

# Rexroth IndraControl VPP 16.1 Rexroth IndraControl VPP 40.1 Rexroth IndraControl VPP 60.1

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**VICPAS**  
HMI Parts Center

## Project Planning Manual



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# 1 System Presentation

## 1.1 Brief Description VPP 16.1, VPP 40.1 and VPP 60.1

The operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 are PC-based machine operator terminals. Depending on the respective application or configuration they can also perform control functions. The number of plug-in cards that can be integrated depends on the used PC box. Three, four or six slots are provided.

### Operator Terminals with Keypad

The front panel with keypad consists of a 5 mm thick aluminum panel with beveled edges covered by a chemical resistant polyester foil with embossed keys.

### Operator Terminals with Touch Screen

The front panel with touch screen also consists of a 5 mm thick aluminum panel with beveled edges. The application software is operated via the touch-sensitive surface of the display.

## 1.2 Variants

### Distinguishing Features

The operator terminals are provided as different variants. Essentially, they differ in display size and touch screen capability. The operator terminal VPP 60.1 features additional alphanumeric keys.

VPP 16.1	BK	DB
Display	12" TFT	
Touch screen	No	Yes
Keys	16 machine function keys	No
Profibus DP Slave	Available	Not available

Fig. 1-1: Distinguishing features VPP 16.1

VPP 40.1	BI	DE	DG
Display	15" TFT		17" TFT
Touch screen	No	Yes	
Keys (keypad)	16 machine function keys	No	
Profibus DP Slave	Available	Not available	

Fig. 1-2: Distinguishing features VPP 40.1

<b>VPP 60.1</b>	<b>BL</b>
Display	12"
Touch screen	No
Keys (keypad)	Machine function keys and alphanumeric keys

Fig. 1-3: Features VPP 60.1

The operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 can be equipped with a PC box providing 3 or 4 PCI slots.

## Variants of the VPP 16.1

### VPP 16.1BK with 16 Machine Function Keys



VPP16\_1BK.jpg

Fig. 1-4: VPP 16.1BK (with 16 machine function keys)



### VPP 16.1DB with Touch Screen



VPP16\_1DB.jpg

Fig. 1-5: VPP 16.1DB (with touch screen)

# Variants of the VPP 40.1

## VPP 40.1BI with 16 Machine Function keys



VPP40\_1BI.jpg

Fig. 1-6: VPP 40.1BI (with 16 machine function keys)

**VPP 40.1DE with 15" Touch Screen**

**VPP 40.1DG with 17" Touch Screen**

These two devices look like the VPP 16.1DB (see page 1-2), however, have greater dimensions and displays.

## VPP 60.1

### VPP 60.1BL with 16 Machine Function Keys, Alphanumeric Keys and 12" Display



Fig. 1-7: VPP 60.1

## 1.3 Operating System

For license reasons the VPP devices are only delivered with already installed operating system.

## 1.4 Commissioning

Mount the device properly (for this, see chapter "Dimensions"). Then, connect the device to the power supply and, if required, to the network.

## 2 Important Directions for Use

### 2.1 Appropriate Use

#### Introduction

Rexroth products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operating safety and reliability.

The products may only be used in the manner that is defined as appropriate. If they are used in an inappropriate manner, then situations can develop that may lead to property damage or injury to personnel.

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**Note:** Bosch Rexroth, as manufacturer, is not liable for any damages resulting from inappropriate use. In such cases, the guarantee and the right to payment of damages resulting from inappropriate use are forfeited. The user alone carries all responsibility of the risks.

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Before using Rexroth products, make sure that all the pre-requisites for appropriate use of the products are satisfied:

- Personnel that in any way, shape or form uses our products must first read and understand the relevant safety instructions and be familiar with appropriate use.
- If the product takes the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software products or alter source codes.
- Do not mount damaged or faulty products or use them in operation.
- Make sure that the products have been installed in the manner described in the relevant documentation.

## Areas of Use and Application

The VPP 16.1, VPP 40.1 and VPP 60.1 devices are PC-based machine and visualization terminals. Depending on the respective application or configuration they can also perform control functions. The operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 of Rexroth are appropriate to the following applications:

- as operator, visualization and programming terminal with integrated soft control in stand-alone machines
- as operator, visualization and programming terminal for connected controls of the IndraControl family

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**Note:** The operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 may only be used with the accessories and parts specified in this document. If a component has not been specifically named, then it may not be either mounted or connected. The same applies to cables and lines.

Operation is only permitted in the specified configurations and combinations of components using the software and firmware as specified in the relevant function descriptions.

In case of non-observance the warranty claim expires automatically.

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Typical applications of the operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 are:

- Lathes
- Milling machines
- Machining centers

The operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 may only be operated under the assembly, installation and ambient conditions as described here (temperature, system of protection, humidity, EMC requirements, etc.) and in the position specified.

## 2.2 Inappropriate Use

Using the operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 outside of the above-referenced areas of application or under operating conditions other than described in the document and the technical data specified is defined as "inappropriate use".

The operator terminals VPP 16.1, VPP 40.1 and VPP 60.1 may not be used, if

- it is subject to operating conditions that do not meet the above specified ambient conditions. This includes, for example, operation under water, in the case of extreme temperature fluctuations or extremely high maximum temperatures, or if
- Bosch Rexroth has not specifically released them for that intended purpose. Please note the specifications outlined in the general Safety Guidelines!

## 3 Safety Instructions for Electric Drives and Controls

### 3.1 Introduction

Read these instructions before the initial startup of the equipment in order to eliminate the risk of bodily harm or material damage. Follow these safety instructions at all times.

Do not attempt to install or start up this equipment without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation of the equipment prior to working with the equipment at any time. If you do not have the user documentation for your equipment, contact your local Bosch Rexroth representative to send this documentation immediately to the person or persons responsible for the safe operation of this equipment.

If the equipment is resold, rented or transferred or passed on to others, then these safety instructions must be delivered with the equipment.



**WARNING**

**Improper use of this equipment, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in material damage, bodily harm, electric shock or even death!**

### 3.2 Explanations

The safety instructions describe the following degrees of hazard seriousness in compliance with ANSI Z535. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions.

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
 <b>DANGER</b>	Death or severe bodily harm will occur.
 <b>WARNING</b>	Death or severe bodily harm may occur.
 <b>CAUTION</b>	Bodily harm or material damage may occur.

Fig. 3-1: Hazard classification (according to ANSI Z535)

### 3.3 Hazards by Improper Use



**DANGER**

**High voltage and high discharge current!  
Danger to life or severe bodily harm by electric shock!**



**DANGER**

**Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!**



**WARNING**

**High electrical voltage due to wrong connections! Danger to life or bodily harm by electric shock!**



**WARNING**

**Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!**



**CAUTION**

**Surface of machine housing could be extremely hot! Danger of injury! Danger of burns!**



**CAUTION**

**Risk of injury due to improper handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock or incorrect handling of pressurized systems!**



**CAUTION**

**Risk of injury due to incorrect handling of batteries!**



## 3.4 General Information

- Bosch Rexroth AG is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before starting up the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.
- Only persons who are trained and qualified for the use and operation of the equipment may work on this equipment or within its proximity.
  - The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the equipment as well as an understanding of all warnings and precautionary measures noted in these instructions.
  - Furthermore, they must be trained, instructed and qualified to switch electrical circuits and equipment on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.
- Only use spare parts and accessories approved by the manufacturer.
- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The equipment is designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Use only safety features and applications that are clearly and explicitly approved in the Project Planning Manual. If this is not the case, they are excluded.
 

The following areas of use and application, for example, include safety features and applications: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications in which electrical devices with vital functions can be electromagnetically disturbed, mining, food processing, control of protection equipment (also in a machine).
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.
 

The machine and installation manufacturer must

  - make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
  - make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.
- Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

- Operation is only permitted if the national EMC regulations for the application are met.  
The instructions for installation in accordance with EMC requirements can be found in the documentation "EMC in Drive and Control Systems".  
The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.

## 3.5 Protection Against Contact with Electrical Parts

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**Note:** This section refers to equipment and drive components with voltages above 50 Volts.

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Touching live parts with voltages of 50 Volts and more with bare hands or conductive tools or touching ungrounded housings can be dangerous and cause electric shock. In order to operate electrical equipment, certain parts must unavoidably have dangerous voltages applied to them.

---



**DANGER**

### High electrical voltage! Danger to life, severe bodily harm by electric shock!

- ⇒ Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain or repair this equipment.
  - ⇒ Follow general construction and safety regulations when working on high voltage installations.
  - ⇒ Before switching on power the ground wire must be permanently connected to all electrical units according to the connection diagram.
  - ⇒ Do not operate electrical equipment at any time, even for brief measurements or tests, if the ground wire is not permanently connected to the points of the components provided for this purpose.
  - ⇒ Before working with electrical parts with voltage higher than 50 V, the equipment must be disconnected from the mains voltage or power supply. Make sure the equipment cannot be switched on again unintended.
  - ⇒ The following should be observed with electrical drive and filter components:
    - ⇒ Wait thirty (30) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.
    - ⇒ Never touch the electrical connection points of a component while power is turned on.
    - ⇒ Install the covers and guards provided with the equipment properly before switching the equipment on. Prevent contact with live parts at any time.
    - ⇒ A residual-current-operated protective device (RCD) must not be used on electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.
    - ⇒ Electrical components with exposed live parts and uncovered high voltage terminals must be installed in a protective housing, for example, in a control cabinet.
-

To be observed with electrical drive and filter components:



**DANGER**

**High electrical voltage on the housing!  
High leakage current! Danger to life, danger of  
injury by electric shock!**

- ⇒ Connect the electrical equipment, the housings of all electrical units and motors permanently with the safety conductor at the ground points before power is switched on. Look at the connection diagram. This is even necessary for brief tests.
- ⇒ Connect the safety conductor of the electrical equipment always permanently and firmly to the supply mains. Leakage current exceeds 3.5 mA in normal operation.
- ⇒ Use a copper conductor with at least 10 mm<sup>2</sup> cross section over its entire course for this safety conductor connection!
- ⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. Otherwise, high voltages can occur on the housing that lead to electric shock.

### 3.6 Protection Against Electric Shock by Protective Low Voltage (PELV)

All connections and terminals with voltages between 0 and 50 Volts on Rexroth products are protective low voltages designed in accordance with international standards on electrical safety.



**WARNING**

**High electrical voltage due to wrong  
connections! Danger to life, bodily harm by  
electric shock!**

- ⇒ Only connect equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) to all terminals and clamps with voltages of 0 to 50 Volts.
- ⇒ Only electrical circuits may be connected which are safely isolated against high voltage circuits. Safe isolation is achieved, for example, with an isolating transformer, an opto-electronic coupler or when battery-operated.

## 3.7 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of the connected motors. Some common examples are:

- improper or wrong wiring of cable connections
- incorrect operation of the equipment components
- wrong input of parameters before operation
- malfunction of sensors, encoders and monitoring devices
- defective components
- software or firmware errors

Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily injury and material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

**DANGER**

### **Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!**

- ⇒ Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation. Unintended machine motion is possible if monitoring devices are disabled, bypassed or not activated.
- ⇒ Pay attention to unintended machine motion or other malfunction in any mode of operation.
- ⇒ Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:
  - use safety fences
  - use safety guards
  - use protective coverings
  - install light curtains or light barriers
- ⇒ Fences and coverings must be strong enough to resist maximum possible momentum, especially if there is a possibility of loose parts flying off.
- ⇒ Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the machine if the emergency stop is not working.
- ⇒ Isolate the drive power connection by means of an emergency stop circuit or use a starting lockout to prevent unintentional start.
- ⇒ Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone. Safe standstill can be achieved by switching off the power supply contactor or by safe mechanical locking of moving parts.
- ⇒ Secure vertical axes against falling or dropping after switching off the motor power by, for example:
  - mechanically securing the vertical axes
  - adding an external braking/ arrester/ clamping mechanism
  - ensuring sufficient equilibration of the vertical axes

The standard equipment motor brake or an external brake controlled directly by the drive controller are not sufficient to guarantee personal safety!
- ⇒ Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:
  - maintenance and repair work
  - cleaning of equipment
  - long periods of discontinued equipment use
- ⇒ Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such equipment cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.

## 3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated near current-carrying conductors and permanent magnets in motors represent a serious health hazard to persons with heart pacemakers, metal implants and hearing aids.



**WARNING**

### **Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!**

- ⇒ Persons with heart pacemakers, hearing aids and metal implants are not permitted to enter the following areas:
- Areas in which electrical equipment and parts are mounted, being operated or started up.
  - Areas in which parts of motors with permanent magnets are being stored, operated, repaired or mounted.
- ⇒ If it is necessary for a person with a heart pacemaker to enter such an area, then a doctor must be consulted prior to doing so. Heart pacemakers that are already implanted or will be implanted in the future, have a considerable variation in their electrical noise immunity. Therefore there are no rules with general validity.
- ⇒ Persons with hearing aids, metal implants or metal pieces must consult a doctor before they enter the areas described above. Otherwise, health hazards will occur.

### 3.9 Protection Against Contact with Hot Parts



**CAUTION**

**Housing surfaces could be extremely hot!  
Danger of injury! Danger of burns!**

- ⇒ Do not touch housing surfaces near sources of heat! Danger of burns!
- ⇒ After switching the equipment off, wait at least ten (10) minutes to allow it to cool down before touching it.
- ⇒ Do not touch hot parts of the equipment, such as housings with integrated heat sinks and resistors. Danger of burns!

### 3.10 Protection During Handling and Mounting

Under certain conditions, incorrect handling and mounting of parts and components may cause injuries.



**CAUTION**

**Risk of injury by incorrect handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock!**

- ⇒ Observe general installation and safety instructions with regard to handling and mounting.
- ⇒ Use appropriate mounting and transport equipment.
- ⇒ Take precautions to avoid pinching and crushing.
- ⇒ Use only appropriate tools. If specified by the product documentation, special tools must be used.
- ⇒ Use lifting devices and tools correctly and safely.
- ⇒ For safe protection wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.
- ⇒ Never stand under suspended loads.
- ⇒ Clean up liquids from the floor immediately to prevent slipping.

## 3.11 Battery Safety

Batteries contain reactive chemicals in a solid housing. Inappropriate handling may result in injuries or material damage.



