution
 Background Lighting
  Brightness
  Half Brightness Time
	LCD
	5.7"
	8 shades of gray
	QVGA, 320 x 240 pixels
	
	140 cd/m²
	50,000 hours
			LCD
			5.7"
			256 colors
			QVGA, 320 x 240 pixels
			
			150 cd/m²
			50,000 hours	

Touch Screen Technology Controller	Analog, resistive (Gunze) Serial (Hampshire)			
Front Frame Mylar Gasket	Aluminum anodized Polyester, light gray Flat gasket around display front			
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	- 20 - - 20 -			

Table 121: Technical data for Power Panel 252 Compact

Features	4PP252:0571-C05	4PP252:0571-C45	4PP252:0571-C25	4PP252:0571-C65
Supply Voltage	24 VDC ± 25%, electrically isolated			
Ground Resistance	≥ 47 kOhm			
Power Consumption	Approx. 15 Watt [1] with inserted aPCI interface module			
Protection	IP20 back side (only with installed aPCI interface modules and Compact Flash card) IP65, dust and sprayed water protection from front			
Housing	Metal			
Weight	Approx. 2.8 kg (with aPCI interface module)			
Outer Dimensions in mm (WxHxD)	302 x 187 x 76			
Altitude	Max. 3,000 m			
Environmental Temperature Operation Storage	0 to 50° C -20° C to +60° C			
Relative Humidity Operation Storage	5 % to 85 %, non-condensing T <= 40° C: 5 % to 90 %, non-condensing T > 40° C: < 90 %, non-condensing			

Table 121: Technical data for Power Panel 252 Compact (Forts.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

5.3.3 Dimensions

These Power Panel versions are the same size as a Power Panel 220 device with an aPCI interface module. The dimensions can be found in the diagram 121 "Dimensions 4PP252.0571-45" on Page 148.

5.3.4 Cutout Installation

These Power Panel versions are the same size as a Power Panel 220 device with an aPCI interface module. The dimensions can be found in the diagram 122 "Cutout dimensions" on Page 149.

5.3.5 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel device (Power Panel 252 LCD B/W QVGA 5.7" F MH 1aPCI or Power Panel 252 LCD C QVGA 5.7" F MH 1aPCI)
10	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
8	Legend strips (inserted in the front)
1	aPCI interface module (3IF771.9 - aPCI interface 1x CAN or 3IF791.9 - aPCI interface 1x X2X-LINK)

Table 122: Delivery Power Panel 252 Light / Compact

Chapter 3 • Installation

1. Mounting Instructions

- The Power Panel must be mounted using retaining clips included in the delivery. Depending on the Power Panel version, a corresponding number of retaining clips are included.
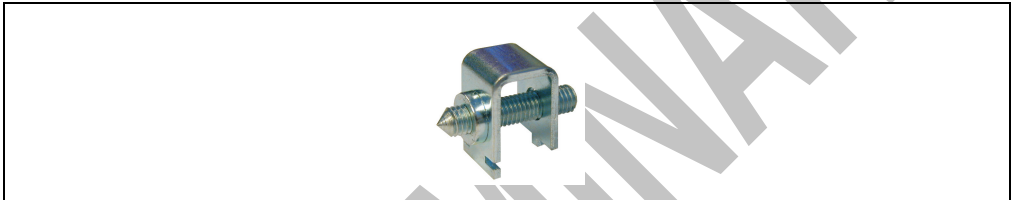
Figure 212: Retaining clip

- In order to guarantee proper air circulation, allow a sufficient amount of space above, below, to the side and behind the Power Panel device. The minimum specified free space can be found in the diagram below. Free space specifcations apply to all Power Panel versions (with/without aPCI slots and keys).

Chapter 3
Installation

Side View

Rear View
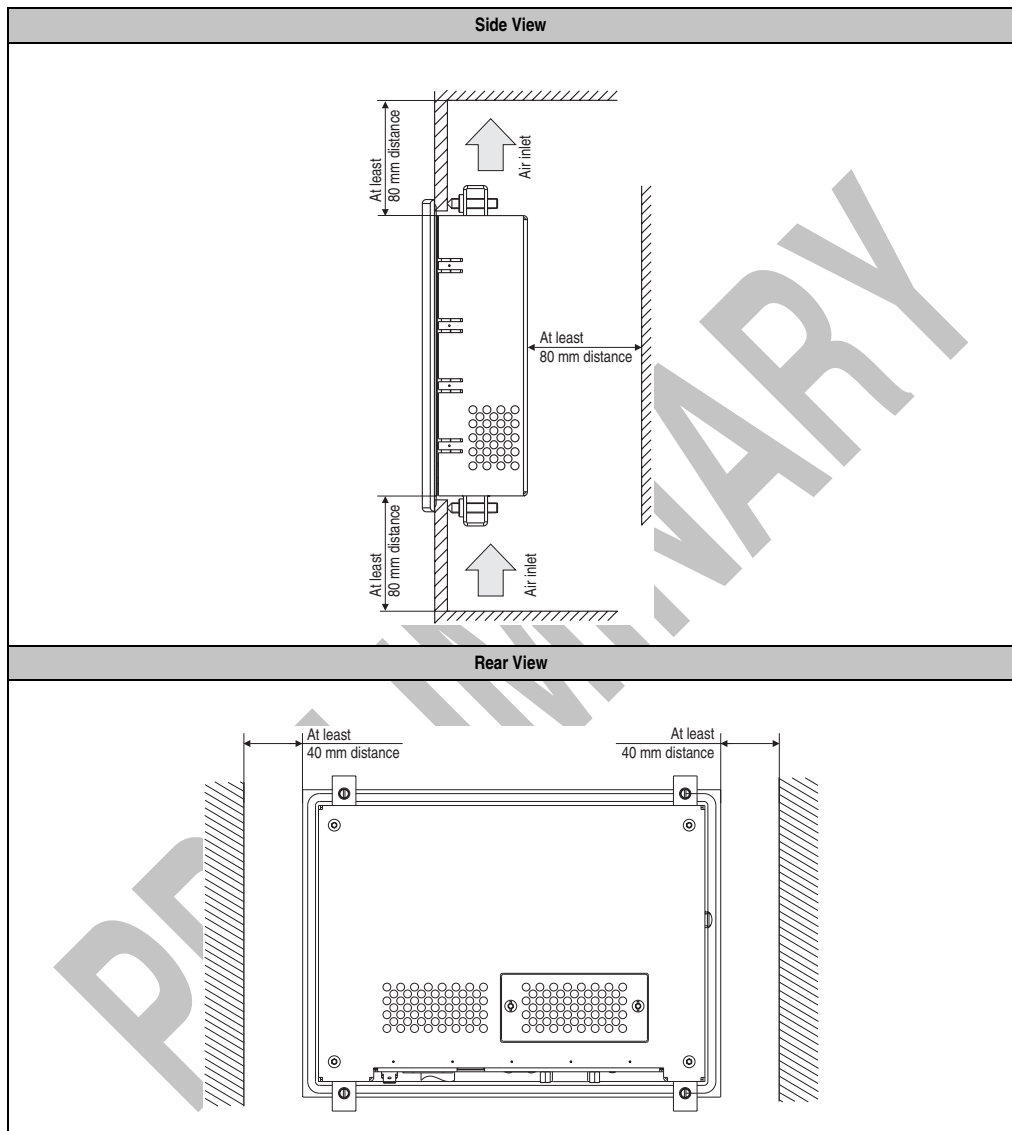
Figure 213: Distance for air circulation

2. Mounting Orientation

The following diagram displays the specifiied mounting orientation for the Power Panel device. The mounting orientation applies to all Power Panel versions (with/without aPCI slots and keys).
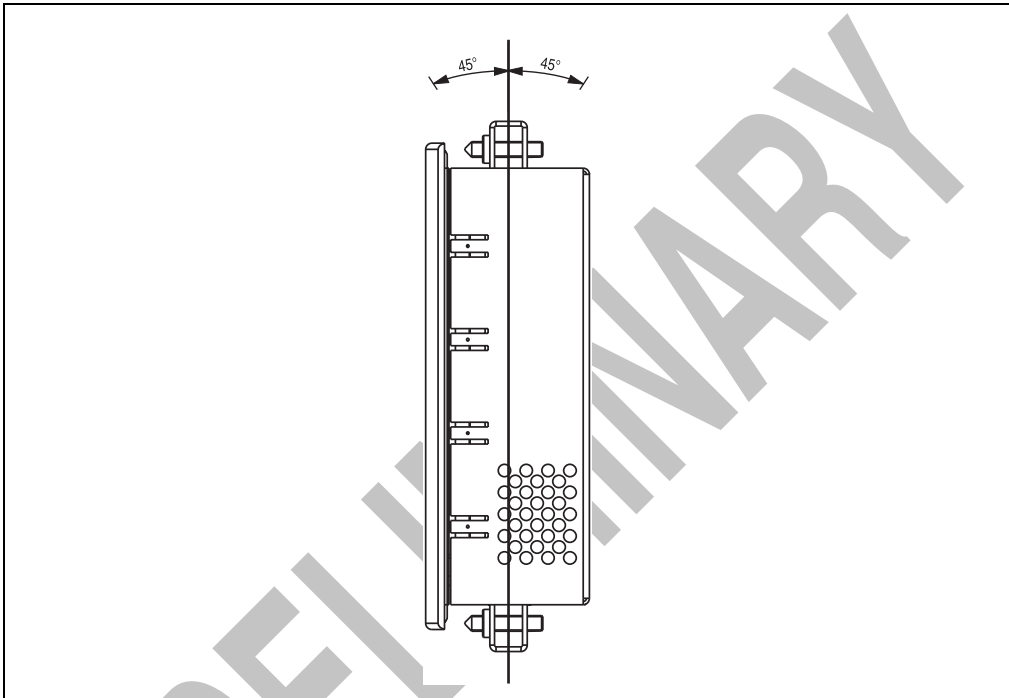
Figure 214: Mounting orientation for the Power Panel

Caution!

The maximum permitted environmental temperature can be found in the technical data for the respective Power Panel device.

Chapter 4 • Software

1. Power Panel with Automation Runtime

1.1 General Information

B&R Automation Runtime guarantees a uniform runtime environment for Automation Studio programs on all target systems. This assures uniform programming and operation on all devices.

Automation Runtime possesses a multitasking operating system adapted especially for use with control technology. The desired application cycle time can be separated into several task classes. Automation Runtime ensures that all application programs are processed within the defined time scale, proving itself to be an adjustable, deterministic real-time multitasking system.

An extensive project can be divided into small individual tasks. This procedure increases modularity and makes maintenance of projects much easier.

1.1.1 Summary Screen

When switching on a Power Panel 100 or Power Panel 200 device, a summary screen appears after the message "Booting, please wait...", which displays the most important parameters of an Automation Runtime Power Panel device:

```
Bernecker + Rainer Industrie-Elektronik

Facotory Settings
 Version                      03
 DeviceID                     1697
 CompatibilityID              00
 Brightness  (min/typ/max)    D5 EA FF
 Contrast    (min/typ/max)    00 46 FF

Mode/Node          00
MAC Address        00:60:65:00:C6:A7
BootLoader         2.07
HW-Layer           1.2.0
OnBoard AR         V2.66

SMC Version        AD


All values in hex
```
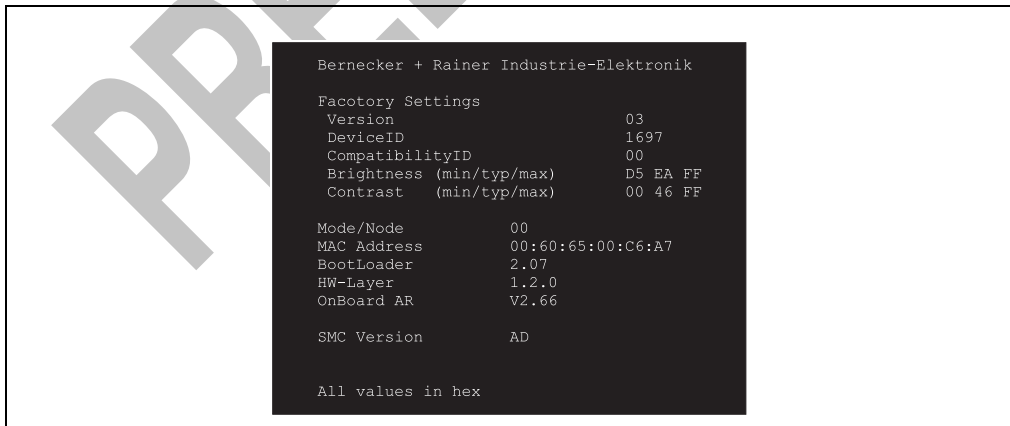
Figure 215: Automation Runtime Summary Screen

Information	Sample Value	Description
Version	03	Displays the factory settings version. The factory settings determine, among other things, the device ID, display ID, display specific initialization sequence and other important parameters. **Information:** **Factory settings are set by B&R and cannot be changed by the user.**
DeviceID	1697	Displays the hex value of the hardware device number.
CompatibilityID	00	Displays the hardware device revision.
Brightness (Min / Type / Max)	D5 EA FF	Indicates the minimum, typical and maximum value as a hexadecimal value for the brightness settings of the display.
Contrast (Min / Type / Max)	00 46 FF	Indicates the minimum, typical and maximum value as a hex value for the contrast settings of the display.
Mode/Node	00	Displays the current operating mode switch settings.
MAC Address	00:60:65:00:C6:A7	Displays the assigned Media Access Control (MAC) address.
BootLoader	2.07	Displays the version of the boot loader.
HW Layer	1.2.0	Displays the version of the hardware layer.
Onboard AR	V2.66	Displays the current onboard Automation Runtime version.
SMC Version	AD	Displays the current SMC (System Management Controller) software version.

Table 123: Automation Runtime Summary Screen

1.2 Terminal Operation

TBD

1.3 Operating System Upgrade

TBD

2. Power Panel with BIOS

Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.05. Therefore, it is possible that these diagrams and BIOS descriptions might not correpsond with the installed BIOS version.

2.1 General Information

BIOS is an abbreviation for "**B**asic **I**nput and **O**utput **S**ystem". It is the most basic standardized connection between the user and the system (hardware). A B&R modified BIOS from Insyde is used in the Power Panel devices.

BIOS Setup lets you modify basic system configuration settings. These settings are saved in CMOS RAM.

The CMOS RAM is a nonvolatile battery backed memory which retains information when the power is not applied on the Power Panel.

The BIOS is immediately activated when you switch on the power supply of the Power Panel.

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

Information:

After 3 unsuccessful attempts at booting the Power Panel device, using the CMOS backup, the current CMOS settings are overwritten by the BIOS. If there is no valid CMOS backup present, then CMOS settings are set to default values (as with "Load Optimized Defaults").

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

Optionally, a BIOS Summary Screen can be displayed at the end of POST. This displays the following information according to the Power Panel display diagonal:

Chapter 4
Software

Figure 216: BIOS Summary Screen for VGA, SVGA, XGA Power Panel devices

Figure 217: BIOS Summary Screen for QVGA Power Panel devices

To deactivate this summary screen, see section "Advanced BIOS Features", on page 267 for VGA, SVGA and XGA Power Panel devices and section 2.3.4 "Advanced BIOS Features" on Page 290 for QVGA Power Panel devices.

To make changes in the BIOS Setup, when booting the Power Panel device the DEL key must be pressed, as soon as the following message appears on the upper margin of the display (during POST):

Figure 218: Press DEL for Setup

If the message disappears before DEL was pressed[1] , then the Power Panel must be booted again in order to enter BIOS Setup.

Warning!

Generally: The best advice is to alter only those settings that you thoroughly understand. On no account should settings be changed without a good reason. The BIOS settings have been carefully chosen by B&R to guarantee ideal performance and reliability. Even a seemingly minor change to the settings may cause the system to become unstable.

1) Entering the characters and operating BIOS setup pages can only be carried out by connecting a USB keyboard or by using the REMHOST program.

Information:

The settings recommended by B&R can be loaded with "Load Optimized Defaults".

The following keys[1] help you navigate in BIOS Setup:

Key	Function
Cursor ↑	Move to previous item.
Cursor ↓	Move to next item.
Cursor ←	Move to previous item.
Cursor →	Move to next item.
ESC	Exits the submenu.
Enter or Press Highlighted Character Shortcut	Change into the selected menu.
F1 and ALT+H	A help window pops up that describes the possible selections for the highlighted item. Press ESC to exit the help window. In a help window, ↑, Cursor ↓, Pos1, End, Page Up, Page Down can be navigated using the cursor, if the help text is longer than the area shown.
Home	Jumps to the first BIOS menu item or object.
End	Jumps to the last BIOS menu item or object.
ALT+Q and ALT+X	Enters BIOS main menu.
- (Minus)	Decrease numerical value or select previous parameter value.
+ (Plus)	Increase numerical value or select next parameter value.

Table 124: BIOS relevant keys

Chapter 4
Software

---

1) Entering the characters and operating BIOS setup pages can only be carried out by connecting a USB keyboard or by using the REMHOST program.

2.2 BIOS Settings VGA, SVGA and XGA Power Panel Devices

Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.05. Therefore, it is possible that these diagrams and BIOS descriptions might not correpsond with the installed BIOS version.

The individual BIOS setup pages for a VGA, SVGA and XGA Power Panel device are described on the following pages.

2.2.1 BIOS Setup Main Menu

The BIOS Setup main menu appears immediately by pressing the DEL button when the system is started:
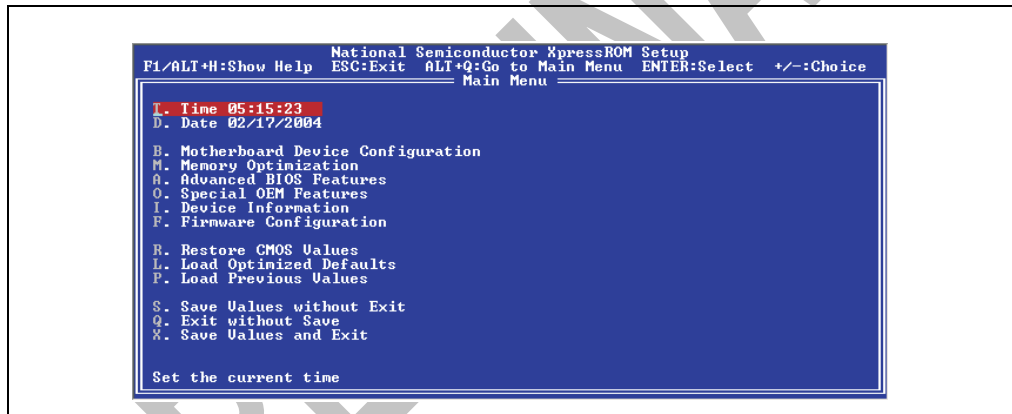
Figure 219: BIOS Setup Main Menu

The individual menu items are explained in detail in the following sections.

Shortcut	BIOS Setup Menu	Function
T	Time 05:15:23	The system time can be configured here.
D	Date 02/17/2004	The system date can be configured here.
B	Motherboard Device Configuration	Motherboard resources can be configured here.
M	Memory Optimization	The settings for memory management can be made here.
A	Advanced BIOS Features	Advanced BIOS options such as boot logo, summary screen, cache areas, etc. can be configured here.
O	Special OEM Features	Specific B&R settings can be made here.
I	Device Information	Important parameters (e.g. temperature, mode/node position, etc.) for a Power Panel device are displayed here.

Table 125: Overview of BIOS Main Menu functions

Shortcut	BIOS Setup Menu	Function
F	Firmware Configuration	On-board firmware for FPGA and aPCI modules can be configured here.
R	Restore CMOS Values	With this, the last saved CMOS values can be restored in the Flash memory.
L	Load Optimized Defaults	Load the optimal BIOS settings for best performance.
P	Load Previous Values	With this, set values are loaded again when the BIOS Setup is called. All changes which had been made up to that point are lost as a result.
S	Save Values without Exit	BIOS values are saved without exiting the BIOS Setup.
Q	Exit without Save	The BIOS Setup is exited possibly without changes being saved.
X	Save Values and Exit	Settings are saved using this option and the BIOS Setup is exited.

Table 125: Overview of BIOS Main Menu functions (Forts.)

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.2.2 Time
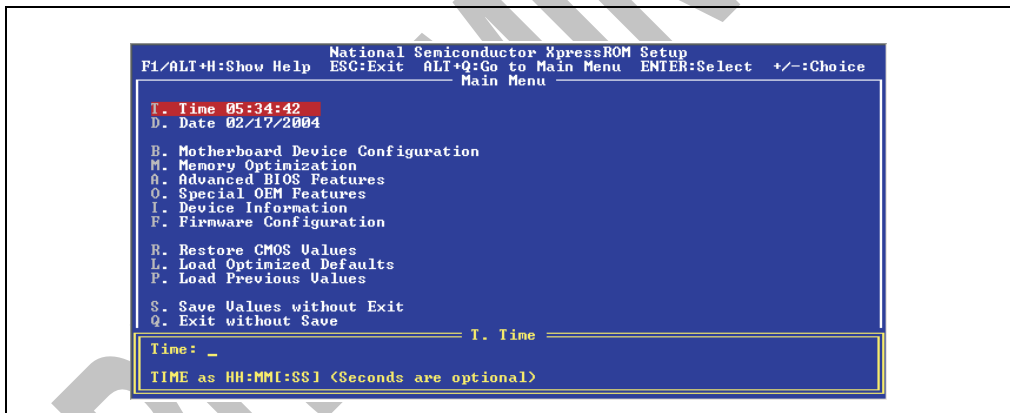
Figure 220: BIOS Time menu

The currently configured system time is displayed here. The time is buffered by a battery (CMOS battery) after the Power Panel device has been switched off.