**CAUTION**

### **Risk of injury by incorrect handling!**

- ⇒ Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and cauterization).
- ⇒ Never charge non-chargeable batteries (danger of leakage and explosion).
- ⇒ Never throw batteries into a fire.
- ⇒ Do not dismantle batteries.
- ⇒ Do not damage electrical components installed in the equipment.

**Note:** Be aware of environmental protection and disposal! The batteries contained in the product should be considered as hazardous material for land, air and sea transport in the sense of the legal requirements (danger of explosion). Dispose batteries separately from other waste. Observe the legal requirements in the country of installation.

## 3.12 Protection Against Pressurized Systems

Certain motors and drive controllers, corresponding to the information in the respective Project Planning Manual, must be provided with pressurized media, such as compressed air, hydraulic oil, cooling fluid and cooling lubricant supplied by external systems. Incorrect handling of the supply and connections of pressurized systems can lead to injuries or accidents. In these cases, improper handling of external supply systems, supply lines or connections can cause injuries or material damage.



**CAUTION**

### **Danger of injury by incorrect handling of pressurized systems !**

- ⇒ Do not attempt to disassemble, to open or to cut a pressurized system (danger of explosion).
- ⇒ Observe the operation instructions of the respective manufacturer.
- ⇒ Before disassembling pressurized systems, release pressure and drain off the fluid or gas.
- ⇒ Use suitable protective clothing (for example safety glasses, safety shoes and safety gloves)
- ⇒ Remove any fluid that has leaked out onto the floor immediately.

**Note:** Environmental protection and disposal! The media used in the operation of the pressurized system equipment may not be environmentally compatible. Media that are damaging the environment must be disposed separately from normal waste. Observe the legal requirements in the country of installation.



## 4 Technical Data

### 4.1 Front Panel

	VPP 16.1BK	VPP 16.1DB	VPP 40.1BI	VPP 40.1DE	VPP 40.1DG
<b>Display</b>	12" TFT, 800 x 600 pixels 256,000 colors		15" TFT, 1024 x 768 pixels 256,000 colors		17" TFT, 1280 x 1024 pixels 16 mill. colors
<b>Operation</b>	Keys	Touch	Keys	Touch	
<b>Surface – Front panel</b>	Color: RAL 7035 light gray				
<b>Degree of protection</b>	Front panel IP 65 according to DIN 40 050, IEC 529				
<b>Interface</b>	USB connection, cover's degree of protection IP 65				

Fig. 4-1: Technical data: front of the VPP 16.1 and the VPP 40.1

	VPP 60.1BL
<b>Display</b>	12" TFT, 800 x 600 pixels 256,000 colors
<b>Operation</b>	Keypad
<b>Surface – Front panel</b>	Color: RAL 7035 light gray
<b>Degree of protection</b>	Front panel IP 65 according to DIN 40 050, IEC 529
<b>Interface</b>	USB connection, cover's degree of protection IP 65

Fig. 4-2: Technical data: front of the VPP 60.1

## 4.2 PC Box

PC box	Type A	Type C
<b>Processor</b>	Celeron with minimum 1.3 GHz and integrated graphic controller with maximum 8 MB video memory	
<b>Working memory</b>	512 MB	
<b>Hard disk</b>	Min. 20 GB, mounted within a vibration-resistant suspension	
<b>Optional drives</b>	DVD ROM or DVD/CD RW	
<b>Interfaces</b> available in all variants	<ul style="list-style-type: none"> <li>• 1 x parallel interface (25-pin, D-Sub)</li> <li>• 1 x external VGA connection (15-pin, HD-Sub)</li> <li>• 2 x USB connection (type A)</li> <li>• 1 x Ethernet connection (RJ 45, 10/100 Base-T)</li> <li>• 1 x keyboard connection (PS/2)</li> <li>• 1 x mouse connection (PS/2)</li> <li>• 1 x external battery connection</li> <li>• 2 to 3 serial standard interfaces RS232 (9-pin, D-Sub) <sup>1</sup></li> <li>•</li> </ul>	
<b>Additional interfaces</b>		
For variant with PROFIBUS DP slave	<ul style="list-style-type: none"> <li>• 1 x PROFIBUS DP slave (9-pin, D-Sub)</li> </ul>	
<b>Slots</b>	2 x PCI, 1 x PCI / ISA	3 x PCI, 1 x PCI / ISA
<b>Degree of protection</b>	PC box: IP 00	
<b>Power supply</b>	85/264 VAC or 24 VDC	
<b>Max. power consumption</b>	200 W	

Fig. 4-3: Technical data: PC box

<sup>1</sup> For devices with touch screen 2 serial interfaces

### 4.3 Power Supply Unit 115 V / 230 V

Nominal input voltage:	115 VAC / 230 VAC	
Input voltage range:	85 ... 264 VAC	
Input current:	1.0 A for nominal voltage 230 VAC 2.0 A for nominal voltage 115 VAC	
Max. inrush current (cold start 25 °C)	40 A for nominal voltage 230 VAC 20 A for nominal voltage 115 VAC	
Output voltages: +5 V +12 V -12 V +20 V ISO 6V	Current (max.)* 20 A 3 A 500 mA 2 A 200 mA	Tolerance (incl. residual ripple) +/-5 % +/-5 % +/-5 % +/-5 % +/-5 %
Max. output power:	160 W*	
Efficiency:	0,8	

\*) Note: During specifying the maximum output currents please observe that the currents separately considered are the maximum possible currents of the respective output voltage. However, it is not possible to create the maximum current from all output voltages, as the maximum total output power (= 160 W) must not be exceeded.

Fig. 4-4: Technical data of the power supply unit 115 V / 230 V

### 4.4 Technical Data of the Power Supply Unit 24 V

Nominal input voltage:	24 VDC	
Input voltage range:	24 VDC +20 %, -15 %	
Noise and surge immunity	U <sub>max</sub> = 35 V (for t < 100 ms)	
Max. input current:	6 A for nominal voltage 24 V	
Max. inrush current:	25 A for nominal voltage 24 V	
Output voltages: +5 V +12 V +24 V -12 V ISO 6V	Current (max.)* 13 A 3 A 2 A 500 mA 200 mA	Tolerance (incl. residual ripple) +/-5 % +/-5 % +/-5 % +/-5 % +/-5 %
Max. output power:	110 W*	
Efficiency:	0,8	

\*) Note: During specifying the maximum output currents please observe that the currents separately considered are the maximum possible currents of the respective output voltage. However, it is not possible to create the maximum current from all output voltages, as the maximum total output power (= 110 W) must not be exceeded.

Fig. 4-5: Technical data of the power supply unit 24 V

## 4.5 Ambient Conditions

	In operation	Storage/Transport
Max. surrounding air temperature <u>Exception:</u>	+5 °C... +45 °C	-20 °C to +60 °C
Max. temperature gradient	Temporal temperature changes up to 3°C per minute	Not defined
Relative humidity	Climatic class 3K3 according to EN 60721, condensation not permissible.	Climatic class 3K3 according to EN 60721, condensation not permissible.
Air pressure	Up to 2,000 m above MSL according to DIN 60204	
Mechanical strength	Max. vibration: Frequency range: 10...150 Hz  Excursion: 0.075 mm for 10 ... 57 Hz  Acceleration: 1 g for 57 ... 150 Hz  According to EN 60068-2-6	Max. shock: 15 g according to DIN IEC 68-2-27, no disturbance of the function
Degree of pollution	2	2

Fig. 4-6: Ambient conditions

## 4.6 Used Standards

The system components of the operator terminals correspond to the following standards:

Standard	Meaning
EN 60 204-1	Electrical equipment of machines
EN 50 081-2	Basic technical standard, emitted interference (industrial environment)
EN 50 082-2	Basic technical standard, noise immunity (industrial environment)
EN 60 742	Transformer for 24 V power supply unit, protective separation
EN 60 950	Overvoltage category II
EN 61 131	Requirements concerning the 24 V outputs
EN 61 131-2	Requirements concerning the 24 power supply
EN 418	Machine safety, EMERGENCY STOP devices
EN 60 529	Degrees of protection (incl. housings and installation compartments)
EN 60 068-2-6	Vibration test
EN 60068-2-27	Shock test

Fig. 4-7: Used standards

**Note:** Concerning delivered operator terminals all CE requirements are fulfilled. After plugging-in extension cards, however, a new CE test has to be executed.

**UL/CSA Certification**

The devices of the VPP family as well as the external battery pack (see chapter 8.5) are basically certificated according to

- **UL508** (Industrial Control Equipment) and
- **C22.2 No. 14-M95** (CSA)

However, it is possible that there are combinations or extension stages with restricted or missing certification. Thus, verify the registration according to the UL marking on the device.

---

**Note:** To guarantee an UL/CSA-compliant operation, you have to fulfill the following conditions:

- Use 60/75 °C copper wire only.
  - Use Class 1 wire only or equivalent.
- 

**Note:** The UL/CSA marking is only valid for the device in its delivery status. After having modified the device, e. g. after plugging-in additional extension cards, the UL compliancy has to be verified.

---

## 4.7 Wear Parts

### Wear Parts without Warranty

- The service life of the backlight is limited to a certain number of operating hours. After this time the backlight will produce only 50 % of its original brightness. This time differs for the used displays. If the surrounding air temperature is 25 °C, the service life is:
  - 12": 40,000 hours
  - 15": 30,000 hours
  - 17": 45,000 hours
- CMOS battery: 5 to 7 years
- Battery pack: The number of charging cycles of the battery pack and thus, its service life is dependent on the surrounding air temperature, in which the battery pack is used. Surrounding air temperature is defined as the temperature, in which the operator terminal or the battery pack is situated, e.g. the internal temperature of the control cabinet or in a operator panel housing.

Surrounding air temperature	Charging cycles	Maintenance interval
25 °C	4000 cycles	6 years
35 °C	2000 cycles	3 years
45 °C	1000 cycles	1.5 years

Fig. 4-8: Battery pack

If you don't exactly know the conditions, Bosch Rexroth recommends to exchange the battery pack every 1.5 years.

- Hard disk: The hard disk is an electromechanic wear part, that has to be changed during the operating time. According to the manufacturer's specifications the hard disk has been developed for a service life of 60 months in consideration of the following conditions:

Operating hours / month		Max. 333
Input/output cycles / month		Min. 10 and max. 150
Operating conditions	Temperature	40 °C
	Rel. humidity	30 %
	Height	< 500 m
Storage conditions	Accesses	30 % of the operating hours
	Temperature	< 30 °C
	Rel. humidity	< 70 %
	Duration	< 3 months

Fig. 4-9: Typical operating and storage conditions of the hard disk

The operation out of this typical conditions is permissible, whereby, however, the service life of the hard disk may reduce. However, the ambient conditions specified for the overall device in chapter 4.5 have to be absolutely kept.

- Also fans are mechanic wear components, whose service life is extremely temperature-dependent. For the fan integrated in the housing the manufacturer specifies the following service life:

Surrounding air temperature	Service life
40 °C	70,000 hours
70 °C	35,000 hours

Fig. 4-10: Service life of the fan

## 4.8 Compatibility Test

All Rexroth controls and drives are developed and tested according to the latest state-of-the-art.

As it is impossible to follow the continuing development of all materials (e.g. lubricants in machine tools) which may interact with our controls and drives, it cannot be completely ruled out that any reactions with the materials used by Bosch Rexroth might occur.

For this reason, before using the respective material a compatibility test has to be carried out for new lubricants, cleaning agents etc. and our housings/our housing materials.

## 5 Dimensions

### 5.1 Housing Dimensions

#### Housing Dimensions VPP 16.1

Independent of the design of the VPP 16.1 with keys (M-Keys, see chapter 6.3) or touch screen the front panel width is 350 mm and the height is 290 mm. The depth of the VPP 16.1 varies depending on the number of slots – three or four – and on the availability of a drive.

#### Views of the VPP 16.1BKA and VPP 16.1DBA Devices with Three Slots

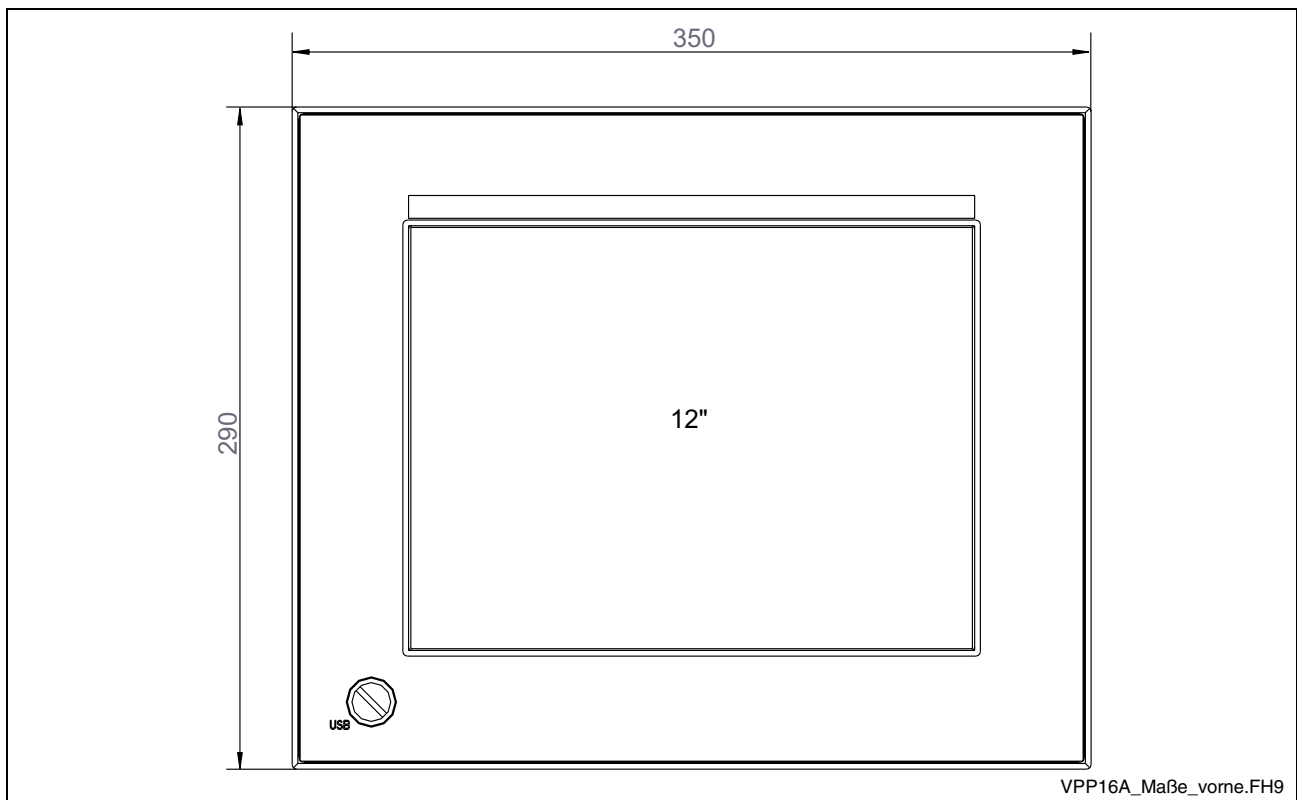


Fig. 5-1: Dimensions – Front panel VPP 16.1DB

The front panel of the VPP 16.1BK has the same dimensions, however keys are arranged on the right, the left and below the display.





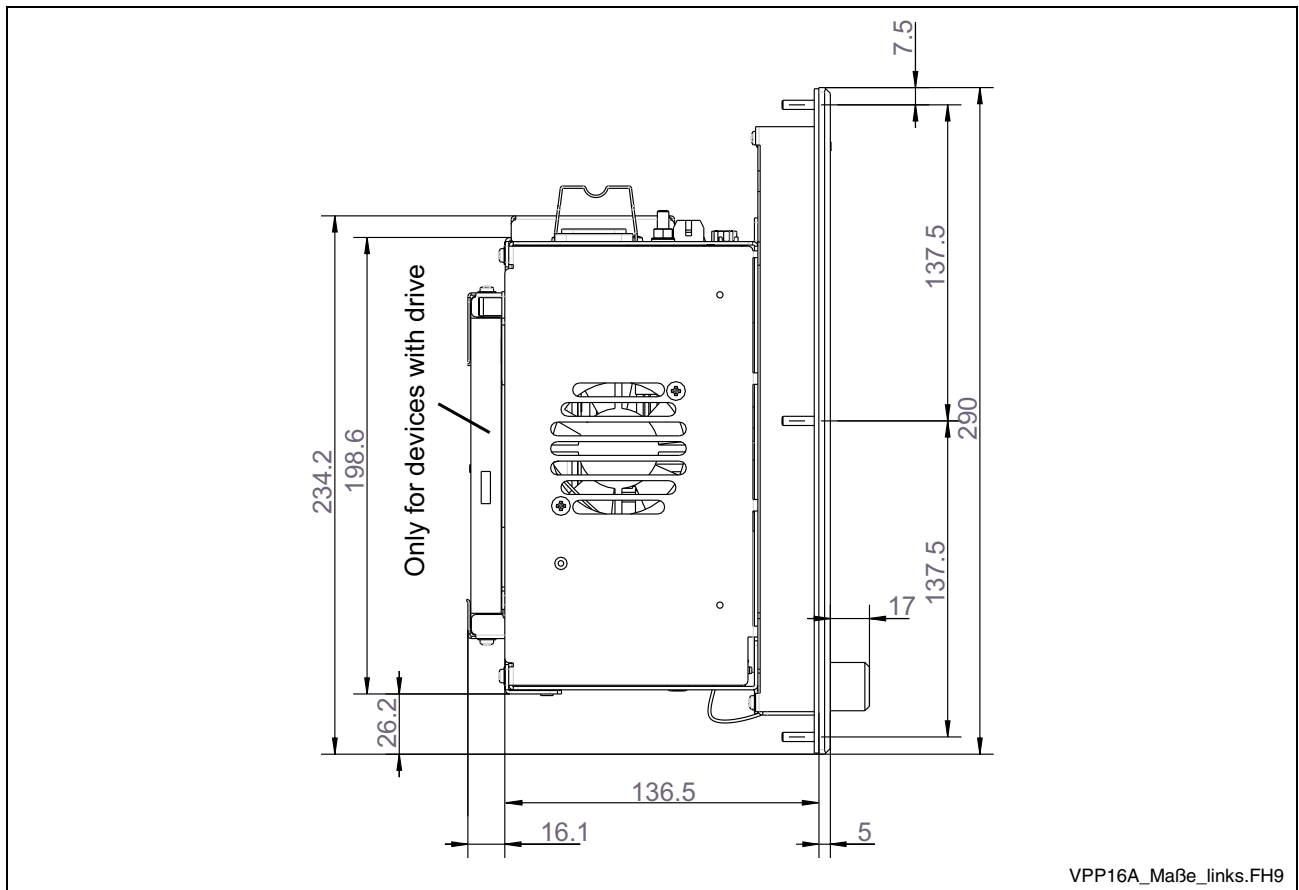


Fig. 5-4: VPP 16.1BKA and VPP 16.1DBA with three slots – Left view

**Views of the VPP 16.1BKC and VPP 16.1DBC Devices with Four Slots**

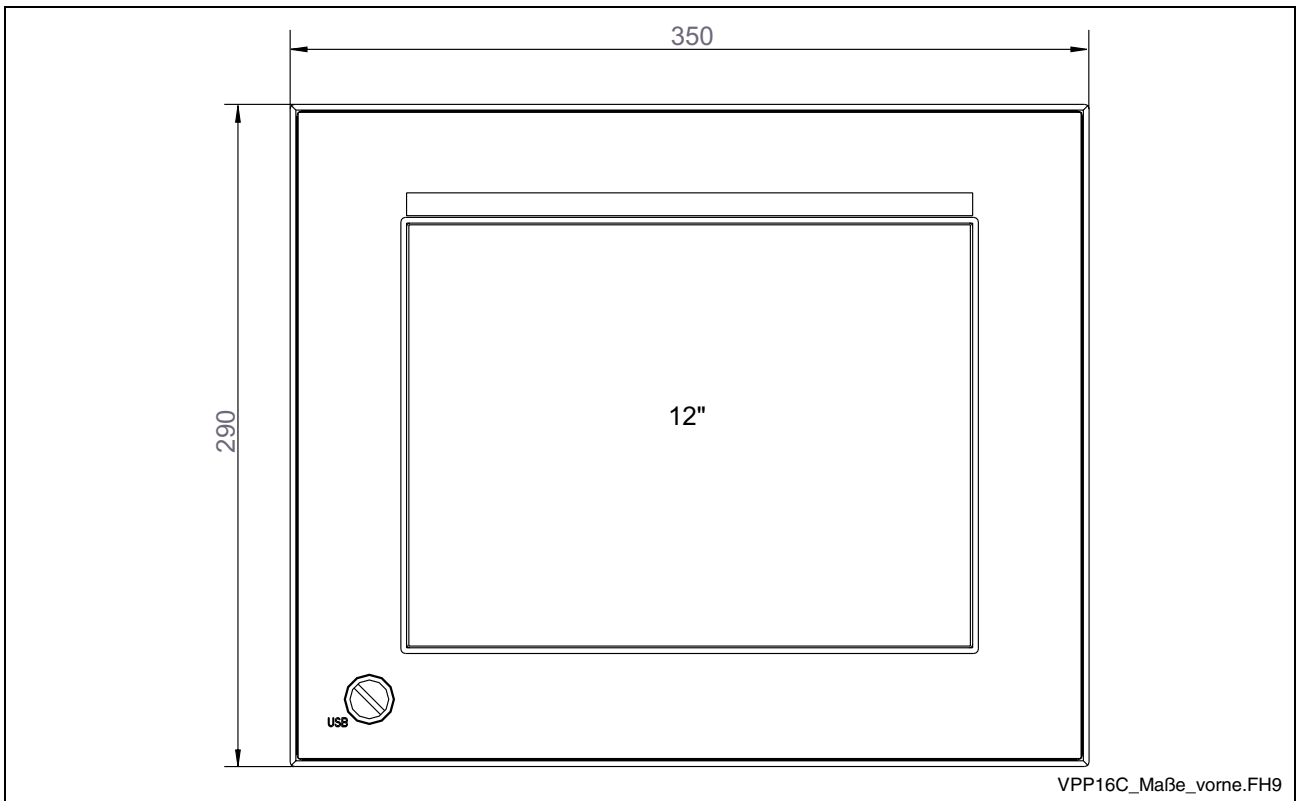


Fig. 5-5: Dimensions – Front panel VPP 16.1DBC  
 The front panel of the VPP 16.1BKC has the same dimensions, however keys are arranged on the right, the left and below the display.