A new system time can be entered by selecting TIME and then confirming with RETURN or with the shortcut "A". The format HH:MM[:SS] must be entered as shown in the following example:

Example: Set time to 13:00:00.

The entry can be made in three different ways using the keyboard:

- 13:00:00 - confirm using RETURN
- 13:00 - confirm using RETURN

Chapter 4
Software

- • 13: - confirm using RETURN

Information:

When using a German keyboard layout, pressing the ":" key enters the letter "Shift+ö".

2.2.3 Date


```
                    National Semiconductor XpressROM Setup
F1/ALT+H:Show Help  ESC:Exit  ALT+Q:Go to Main Menu  ENTER:Select  +/-:Choice
                              Main Menu

  T. Time 05:38:03
  D. Date 02/17/2004

  B. Motherboard Device Configuration
  M. Memory Optimization
  A. Advanced BIOS Features
  O. Special OEM Features
  I. Device Information
  F. Firmware Configuration

  R. Restore CMOS Values
  L. Load Optimized Defaults
  P. Load Previous Values

  S. Save Values without Exit
  Q. Exit without Save
                              D. Date
  Date: _

  Date as MM/DD/YYYY
```

Figure 221: BIOS Date menu

The current system date is displayed here. The date is buffered by a battery (CMOS battery) after the Power Panel device has been switched off.

A new system date can be entered by selecting DATE and then confirming with RETURN or with the shortcut "B". The format MM:DD:YYYY must be entered as shown in the following example:

Example: Set date to 12.02.2003.

Entry using keyboard:

- • 12/02/2003 - confirmed by RETURN

Information:

When using a German keyboard layout, pressing the "/" key enters the letter "-" (next to the shift key).

2.2.4 Motherboard Device Configuration
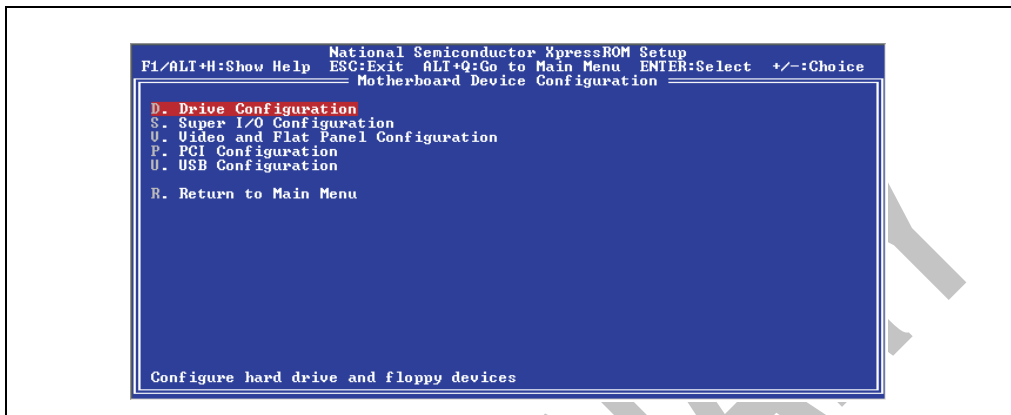
Figure 222: BIOS Motherboard Device Configuration menu

Shortcut	BIOS Setup Menu	Function
D	Drive Configuration	Settings for floppy drive and Compact Flash card.
S	Super I/O Configuration	Configures the Super I/O device.
V	Video and Flat Panel Configuration	Displays the video settings and configuration for resolution, brightness and contrast display parameters.
P	PCI Configuration	Configures PCI bus settings.
U	USB Configuration	Configuration of USB Settings.
R	Return to Main Menu	Exit current page and return to BIOS Main Menu.

Table 126: BIOS Motherboard Device Configuration menu

Drive Configuration
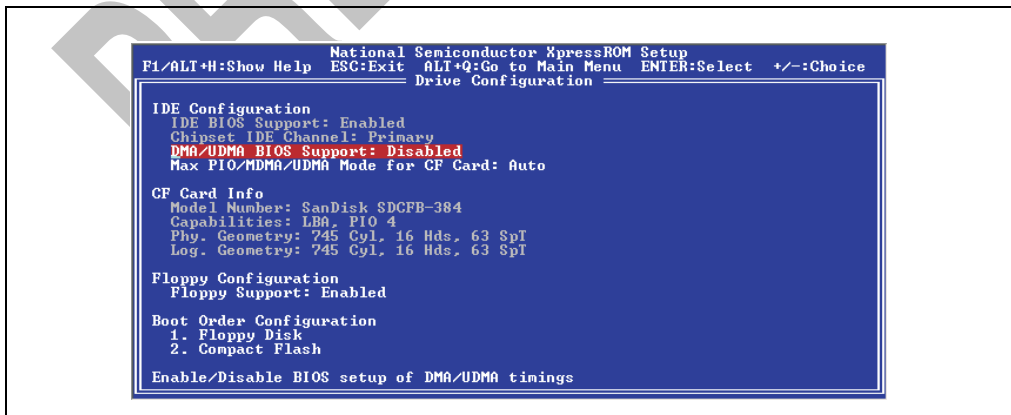
Figure 223: BIOS Drive Configuration menu

BIOS Setting	Description	Configuration Possibilities		Effect
IDE BIOS Support	Displays the IDE configuration for the Power Panel device.	None		-
Chipset IDE Channel	Displays the IDE channel used.	None		-
DMA/UDMA BIOS Support	DMA/UDMA BIOS Support can be configured here.	Enabled		Activates this function.
		Disabled		Only PIO modes for data transfer to and from Compact Flash cards are used.
Max PIO/MDMA/UDMA Mode for CF Card	The maximum data transfer mode to and from a Compact Flash card can be configured here. **Information:** **If a mode is configured that is not supported by the Compact Flash card, then the fastest supported mode is configured.**	Auto		The fastest from the inserted Compact Flash cards supported modes are configured.
		PIO 0 to PIO 4		Manual Configuration Option for PIO Mode.
		MDMA 0 to MDMA 2		Manual Configuration Option for MDMA Mode.
		UDMA 0 to UDMA 2		Manual Configuration Option for UDMA Mode.
Model Number	Displays the Compact Flash model ID.	None		-
Capabilities	Displays the possible data transfer mode speeds to and from an inserted Compact Flash card.	None		-
Phy. Geometry	Displays the physical geometry of the inserted Compact Flash card in cylinders, heads and sectors.	None		-
Log. Geometry	Displays the logical geometry of the inserted Compact Flash card in cylinders, heads and sectors.	None		-
Floppy Configuration	Floppy Support (USB) can be activated here. It is also possible to access a remote floppy drive using the program "Remhost" (see section "REMHOST", on page 308) and, using this, to carry out e.g. a BIOS upgrade.	Enabled		USB Floppy Support activated.
		Disabled		USB Floppy Support deactivated.
Boot Order Configuration	Configures the boot order for memory media. **If two identical devices are selected a conflict warning is displayed.**	1	Floppy Disk [1]	An attempt is made to boot from this configured drive first.
			Compact Flash	
			NONE	
		2	Floppy Disk [1]	An attempt is made to boot from this configured drive second.
			Compact Flash	
			NONE	

Table 127: BIOS Drive Configuration menu

1) Only HD diskettes (1.44 MB) are still supported by BIOS.

Super I/O Configuration
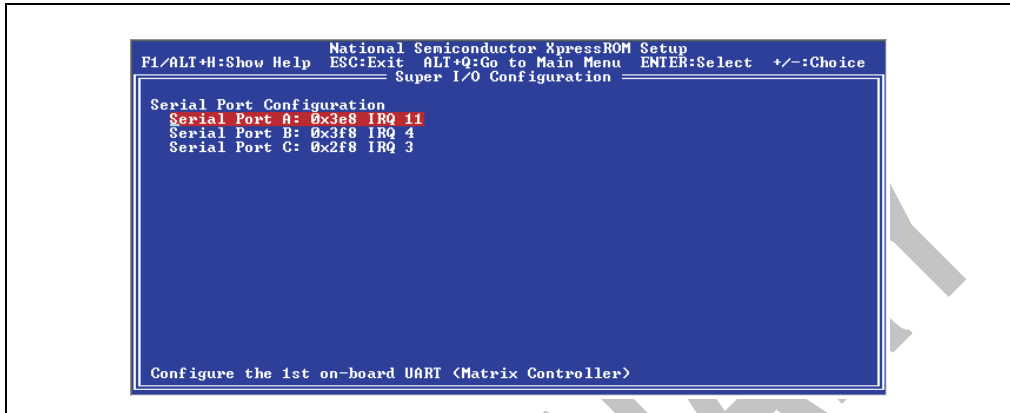
Figure 224: BIOS Super I/O Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
Serial Port A:	Configures the first UART address range and the corresponding interrupt for the matrix controller. **BIOS Default Setting: 0x3e8 IRQ 11.** **Information:** **Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3e8 IRQ 11	Use this address range and interrupt.
		0x3f8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x2f8 IRQ 11	
Serial Port B:	Configures the second UART address range and the corresponding interrupt for the serial interface. **BIOS Default Setting: 0x3f8 IRQ 4.** **Information:** **Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3f8 IRQ 4	Use this address range and interrupt.
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	
Serial Port C:	Configures the third UART address range and the corresponding interrupt for the touch controller. **BIOS Default Setting: 0x2f8 IRQ 3.** **Information:** **Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x2f8 IRQ 3	Use this address range and interrupt.
		0x3f8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	

Table 128: BIOS Super I/O Configuration menu

Chapter 4
Software

Video and Flat Panel Configuration
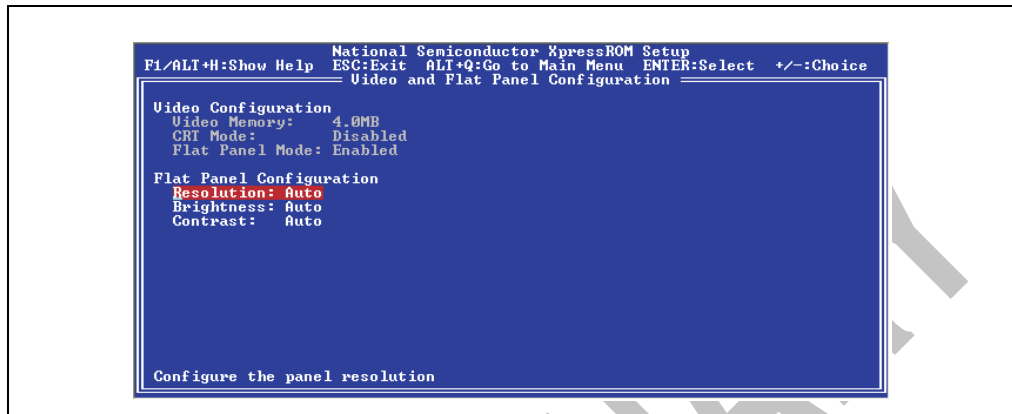
Figure 225: BIOS Video Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
Video Memory	Displays the current video memory, which is reserved by the main memory.	None	-
CRT Mode	Display on an external screen.	None	-
Flat Panel Mode	Display on a Power Panel display.	None	-
Resolution	Configures the maximum setting of the maximum resolution for the display. **Note: The correct resolution should be configured for the Power Panel device that has been specifiied. Otherwise, the display can be damaged by incorrect timing values. If the mode/node switch is set to 0/0, then the resolution is automatically reset every time the Power Panel device restarted.**	Auto	The maximum resolution is read from the factory settings and correctly configured automatically.
		QVGA(320x240) LCD	Optimal setting for a QVGA LCD Power Panel.
		QVGA(320x240) TFT	Optimal setting for a QVGA TFT Power Panel.
		VGA (640x480)	Optimal setting for a VGA Power Panel.
		SVGA (800x600)	Optimal setting for a SVGA Power Panel.
		XGA(1024x768)	Optimal setting for a XGA Power Panel.
Brightness	Setting for the background lighting of the display. **Note: If the mode/node switch is set to 0/0, then brightness settings are automatically set to the default values from the factory settings every time the Power Panel device is restarted.**	Auto	The optimal brightness is automatically configured using factory settings. Therefore, a brightness setting between 100% and 0% is set.
		0% to 100%	Manual setting of the desired brightness within factory settings limits.
Contrast	Setting for the contrast of the display. **Note: Contrast settings can only be configured with passive displays. If the mode/node switch is set to 0/0, then contrast settings are automatically set to the default values from the factory settings every time the Power Panel device is restarted.**	Auto	The optimal contrast is automatically configured using factory settings. Therefore, a contrast value between 100% and 0% is set.
		0% to 100%	Manual setting of the desired contrast within factory settings limits.

Table 129: BIOS Video Configuration menu

PCI Configuration

```
                    National Semiconductor XpressROM Setup
    F1/ALT+H:Show Help  ESC:Exit  ALT+Q:Go to Main Menu  ENTER:Select  +/-:Choice
                          ══ PCI Configuration ══

    PCI Interrupt Steering
      PCI  INTA#:  IRQ 9
      PCI  INTB#:  IRQ 5
      PCI  INTC#:  IRQ 10
      PCI  INTD#:  IRQ 7






    Enable/Disable INTA# to IRQ steering (Ethernet)
```
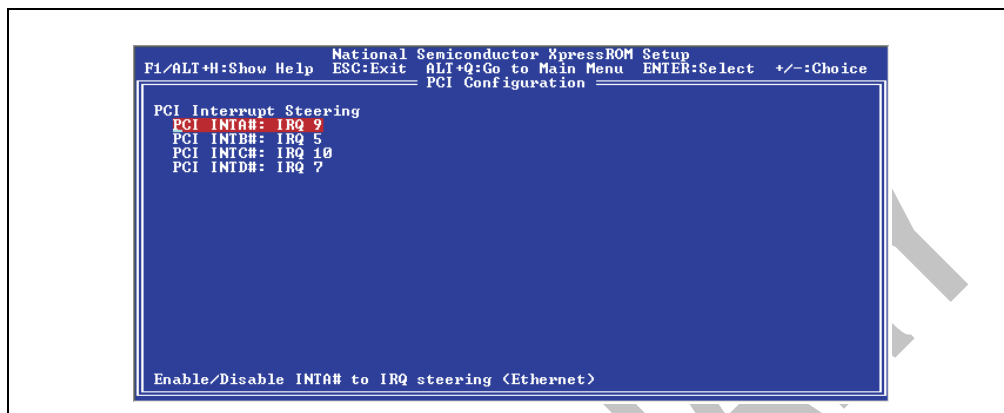
Figure 226: BIOS PCI Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
PCI INTA#	Activates the IRQ for the Ethernet controller. **BIOS Default Setting: IRQ 9.**	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTB#	Activates IRQ for the aPCI slot 1. **BIOS Default Setting: IRQ 5.** First IRQ for aPCI Slot 1 and IRQ for USB controller.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTC#	Activates IRQ for the aPCI slot 2. **BIOS Default Setting: IRQ 10.** First IRQ for aPCI slot 2 and second IRQ for aPCI slot 1.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTD#	Activates IRQ for the USB controller. **BIOS Default Setting: IRQ 7.** Second IRQ for aPCI slot 2.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.

Table 130: BIOS PCI Configuration menu

Chapter 4
Software
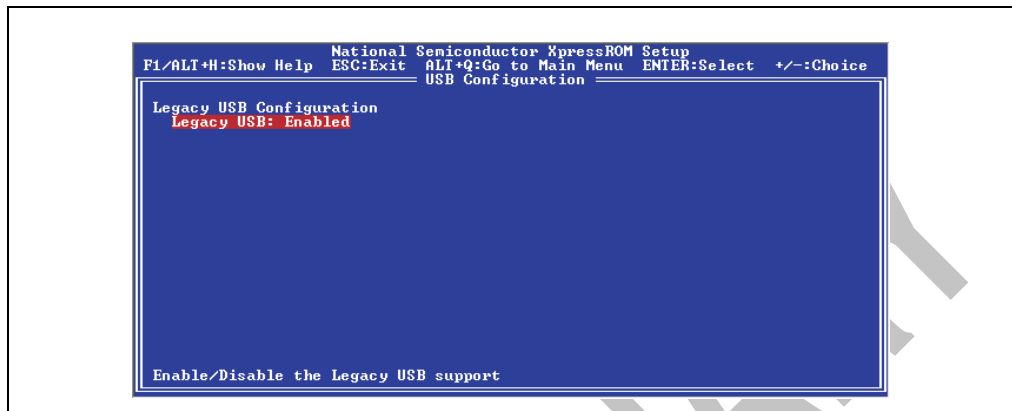
USB Configuration

Figure 227: BIOS USB Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
Legacy USB	This function activates USB support, in order to also carry out BIOS settings before the operating system loads with USB support, e.g. using a USB keyboard. **Note: If the mode/node switch is set to 0/0, then the Legacy USB always set to "enabled".**	Enabled	Activating USB Legacy support.
		Disabled	Deactivating USB Legacy Support **Note: After deactivating this support, booting from a USB floppy drive is no longer possible.**

Table 131: BIOS USB Configuration menu

2.2.5 Memory Optimization

Warning!

The parameters in this screen are for system designers, service personnel, and technically competent users only. The best advice is to alter only those settings that you thoroughly understand.

The incorrect setting for "Memory Optimization" values can cause instability and even cause the entire system not to boot. If the Power Panel device can no longer be booted, then the default values can be restored by restarting three times.

Information:

More detailed information about the meaning and effects of the settings can also be found in the corresponding user's manual for the processor.

```
                   National Semiconductor XpressROM Setup
  F1/ALT+H:Show Help  ESC:Exit  ALT+Q:Go to Main Menu  ENTER:Select  +/-:Choice
  ══════════════════════════ Memory Optimization ═══════════════════════════
  Memory Optimization: Conservative     Load current values from CPU

  MC_MEM_CNTRL1                          MC_SYNC_TIM1
    MD Control:           3                CAS Latency: 2 Clk
    MA/BA Control:        3                tRC:         7 Clk
    MEM Control:          3                tRAS:        5 Clk
    SDRAM Clock Ratio:    4                tRP:         2 Clk
    Refresh Interval:     1D               tRCD:        2 Clk
    Refresh Stagger:      0 SDRAM Clocks   tRRD:        1
    2 CLK ADDR Setup:     Disabled         tDPL:        2 Clk
    SMM Mapping:          Enabled
    X-Bus Round Robin:    Enabled

  MC_MEM_CNTRL2
    SDRAM Shift SDCLK:    2
    Read Data Phase:      1 Core Clock
    Fast Read Mask:       Disabled


  Select type of memory optimization
```
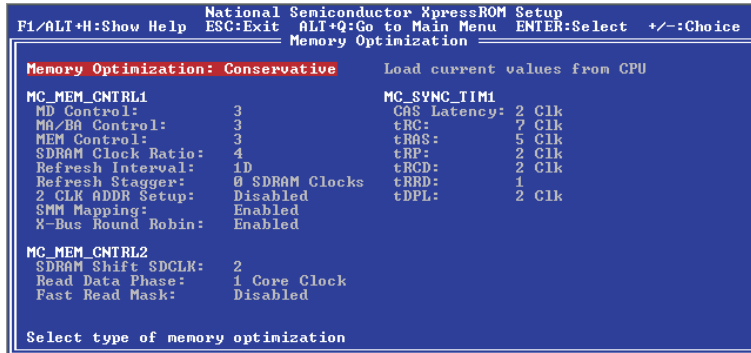
Figure 228: BIOS Memory Optimization menu

BIOS Setting	Description	Configuration Possibilities	Effect
Memory Optimization	Defines the handling of memory optimization. With this option, it is recommended that the user uploads current base values (that the system uses) from the CPU to this BIOS page when setting the values manually for the first time.	Conservative	The BIOS uses automatically PC66 timings.
		Optimized	BIOS uses optimized memory settings for the memory chips used. This allows faster timings to be made.
		Aggressive	BIOS uses "aggressive" memory settings based on SPD and CPU speed. **Warning!** **Aggressive memory settings can cause stability problems for the system.**
		Manual	If "Manual" is selected, then the remaining values can be configured on this BIOS menu page. Values only become active when the user saves these before exiting BIOS and the Power Panel is rebooted.
Load current values from CPU	All the specified values are configured on this BIOS setup page with the current configured values.	None	The memory timing values currently used are uploaded by the CPU. It is recommended that when using this option, the user uploads optimal base values (that the system uses) from the CPU to this BIOS page when setting the values manually for the first time.
MD Control	Configures MD[63:0] drive strength.	0 to 3	0 = weakest, 3 = strongest
MA/BA Control	Configures MA[12:0] and BA[1:0] drive strength.	0 to 3	0 = weakest, 3 = strongest
MEM Control	Configures RASA#, CASA#, WEA#, CS[1:0]#, CKEA, DQM[7:0] drive strength.	0 to 3	0 = weakest, 3 = strongest
SDRAM Clock Ratio	Configures the SDRAM Timing.	2; 2,5; 3; 3,5; 4; 4,5; 5	Sets DRAM Clock Timings.