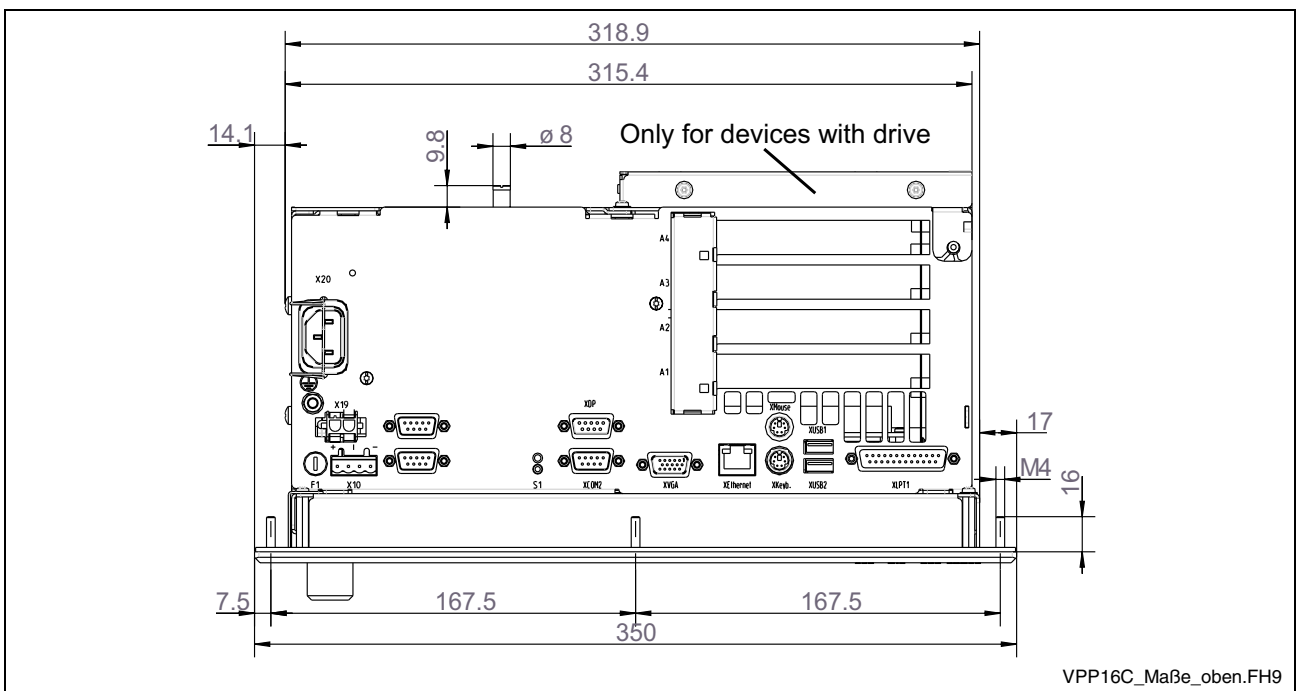


Fig. 5-6: VPP 16.1BKC and VPP 16.1DBC with four slots – Top view

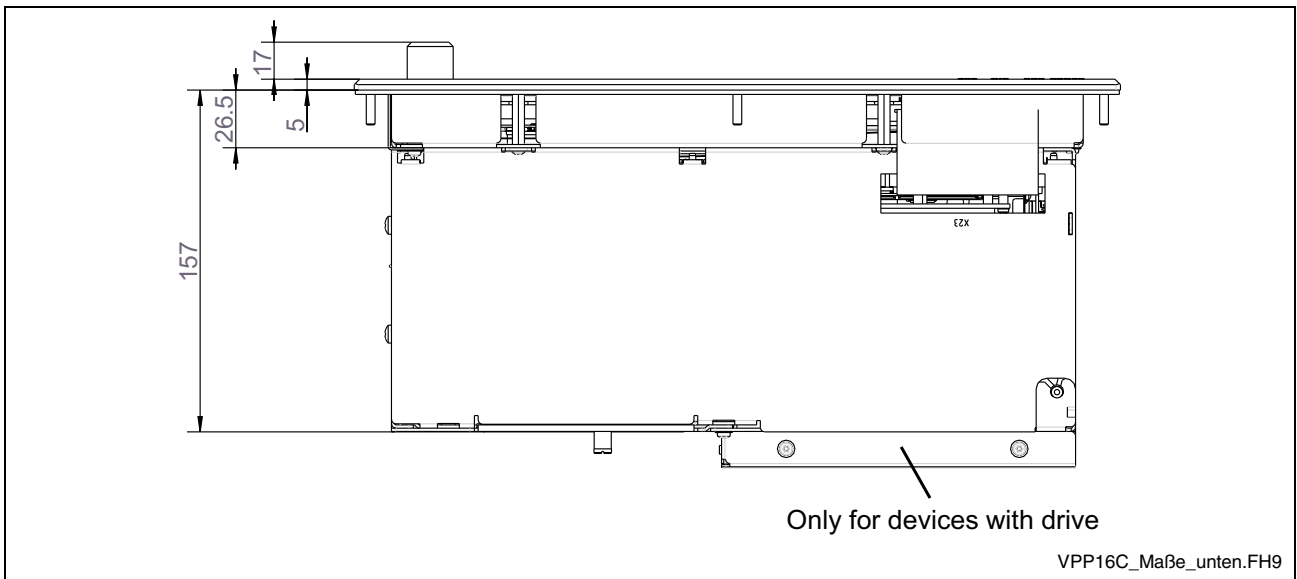


Fig. 5-7: VPP 16.1BKC and VPP 16.1DBC with four slots – Bottom view

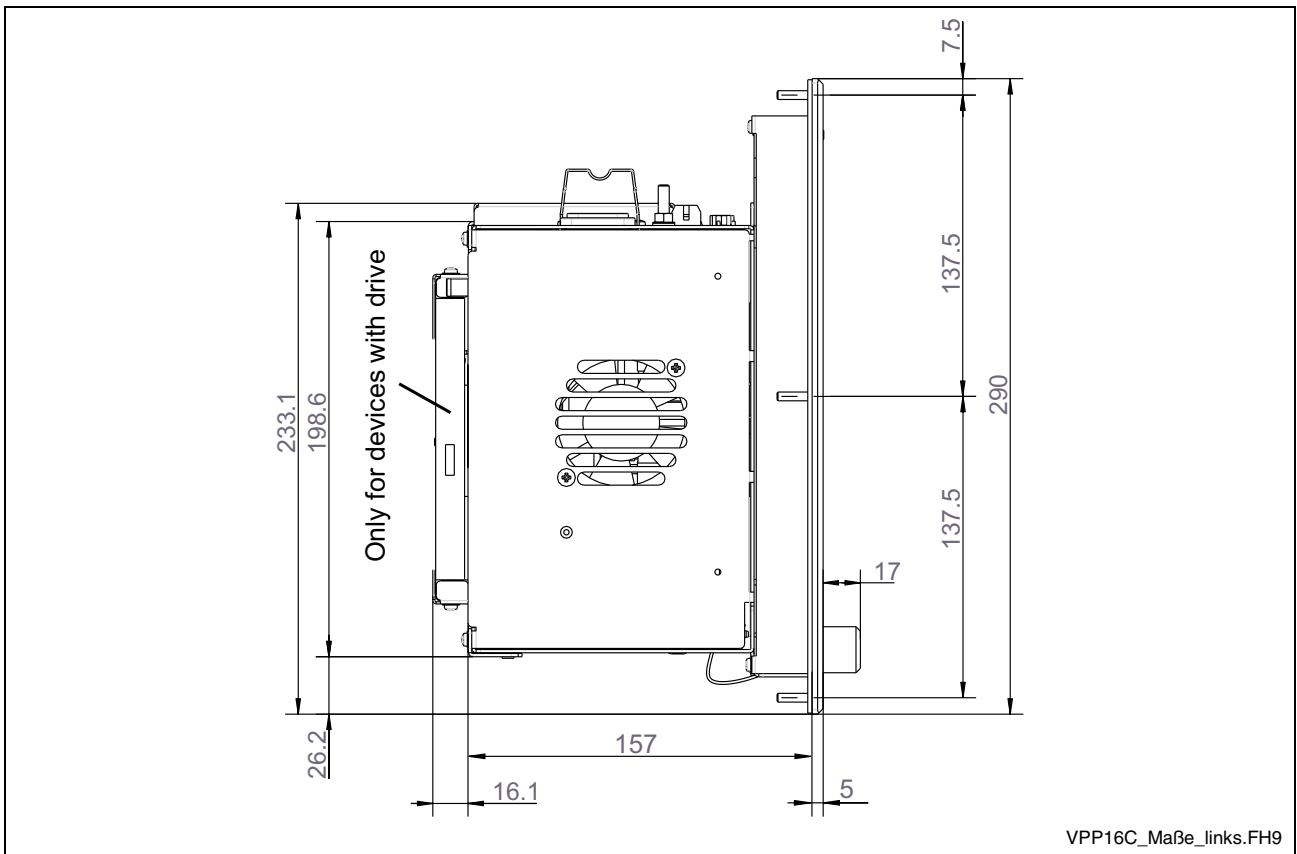


Fig. 5-8: VPP 16.1BKC and VPP 16.1DBC with four slots – Left view

## Housing Dimensions VPP 40.1

Independent of the design of the VPP 40.1 with keys (M-Keys, see chapter 6.3) or touch screen 15" or 17" the front panel width is 407 mm and the height is 371 mm. The depth of the VPP 40.1 varies depending on the number of slots – three or four – and on the availability of a drive.

### Views of the VPP 40.1BIA, VPP 40.1DEA and VPP 40.1DGA Devices with Three Slots

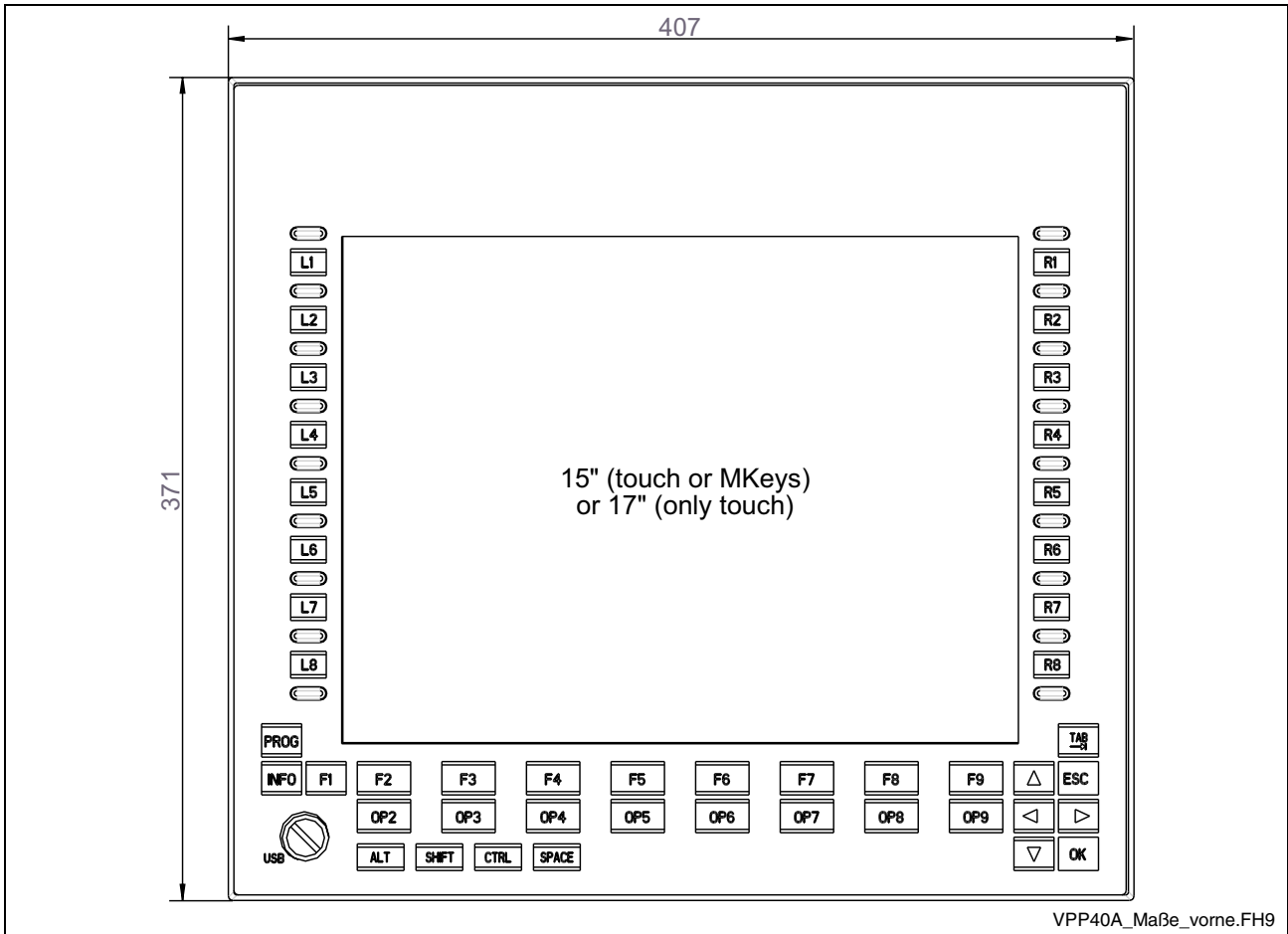


Fig. 5-9: Dimensions – Front panel VPP 40.1BI  
 The front panels of the VPP 40.1DE and VPP 40.1DG devices have the same dimensions, however the devices have no keys.

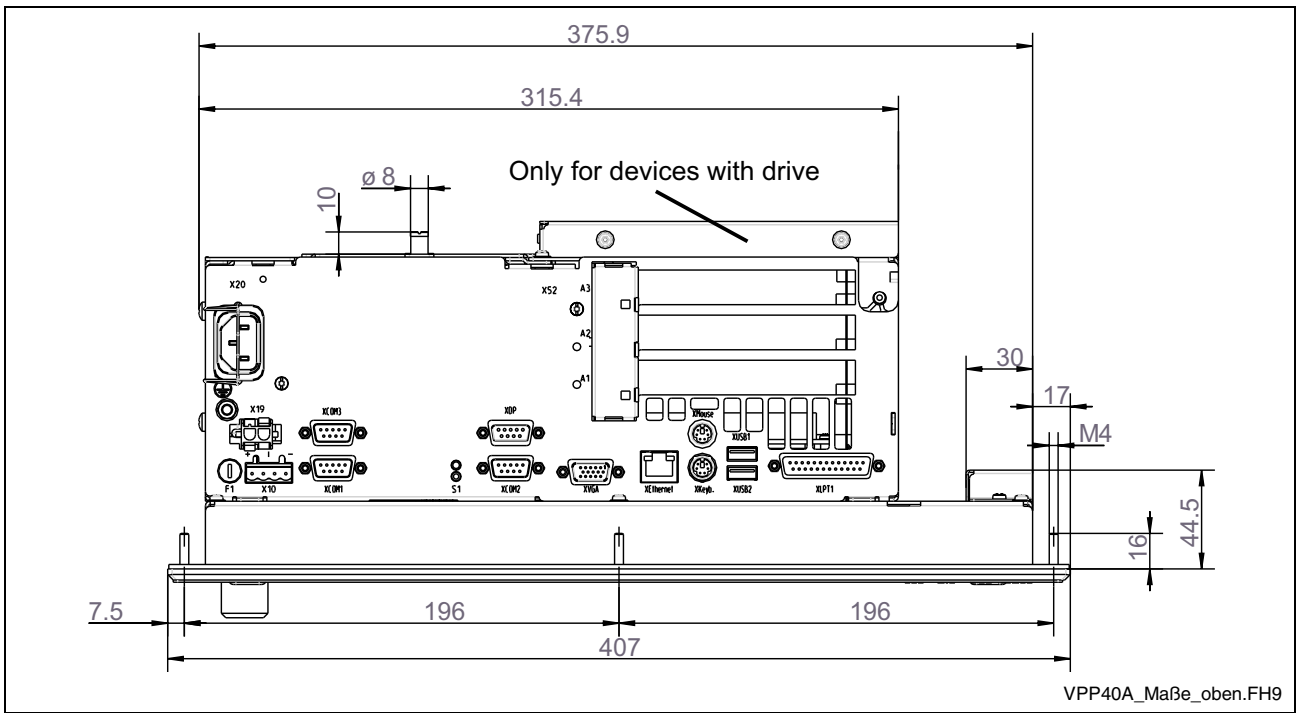


Fig. 5-10: VPP 40.1BIA, VPP 40.1DEA and VPP 40.1DGA with three slots – Top view

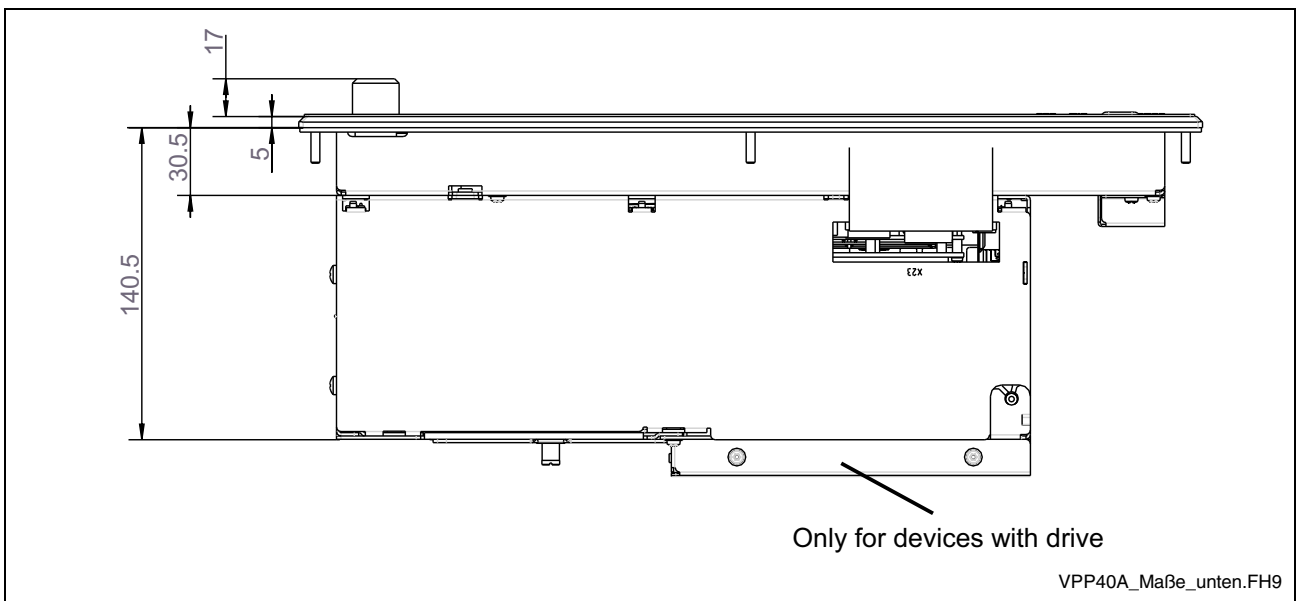


Fig. 5-11: VPP 40.1BIA, VPP 40.1DEA and VPP 40.1DGA with three slots – Bottom view