Table 132: BIOS Memory Optimization menu

Chapter 4
Software

BIOS Setting	Description	Configuration Possibilities	Effect
Refresh Interval	This parameter defines the number of processor core clocks that are multiplied by 64 between refresh cycles of the DRAM memory.	00 to FF	
Refresh Stagger	This parameter defines the number of cycles between the RFSH command and each of the four rows.	0 SDRAM clocks to 3 SDRAM clocks	
2 CLK ADDR Setup	Activates the function two clock address setup.	Enabled	Activates this function.
		Disabled	Deactivates this function.
SMM Mapping	Maps the SMM memory area from GX_BASE+400000 to the physical address A0000 to BFFFF in SDRAM.	Enabled	Activates this function.
		Disabled	Deactivates this function.
X-Bus Round Robin	Configures the priority levels for processor, graphic and display controller requests.	Enabled	Processor, graphic and display controller requests are treated with the same priority level.
		Disabled	Processor requests are given a higher priority level. Display controller requests always have the highest priority.
SDRAM Shift SDCLK	This function makes switching possible for SDCLK SDRAM hold time requests.	0,5; 1; 1,5; 2; 2,5 or 3	
		No Shift	No switching.
Read Data Phase	Configures Read Data Phase Regulates whether read data is latched to one or two core clocks for the rising edges of the SDCLK.	1 Core Clock	After one core clock.
		2 Core Clocks	After two core clocks.
Fast Read Mask	Prevents the bypassing of FIFO requests using the core.	Enabled	Activates the function.
		Disabled	Deactivates the function.
CAS Latency	Column Address Strobe Latency (CAS) describes the delay between addressing in a RAM function block and preparing stored data to this address. The higher the subsequent value, the greater the delay.	2; 3; 4; 5; 6 or 7 clk	Setting the desired cycle time.
tRC	Sets the minimum number of SDRAM cycles between RFSH and RFSH/ACT commands.	2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15 or 16 Clk	Setting the desired cycle time.
tRAS	Sets the minimum number of SDRAM cycles between ACT and PRE commands.	2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15 or 16 Clk	Setting the desired cycle time.
tRP	Sets the minimum number of SDRAM cycles between PRE and ACT commands.	1; 2; 3; 4; 5; 6 or 7 Clk	Setting the desired cycle time.
tRCD	Configures the delay between the ACT and READ/WRITE command. (tRCD) Sets the minimum number of SDRAM cycles between ACT and READ/WRITE commands.	1; 2; 3; 4; 5; 6 or 7 Clk	Setting the desired cycle time.
tRRD	Configures the time between ACT(0) to ACT(1) command period.	0-7	

Table 132: BIOS Memory Optimization menu (Forts.)

BIOS Setting	Description	Configuration Possibilities	Effect
tDPL	Sets the minimum number of SDRAM cycles between the time for the last record date until the memory area. is reloaded.	1; 2; 3; 4; 5; 6; 7 Clk	Setting the desired cycle time.

Table 132: BIOS Memory Optimization menu (Forts.)

2.2.6 Advanced BIOS Features
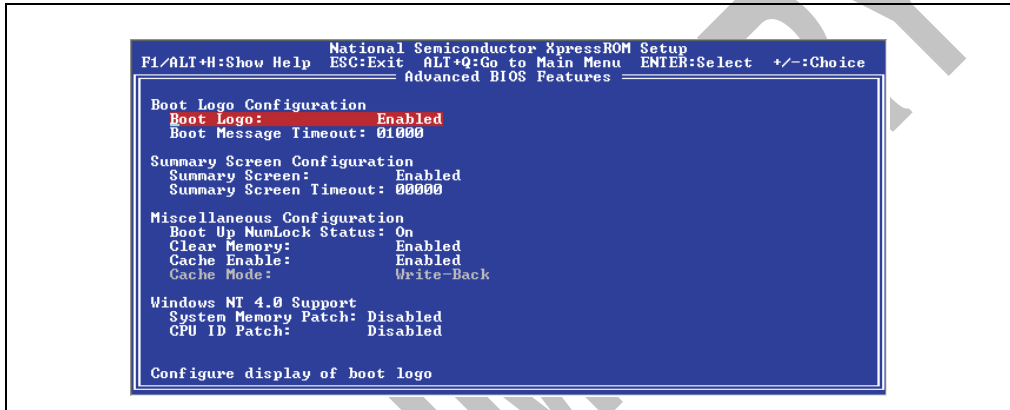
Figure 229: BIOS Advanced BIOS Features menu

BIOS Setting	Description	Configuration Possibilities	Effect
Boot Logo	Displays a boot logo during the start-up of the Power Panel.	Disabled	There is no boot logo displayed during booting.
		Enabled	A B&R boot logo is displayed during booting, as long as no bitmap created by a user is added.
Boot Message Timeout	Time definition, how long the message "Press DEL for Setup" is shown on the display and how much time the user has to change to the BIOS configuration. **Can be resumed before the timeout expires by pressing any button.**	0	No waiting.
		1-65535 [milliseconds]	The manually set value is waited for in milliseconds, until the boot procedure resumes.
Summary Screen	Displays information about BIOS, VGA, VSA versions, devices found, etc.	Enabled	Shows summary screen.
		Disabled	Hides summary screen.
Summary Screen Timeout	Time definition, how long the summary screen is displayed. **Can be resumed before the timeout expires by pressing any button.**	0	No waiting.
		1-65535 [milliseconds]	The manually set value in milliseconds which is waited for.
Boot Up NumLock Status	Defines the status of an existing numeric keypad when the system is booted.	On	Numeric keypad is activated
		Off	Numeric keypad is deactivated

Table 133: BIOS Advanced BIOS Features menu

Chapter 4
Software

BIOS Setting	Description	Configuration Possibilities	Effect
Clear Memory	After starting, the BIOS automatically clears the entire main memory. Note: Clearing e.g. 256 MB RAM takes approximately 3 seconds.	Enabled	The entire main memory is cleared. This makes sense for example when the system to be booted requires initialized main memory when booting.
		Disabled	Deactivates the function.
Cache Enable	The processor has a 16 kB fast L1 cache. The data for fast access is provided in this memory.	Enabled	Recurring commands are processed in the fast L1 cache.
		Disabled	Deactivates the function.
Cache Mode	Using cache mode, write accesses are determined on the cache. The option is fixed on "Write Back". The information is only written in the main memory if necessary (main memory and cache do not have the same information content).	None	-
System Memory Patch	When activated, the buffer address length is not returned as zero from the national specific software interrupt 15h, the system service function E8h and the subfunction 20h (Get System Memory Map). **This function should be activated only when using Windows NT4.0 operating system.**	Enabled	Activates the function.
		Disabled	Deactivates the function.
CPU ID Patch	Windows NT 4.0 checks the CPU ID and recognizes a Geode CPU and does not allow this to be operated. The recognition is implemented starting from Service Pack 6. For this reason, the function must activated during installation of Windows NT 4.0, until Service Pack 6 has been installed. **This function should be activated only when using Windows NT4.0 operating system.**	Enabled	Activates the function.
		Disabled	Deactivates the function.

Table 133: BIOS Advanced BIOS Features menu (Forts.)

2.2.7 Special OEM Features
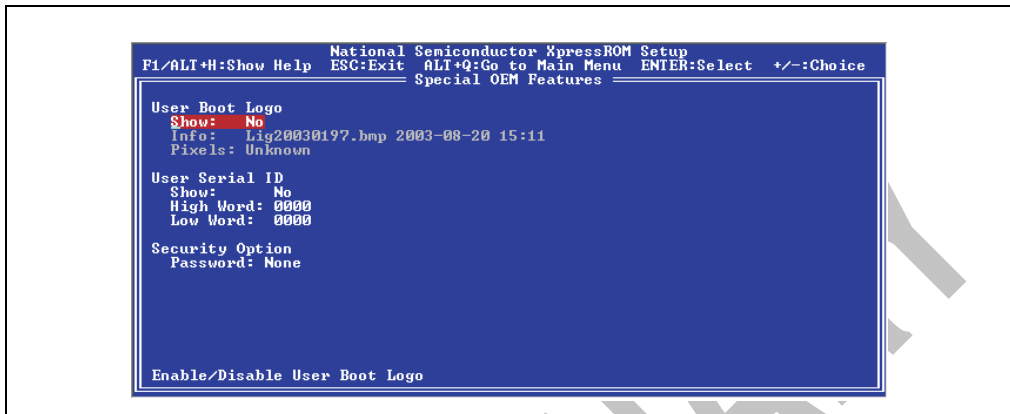
Figure 230: BIOS Special OEM Features menu

BIOS Setting	Description	Configuration Possibilities	Effect
Show (User Boot Logo)	A boot logo that has been created by a user can be displayed here instead of the B&R boot logo.[1]	Yes	Display
		No	
Info	Displays the name and the creation date of the user boot logo.	None	-
Pixels	Displays the resolution of the user boot logo.	None	-
User Serial ID Show	A user serial number can be displayed in the summary screen using this function when the system is started.	Yes	Displays the assigned user serial ID.
		No	Hides the assigned user serial ID.
High Word	Input possibilities for the first 4 bytes for the user serial number.	0000-FFFF	The hexadecimal value entered defines the first 4 positions of the user serial ID.
Low Word	Input possibilities for the second 4 bytes of the user serial number.	0000-FFFF	The hexadecimal value entered defines the second 4 positions of the user serial ID.
Password	A password can be defined here which must be entered by the user when the BIOS setup is called.	Max. 8 characters	The password must be confirmed by being entered for a second time. The password can be removed again by entering a blank password (just pressing RETURN). **Important: The password entered is also saved in the CMOS Backup, and is impossible to delete.**

Table 134: BIOS Special Functions menu

1) See section 2.4.3 "User Boot Logo Upgrade (Disk3)" on Page 305 regarding guidelines for creating a user boot logo.

Chapter 4
Software

2.2.8 Device Information
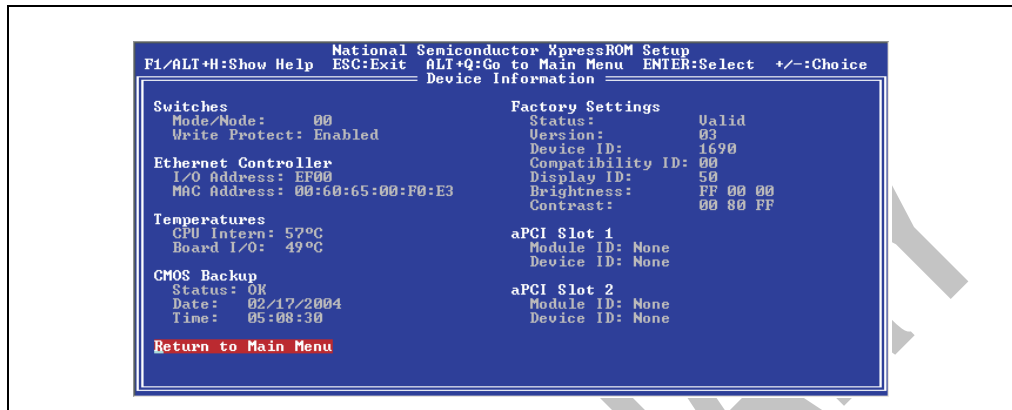
Figure 231: BIOS Device Information menu

BIOS Setting	Description	Configuration Possibilities	Effect
Mode/Node	Displays the current mode/node switch position.	None	-
Write Protect	Displays the switch position for the "Write Protect" switch.	None	-
I/O Address	Displays the Ethernet I/O address.	None	-
MAC Address	Displays the assigned MAC address.	None	-
CPU Internal	Displays the current internal processor temperature.	None	-
Board I/O	Indicates the current board I/O temperature.	None	-
Status	The status for the last automatically saved CMOS backup is displayed here.	None	If the boot procedure is successful, then the CMOS values are automatically saved by BIOS in the Flash memory. The values therefore are only saved in the Flash memory if the backup is not equal to the current CMOS, the backup is not available or the backup checksum is incorrect.
Date	Date of the last automatically saved CMOS backup.	None	
Time	Time of the last automatically created CMOS backup.	None	
Status	Status display for factory settings.	None	-
Version	Version display for factory settings.	None	-
Device ID	Hex value for the device code of the Power Panel device.	None	-
CompatibilityID	The compatibility code of the Power Panel device is displayed here.	None	-

Table 135: BIOS Device Information menu

BIOS Setting	Description	Configuration Possibilities	Effect

Display ID	Shows the display ID used.
	Possible display IDs are:
	    00h - unknown
	    10h - Passive displays (STN)
	    11h - LCD B/W QVGA
	    12h - LCD COL QVGA
	    20h - Active displays (TFT) with QVGA
	    30h - Active displays (TFT) with VGA
	    40h - Active displays (TFT) with SVGA
	    50h - Active displays (TFT) with XVGA
		None	-

Brightness	The defined brightness values (minimum, default, maximum) for the display used are shown here as as hex values.	None	-
Contrast	The defined contrast values (minimum, default, maximum) for the display used are shown here as as hex values.	None	-

aPCI slot 1
    Module ID
    Device ID
	Information about an installed aPCI module in aPCI slot 1 of the Power Panel device is displayed here.	None	-

aPCI slot 1
    Module ID
    Device ID
	Information about an installed aPCI module in aPCI slot 2 of the Power Panel device is displayed here.	None	-

Table 135: BIOS Device Information menu (Forts.)

Chapter 4
Software

2.2.9 Firmware Configuration

```
                    National Semiconductor XpressROM Setup
F1/ALT+H:Show Help  ESC:Exit  ALT+Q:Go to Main Menu  ENTER:Select  +/-:Choice
                         Firmware Configuration

   On-Board FPGA
      Boot:    Enabled
      Info:    PowerPanel 05.08.2003 V2.1
      Status: No FPGA

   aPCI Slot 1
      Boot:    Enabled
      Info:    No firmware burned
      Status: No aPCI module

   aPCI Slot 2
      Boot:    Enabled
      Info:    No firmware burned
      Status: No aPCI module




   Enable/Disable boot of on-board FPGA
```

Figure 232: BIOS Firmware Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
On-board FPGA Boot	The onboard FPGA controls the image output for Power Panel 200 devices with BIOS.	Enabled	The onboard FPGA is activated and initialized.
		Disabled	Deactivates the FPGA. If this function is deactivated, then no picture is output on Power Panel 200 devices. This function can only be reactivated by using the program "Remhost" (see section "REMHOST", on page 308).
Info	Information about FPGA Firmware.	None	-
Status	Status display for the onboard FPGA.	None	-
aPCI slot 1 Boot	A connected aPCI module in the aPCI slot 1 is initialized and booted, as long as a valid firmware is available.	Enabled	The aPCI module is booted if a corresponding firmware file is burned in the Flash memory of the Power Panel.
		Disabled	The aPCI module is not booted by the BIOS.
Info	Information about a stored boot file for the aPCI slot 1 in the Flash memory.	None	-
Status	Status display for aPCI slot 1 modules.	None	-
aPCI slot 2 Boot	A connected aPCI module in the aPCI slot 2 is initialized and booted, as long as a valid firmware is available.	Enabled	The aPCI module is booted if a corresponding firmware file is burned in the Flash memory of the Power Panel.
		Disabled	The aPCI module is not booted by the BIOS.
Info	Information about a stored boot file for the aPCI slot 2 in the Flash memory.	None	-
Status	Status display for aPCI slot 2 modules.	None	-

Table 136: BIOS Firmware Configuration menu

2.2.10 Restore CMOS Values
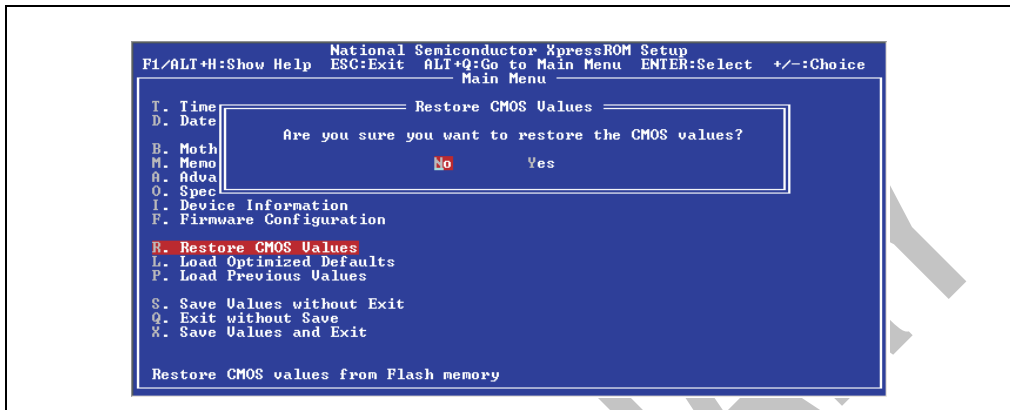
Figure 233: BIOS Restore CMOS Values menu

By clicking on "Yes", the last saved CMOS values can be restored in the Flash memory ROM using this BIOS menu item (R shortcut). All configurable CMOS values (besides date and time) are restored again in the BIOS Setup.

Information:

If the boot procedure is successful, then the CMOS values are automatically saved by BIOS in the Flash memory. The values therefore are only saved in the Flash memory if the backup is not equal to the current CMOS, the backup is not available or the backup checksum is incorrect.

For protecting CMOS data, a CMOS backup was built into the BIOS. If the BIOS setup was ended using "Save Values and Exit" and the Power Panel device was correctly restarted, then the CMOS data is burned in the Flash memory. If the CMOS checksum is incorrect during startup, (battery empty) or the Power Panel device cannot be booted correctly three times consecutively, then the salvaged data from the Flash memory is copied again to the CMOS. Setup is back to its orginal state, except for the time.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

Chapter 4
Software

2.2.11 Load Optimized Defaults
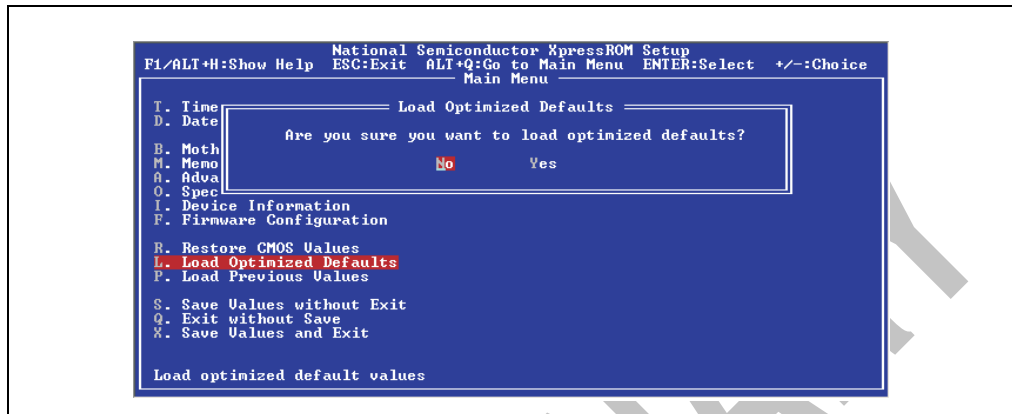
Figure 234: BIOS Load Optimized Defaults menu

By clicking on "Yes", optimal BIOS settings for best performance can be loaded using this BIOS menu item (L shortcut).

Information:

These settings are also recommended by B&R.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.2.12 Load Previous Values
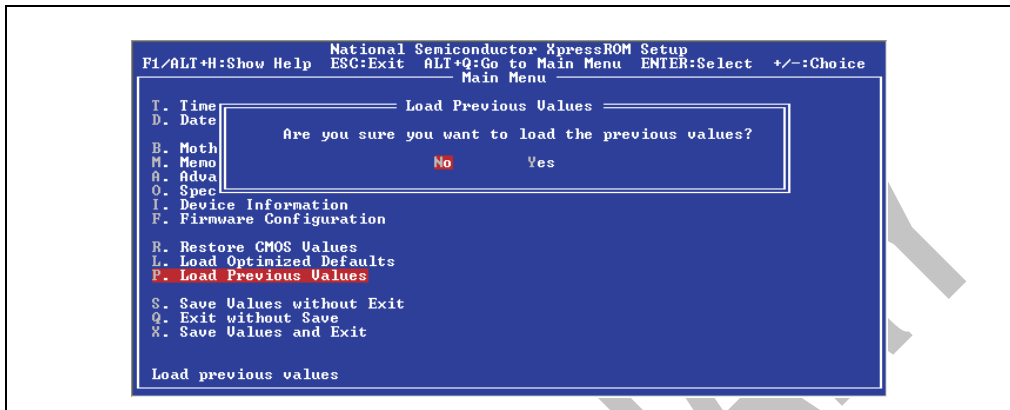
Figure 235: BIOS Load Previous Values menu

By clicking on "yes", the set values called at the BIOS Setup are loaded again using this BIOS menu item (P shortcut). All changes which had been made up to that point are lost as a result.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.2.13 Save Values without Exit
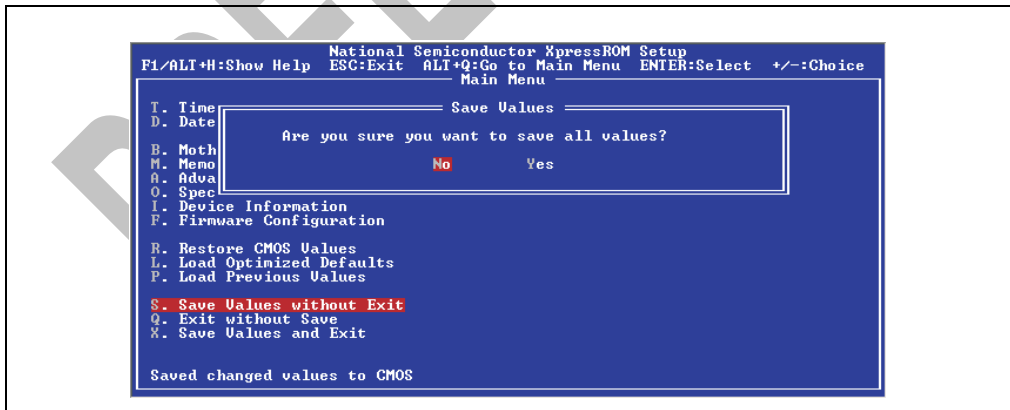
Figure 236: BIOS Save Values without Exit menu

The BIOS values are saved using this menu item (S shortcut) by clicking "Yes". After this, the user can make further settings or exit BIOS Setup.