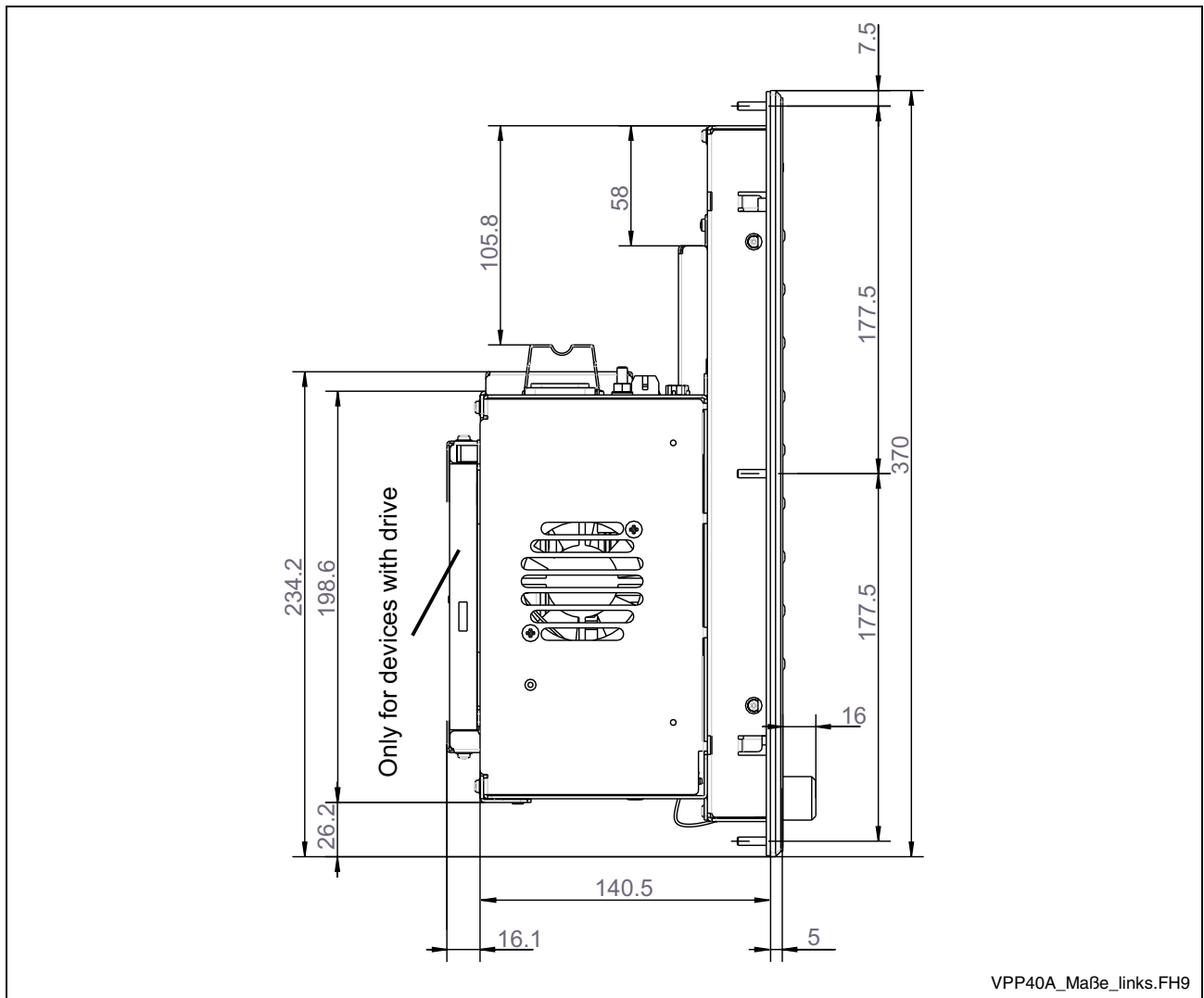


Fig. 5-12: VPP 40.1BIA, VPP 40.1DEA and VPP 40.1DGA with three slots – Left view

**View of the VPP 40.1BIC, VPP 40.1DEC and VPP 40.1DGC with Four Slots**

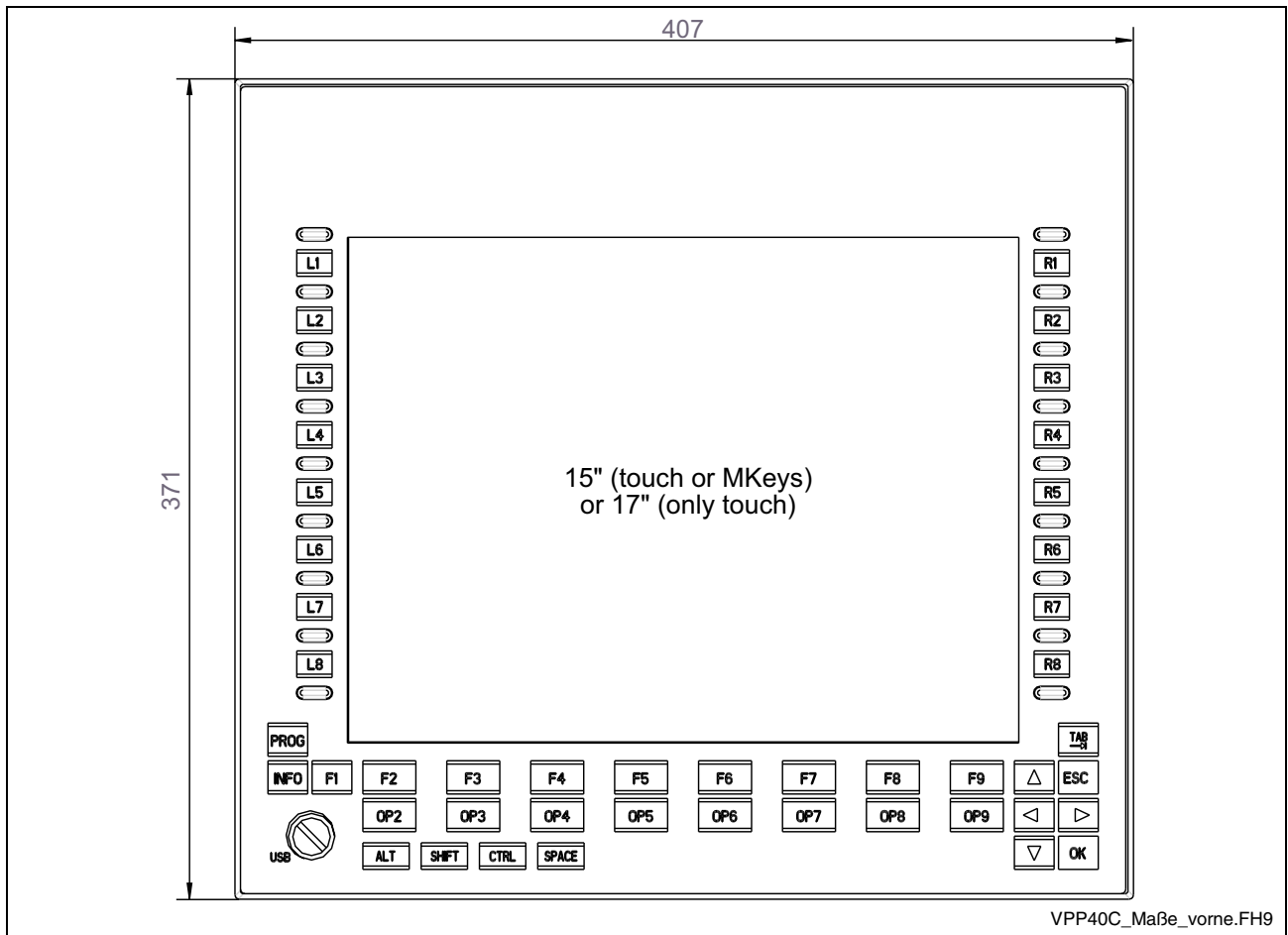


Fig. 5-13: Dimensions – Front panel VPP 40.1BI  
 The front panels of the VPP 40.1DE and VPP 40.1DG devices have the same dimensions, however the devices have no keys.





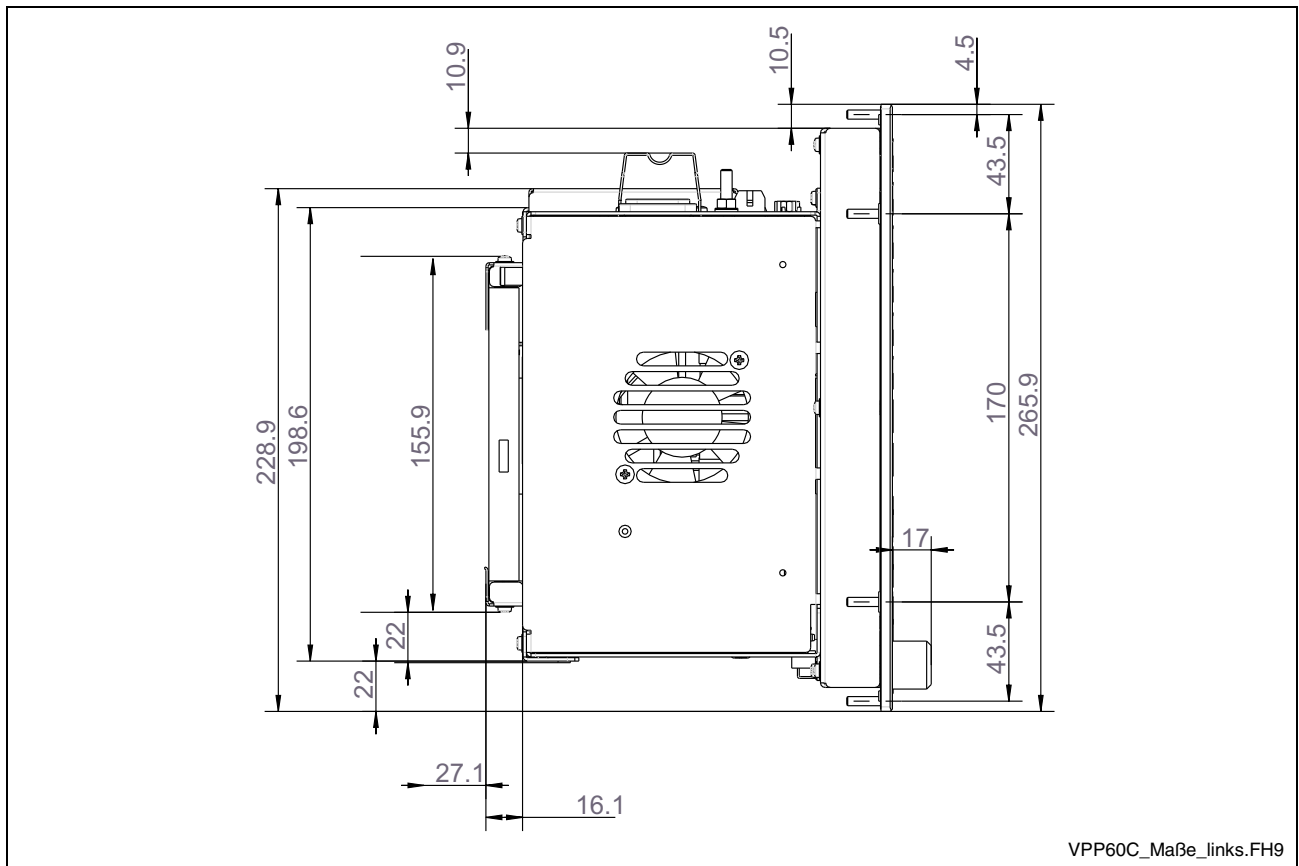


Fig. 5-16: VPP 40.1BIC, VPP 40.1DEC and VPP 40.1DGC with four slots – Left view

### Housing Dimensions VPP 60.1

The front panel width of the operator terminal VPP 60.1 is 483 (19") mm and the height is 266 mm; the depth of the two variants depends on the number of slots – for VPP 60.1BLA devices three and for VPP 60.1BLC four.