Chapter 4
Software

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.2.14 Exit without Save


```
                    National Semiconductor XpressROM Setup
F1/ALT+H:Show Help   ESC:Exit   ALT+Q:Go to Main Menu   ENTER:Select   +/-:Choice
                              Main Menu
   T. Time┌─────────────── Exit Without Save ───────────────┐
   D. Date│                                                 │
          │   Are you sure you want to exit without saving? │
   B. Moth│                                                 │
   M. Memo│                 No        Yes                   │
   A. Adva│                                                 │
   O. Spec└─────────────────────────────────────────────────┘
   I. Device Information
   F. Firmware Configuration

   R. Restore CMOS Values
   L. Load Optimized Defaults
   P. Load Previous Values

   S. Save Values without Exit
   Q. Exit without Save
   X. Save Values and Exit

   Exit without saving changes (except for Date And Time)
```

Figure 237: BIOS Exit without Save menu

Using this BIOS menu item (Q shortcut), the user can exit the BIOS Setup by clicking "Yes", without having to save any possible changes made. Afterwards, the system is automatically restarted.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.2.15 Save Values and Exit

```
                        National Semiconductor XpressROM Setup
F1/ALT+H:Show Help   ESC:Exit   ALT+Q:Go to Main Menu   ENTER:Select   +/-:Choice
                                    Main Menu
   T. Time┌──────────────── Save Values and Exit ────────────────┐
   D. Date│                                                      │
          │   Are you sure you want to save all values and exit? │
   B. Moth│                                                      │
   M. Memo│                  No         Yes                      │
   A. Adva│                                                      │
   O. Spec└──────────────────────────────────────────────────────┘
   I. Device Information
   F. Firmware Configuration

   R. Restore CMOS Values
   L. Load Optimized Defaults
   P. Load Previous Values

   S. Save Values without Exit
   Q. Exit without Save
   X. Save Values and Exit


   Save all changes and exit
```

Figure 238: BIOS Save Values and Exit menu

Using this menu item (X shortcut) settings are saved, the BIOS Setup is automatically shut down by clicking "Yes" and a reboot of the system takes place.

For more information about CMOS backup, see section 2.5 "CMOS Backup".

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

Chapter 4
Software

2.3 BIOS Settings QVGA Power Panel Devices

Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.05. Therefore, it is possible that these diagrams and BIOS descriptions might not correpsond with the installed BIOS version.

In the following pages, the individual BIOS setup pages for a QVGA Power Panel device will be described in more detail.

2.3.1 BIOS Setup Main Menu

The BIOS Setup main menu appears immediately by pressing the DEL button when the system is started:
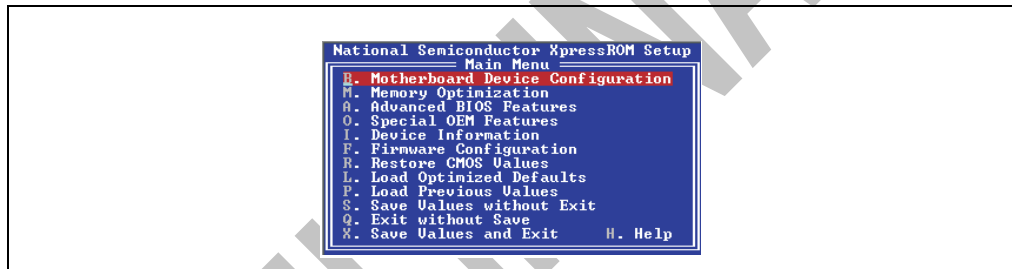
Figure 239: BIOS Setup Main Menu

The individual menu items are explained in detail in the following sections.

Shortcut	BIOS Setup Menu	Function
B	Motherboard Device Configuration	Motherboard resources such as date, time, USB, PCI etc. can be configured here.
M	Memory Optimization	The settings for memory management can be made here.
A	Advanced BIOS Features	Advanced BIOS options such as boot logo, summary screen, cache areas, etc. can be configured here.
O	Special OEM Features	Specific B&R settings can be made here.
I	Device Information	Important parameters (e.g. temperature, mode/node position, etc.) for a Power Panel device are displayed here.
F	Firmware Configuration	On-board firmware for FPGA and aPCI modules can be configured here.
R	Restore CMOS Values	With this, the last saved CMOS values can be restored in the Flash memory.
L	Load Optimized Defaults	Load the optimal BIOS settings for best performance.
P	Load Previous Values	With this, set values are loaded again when the BIOS Setup is called. All changes which had been made up to that point are lost as a result.
S	Save Values without Exit	BIOS values are saved without exiting the BIOS Setup.

Table 137: Overview of BIOS Main Menu functions

Shortcut	BIOS Setup Menu	Function
Q	**Exit without Save**	The BIOS Setup is exited possibly without changes being saved.
X	**Save Values and Exit**	Settings are saved using this option and the BIOS Setup is exited.

Table 137: Overview of BIOS Main Menu functions (Forts.)

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.3.2 Motherboard Device Configuration
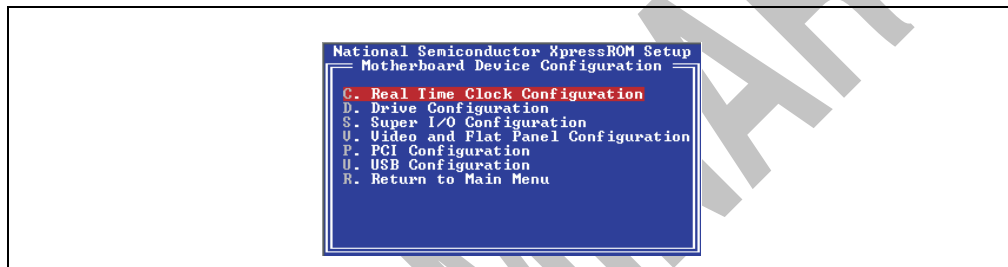
Figure 240: BIOS Motherboard Device Configuration

Shortcut	BIOS Setup Menu	Function
C	**Real-time Clock Configuration**	Setting the system date and the system time
D	**Drive Configuration**	Settings for floppy drive and Compact Flash card.
S	**Super I/O Configuration**	Configures the Super I/O device.
V	**Video and Flat Panel Configuration**	Displays the video settings and configuration for resolution, brightness and contrast display parameters.
P	**PCI Configuration**	Configures PCI bus settings.
U	**USB Configuration**	Configuration of USB Settings.
R	**Return to Main Menu**	Exit current page and return to BIOS Main Menu.

Table 138: BIOS Motherboard Device Configuration menu

Chapter 4
Software

Real-time Clock Configuration
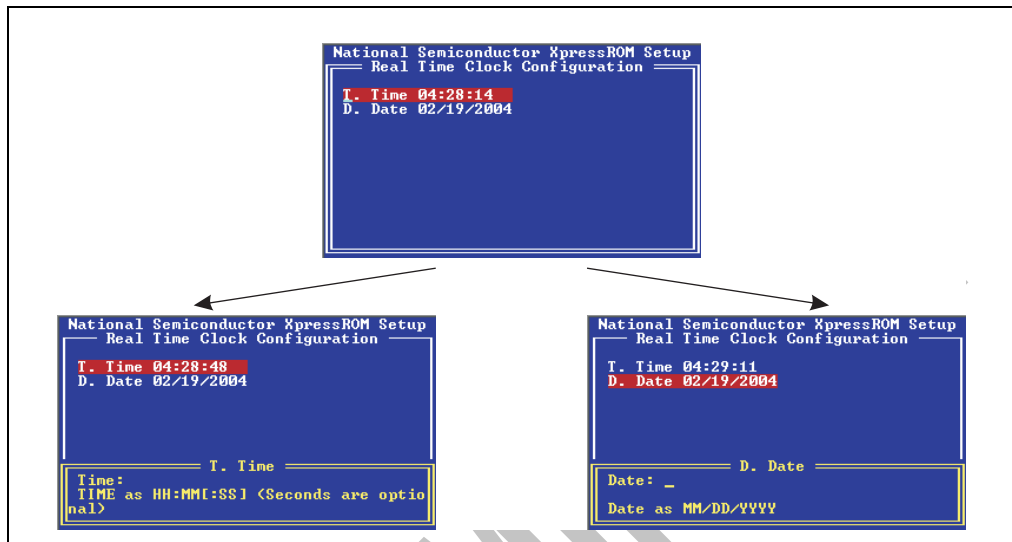
Figure 241: BIOS Real-time Clock Configuration

Shortcut	BIOS Setup Menu	Function
T	**Time**	Sets the system time.
D	**Date**	Sets the system date.

Table 139: BIOS Real-time Clock Configuration menu

Time

The currently configured system time is displayed here. The time is buffered by a battery (CMOS battery) after the Power Panel device has been switched off.

A new system time can be entered by selecting TIME and then confirming with RETURN or with the shortcut "A". The format HH:MM[:SS] must be entered as shown in the following example:

Example: Set time to 13:00:00.

The entry can be made in three different ways using the keyboard:

- 13:00:00 - confirm using RETURN
- 13:00 - confirm using RETURN
- 13: - confirm using RETURN

Information:

When using a German keyboard layout, pressing the ":" key enters the letter "Shift+ö".

Date

The current system date is displayed here. The date is buffered by a battery (CMOS battery) after the Power Panel device has been switched off.

A new system date can be entered by selecting DATE and then confirming with RETURN or with the shortcut "B". The format MM:DD:YYYY must be entered as shown in the following example:

Example: Set date to 12.02.2003.

Entry using keyboard:

• 12/02/2003 - confirmed by RETURN

Information:

When using a German keyboard layout, pressing the "/" key enters the letter "-" (next to the shift key).

Drive Configuration
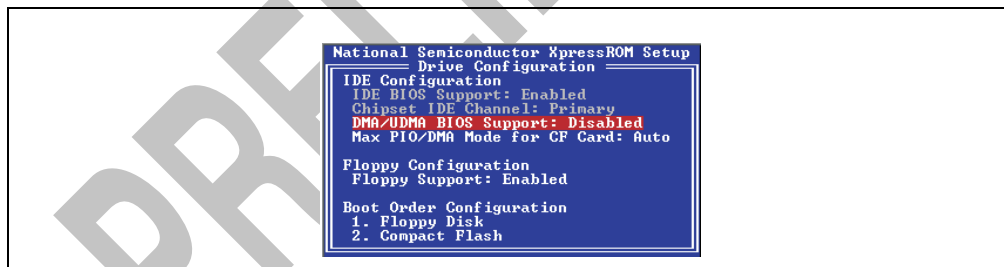
Figure 242: BIOS Drive Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
IDE BIOS Support	Display for IDE configuration of the Power Panel.	None	-
Chipset IDE Channel	Displays the IDE channel used.	None	-
DMA/UDMA BIOS Support	DMA/UDMA BIOS Support can be configured here.	Enabled	Activates this function.
		Disabled	Only PIO modes for data transfer to and from Compact Flash cards are used.

Table 140: BIOS Drive Configuration menu

Chapter 4
Software

BIOS Setting	Description	Configuration Possibilities		Effect
Max PIO/MDMA/UDMA Mode for CF Card	The maximum data transfer mode to and from a Compact Flash card can be configured here. **Information:** **If a mode is configured that is not supported by the Compact Flash card, then the fastest supported mode is configured.**	Auto		The fastest from the inserted Compact Flash cards supported modes are configured.
		PIO 0 to PIO 4		Manual Configuration Option for PIO Mode.
		MDMA 0 to MDMA 2		Manual Configuration Option for MDMA Mode.
		UDMA 0 to UDMA 2		Manual Configuration Option for UDMA Mode.
Floppy Configuration	Floppy Support (USB) can be activated here. It is also possible to access a remote floppy drive using the program "Remhost" (see section "REMHOST", on page 308) and, using this, to carry out e.g. a BIOS upgrade.	Enabled		USB Floppy Support activated.
		Disabled		USB Floppy Support deactivated.
Boot Order Configuration	Configures the boot order for memory media. **If two identical devices are selected a conflict warning is displayed.**	1	Floppy Disk [1]	An attempt is made to boot from this configured drive first.
			Compact Flash	
			NONE	
		2	Floppy Disk [1]	An attempt is made to boot from this configured drive second.
			Compact Flash	
			NONE	

Table 140: BIOS Drive Configuration menu (Forts.)

1) Only HD diskettes (1.44 MB) are still supported by BIOS.

Super I/O Configuration
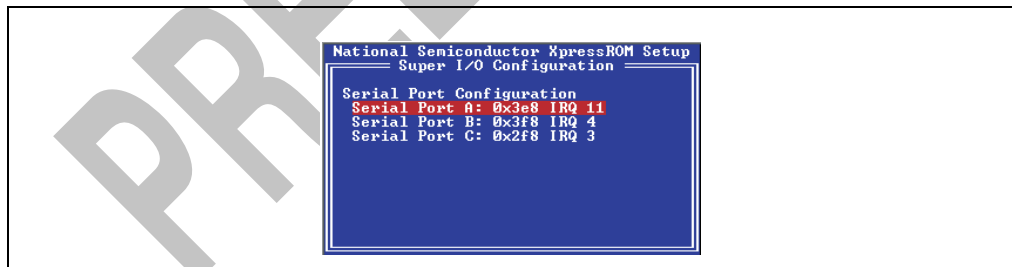
Figure 243: BIOS Super I/O Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
Serial Port A:	Configures the first UART address range and the corresponding interrupt for the matrix controller. **BIOS Default Setting: 0x3e8 IRQ 11.** **Information:** **Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3e8 IRQ 11	Use this address range and interrupt.
		0x3f8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x2f8 IRQ 11	
Serial Port B:	Configures the second UART address range and the corresponding interrupt for the serial interface. **BIOS Default Setting: 0x3f8 IRQ 4.** **Information:** **Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3f8 IRQ 4	Use this address range and interrupt.
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	
Serial Port C:	Configures the third UART address range and the corresponding interrupt for the touch controller. **BIOS Default Setting: 0x2f8 IRQ 3.** **Information:** **Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x2f8 IRQ 3	Use this address range and interrupt.
		0x3f8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	

Table 141: BIOS Super I/O Configuration menu

Video and Flat Panel Configuration
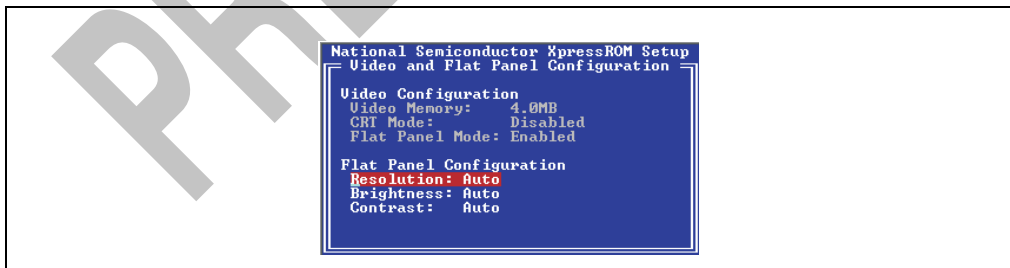
Figure 244: BIOS Video Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
Video Memory	Displays the current video memory, which is reserved by the main memory.	None	-

Table 142: BIOS Video Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
CRT Mode	Display on an external screen.	None	-
Flat Panel Mode	Display on a Power Panel display.	None	-
Resolution	Configures the maximum setting of the maximum resolution for the display. **Note: The correct resolution should be configured for the Power Panel device that has been specifiied. Otherwise, the display can be damaged by incorrect timing values. If the mode/node switch is set to 0/0, then the resolution is automatically reset every time the Power Panel device restarted.**	Auto	The maximum resolution is read from the factory settings and correctly configured automatically.
		QVGA(320x240) LCD	Optimal setting for a QVGA LCD Power Panel.
		QVGA(320x240) TFT	Optimal setting for a QVGA TFT Power Panel.
		VGA (640x480)	Optimal setting for a VGA Power Panel.
		SVGA (800x600)	Optimal setting for a SVGA Power Panel.
		XGA(1024x768)	Optimal setting for a XGA Power Panel.
Brightness	Setting for the background lighting of the display. **Note: If the mode/node switch is set to 0/0, then brightness settings are automatically set to the default values from the factory settings every time the Power Panel device is restarted.**	Auto	The optimal brightness is automatically configured using factory settings. Therefore, a brightness setting between 100% and 0% is set.
		0% to 100%	Manual setting of the desired brightness within factory settings limits.
Contrast	Setting for the contrast of the display. **Note: Contrast settings can only be configured with passive displays. If the mode/node switch is set to 0/0, then contrast settings are automatically set to the default values from the factory settings every time the Power Panel device is restarted.**	Auto	The optimal contrast is automatically configured using factory settings. Therefore, a contrast value between 100% and 0% is set.
		0% to 100%	Manual setting of the desired contrast within factory settings limits.

Table 142: BIOS Video Configuration menu (Forts.)

PCI Configuration
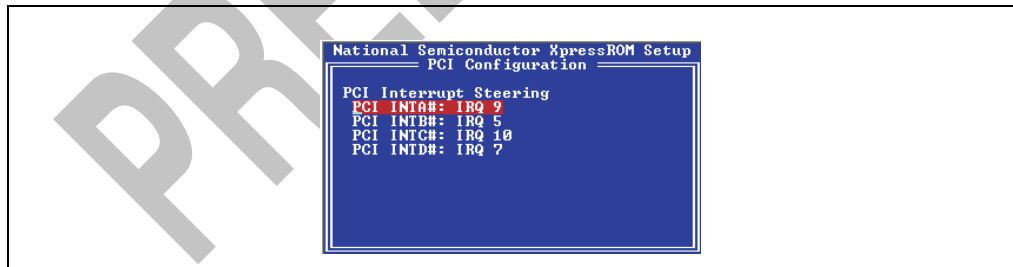
Figure 245: BIOS PCI Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
PCI INTA#	Activates the IRQ for the Ethernet controller. **BIOS Default Setting: IRQ 9.**	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.

Table 143: BIOS PCI Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
PCI INTB#	Activates IRQ for the aPCI slot 1. **BIOS Default Setting: IRQ 5.** First IRQ for aPCI Slot 1 and IRQ for USB controller.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTC#	Activates IRQ for the aPCI slot 2. **BIOS Default Setting: IRQ 10.** First IRQ for aPCI slot 2 and second IRQ for aPCI slot 1.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTD#	Activates IRQ for the USB controller. **BIOS Default Setting: IRQ 7.** Second IRQ for aPCI slot 2.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.

Table 143: BIOS PCI Configuration menu (Forts.)

USB Configuration

Figure 246: BIOS USB Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
Legacy USB	This function activates USB support, in order to also carry out BIOS settings before the operating system loads with USB support, e.g. using a USB keyboard. **Note: If the mode/node switch is set to 0/0, then the Legacy USB always set to "enabled".**	Enabled	Activating USB Legacy support.
		Disabled	Deactivating USB Legacy Support **Note: After deactivating this support, booting from a USB floppy drive is no longer possible.**

Table 144: BIOS USB Configuration menu

2.3.3 Memory Optimization

Warning!

The parameters in this screen are for system designers, service personnel, and technically competent users only. The best advice is to alter only those settings that you thoroughly understand.

The incorrect setting for "Memory Optimization" values can cause instability and even cause the entire system not to boot. If the Power Panel device can no longer be booted, then the default values can be restored by restarting three times.

Information:

More detailed information about the meaning and effects of the settings can also be found in the corresponding user's manual for the processor.
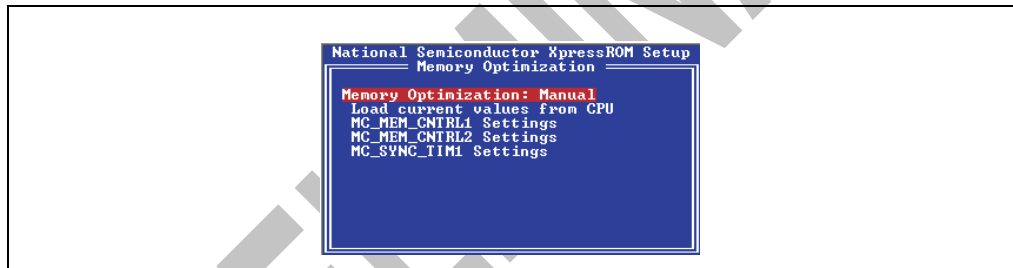
Figure 247: BIOS Memory Optimization menu

BIOS Setting	Description	Configuration Possibilities	Effect
Memory Optimization	Defines the handling of memory optimization. With this option, it is recommended that the user uploads current base values (that the system uses) from the CPU to this BIOS page when setting the values manually for the first time.	Conservative	The BIOS uses automatically PC66 timings.
		Optimized	BIOS uses optimized memory settings for the memory chips used. This allows faster timings to be made.
		Aggressive	BIOS uses "aggressive" memory settings based on SPD and CPU speed. **Warning!** **Aggressive memory settings can cause stability problems for the system.**
		Manual	If "Manual" is selected then the remaining 3 submenus are active, in order to be able to make the changes.