#### Views of the VPP 60.1BLA Device with Three Slots

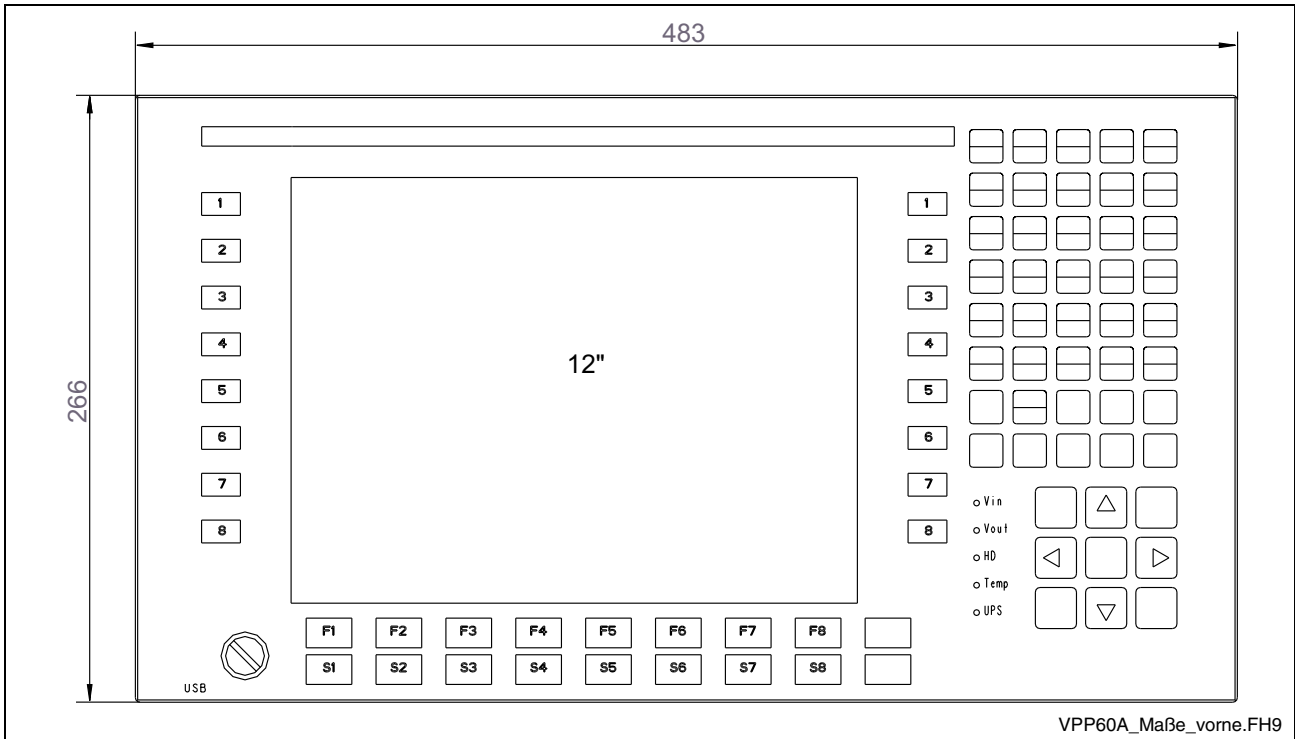


Fig. 5-17: Dimensions – Front panel of the VPP 60.1BL

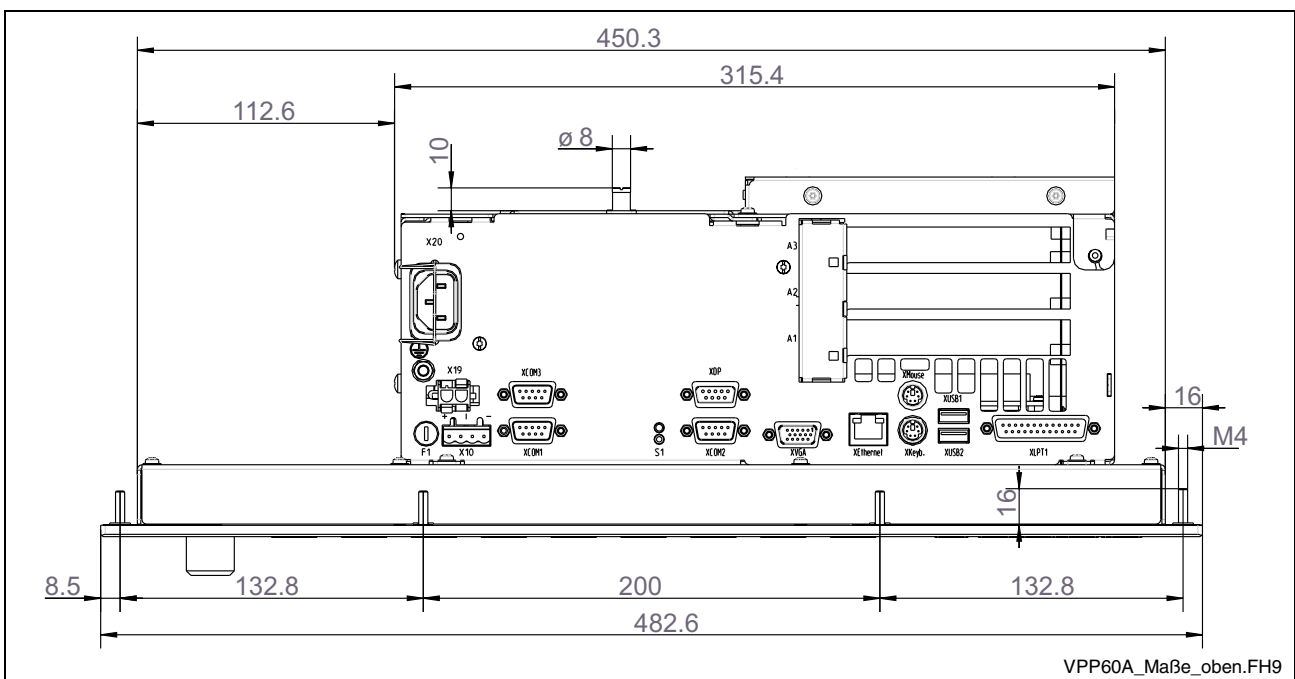


Fig. 5-18: VPP 60.1BLA with three slots – Top view

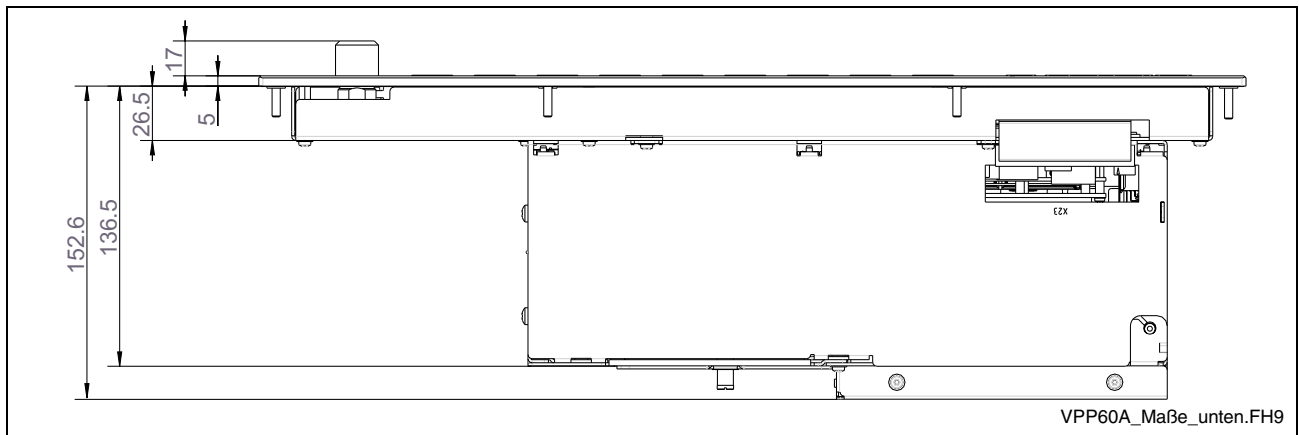


Fig. 5-19: Dimensions – VPP 60.1BLA with three slots – Bottom view

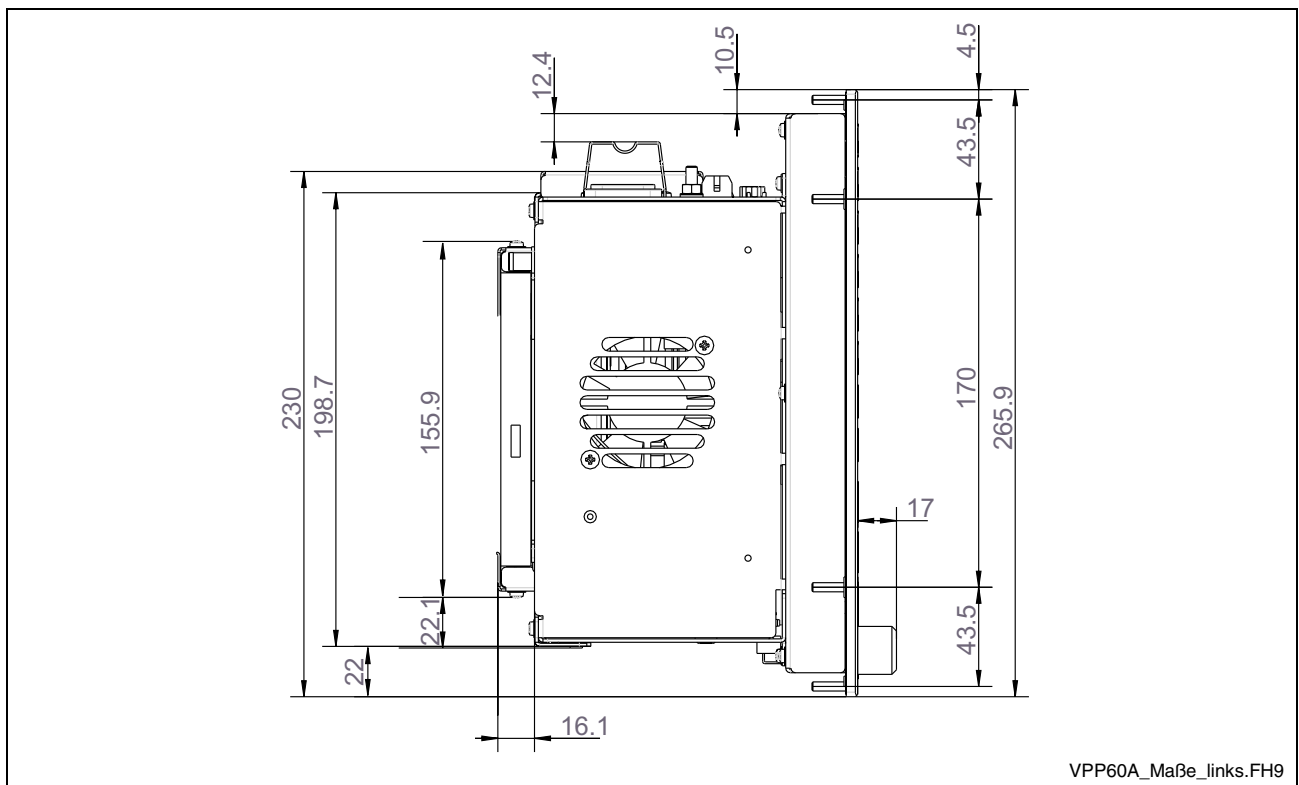


Fig. 5-20: Dimensions – VPP 60.1BLA with three slots – Left view

Views of the VPP 60.1BLC Device with Four Slots

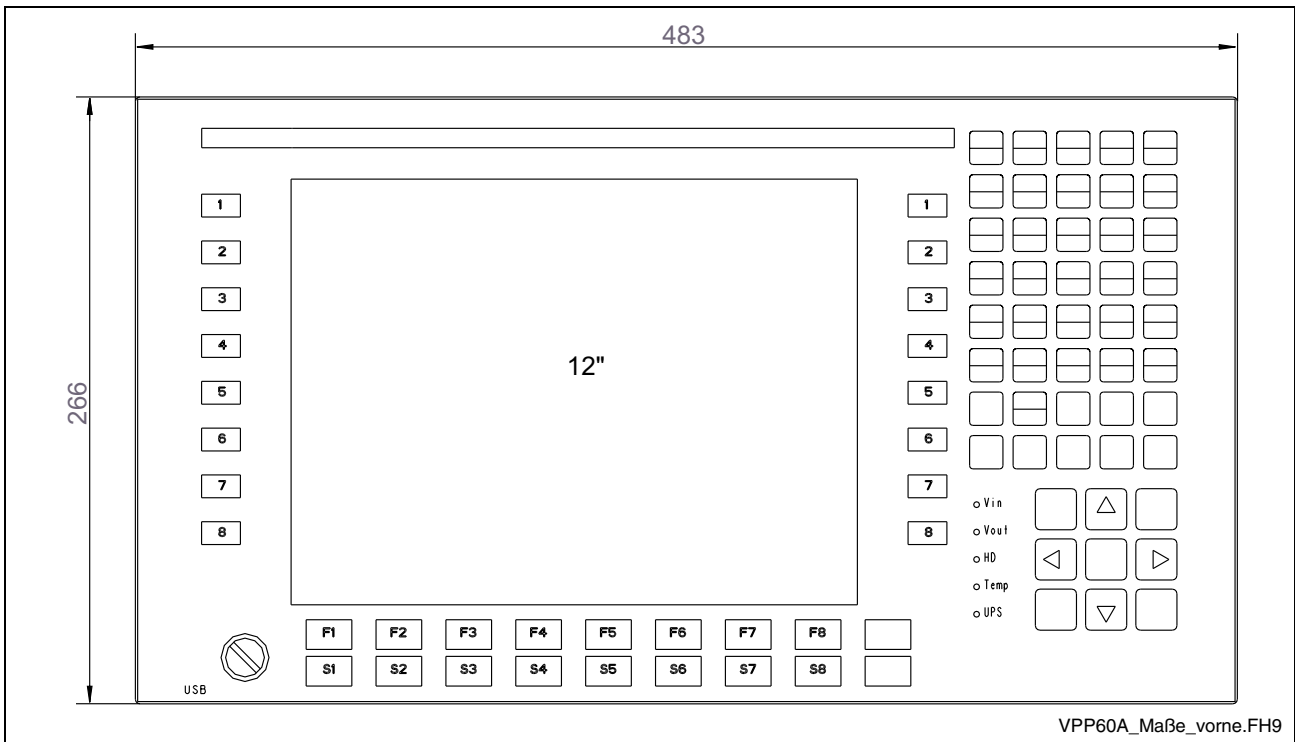


Fig. 5-21: Dimensions – Front panel of the VPP 60.1BL

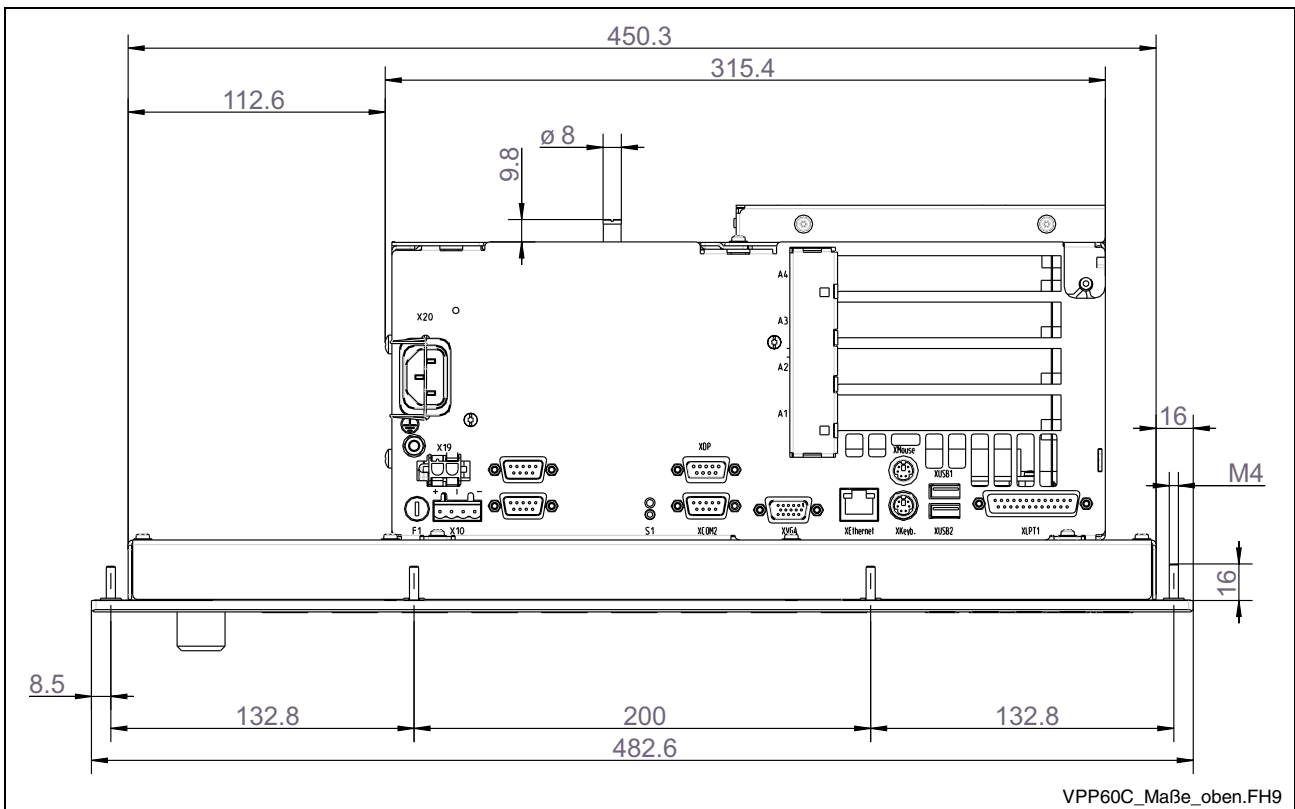


Fig. 5-22: Dimensions – VPP 60.1BLC with four slots – Top view

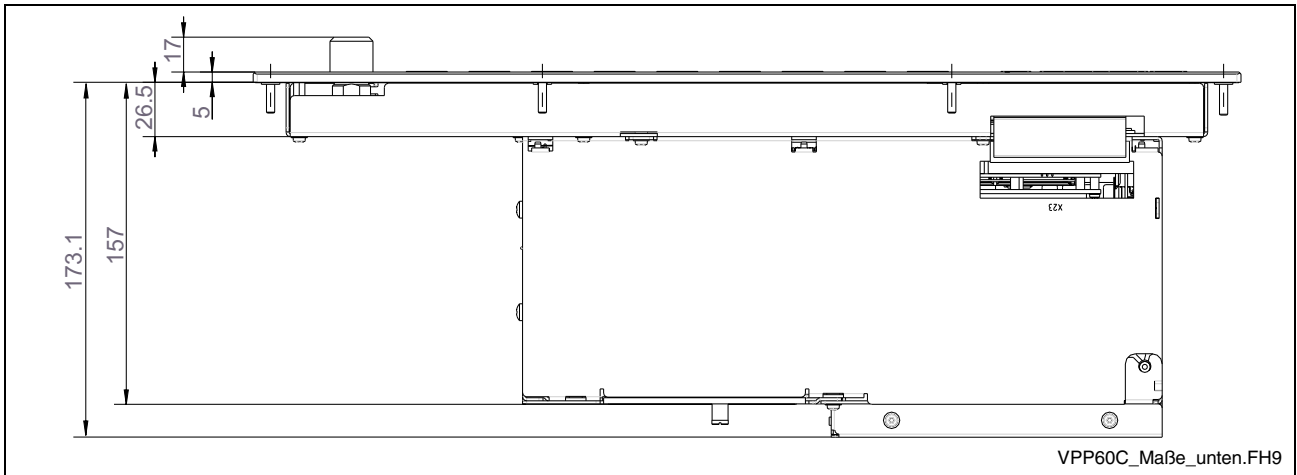


Fig. 5-23: Dimensions – VPP 60.1BLC with four slots – Bottom view

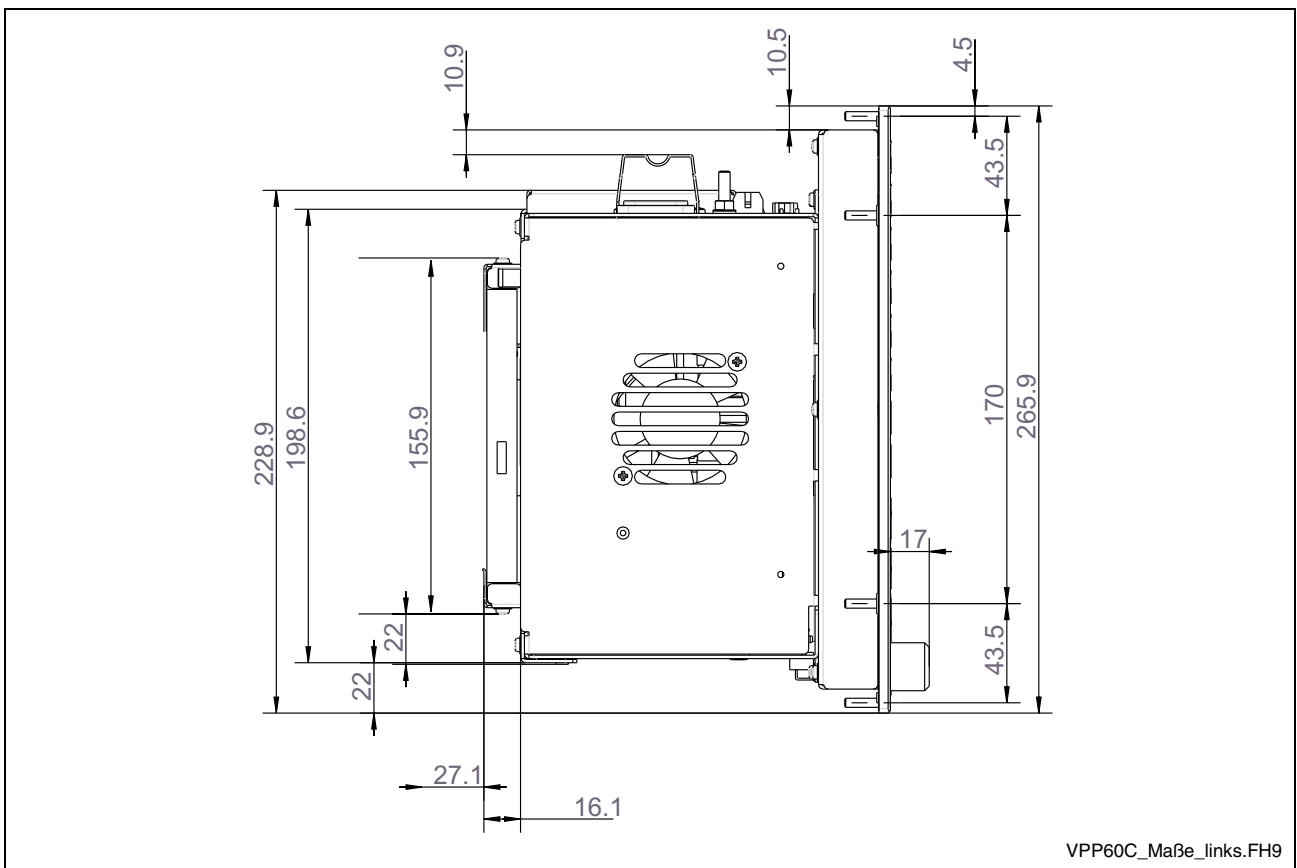


Fig. 5-24: Dimensions – VPP 60.1BLC with four slots – Left view

## 5.2 Installation

### Installation Notes

- When installing the operator terminal observe to ensure an ergonomic operation. Additionally, ensure that all moving machine components are in sight of the operator.
- Avoid installation locations exposed to direct sunlight, as the screen readability is reduced and additional heat development can occur.
- Install the operator terminal in a manner ensuring easy access to the connector panel (top side).
- Observe that the LED displays on the front panel are not obstructed.
- Provide a sufficient minimum clearance of 50 mm for cooling and cable routing around the device.
- Lay all connecting cables in loops and use strain reliefs for all cables.
- Keep a suitably large distance from sources of interference.

### Mounting Cut-Out



**DANGER**

#### Loss of degree of protection IP 65!

The front panels of the VPP devices correspond to degree of protection IP 65. To ensure that this degree of protection also remains preserved in the mounted status, you have to take appropriate measures:

- ⇒ Remove – as mentioned below – immediately before mounting the device the paper strip from the seal at the rear side of the front panel.
- ⇒ Further required measures are to be taken depending on the mounting location, e. g. the stabilization of the mounting frame.

For mounting the operator terminal proceed as follows:

1. Create a mounting cut-out with 8 holes with a diameter of 5 mm, according to the three following illustrations "Mounting dimensions".
2. Remove the paper strip from the seal at the rear side of the front panel.
3. Insert the operator terminal from the front into the cut-out. Then insert the mounting bolts M4 into the drilled holes.
4. Fasten the operator terminal by screwing the nuts at the rear side of the mounting bolts.

### Mounting Cut-Out VPP 16.1

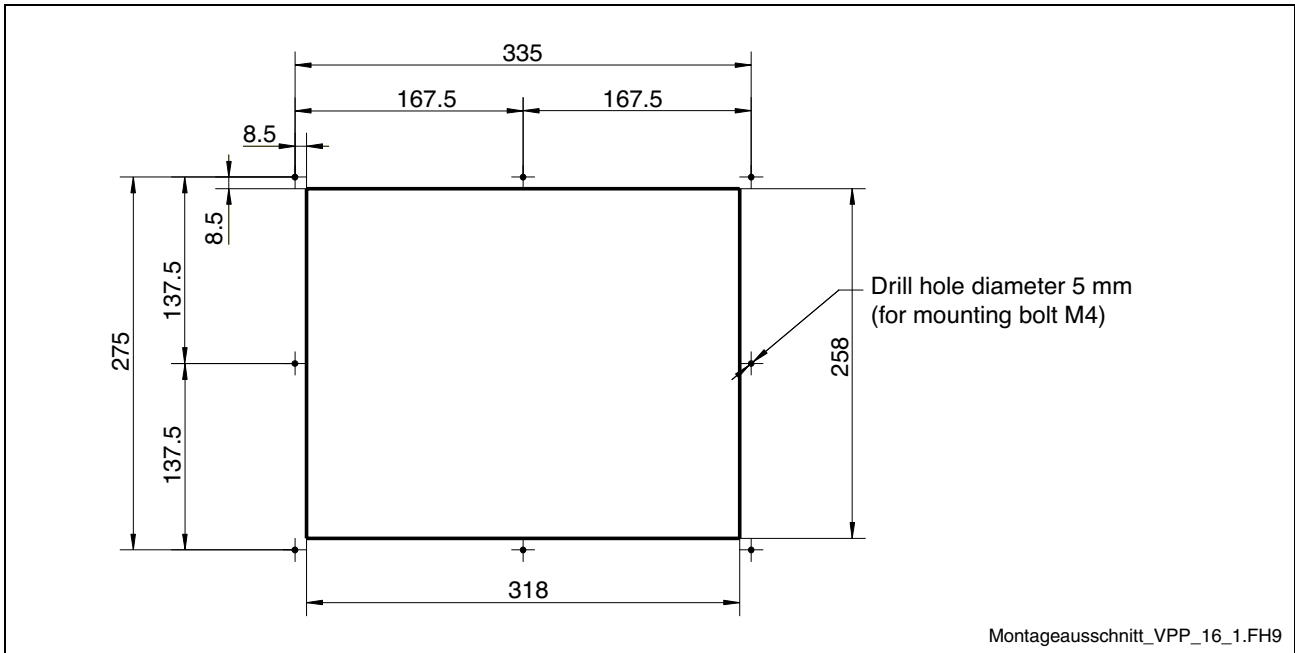


Fig. 5-25: Mounting dimensions VPP 16.1

### Mounting Cut-Out VPP 40.1

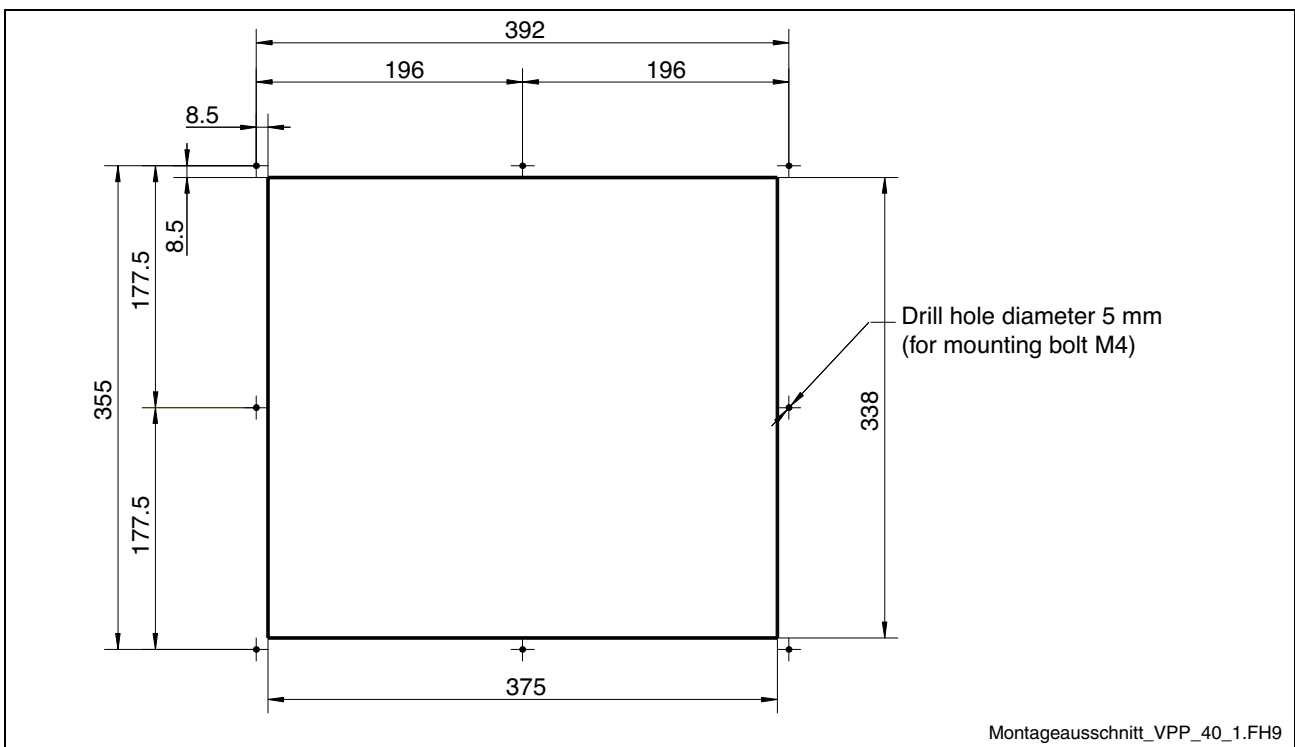


Fig. 5-26: Mounting dimensions VPP 40.1

### Mounting Cut-Out VPP 60.1

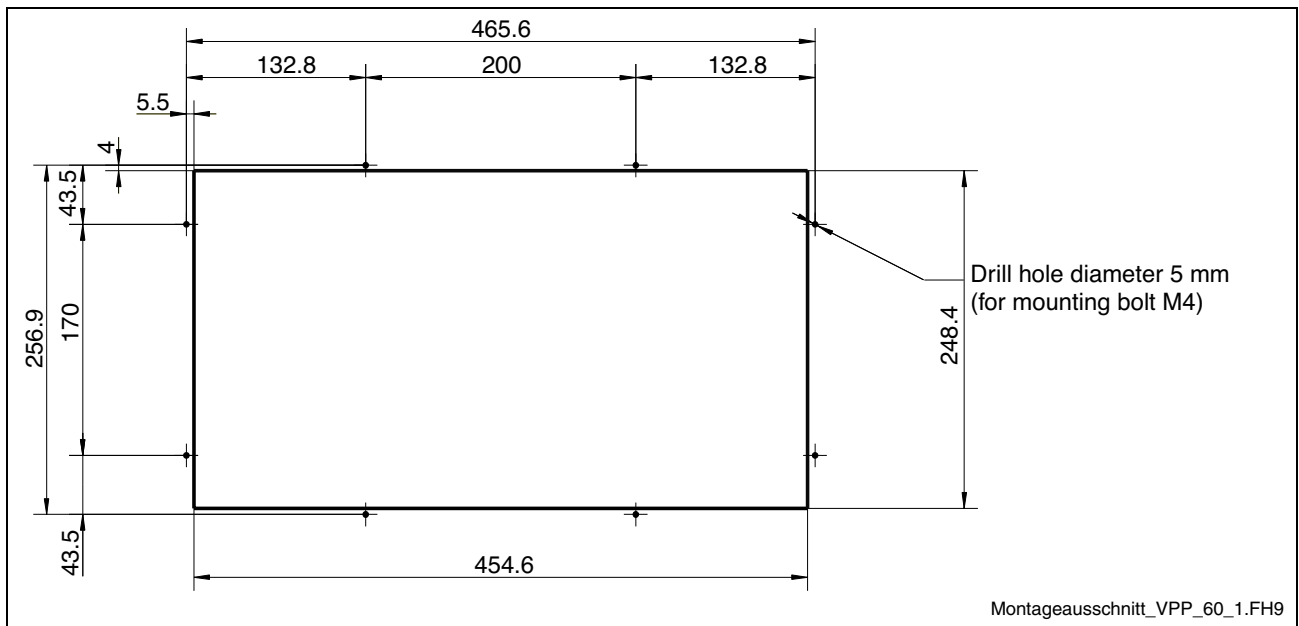


Fig. 5-27: Mounting dimensions VPP 60.1



## 6 Display and Operating Components

### 6.1 Backlight Switch-Off

The backlight as background lighting of the display has a limited lifetime (see chapter "Wear Parts" on page 4-5).