Table 145: BIOS Memory Optimization menu

BIOS Setting	Description	Configuration Possibilities	Effect
Load current values from CPU	All the specified values are configured on this BIOS setup page with the current configured values.	None	The memory timing values currently used are uploaded by the CPU. It is recommended that when using this option, the user uploads optimal base values (that the system uses) from the CPU to this BIOS page when setting the values manually for the first time.
MC_MEM_CNTRL1 Settings	The memory control register MC_MEM_CNTRL1 can be configured here. Only active, when "Memory Optimization" is set to "Manual". See section "MC_MEM_CNTRL1 Settings" on Page 287.	None	-
MC_MEM_CNTRL2 Settings	The memory control register MC_MEM_CNTRL2 can be configured here. Only active, when "Memory Optimization" is set to "Manual". See section "MC_MEM_CNTRL2 Settings" on Page 288.	None	-
MC_SYNC_TIM1 Settings	The memory control register MC_SYNC_TIM1 can be configured here. Only active, when "Memory Optimization" is set to "Manual". See section "MC_SYNC_TIM1 Settings" on Page 289.	None	-

Table 145: BIOS Memory Optimization menu (Forts.)

MC_MEM_CNTRL1 Settings
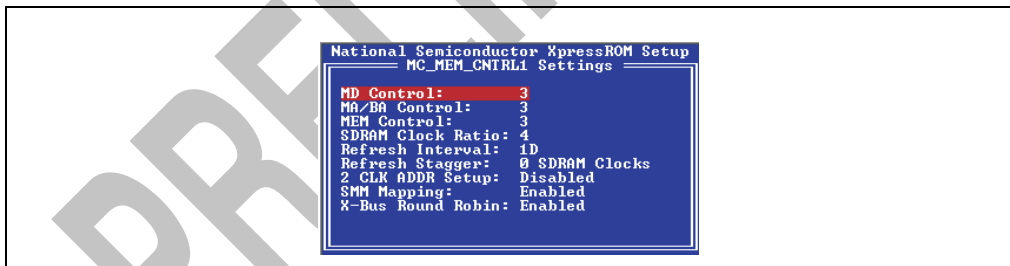
Figure 248: MC_MEM_CNTRL1 Settings

BIOS Setting	Description	Configuration Possibilities	Effect
MD Control	Configures MD[63:0] drive strength.	0 to 3	0 = weakest, 3 = strongest
MA/BA Control	Configures MA[12:0] and BA[1:0] drive strength.	0 to 3	0 = weakest, 3 = strongest
MEM Control	Configures RASA#, CASA#, WEA#, CS[1:0]#, CKEA, DQM[7:0] drive strength.	0 to 3	0 = weakest, 3 = strongest
SDRAM Clock Ratio	Configures the SDRAM Timing.	2; 2,5; 3; 3,5; 4; 4,5; 5	Sets DRAM Clock Timings.

Table 146: BIOS MC_MEM_CNTRL1 Settings menu

Chapter 4
Software

BIOS Setting	Description	Configuration Possibilities	Effect
Refresh Interval	This parameter defines the number of processor core clocks that are multiplied by 64 between refresh cycles of the DRAM memory.	00 to FF	
Refresh Stagger	This parameter defines the number of cycles between the RFSH command and each of the four rows.	0 SDRAM clocks to 3 SDRAM clocks	
2 CLK ADDR Setup	Activates the function two clock address setup.	Enabled	Activates this function.
		Disabled	Deactivates this function.
SMM Mapping	Maps the SMM memory area from GX_BASE+400000 to the physical address A0000 to BFFFF in SDRAM.	Enabled	Activates this function.
		Disabled	Deactivates this function.
X-Bus Round Robin	Configures the priority levels for processor, graphic and display controller requests.	Enabled	Processor, graphic and display controller requests are treated with the same priority level.
		Disabled	Processor requests are given a higher priority level. Display controller requests always have the highest priority.

Table 146: BIOS MC_MEM_CNTRL1 Settings menu (Forts.)

MC_MEM_CNTRL2 Settings
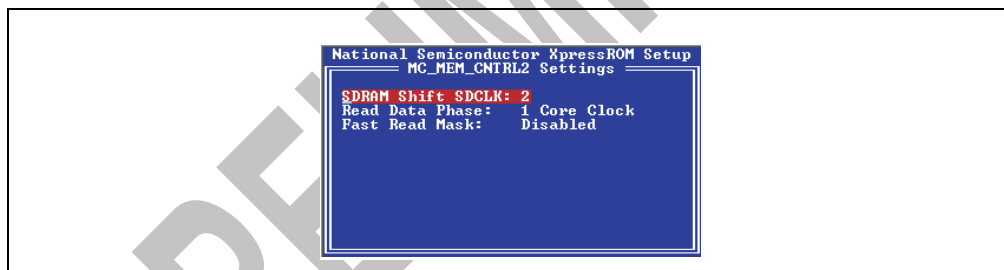
Figure 249: MC_MEM_CNTRL2 Settings

BIOS Setting	Description	Configuration Possibilities	Effect
SDRAM Shift SDCLK	This function makes switching possible for SDCLK SDRAM hold time requests.	0,5; 1; 1,5; 2; 2,5 or 3	
		No Shift	No switching.
Read Data Phase	Configures Read Data Phase Regulates whether read data is latched to one or two core clocks for the rising edges of the SDCLK.	1 Core Clock	After one core clock.
		2 Core Clocks	After two core clocks.
Fast Read Mask	Prevents the bypassing of FIFO requests using the core.	Enabled	Activates the function.
		Disabled	Deactivates the function.

Table 147: BIOS MC_MEM_CNTRL2 settings menu

MC_SYNC_TIM1 Settings
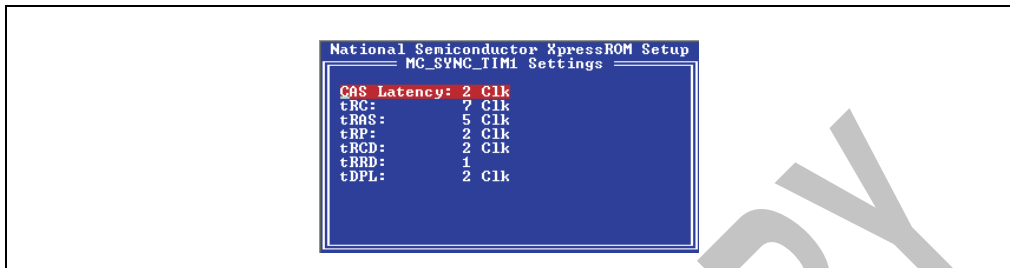
Figure 250: MC_SYNC_TIM1 Settings

BIOS Setting	Description	Configuration Possibilities	Effect
CAS Latency	Column Address Strobe Latency (CAS) describes the delay between addressing in a RAM function block and preparing stored data to this address. The higher the subsequent value, the greater the delay.	2; 3; 4; 5; 6 or 7 clk	Setting the desired cycle time.
tRC	Sets the minimum number of SDRAM cycles between RFSH and RFSH/ACT commands.	2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15 or 16 Clk	Setting the desired cycle time.
tRAS	Sets the minimum number of SDRAM cycles between ACT and PRE commands.	2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15 or 16 Clk	Setting the desired cycle time.
tRP	Sets the minimum number of SDRAM cycles between PRE and ACT commands.	1; 2; 3; 4; 5; 6 or 7 Clk	Setting the desired cycle time.
tRCD	Configures the delay between the ACT and READ/WRITE command. (tRCD) Sets the minimum number of SDRAM cycles between ACT and READ/WRITE commands.	1; 2; 3; 4; 5; 6 or 7 Clk	Setting the desired cycle time.
tRRD	Configures the time between ACT(0) to ACT(1) command period.	0-7	
tDPL	Sets the minimum number of SDRAM cycles between the time for the last record date until the memory area. is reloaded.	1; 2; 3; 4; 5; 6; 7 Clk	Setting the desired cycle time.

Table 148: BIOS MC_SYNC_TIM1 settings menu

Chapter 4
Software

2.3.4 Advanced BIOS Features

```
National Semiconductor XpressROM Setup
═════ Advanced BIOS Features ═════

Boot Logo Configuration
  Boot Logo:              Enabled
  Boot Message Timeout:   01000
Summary Screen Configuration
  Summary Screen:         Enabled
  Summary Screen Timeout: 00000
Miscellaneous Configuration
  Boot Up NumLock Status: On
  Clear Memory:           Enabled
  Cache Enable:           Enabled
  Cache Mode:             Write-Back
```
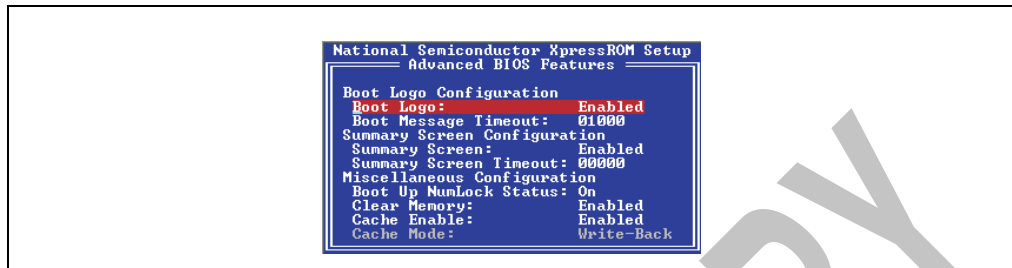
Figure 251: BIOS Advanced BIOS Features menu

BIOS Setting	Description	Configuration Possibilities	Effect
Boot Logo	Displays a boot logo during the start-up of the Power Panel.	Disabled	There is no boot logo displayed during booting.
		Enabled	A B&R boot logo is displayed during booting, as long as no bitmap created by a user is added.
Boot Message Timeout	Time definition, how long the message "Press DEL for Setup" is shown on the display and how much time the user has to change to the BIOS configuration. **Can be resumed before the timeout expires by pressing any button.**	0	No waiting.
		1-65535 [milliseconds]	The manually set value is waited for in milliseconds, until the boot procedure resumes.
Summary Screen	Displays information about BIOS, VGA, VSA versions, devices found, etc.	Enabled	Shows summary screen.
		Disabled	Hides summary screen.
Summary Screen Timeout	Time definition, how long the summary screen is displayed. **Can be resumed before the timeout expires by pressing any button.**	0	No waiting.
		1-65535 [milliseconds]	The manually set value in milliseconds which is waited for.
Boot Up NumLock Status	Defines the status of an existing numeric keypad when the system is booted.	On	Numeric keypad is activated
		Off	Numeric keypad is deactivated
Clear Memory	After starting, the BIOS automatically clears the entire main memory. Note: Clearing e.g. 256 MB RAM takes approximately 3 seconds.	Enabled	The entire main memory is cleared. This makes sense for example when the system to be booted requires initialized main memory when booting.
		Disabled	Deactivates the function.
Cache Enable	The processor has a 16 kB fast L1 cache. The data for fast access is provided in this memory.	Enabled	Recurring commands are processed in the fast L1 cache.
		Disabled	Deactivates the function.
Cache Mode	Using cache mode, write accesses are determined on the cache. The option is fixed on "Write Back". The information is only written in the main memory if necessary (main memory and cache do not have the same information content).	None	-

Table 149: BIOS Advanced BIOS Features menu

2.3.5 Special OEM Features
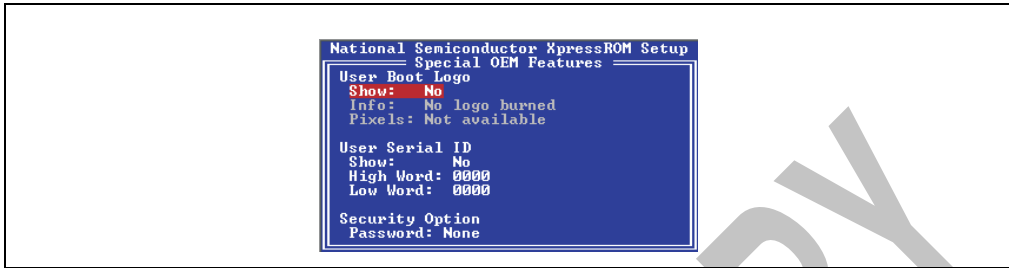
Figure 252: BIOS Special OEM Features menu

BIOS Setting	Description	Configuration Possibilities	Effect
Show (User Boot Logo)	A boot logo that has been created by a user can be displayed here instead of the B&R boot logo.[1]	Yes	Display
		No	
Info	Displays the name and the creation date of the user boot logo.	None	-
Pixels	Displays the resolution of the user boot logo.	None	-
User Serial ID Show	A user serial number can be displayed in the summary screen using this function when the system is started.	Yes	Displays the assigned user serial ID.
		No	Hides the assigned user serial ID.
High Word	Input possibilities for the first 4 bytes for the user serial number.	0000-FFFF	The hexadecimal value entered defines the first 4 positions of the user serial ID.
Low Word	Input possibilities for the second 4 bytes of the user serial number.	0000-FFFF	The hexadecimal value entered defines the second 4 positions of the user serial ID.
Password	A password can be defined here which must be entered by the user when the BIOS setup is called.	Max. 8 characters	The password must be confirmed by being entered for a second time. The password can be removed again by entering a blank password (just pressing RETURN). **Important: The password entered is also saved in the CMOS Backup, and is impossible to delete.**

Table 150: BIOS Special Functions menu

1) See section 2.4.3 "User Boot Logo Upgrade (Disk3)" on Page 305 regarding guidelines for creating a user boot logo.

Chapter 4
Software

2.3.6 Device Information
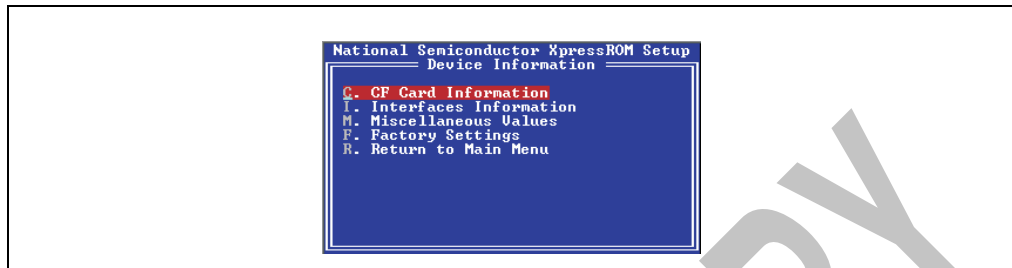
Figure 253: BIOS Device Information menu

Shortcut	BIOS Setup Menu	Function
C	CF Card Information	Information about the inserted Compact Flash card is displayed here.
T	Interfaces Information	Information about the mode/node switch position, the Ethernet controller and available aPCI modules is displayed here.
M	Miscellaneous Values	Displays CPU and board I/O temperature and information about the last CMOS backup.
F	Factory Settings	Information for factory settings.
R	Return to Main Menu	Exits current page and return to Main Menu.

Table 151: BIOS Real-time Configuration menu

CF Card Information
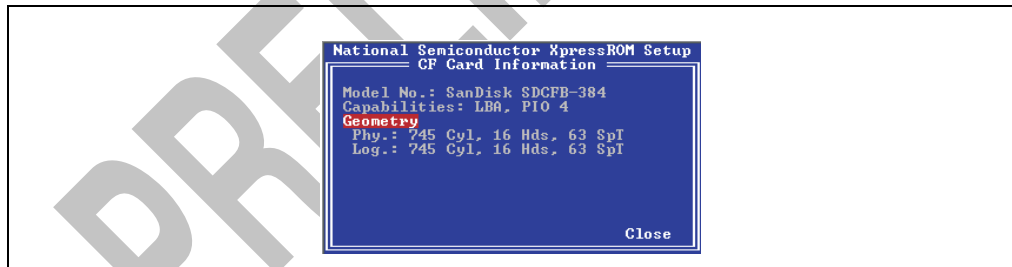
Figure 254: BIOS CF card information menu

BIOS Setting	Description	Configuration Possibilities	Effect
Model Number	Displays the Compact Flash model ID.	None	-
Capabilities	Displays the possible data transfer mode speeds to and from an inserted Compact Flash card.	None	-
Phy. Geometry	Displays the physical geometry of the inserted Compact Flash card in cylinders, heads and sectors.	None	-

Table 152: BIOS CF card information menu

BIOS Setting	Description	Configuration Possibilities	Effect
Log. Geometry	Displays the logical geometry of the inserted Compact Flash card in cylinders, heads and sectors.	None	-

Table 152: BIOS CF card information menu (Forts.)

Interfaces Information
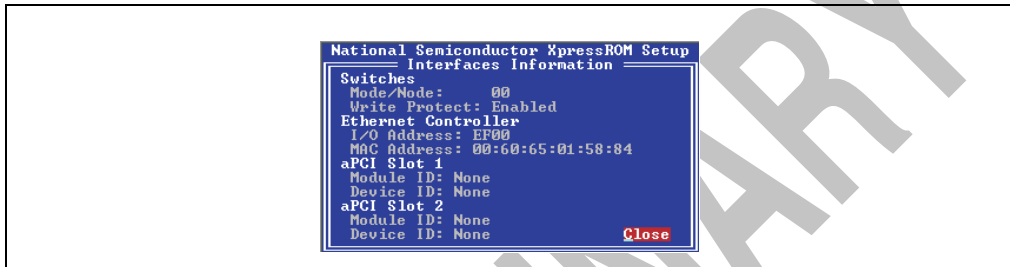
Figure 255: BIOS Interfaces Information menu

BIOS Setting	Description	Configuration Possibilities	Effect
Mode/Node	Displays the current mode/node switch position.	None	-
Write Protect	Displays the switch position for the "Write Protect" switch.	None	-
I/O Address	Displays the Ethernet I/O address.	None	-
MAC Address	Displays the assigned MAC address.	None	-

aPCI slot 1
  Module ID
  Device ID
	Information about an installed aPCI module in aPCI slot 1 of the Power Panel device is displayed here.	None	-

aPCI slot 1
  Module ID
  Device ID
	Information about an installed aPCI module in aPCI slot 2 of the Power Panel device is displayed here.	None	-

Table 153: BIOS Interfaces Information menu

Miscellaneous Values
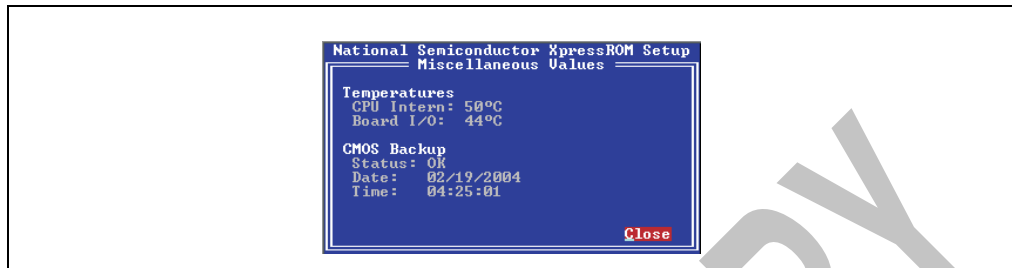
Figure 256: BIOS Miscellaneous Values menu

BIOS Setting	Description	Configuration Possibilities	Effect
CPU Internal	Displays the current internal processor temperature.	None	-
Board I/O	Indicates the current board I/O temperature.	None	-
Status	The status for the last automatically saved CMOS backup is displayed here.	None	If the boot procedure is successful, then the CMOS values are automatically saved by BIOS in the Flash memory. The values therefore are only saved in the Flash memory if the backup is not equal to the current CMOS, the backup is not available or the backup checksum is incorrect.
Date	Date of the last automatically saved CMOS backup.	None	
Time	Time of the last automatically created CMOS backup.	None	

Table 154: BIOS Miscellaneous Values menu

Factory Settings
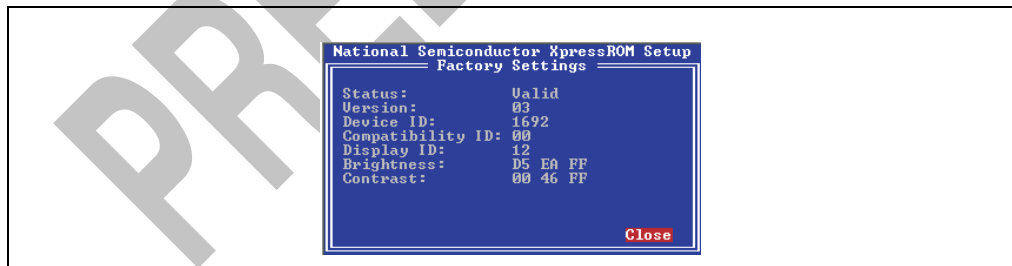
Figure 257: BIOS Factory Settings menu

BIOS Setting	Description	Configuration Possibilities	Effect
Status	Status display for factory settings.	None	Status
Version	Version display for factory settings.	None	Version
Device ID	Hex value for the device code of the Power Panel device.	None	Device ID

Table 155: BIOS Factory Settings menu

BIOS Setting	Description	Configuration Possibilities	Effect
CompatibilityID	The compatibility code of the Power Panel device is displayed here.	None	CompatibilityID
Display ID	Shows the display ID used. Possible display IDs are: 00h - unknown 10h - Passive displays (STN) 11h - LCD B/W QVGA 12h - LCD COL QVGA 20h - Active displays (TFT) with QVGA 30h - Active displays (TFT) with VGA 40h - Active displays (TFT) with SVGA 50h - Active displays (TFT) with XVGA	None	-
Brightness	The defined brightness values (minimum, default, maximum) for the display used are shown here as as hex values.	None	-
Contrast	The defined contrast values (minimum, default, maximum) for the display used are shown here as as hex values.	None	-

Table 155: BIOS Factory Settings menu (Forts.)

2.3.7 Firmware Configuration
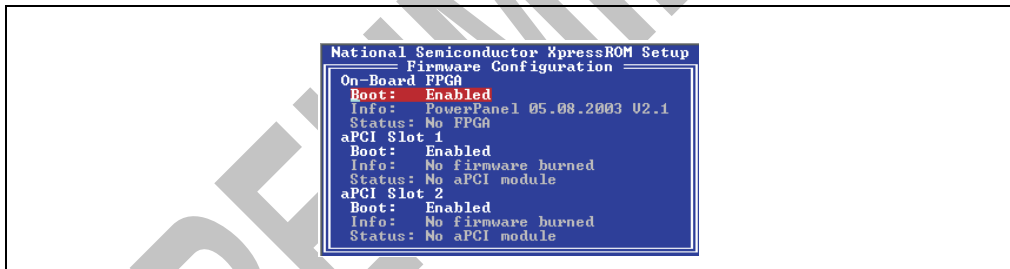
Figure 258: BIOS Firmware Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
On-board FPGA Boot	The onboard FPGA controls the image output for Power Panel 200 devices with BIOS.	Enabled	The onboard FPGA is activated and initialized.
		Disabled	Deactivates the FPGA. If this function is deactivated, then no picture is output on Power Panel 200 devices. This function can only be reactivated by using the program "Remhost" (see section "REMHOST", on page 308).
Info	Information about FPGA Firmware.	None	-
Status	Status display for the onboard FPGA.	None	-

Table 156: BIOS Firmware Configuration menu

BIOS Setting	Description	Configuration Possibilities	Effect
aPCI slot 1 Boot	A connected aPCI module in the aPCI slot 1 is initialized and booted, as long as a valid firmware is available.	Enabled	The aPCI module is booted if a corresponding firmware file is burned in the Flash memory of the Power Panel.
		Disabled	The aPCI module is not booted by the BIOS.
Info	Information about a stored boot file for the aPCI slot 1 in the Flash memory.	None	-
Status	Status display for aPCI slot 1 modules.	None	-
aPCI slot 2 Boot	A connected aPCI module in the aPCI slot 2 is initialized and booted, as long as a valid firmware is available.	Enabled	The aPCI module is booted if a corresponding firmware file is burned in the Flash memory of the Power Panel.
		Disabled	The aPCI module is not booted by the BIOS.
Info	Information about a stored boot file for the aPCI slot 2 in the Flash memory.	None	-
Status	Status display for aPCI slot 2 modules.	None	-

Table 156: BIOS Firmware Configuration menu (Forts.)

2.3.8 Restore CMOS Values
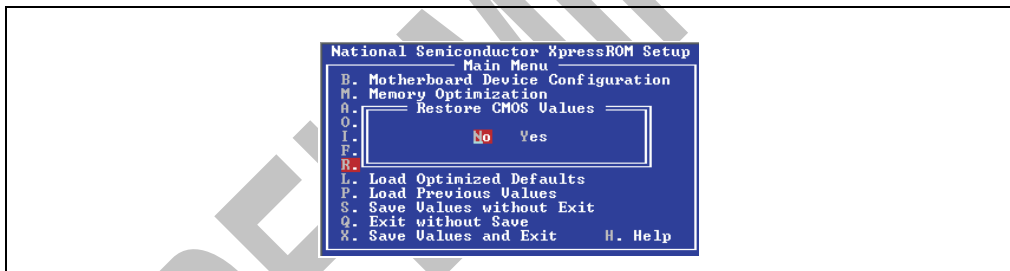
Figure 259: BIOS Restore CMOS Values menu

By clicking on "Yes", the last saved CMOS values can be restored in the Flash memory ROM using this BIOS menu item (R shortcut). All configurable CMOS values (besides date and time) are restored again in the BIOS Setup.

Information:

If the boot procedure is successful, then the CMOS values are automatically saved by BIOS in the Flash memory. The values therefore are only saved in the Flash memory if the backup is not equal to the current CMOS, the backup is not available or the backup checksum is incorrect.

For protecting CMOS data, a CMOS backup was built into the BIOS. If the BIOS setup was ended using "Save Values and Exit" and the Power Panel device was correctly restarted, then the CMOS data is burned in the Flash memory. If the CMOS checksum is incorrect during

startup, (battery empty) or the Power Panel device cannot be booted correctly three times consecutively, then the salvaged data from the Flash memory is copied again to the CMOS. Setup is back to its orginal state, except for the time.

2.3.9 Load Optimized Defaults
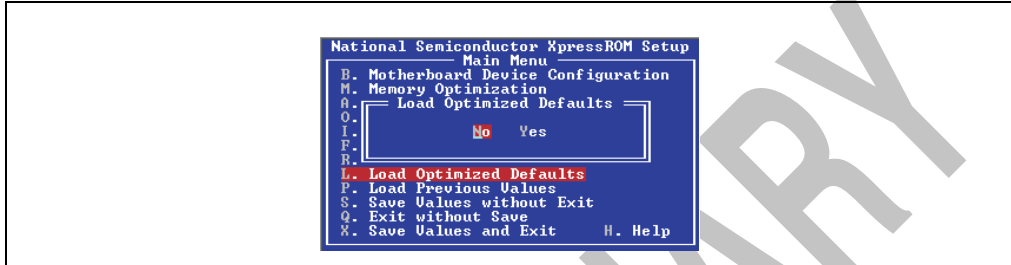
Figure 260: BIOS Load Optimized Defaults menu

By clicking on "Yes", optimal BIOS settings for best performance can be loaded using this BIOS menu item (L shortcut).

Information:

These settings are also recommended by B&R.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.3.10 Load Previous Values
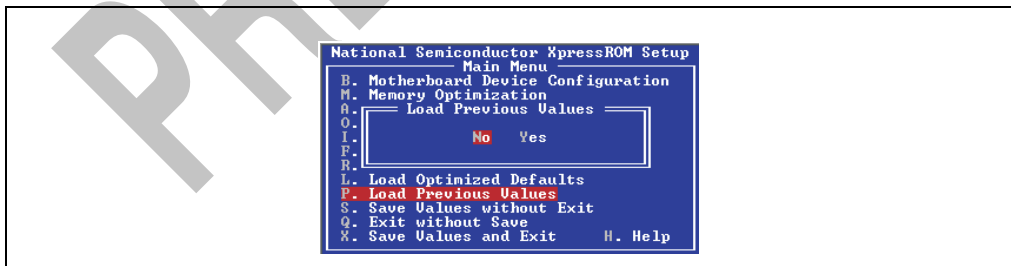
Figure 261: BIOS Load Previous Values menu

By clicking on "yes", the set values called at the BIOS Setup are loaded again using this BIOS menu item (P shortcut). All changes which had been made up to that point are lost as a result.

Chapter 4
Software

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.3.11 Save Values without Exit
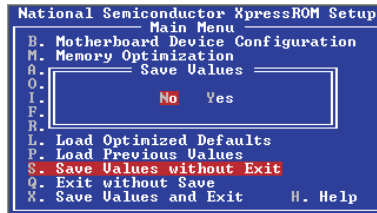
Figure 262: BIOS Save Values without Exit menu

The BIOS values are saved using this menu item (S shortcut) by clicking "Yes". After this, the user can make further settings or exit BIOS Setup.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.3.12 Exit without Save
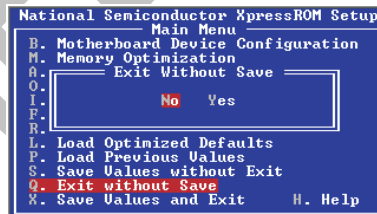
Figure 263: BIOS Exit without Save menu

Using this BIOS menu item (Q shortcut), the user can exit the BIOS Setup by clicking "Yes", without having to save any possible changes made. Afterwards, the system is automatically restarted.

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.3.13 Save Values and Exit
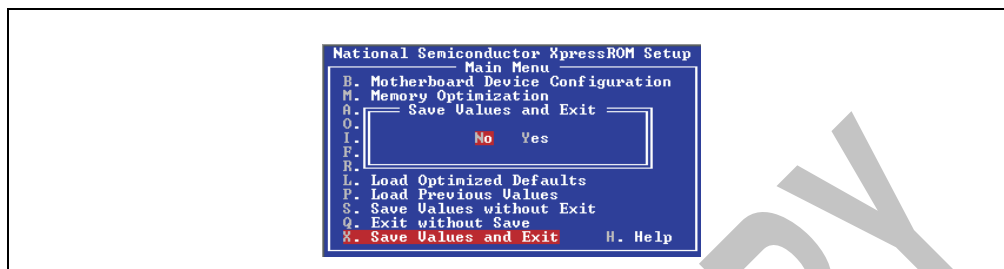
Figure 264: BIOS Save Values and Exit menu

Using this menu item (X shortcut) settings are saved, the BIOS Setup is automatically shut down by clicking "Yes" and a reboot of the system takes place.

For more information about CMOS backup, see section 2.5 "CMOS Backup".

Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

2.3.14 Help
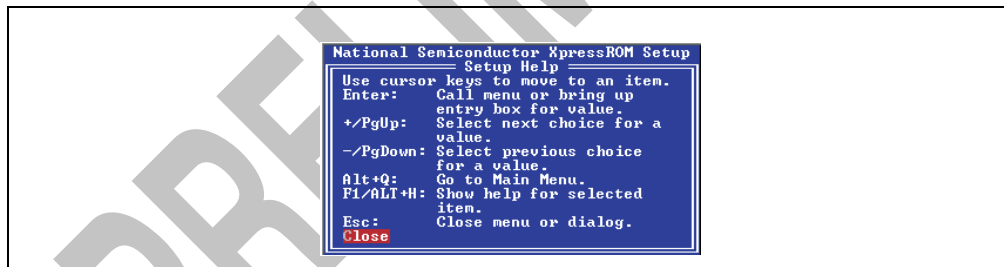
Figure 265: BIOS Help menu

Using this menu item (H shortcut), a help page, containing the most important key assignments is displayed.

Chapter 4
Software

2.4 BIOS Upgrade

Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.05. Therefore, it is possible that these diagrams and BIOS descriptions might not correpsond with the installed BIOS version.

An upgrade might be necessary for the following reason:

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

A current BIOS upgrade can be found on the HMI Drivers & Utilities CD-ROM (model number 5S0000.01-090 starting from version 1.49) or can be directly downloaded from the support area on the B&R homepage (www.br-automation.com).

The upgrade disk set consists of the following 3 parts:

- BIOS upgrade (Disk1)
- aPCI firmware upgrade (Disk2)
- User boot logo upgrade (Disk3)

Three blank disks are required, which can be labeled as follows:
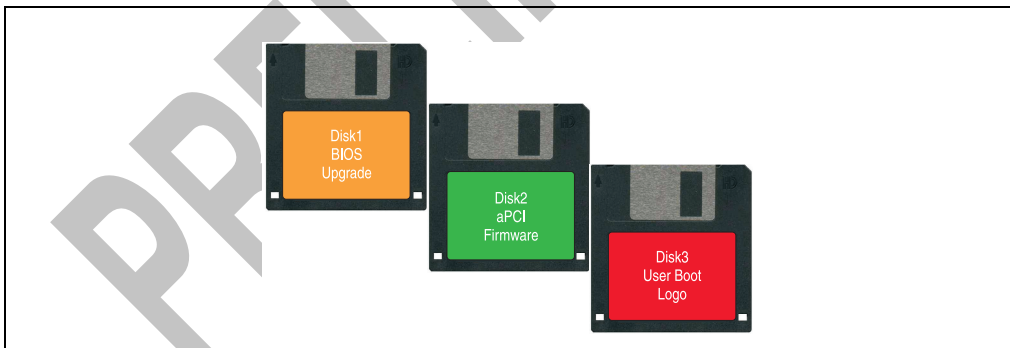
Figure 266: Example of disk labels

2.4.1 BIOS Upgrade (Disk1)

The following steps should be carried out to upgrade or save BIOS:

- First, a blank HD disk must be made bootable (commando line "sys a:" or "format a: /s")

Information:

For the upgrade, a boot disk must be created (or a bootable Compact Flash card) with Windows ME, Windows XP or MS-DOS 6.22.

MS-DOS boot disks function with BIOS versions earlier than 1.02 only with REMHOST.

- Copy the content of the *.zip file order ...\Disk1\... to this disk.

- Insert diskette in the USB floppy disk drive and reboot the Power Panel device (possibly from the floppy disk drive of a remote PCs using REMHOST, see also section 2.6 "REMHOST" on Page 308). For more on the settings required for the Power Panel device when booting from a disk, please refer to section "Drive Configuration" on Page 259 for VGA, SVGA and XGA Power Panel devices and also section "Drive Configuration" on Page 281 for QVGA Power Panel devices.

- After booting from the diskette, you enter the following startup menu:

```
          Microsoft Windows Startup Menu
          =====================================

          1. Upgrade complete System (BIOS,FPGA)
          2. Upgrade XpressROM BIOS
          3. Upgrade FPGA Firmware
          4. Save complete System (BIOS, FPGA)
          5. Save XpressROM BIOS
          6. Save FPGA Firmware
          7. Start REMHOST Utiltity
          8. Exit

          Enter a choice:_
```

Figure 267: BIOS Upgrade Startup Menu

Item	Menu Item	Description
1	Upgrade complete system (BIOS, FPGA)	All BIOS areas (XpressROM and FPGA firmware) are automatically updated (default after 5 sec).
2	Upgrade XpressROM BIOS only	Only the XpressROM BIOS is automatically updated.
3	Upgrade FPGA firmware only	Only the FPGA firmware is automatically updated.

Table 157: BIOS upgrade menu description

Item	Menu Item	Description
4	Save complete system	All BIOS areas (XpressROM and FPGA firmware) are automatically protected. **Information:** **There must be up to 448 KB free space on the disk.**
5	Save XpressROM BIOS only	Only the XpressROM BIOS is automatically protected. **Information:** **There must be approximately 256 KB free space on the disk.**
6	Save FPGA firmware only	Only the FPGA firmware is automatically protected. **Information:** **There must be up to 192 KB free space on the disk.**
7	Start REMHOST utility	The REMHOST utility (see section 2.6 "REMHOST" on Page 308) is started. With this utility, the upgrade can be made using a serial connection from a remote PC.
8	Exit	Return to the shell (MS-DOS).

Table 157: BIOS upgrade menu description (Forts.)

Information:

If you do not press a button within 5 seconds, then step 1 "Upgrade Complete System" (BIOS, FPGA) is automatically carried out and the Power Panel is independently updated.

If you want to indivdually upgrade the XpressROM or the FPGA firmware, then these options can be selected in the startup menu (2 or 3).

It is also possible to protect the existing BIOS or individual components. For this, there must be approximately 448 KB free space on the disk. Otherwise, "Save..." functions might not be able to be executed.

• The system must be rebooted after a successful upgrade.

2.4.2 aPCI Firmware Upgrade (Disk2)

The following steps should be taken to upgrade or save the firmware for aPCI modules:

- First, a blank HD disk must be made bootable (commando line "sys a:" or "format a: /s")

Information:

For the upgrade, a boot disk must be created (or a bootable Compact Flash card) with Windows ME, Windows XP or MS-DOS 6.22.

MS-DOS boot disks function with BIOS versions earlier than 1.02 only with REMHOST.

- Copy the content of the *.zip file order ...\Disk2\... to this disk.
- If a user wants to upgrade the aPCI firmware, then aPCI firmware files (FPGA files) for aPCI modules must be copied to this disk. If there are already aPCI modules connected to the Power Panel and BIOS V1.04 is installed, then the file name XFLASH.EXE can be automatically determined. Otherwise, the file name XFLASH.EXE is requested or a standard file name is used: "apci1.rom" for aPCI slot 1, "apci2.rom" for aPCI slot 2 -> the aPCI firmware file must be renamed beforehand!

Information:

The appropriate aPCI firmware files are available from B&R.

- Insert diskette in the USB floppy disk drive and reboot the Power Panel device (possibly from the floppy disk drive of a remote PCs using REMHOST, see also section 2.6 "REMHOST" on Page 308). For more on the settings required for the Power Panel device when booting from a disk, please refer to section "Drive Configuration" on Page 259 for VGA, SVGA and XGA Power Panel devices and also section "Drive Configuration" on Page 281 for QVGA Power Panel devices.

Chapter 4
Software

- After booting from the diskette, you enter the following startup menu:

```
        Microsoft Windows Startup Menu
        ====================================

        1. Upgrade Firmware of both aPCI Slots
        2. Upgrade Firmware of aPCI Slot 1
        3. Upgrade Firmware of aPCI Slot 2
        4. Save Firmware of both aPCI Slots
        5. Save Firmware of aPCi Slot 1
        6. Save Firmware of aPCi Slot 2
        7. Exit

        Enter a choice:_
```

Figure 268: aPCI firmware Upgrade Startup Menu

Item	Menu Item	Description
1	Upgrade firmware of both aPCI slots	The firmware for both aPCI slots are automatically updated (default after 5 seconds).
2	Upgrade firmware of aPCI slot 1	Only firmware from aPCI slot 1 is updated.
3	Upgrade firmware of aPCI slot 2	Only firmware from aPCI slot 2 is updated.
4	Save firmware of both aPCI slots	Firmware for both aPCI slots are automatically saved. **Information:** **There must be up to 384 KB free space on the disk.**
5	Save firmware of aPCI slot 1	Only firmware from aPCI slot 1 is saved. **Information:** **There must be up to 192 KB free space on the disk.**
6	Save firmware of aPCI slot 2	Only firmware from aPCI slot 2 is saved. **Information:** **There must be up to 192 KB free space on the disk.**
7	Exit	Return to the shell (MS-DOS).

Table 158: aPCI Firmware Upgrade menu description

Information:

If you do not press a button within 5 seconds, then step 1 "Upgrade firmware of both aPCI Slots" is automatically carried out and the Power Panel is independently updated.

- The system must be rebooted after a successful upgrade.

2.4.3 User Boot Logo Upgrade (Disk3)

The following steps should be taken to update, save or delete a user boot:

• First, a blank HD disk must be made bootable (commando line "sys a:" or "format a: /s")

Information:

For the upgrade, a boot disk must be created (or a bootable Compact Flash card) with Windows ME, Windows XP or MS-DOS 6.22.

MS-DOS boot disks function with BIOS versions earlier than 1.02 only with REMHOST.

• Copy the content of the *.zip file order ...\Disk3\... to this disk.

• Creates the user boot logo according to section "Guidelines for Creating a User Boot Logo" on Page 306 and copies to the disk.

• Insert diskette in the USB floppy disk drive and reboot the Power Panel device (possibly from the floppy disk drive of a remote PCs using REMHOST, see also section 2.6 "REMHOST" on Page 308). For more on the settings required for the Power Panel device when booting from a disk, please refer to section "Drive Configuration" on Page 259 for VGA, SVGA and XGA Power Panel devices and also section "Drive Configuration" on Page 281 for QVGA Power Panel devices.

• After booting from the diskette, you enter the following startup menu:

```
Microsoft Windows Startup Menu
====================================

1. Update User Boot Logo
2. Save User Boot Logo
3. Delete User Boot Logo
4. Exit

Enter a choice:_
```

Figure 269: User Boot Logo Upgrade Startup Menu

Item	Menu Item	Description
1	Update user boot logo	The user boot logo is automatically updated with the file USERLOGO.ROM (default after 5 seconds).
2	Save user boot logo	The user boot logo is automatically saved in the file USERLOGO.SAV. **Information:** **There must be up to 192 KB free space on the disk.**

Table 159: User boot logo upgrade menu description

Chapter 4
Software

Item	Menu Item	Description
3	Delete user boot logo	An existing user boot logo is deleted in the flash. **Information:** **The B&R boot logo is then automatically displayed again by BIOS.**
4	Exit	Return to the shell (MS-DOS).

Table 159: User boot logo upgrade menu description (Forts.)

Information:

If you do not press a button within 5 seconds, then step 1 "Update User Boot Logo" is automatically carried out and the Power Panel is independently updated.

- The system must be rebooted after a successful upgrade.
- In the CMOS setup for BIOS, the display for the boot logo must be set from "No" to "Yes" (for more on this, see section 2.2.7 "Special OEM Features" on Page 269 for VGA, SVGA and XGA Power Panel devices and also section2.3.5 "Special OEM Features" on Page 291 for QVGA Power Panel devices.

Guidelines for Creating a User Boot Logo

To update the user boot logo, a bitmap must be created according to the following guidelines and then copied to the user boot logo upgrade disk:

1) A Windows bitmap with a maximum of 256 colors must be created with the appropriate resolution for the Power Panel: 320x240 (QVGA), 640x480 (VGA), 800x600 (SVGA) or 1024x768 (XGA). The bitmap is not allowed to be compressed.

2) Since status messages are output on the top of the display when booting the Power Panel, there should not be any user boot logo pixels positioned here in the bitmap (approximately 10 pixel stripes), as these will be cross-faded. These status messages use bitmap palette index 0 as the background color and index 7 as the foreground color (starting from BIOS V1.05; index 63 with older versions).

3) Using the utility USERLOGO.EXE, the bitmap file must then be converted into a ROM file that can be read by BIOS (please refer to the online help for the utility, regarding more instructions about this).

4) The userlogo.rom file created by the utility is only permitted to have a maximum size of 192 KB. If this size is exceeded, a warning appears. The user can e.g. reduce the details in the Windows bitmap in order not to exceed the maximum byte size.

5) After this, the userlogo.rom file should be copied to the disk.

2.5 CMOS Backup

For protecting CMOS data, a CMOS backup was integrated into the BIOS. If BIOS setup was exited with "Save Values and Exit" (see section 2.2.15 "Save Values and Exit" on Page 277 for VGA, SVGA and XGA Power Panel devices and also section 2.3.13 "Save Values and Exit" on Page 299 for QVGA Power Panel devices) and the Power Panel devices was correctly restarted, then the CMOS data is burned in the Flash memory. If the CMOS checksum is incorrect during startup, (battery empty) or the Power Panel device cannot be booted correctly three times consecutively, then the salvaged data from the Flash memory is copied again to the CMOS. Setup is back to its orginal state, except for the time.

Chapter 4
Software

2.6 REMHOST

2.6.1 General Information

REMHOST is a MS-DOS program (REMHOST.EXE) and can be used by a remote PC to operate a BIOS Power Panel device. The Power Panel receives keyboard entries from a remote PC using REMHOST. Screen outputs for the Power Panel device are redirected to the screen of the remote PCs. The Power Panel can acess the floppy drive (internal or external) of the remote PC or an individual floppy drive (USB) and also boot from this.

Information:

REMHOST.EXE is part of the disk set for every BIOS upgrade version.
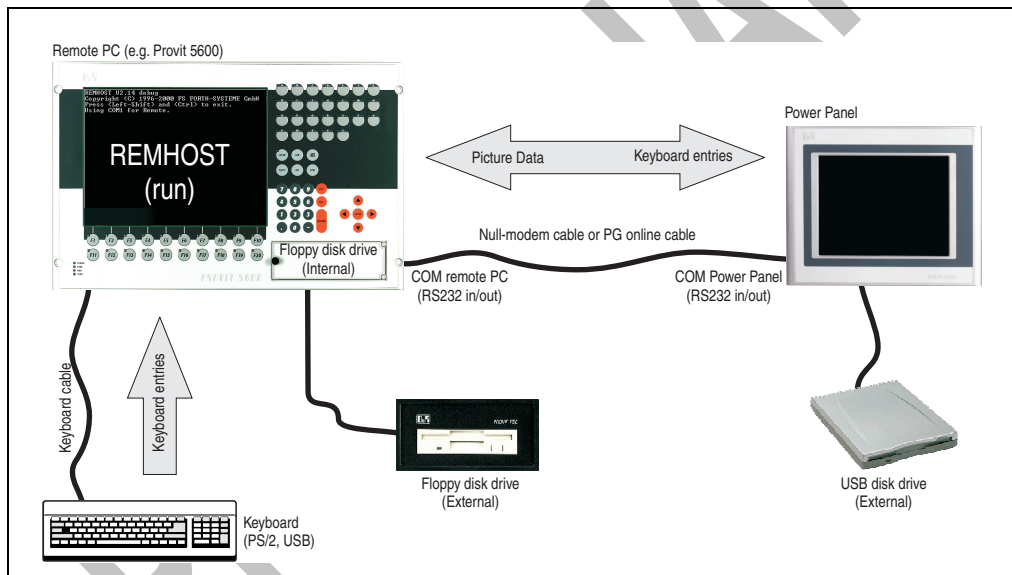
Figure 270: REMHOST communication model

REMHOST can be used if :

- The display for the Power Panel device is not functioning.

- Brghtness and contrast settings for the Power Panel display are adjusted so that outputs can no longer be detected.

- BIOS setup settings must be made for a Power Panel with a QVGA display[1] .

---

1) With BIOS versions earlier than V1.04.

• There is no USB floppy present and the BIOS for the Power Panel device should be updated.

2.6.2 Requirements

The Power Panel must be connected to the remote PC using a serial cable (e.g. a null-modem cable or PG online cable, see figure "REMHOST pin assignment - Power Panel connection cable", on page 311 for the necessary assignment). The serial cable must be connected to a COM interface for the remote PC and to the COM interface for the Power Panel device (see figure 270 "REMHOST communication model"). The mode/node switch for the Power Panel device must be set to 00 (= service mode) see figure 186 "Mode / node switch" on Page 213.

2.6.3 Important Notes

Information:

- **REMHOST only functions when the "diverted" functions for the Power Panel device are operated using BIOS calls. For example, that means if a program writes directly to the video memory on the Power Panel, then these outputs cannot be redirected to the screen of a remote PC. Generally, only programs which work in text mode should be used. Therefore, a MS-DOS start diskette must be used when booting the Power Panel using REMHOST. If booting is made with a Windows start diskette, illegible symbols are output on the remote screen and the user's inputs are not correctly displayed.**

- **REMHOST must be called from MS-DOS. In the MS-DOS command prompt in Windows, error free operation of REMHOST is not guaranteed: e.g. very slow screen outputs (in Windows NT4.0 and 2000), errors with write accesses to the remote floppy.**

Warning!

When upgrading BIOS using REMHOST, it should be noted that the Power Panel, the remote PC and the serial connection are all connected to each other for the whole period while the upgrade is taking place.

Caution!

The Power Panel can no longer be started if the BIOS upgrade is aborted. Therefore, when upgrading BIOS with REMHOST, the start for REMHOST should take place in MS-DOS (not in the MS-DOS command prompt from Windows).

Chapter 4
Software

2.6.4 Configuration of REMHOST

The function of REMHOST is controlled using a REMHOST.INI configuration file. REMHOST.INI is an ASCII text file and can be opened and edited with any text editor (e.g. notepad).
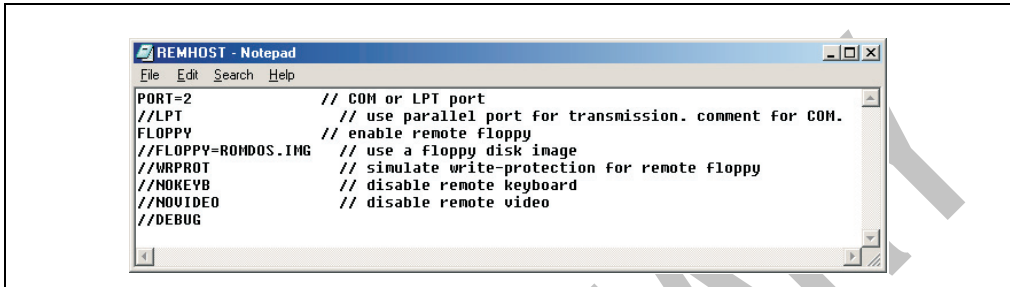
Figure 271: Example for REMHOST.INI

In the following table, all commands are listed which REMHOST supports. If the commands begin with consecutive slash symbols ("//") , then these are evaluated as a comment begin. This can be used to deactivate individual parameters.

Configuration Possibility	Description
PORT=x	Specifies the COM interface on the remote PC, which is used for the serial connection to the Power Panel. "x" stands for the COM number, e.g. COM2 is used for PORT=2.
LPT	The parallel interface is used for communication. This option can not be used with the Power Panel.
FLOPPY	The floppy disk drive for the remote PC is used as the floppy disk drive for the Power Panel. Therefore, a connected USB floppy disk drive on the Power Panel cannot be used.
FLOPPY=ROMDOS.IMG	A floppy image file can be used for the simulation of a floppy disk drive on the hard disk of the remote PC. A floppy image can be created with the program WINIMAGE (download of a shareware version is possible from www.winimage.com). In this way, several versions of BIOS upgrades can be easily stored on the hard disk of the remote PC.
WRPROT	Write protection for the floppy disk drive can be simulated using this parameter.
NOKEYB	If this parameter is activated, then the keyboard of the remote PC is not used by REMHOST. Inputs must then take place on the Power Panel, e.g. using a USB keyboard.
NOVIDEO	If this parameter is activated, then the screen output is not made on the remote PC. Outputs take place on the display of the Power Panel device.
DEBUG	REMHOST outputs debug information.

Table 160: Description of REMHOST.INI Configuration Possibilities

2.6.5 Program Start

The name for the configuration file can be specified when starting the program. If no name is specified, then the REMHOST.INI file is used as standard.

```
REMHOST V2.15
Copyright <c> 1996-2000 FS FORTH-SYSTEME GmbH
Copyright <c> 2003       Bernecker + Rainer
Press <Left-Shift> and <Ctrl> to exit.
Using COM1 for Remote.
```

Figure 272: REMHOST Program Start

After the program is started, REMHOST displays, amongst other things, the current version as well as the COM interface used for communication with the Power Panel of the remote PC.

The connection is established using a Power Panel device, if this is rebooted and the mode/node switch is set to 00h on the Power Panel.

Information:

If the Power Panel is already started, then NO connection can be established using a subsequent REMHOST start.

2.6.6 Program End

REMHOST can be ended again by simultaneously pressing the left SHIFT key and the CTRL key.

Information:

The Power Panel must be restarted in order to undo the redirections for keyboard, floppy disk drive and display.

2.6.7 Assignment for the Connection Cable

The connection cable required for REMHOST must have two 9-pin DSUB sockets. The appropriate cable can be ordered directly from B&R under the model number 9A0017.01 (length = 0.6 m) and 9A0017.02 (length = 1.8 m).

The cable can also be made by the user. A self made cable can have a maximum length of 15 meters. The pins must be connected as follows:
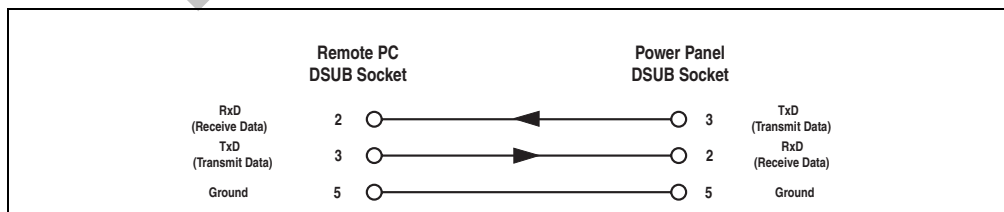
Figure 273: REMHOST pin assignment - Power Panel connection cable

Chapter 4
Software

2.7 Distribution of Resources

2.7.1 RAM Address Assignment

RAM Address	Resource
00000000 - 000003FF	Interrupt Vectors
00000400 - 000004FF	BIOS Data Area
00000500 - 0009FBFF	Freely available for the operating system (MS-DOS program area)
0009FC00 - 0009FFFF	Advanced BIOS data area
000A0000 - 000BFFFF	VGA memory
000C0000 - 000C7FFF	VGA BIOS
000C8000 - 000CBFFF	Reserved
000CC000 - 000EFFFF	XpressROM expansions ROMS. Unused areas can be used for HMA.
000F0000 - 000FFFFF	XpressROM BIOS
00100000 - BC_RAM_TOP	Remaining DRAM
40000000	GX_Base register (defined by BIOS, can also be 40000000, 80000000 or C0000000)
40000000 - 40000BFF	L1 scratchpad
40008000 - 400080FF	Internal BUS IF unit registers
40008100 - 400082FF	Graphics pipeline registers
40008300 - 400083FF	Display controller registers
40008400 - 400084FF	Memory controller register
40009000 - 403FFFFF	PCI Accessible
40010000 - 40010FFF	Video configuration registers
40011000 - 40011FFF	Audio configuration registers
40015000 - 40015FFF	VIP interface registers
40800000 - 40BFFFFF	VGA frame buffer
D0000000 - FBFFFFFF	PCI memory and PCI ROM (are dynamically assigned during POST)
FFE00000 - FFFFFFFF	High BIOS area (Flash Memory)

Table 161: RAM address assignment

2.7.2 DMA Channels Assignment

DMA Channel	Resource
0	Free
1	Free
2	Floppy Drive
3	Free
4	Free
5	Free

Table 162: Assignment of DMA channels

DMA Channel	Resource
6	Free
7	Free

Table 162: Assignment of DMA channels (Forts.)

2.7.3 I/O Address Assignment

I/O Address	Resource
0000 - 000F	DMA controller channels 0-3
0020 - 0021	Master programmable interrupt controller
0022 - 0023	CPU configuration registers
0040 - 0043	Programmable interval timer
0060 - 0066	Keyboard controller (emulated by Legacy USB)
0070 - 0071	RTC (Reat-time clock)
0072 - 0073	Extended RTC (Reat-time clock)
0080	BIOS POST debug output port
0081 - 0083	DMA channel low page registers
0084	VSA debug output port
0085 - 008F	DMA channel low page registers
0092	Port A control register
00A0 - 00A1	Slave programmable interrupt controller
00C0 - 00CF	DMA controller channels 4-7
00D0 - 00DF	DMA status/control/mode registers channel 0-7
00F0 - 00F1	Coprocessor error register
015C - 015D	On-chip SIO configuration
0170 - 0177	Primary IDE
01F0 - 01F7	Primary IDE
0220 - 022F	Audio (not supported)
02F8 - 02FF	COM2
0376 - 0377	Secondary IDE channel
03B0 - 03BB	Video controller
03C0 - 03DF	Video controller
03E8 - 03EF	COM3
03F0 - 03F5	Floppy controller (emulated by Legacy USB)
03F6 - 03F7	Primary IDE
03F8 - 03FF	COM1
0480 - 048F	DMA channel high page registers
04D0 - 04D1	Interrupt edge/level registers
0CF8 - 0CFF	PCI configuration registers

Table 163: I/O address assignment

Chapter 4
Software

I/O Address	Resource
5000 - 500F	IDE controller configuration registers (F2BAR4)
6000 - 60FF	SMI status and aPCI registers (F1BAR0)
6200 - 623F	X-Bus expansion support registers (F5BAR0)
6400 - 643F	GPIO runtime and configuration registers (F0BAR0)
6600 - 663F	LPC support registers (F0BAR1)
9000 - 903F	CPU configuration registers
AC00 - ACFF	aCPI registers (F1BAR1)
AD00 - AFFF	PCI assignment (dynamically assigned during POST)
B000 - BFFF	PCI assignment (dynamically assigned during POST)
C000 - CFFF	PCI assignment (dynamically assigned during POST)
D000 - DFFF	PCI assignment (dynamically assigned during POST)
E000 - EFFF	PCI assignment (dynamically assigned during POST)
F000 - FFFF	Reserved

Table 163: I/O address assignment (Forts.)

2.7.4 Interrupt Assignments

Interrupts	Resource
IRQ 0	System Timer
IRQ 1	Keyboard (Legacy USB emulation)
IRQ 2	2nd PIC IRQ cascade
IRQ 3	COM2 [1]
IRQ 4	COM1 [1]
IRQ 5	USB and aPCI slot 1 (first interrupt) [1]
IRQ 6	Floppy Drive
IRQ 7	aPCI slot 2 [1] (second interrupt)
IRQ 8	RTC (Reat-time clock)
IRQ 9	Ethernet (MacPhyter) [1]
IRQ 10	aPCI slot 2 (first interrupt) and aPCI slot 1 (second interrupt)[1]
IRQ 11	COM3 [1]
IRQ 12	PS/2 mouse (Legacy USB emulation)
IRQ 13	FPU (Coprocessor)
IRQ 14	Primary IDE (primary hard disk)
IRQ 15	Secondary IDE (secondary hard disk)

Table 164: Interrupt assignments

1) BIOS setup default setting.

3. Windows CE

3.1 General Information

Windows CE is an operating system which is optimally tailored to the hardware used. This means that only those functions and modules that are required by the respective device are included. This makes this operating system extremely robust and stable.

Advantages

- Windows CE is a 32-bit operating system with multitasking and multithreading.
- Windows CE is compact and offers high performance even for configurations with limited working memory.
- Windows CE is ideally suited for integrated automation systems in industry.
- Windows CE is cheaper than other Windows licences.

The Windows CE available from B&R (see section "Software", on page 27 for model number) was developed for Power Panel BIOS devices, and is only available with a Power Panel BIOS device.

3.2 What is Required?

The Power Panel must fulfil the following criteria to be able operate the Windows CE operating system.

- Power Panel device with BIOS (see Overview "Power Panel 100 with BIOS", on page 25)
- BIOS Version >= 1.00
- At least 64 MB RAM

3.3 Installation Procedures

Generally, Windows CE is already preinstalled at B&R Austria. After switching on the device, only the touch screen needs to be calibrated.

More detailed instructions for manual installation can be found in the Windows CE help file. This help file is found on the HMI Drivers & Utilities CD-Rom (model number 5S0000.01-090 from version 1.49) or can be downloaded directly from the download area of the B&R homepage (www.br-automation.com).

4. Windows XP Embedded

4.1 General Information

Windows XP Embedded is the most modularized version of the desktop operating systems Windows XP Professional, and enables the rapid developement of reliable and advanced embedded devices. Windows XP Embedded is based on the same binaries as Windows XP Professional and is optimally tailored to the hardware used. This means that only those functions and modules that are required by the respective device are included. Windows XP Embedded is based on the reliable code base of Windows XP Professional and provides industry with leading reliability, improvements in security and performance together with latest possibilities for web browsing and extensive device support.

The Windows XP Embedded version available from B&R (see section "Software", on page 27 for model number) was developed for Power Panel BIOS devices, and is only available with a Power Panel BIOS device.

4.2 What is Required?

The Power Panel must fulfil the following criteria to be able run the Windows XP Embedded operating system.

- Power Panel device with BIOS (see Overview "Power Panel 100 with BIOS", on page 25)
- BIOS version >= 1.04
- At least 128 MB RAM

4.3 Installation Procedures

Generally, Windows XP Embedded is already preinstalled at B&R Austria on a suitable Compact Flash card (256 MB). The Power Panel device is automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes and the device is then additionally rebooted a number of times.

A short guide to creating individual Windows XP Embedded Images as well as a suitable Target Designer export file for Power Panel BIOS devices can be found on the HMI Drivers & Utilities CD-ROM (model number 5S0000.01-090, for version 1.49 or higher) or can be directly downloaded from B&R's homepage (www.br-automation.com).

Chapter 4
Software

Chapter 5 • Standards and Certifications

TBD

Chapter 5
Standards and
Certifications

Chapter 6 • Accessories

1. Overview

Model Number	Description	Note
0AC201.9	**Lithium Batteries (5 pcs.)** Lithium batteries, 5 pcs., 3 V / 950 mAh	
0TB103.9	**Plug for the 24 V supply voltage (screw clamps)** Plug 24 V 5.08 3-pin Screw clamps	
0TB103.91	**Plug for the 24 V supply voltage (cage clamps)** Plug 24 V 5.08 3-pin Cage clamps	
5AC900.057X-00	**Legend Strips 3x 5.7" high1** Legend strip template for 4PP151.0571-01, 4PP151.0571-21, 4PP251.0571-45, 4PP251.0571-65, 4PP251.0571-85, 4PP251.0571-A5	
5AC900.057X-01	**Legend Strips 2x 5.7" diagonal2** Legend strip template for 4PP152.0571-01, 4PP152.0571-21, 4PP252.0571-45, 4PP252.0571-65, 4PP252.0571-85, 4PP252.0571-A5	
5AC900.104X-00	**Legend Strips 1x 10.4" high1** Legend strip template for 4PP151.1043-31, 4PP181.1043-31, 4PP251.1043-75, 4PP251.1043-B5, 4PP281.1043-75, 4PP281.1043-B5	
5AC900.104X-01	**Legend Strips 1x 10.4" diagonal2** Legend strip template for 4PP152.1043-31, 4PP182.1043-31, 4PP252.1043-75, 4PP252.1043-B5, 4PP282.1043-75, 4PP282.1043-B5	
5AC900.104X-02	**Legend Strips 3x 10.4" diagonal1** Legend strip template for 4PP180.1043-31, 4PP280.1043-75, 4PP280.1043-B5	
5AC900.150X-00	**Legend Stripss 4x 15"** Legend strip template for 4PP280.1505-75, 4PP280.1505-B5, 4PP281.1505-75, 4PP281.1505-B5	
5CFCRD.0032-01	**Compact Flash 32 MB TrueIDE SanDisk/R2** Compact Flash card with 32 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0032-02	**Compact Flash 32 MB TrueIDE SanDisk/A** Compact Flash card with 32 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0032-01*
5CFCRD.0064-01	**Compact Flash 64 MB TrueIDE SanDisk/R2** Compact Flash card with 64 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0064-02	**Compact Flash 64 MB TrueIDE SanDisk/A** Compact Flash card with 64 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0064-01*
5CFCRD.0128-01	**Compact Flash 128 MB TrueIDE SanDisk/R2** Compact Flash card with 128 MB FPROM, and true IDE/ATA interface.	

Table 165: Model numbers for accessories

Model Number	Description	Note
5CFCRD.0128-02	**Compact Flash 128 MB TrueIDE SanDisk/A** Compact Flash card with 128 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0128-01*
5CFCRD.0192-01	**Compact Flash 196 MB TrueIDE SanDisk/R2** Compact Flash card with 196 MB FPROM, and true IDE/ATA interface.	*Cancelled since 07/03*
5CFCRD.0256-01	**Compact Flash 256 MB TrueIDE SanDisk/R2** Compact Flash card with 256 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0256-02	**Compact Flash 256 MB TrueIDE SanDisk/A** Compact Flash card with 256 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0256-01*
5CFCRD.0384-01	**Compact Flash 384 MB TrueIDE SanDisk/R2** Compact Flash card with 384 MB FPROM, and true IDE/ATA interface.	*Cancelled since 07/03*
5CFCRD.0512-01	**Compact Flash 512 MB TrueIDE SanDisk/R2** Compact Flash card with 512 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0512-02	**Compact Flash 512 MB TrueIDE SanDisk/A** Compact Flash card with 512 MB FPROM, and true IDE/ATA interface.	*Replacement type for 5CFCRD.0512-01*
5CFCRD.1024-02	**Compact Flash 1024 MB TrueIDE SanDisk/A** Compact Flash card with 1024 MB Flash PROM and True IDE/ATA interface	
5CFCRD.2048-02	**Compact Flash 2048 MB TrueIDE SanDisk/A** Compact Flash card with 2048 MB Flash PROM and True IDE/ATA interface	
5MMUSB.0128-00	**USB Memory Stick 128 MB SanDisk**	
5MMUSB.0256-00	**USB Memory Stick 256 MB SanDisk**	
5MMUSB.0512-00	**USB Memory Stick 512 MB SanDisk**	

Table 165: Model numbers for accessories

2. Lithium Battery 0AC201.9

2.1 General Information

The lithium battery guarantees buffering of the internal real-time clock (RTC), SRAM data and also individually saved BIOS settings. The battery status (good or bad) can be requested using software. From this point, starting from when battery capacity is recognized as insufficient, data buffering is guaranteed for another 500 hours approximately. When changing the battery, data is buffered for another 10 minutes approximately by a gold leaf capacitor.

2.2 Order Data

Model Number	Description	Image
0AC201.9	Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	

Table 166: Lithium battery order data

2.3 Technical Data

Information:

The specified limits listed here like for example, temperature, relative humidity, shock and vibration, only apply to his accessory and do not also automatically apply to the whole terminal.

Product ID	0AC201.9
Capacity	950 mAh
Voltage	3 V
Self Discharge at 23° C	< 1% per year
Storage Time	Max. 3 years at 30° C
Storage Temperature	- 20° C to +60° C
Relative Humidity	0 to 95 % (non-condensing)

Table 167: Technical Data for the Lithium Battery

Chapter 6
Accessories

3. TB103 3-pin Supply Voltage Connector

3.1 General Information

This single row 3-pin terminal block is mainly used to connect the supply voltage terminal block for all Power Panel 100/200 devices.

3.2 Order Data
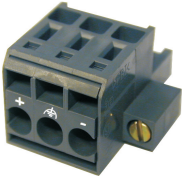
Model Number	Description	Image
0TB103.9	Plug for the 24 V supply voltage (screw clamps)	
0TB103.91	Plug for the 24 V supply voltage (cage clamps)	
		0TB103.9
		0TB103.91

Table 168: TB103 order data

3.3 Technical Data

Product ID	0TB103.9	0TB103.91
Number of Pins	3	
Type of Terminal	Screw clamps	Cage clamps
Distance between Contacts	5,08 mm	
Resistance between Contacts	$\leq$ 5 mΩ	
Nom. Voltage according to VDE / UL,CSA	250 V / 300 V	
Current Load according to VDE / UL,CSA	14.5 A / 10 A per contact	
Connection Cross Section	0.08 mm² -2.5 mm² (AWG 26 - 12)	
Cable Type	Only copper wires (no aluminum wires!)	

Table 169: TB103 technical data

4. Legend Strip Template

Power Panel devices with keys are delivered with partially pre-labeled key legend strips (F1, F2, etc.). The key legend strip slots are accessible from the back of the Power Panel device (above and below).
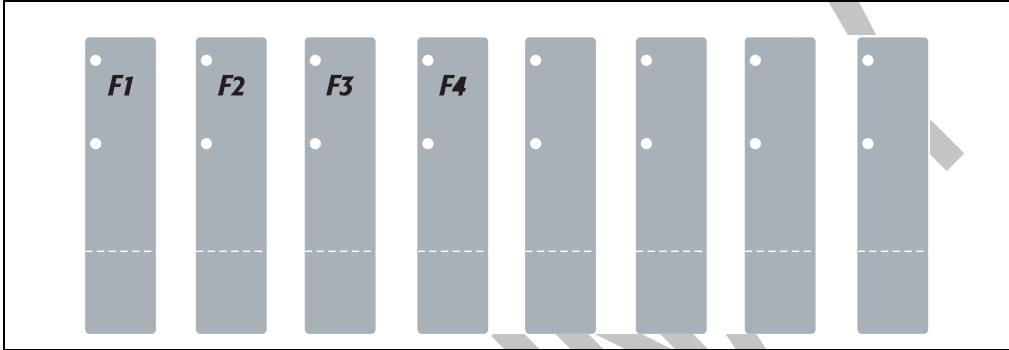
Figure 274: Legend strip samples

Printable legend strips (A4 format) can be ordered from B&R (see table 170 "Legend strip template order data" on Page 326). This can be printed using a standard laser printer. A print template (available for Corel Draw version 7, 9 and 10) for the respective legend strip template can be downloaded from the B&R homepage www.br-automation.com.

Chapter 6
Accessories

4.1 Order Data

Model Number	Description	Image
5AC900.057X-00	**Legend Strips 3x 5.7" high1** Legend strip template for 4PP151.0571-01, 4PP151.0571-21, 4PP251.0571-45, 4PP251.0571-65, 4PP251.0571-85, 4PP251.0571-A5	Examples of Legend Strip Templates
5AC900.057X-01	**Legend Strips 2x 5.7" diagonal2** Legend strip template for 4PP152.0571-01, 4PP152.0571-21, 4PP252.0571-45, 4PP252.0571-65, 4PP252.0571-85, 4PP252.0571-A5	
5AC900.104X-00	**Legend Strips 1x 10.4" high1** Legend strip template for 4PP151.1043-31, 4PP181.1043-31, 4PP251.1043-75, 4PP251.1043-B5, 4PP281.1043-75, 4PP281.1043-B5	
5AC900.104X-01	**Legend Strips 1x 10.4" diagonal2** Legend strip template for 4PP152.1043-31, 4PP182.1043-31, 4PP252.1043-75, 4PP252.1043-B5, 4PP282.1043-75, 4PP282.1043-B5	
5AC900.104X-02	**Legend Strips 3x 10.4" diagonal1** Legend strip template for 4PP180.1043-31, 4PP280.1043-75, 4PP280.1043-B5	
5AC900.150X-00	**Legend Strips 4x 15"** Legend strip template for 4PP280.1505-75, 4PP280.1505-B5, 4PP281.1505-75, 4PP281.1505-B5	

Table 170: Legend strip template order data

5. Compact Flash Cards 5CFCRD.0xxx-01

5.1 General Information

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

5.2 Order Data

Model Number	Description	Image
5CFCRD.0032-01	Compact Flash 32 MB ATA/True IDE	
5CFCRD.0064-01	Compact Flash 64 MB ATA/True IDE	
5CFCRD.0128-01	Compact Flash 128 MB ATA/True IDE	
5CFCRD.0128-01	Compact Flash 196 MB ATA/True IDE	
5CFCRD.0256-01	Compact Flash 256 MB ATA/True IDE	
5CFCRD.0384-01	Compact Flash 384 MB ATA/True IDE	
5CFCRD.0512-01	Compact Flash 512 MB ATA/True IDE	

Table 171: Compact Flash cards 5CFCRD.xxxx-01 order data

5.3 Technical Data

Information:

The specified limits listed here like for example, temperature, relative humidity, shock and vibration, only apply to his accessory and do not also automatically apply to the whole terminal.

Temperature
    Operation
    Storage
	0° C to 60° C
	-25° C to 85° C

Relative Humidity Operation/Storage	8 % to 95 %, non-condensing
Vibration Operation/Storage	Maximum 30 G point to point
Shock Operation/Storage	Maximum 3,000 G

Table 172: Compact Flash cards 5CFCRD.xxxx-01 technical data

Chapter 6
Accessories

Altitude	24,000 meters
MTBF (@ 25° C)	> 3,000,000 hours
Maintenance	None
Data Reliability	<1 unrecoverable error in 10^{14} bit read accesses <1 faulty correction in 10^{20} bit read accesses
Clear/Write Procedures	> 2,000,000 times
Weight	11.4 grammes

Dimensions
   Length
   Width
   Thickness
	36.4 ± 0.15 mm
	42.8 ± 0.10 mm
	3.3 mm ± 0.10 mm

Table 172: Compact Flash cards 5CFCRD.xxxx-01 technical data (Forts.)

6. Compact Flash Cards 5CFCRD.xxxx-02

6.1 General Information

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

6.2 Order Data

Model Number	Description	Image
5CFCRD.0032-02	Compact Flash 32 MB TrueIDE SanDisk/A	
5CFCRD.0064-02	Compact Flash 64 MB TrueIDE SanDisk/A	
5CFCRD.0128-02	Compact Flash 128 MB TrueIDE SanDisk/A	
5CFCRD.0256-02	Compact Flash 256 MB TrueIDE SanDisk/A	
5CFCRD.0512-02	Compact Flash 512 MB TrueIDE SanDisk/A	
5CFCRD.1024-02	Compact Flash 1024 MB TrueIDE SanDisk/A	
5CFCRD.2048-02	Compact Flash 2048 MB TrueIDE SanDisk/A	

Table 173: Compact Flash cards 5CFCRD.xxxx-02 order data

6.3 Technical Data

Information:

The following defined characteristics, features and limit values are only valid for this accessory and can deviate from the entire device. For the entire device where, for example, this accessory is installed, the data given for the entire devlice is valid.

Features	5CFCRD.xxxx-02

Environmental Temperature
    Operation
    Storage
    Transport
	0° C to +70° C
	-25° C to +85° C
	-25° C to +85° C

Relative Humidity Operation/Storage	8% to 95%, non-condensing
Vibration Operation/Storage	Maximum 30 G (point to point)
Shock Operation/Storage	Maximum 3,000 G

Table 174: Compact Flash cards 5CFCRD.xxxx-02 technical data

Features	5CFCRD.xxxx-02
Altitude	24,000 meters
MTBF (@ 25° C)	> 3,000,000 hours
Maintenance	None
Data Reliability	< 1 unrecoverable error in 10^{14} bit read accesses < 1 faulty correction in 10^{20} bit read accesses
Clear/Write Procedures	> 2,000,000 times
Weight	11.4 g
Dimensions Length Width Thickness	36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 mm ± 0.10 mm

Table 174: Compact Flash cards 5CFCRD.xxxx-02 technical data (Forts.)

6.4 Dimensions
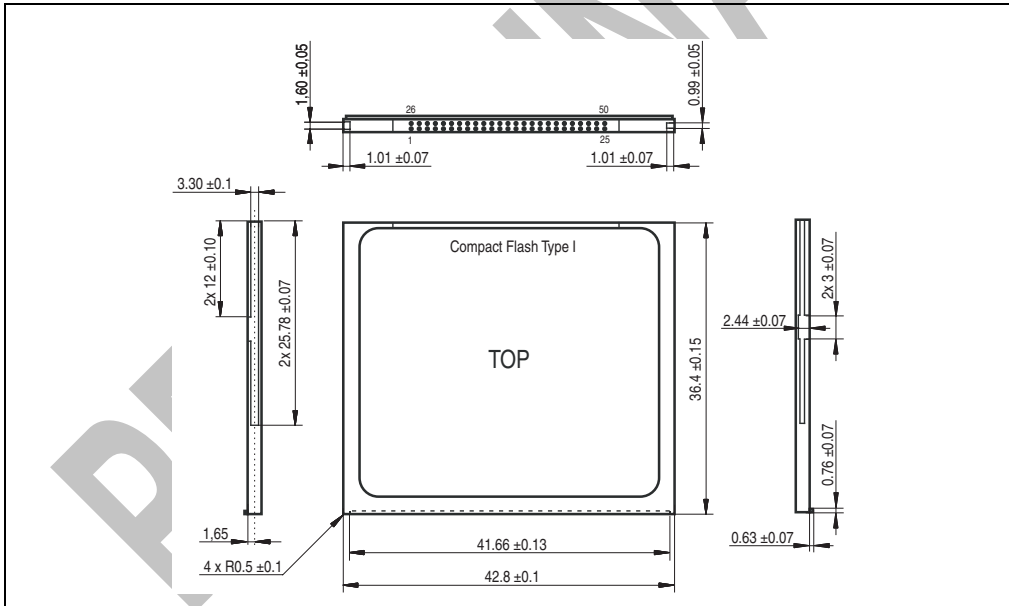
Figure 275: Dimensions for Compact Flash card type I

6.5 Calculating the Lifespan

TBD

7. USB Memory Stick

7.1 General Information

USB memory sticks are easy-to-exchange memory media. Because of the fast data transfer USB 2.0, USB memory sticks provide optimal values for use as a portable memory medium. "Hot PLUG & PLAY" - without requiring additional drivers (except with Windows 98SE), the USB memory stick can be converted immediately into an additional drive, in which data can be read from or written to. Only USB memory sticks from the memory specialists SanDisk are being used.

7.2 Order Data

Model Number	Description	Image
5MMUSB.0128-00	USB memory stick 128 MB SanDisk	
5MMUSB.0256-00	USB memory stick 256 MB SanDisk	
5MMUSB.0512-00	USB memory stick 512 MB SanDisk	

Table 175: USB memory stick order data

7.3 Technical Data

> # Information:
>
> **The following defined characteristics, features and limit values are only valid for this accessory and can deviate from the entire device. For the entire device where, for example, this accessory is installed, the data given for the entire devlice is valid.**

Features	5MMUSB.0xxx-00
LED	1 LED (green), signals data transfer (send and receive)
Voltage Supply	via the USB port

Interface
    Type
    Transfer Rate
    Sequential Reading
    Sequential Writing
    Connection
	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified
	USB 1.1 and 2.0 compatible
	up to 480 MBit (high speed)
	8,7 MB/seconds
	1,7 MB/seconds
	to each USB type A interface

Environmental Temperature
    Operation
    Storage
    Transport
	
	0° C to +45° C
	-20° C to +60° C
	-20° C to +60° C

Table 176: USB memory stick 5MMUSB.0xxx-00 technical data

Features	5MMUSB.0xxx-00
Relative Humidity 　Operation 　Storage 　Transport	10 % to 90 %, non-condensing 5 % to 90 %, non-condensing 5 % to 90 %, non-condensing
Vibration 　Operation 　Storage 　Transport	2 G (10 to 500 Hz), oscillation rate 1/minute 4 G (10 to 500 Hz), oscillation rate 1/minute 4 G (10 to 500 Hz), oscillation rate 1/minute
Shock 　Operation 　Storage 　Transport	40 G and 11 ms duration (all axes) 80 G and 11 ms duration (all axes) 80 G and 11 ms duration (all axes)
Altitude 　Operation 　Storage 　Transport	3,000 meters
MTBF (@ 25° C)	> 100000 hours
Data Preservation	10 years
Maintenance	None
Dimensions 　Length 　Width 　Thickness	62 mm 19 mm 11 mm
Operating System Support	Windows CE 4.1, CE 4.2, 98SE[1] , ME, 2000, XP Mac OS 9.1 and 10.1.2+

Table 176: USB memory stick 5MMUSB.0xxx-00 technical data (Forts.)

1) For Win 98SE, a driver can be downloaded from the SanDisk homepage.

Chapter 7 • Maintenance / Servicing

The following section describes service/maintenance work which can be carried out by the user.

Maintenance Work On	Maintenance Work	Change Interval
Power Panel	Cleaning the Touch Screen	Depends on how dirty the touch membrane is approximately once a week
	Changing the battery [1]	2 years with SRAM [2] component parts
		3 years without SRAM component parts

Table 177: Maintenance Work

1) The change interval refers to the average life span and operating conditions and is recommended by B&R.

2) The existence of a 256 KB battery buffered SRAM can be found in chapter 2 "Technical Data" on Page 29 for each individual Power Panel version.

1. Operating Guidelines for the Touch Screen

- Do not use pointed objects such as pens, knives, etc. A specially designed pen for the touch screen can be optionally ordered from B&R (model no. 9A0013.01).
- Do not place any heavy objects on the touch screen.

2. Cleaning the Touch Screen

The display with the touch screen should be cleaned at regular intervals.

2.1 Cleaning Agent

A damp cloth should be used for cleaning the touch screen. For dampening the cloth, use only water with detergent, screen cleaning agent or alcohol (Ethanol). Apply the cleaning agent onto a cloth beforehand and NOT sprayed directly onto the touch screen itself. Under no circumstances use aggressive solvents, chemicals or scouring agents.

Information:

Only clean the device when it has been switched off, as touching the screen will trigger unintended functions to be executed.

3. Changing the Battery

A battery change is only necessary for devices with a lithium battery (see chapter "Technical Data", on page 29 for Power Panel devices).

The lithium battery guarantees buffering of the internal real-time clock (RTC), SRAM data and also individually saved BIOS settings. The battery status (good or bad) can be requested using software. From this point, starting from when battery capacity is recognized as insufficient, data buffering is guaranteed for another 500 hours approximately. When changing the battery, data is buffered for another 10 minutes approximately by a gold leaf capacitor.
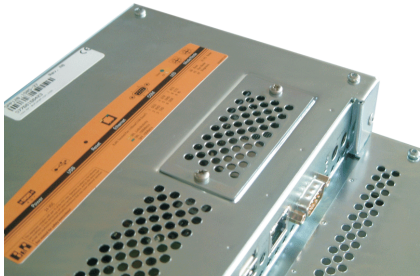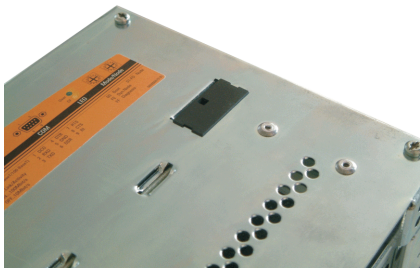
Under normal operating conditions, the battery has a typical lifespan of approximately 2 years.

Information:

Changing the battery should only be carried out by qualified personnel.

3.1 Procedure for Changing the Battery

- Disconnect the power supply to the Power Panel

- Touch the housing or earth connection (not the power supply!) in order to discharge any electrostatic charge from your body

- Remove the battery cover: The battery cover is found on the rear side of the Power Panel device.

0 aPCI Slot Power Panel Devices	1 or 2 aPCI Slot Power Panel Devices

- Remove the battery from the holder (don't use uninsulated tools >- risk of short circuiting). The battery should not be held by its edges. **Insulated** tweezers may also be used for removing the battery.
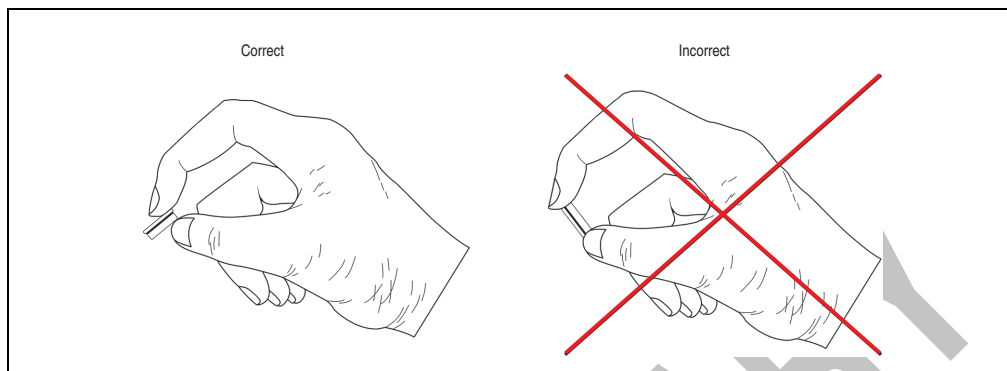
Figure 276: Handling the Battery

- After removing the battery, the data is buffered for at least another 10 minutes by a gold leaf capacitor, so that the data is not lost.

- Insert the new battery with correct polarity.

- Put on the battery cover and fasten the screws.

- Reconnect the power supply to the Power Panel.

- Possibly, the data and time in BIOS must be set again (see section "Power Panel with BIOS", on page 253).

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of accordingly.

Figure Index

Table Index

A

B

C

D

E

F

G

H

I

L

M

Model Number Index