To extend the service life of the LCD backlight, the flat screen display features a backlight switch-off. This function "darkens" the display, if no operation of the operator terminal has occurred for a certain period of time. The length of the time interval can be specified in the Windows Control Panel.

#### How to activate the backlight switch-off:

1. Select the Windows Control Panel (Start -> Settings -> Control Panel):

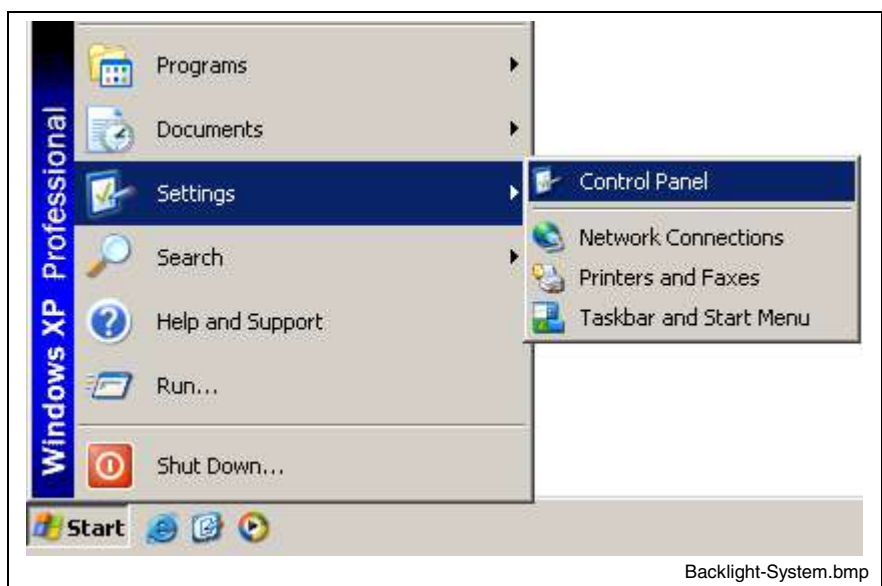


Fig. 6-1: Selecting the Control Panel

2. The "Control Panel" window opens; double-click on "Monitor".

3. The "Display Properties" window opens. Select the "Screen Saver" tab:

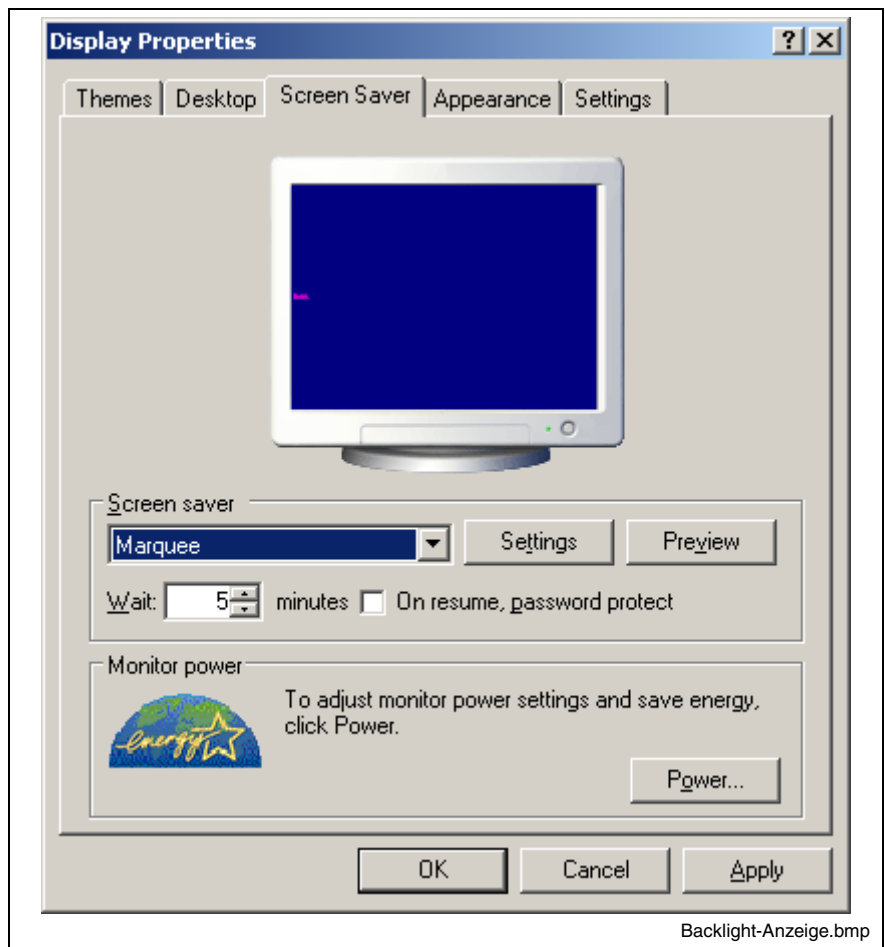


Fig. 6-2: "Screen Saver" tab

- Click on the **Install** button. The "Power Options Properties" window opens.

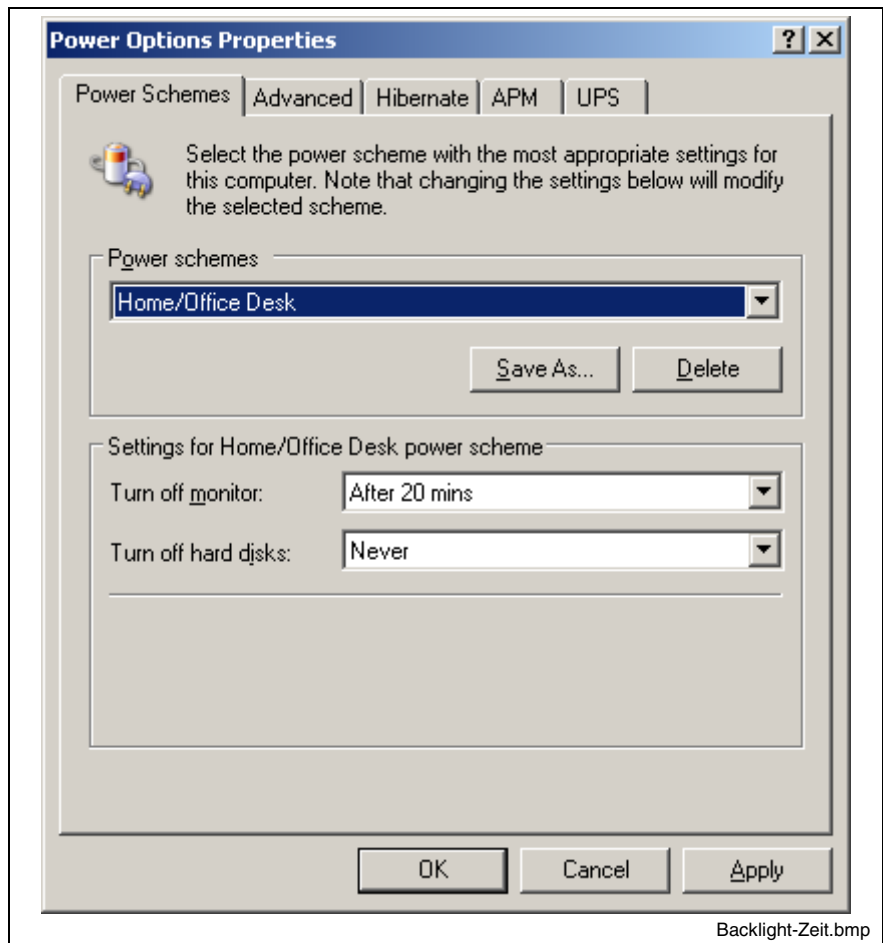


Fig. 6-3: "Power Options Properties" window

- Here you can set a time period between 1 minute and 5 hours; after the expiration of the set time the monitor and therefore the backlight switch off.

---

**Note:** If the display is "darkened" and does not react to a keyboard input or mouse movement, generally, the backlight can be reactivated by pressing the key combination "CTRL" + "Tab".

---

## 6.2 Operating and Error Indication

### Operating and Error Indication of the VPP 16.1 and VPP 40.1 Devices

In the upper right part of the front panel there are 4 illuminated symbols (see Fig. 6-6) to indicate the device states and errors. Start the measures specified in the following table, if one of the illuminated symbols indicates an error or a note.





Symbol	Display	Meaning	Measure
	LED green	Supply voltage ON	-
	LED OFF	No supply voltage 230/115 VAC or 24 VDC	Check supply voltage at the power supply unit!
	LED yellow	Hard disk access	-
	LED green	Temperature in the safe range	
	LED red flashing	Temperature > 50 °C	Reduce surrounding air temperature! Check fan at the PC!
	LED OFF	Normal mode	-
	LED red	Operator terminal is currently operating in battery mode, i. e. no power supply available!	Restore supply voltage and initiate controlled VPP restart!
	LED red flashing	Battery pack discharged, defective or not connected	Check battery pack! Maintain the charging time of 5 hours!

Fig. 6-4: Operating and error indication of the VPP 16.1 and VPP 40.1 devices

### Operating and Error Indication of the VPP 60.1 Devices

In the lower right part of the front panel there are 5 illuminated symbols (see Fig. 6-7) to indicate the device states and errors. Start the measures specified in the following table, if one of the light-emitting-diodes indicate an error or a note.

LED	Display	Meaning	Measure
Vin	LED green	Normal mode	-
	LED OFF	No supply voltage 230/115 VAC or 24 VDC	Check supply voltage at the power supply unit!
Vout	LED green	Normal mode	
	LED OFF	Internal voltages + 5 V / +12 V not available	Check supply voltage at the power supply unit!
HD	LED yellow	Hard disk access	-
Temp	LED OFF	Normal mode	
	LED red flashing	Temperature within the housing > 50 °C	Reduce surrounding air temperature! Check fan at the PC!
UPS	LED OFF	Normal mode	-
	LED red	Operator terminal is currently operating in battery mode, i. e. no power supply available!	Restore supply voltage and initiate controlled VPP restart!
	LED red flashing	Battery pack discharged, defective or not connected	Check battery pack! Maintain the charging time of 5 hours!

Fig. 6-5: LEDs to indicate operations and errors of the VPP 60.1

### 6.3 Keypad

#### System Requirements

To operate the keypad, an English or US keyboard driver is required. Therefore, don't change the corresponding manufacturer's settings.

#### Position of the Keys



Fig. 6-6: Position of the keys for VPP 16.1BK and VPP 40.1BI devices



Fig. 6-7: Position of the keys for VPP 60.1

## VPP 16.1 and VPP 40.1

### Function and Operation Keys (F... + OP...)

The assignment of the function and operation keys is determined by the respective application software / the used operating system.

### Use of an External Keyboard

Concerning the VPP 16.1BK and VPP 40.1BI keypad the key functions can also be activated with an external PC keyboard by pressing the following key combinations :

Keys of the VPP 16.1BK and VPP 40.1BI	Corresponding key of a standard keyboard
OP2	CTRL + SHIFT + ALT + F2
to	
OP9	CTRL + SHIFT + ALT + F9
PROG	CTRL + SHIFT + ALT + Q
INFO	CTRL + SHIFT + ALT + I

Fig. 6-8: Key combinations for the keys of the VPP 16.1BK and VPP 40.1BI

### M-Keys

Eight M-Keys (machine function keys) are allocated at the right and the left side of the display (see Fig. 6-6). The keys on the right side of the display are labeled with R1 to R8, the keys on the left side of the display with L1 to L8.

#### Addressing of the M-Keys

The status of the M-Keys can be retrieved by several ways:

- Pressed M-Keys are transmitted as PS/2 signals to the PC.
- The states of the M-Keys can be requested via the ISA bus.
- They can be transferred to a soft control installed on the PC via the serial interface COM3.
- At last, the signals are output at the optional plug XDP as outputs of a PROFIBUS DP slave.

**Requesting M-Keys via PS/2** The following key codes are output:

Key combinations for the keys of the VPP 16.1BK and VPP 40.1BI	Corresponding key of a standard keyboard
M-Keys, left <div style="border: 1px solid black; border-radius: 5px; padding: 2px; display: inline-block; margin: 5px;">L1</div> to <div style="border: 1px solid black; border-radius: 5px; padding: 2px; display: inline-block; margin: 5px;">L8</div>	CTRL + ALT + SHIFT LEFT + X ASCII block X: 1 ... 8 (not NUM block)
M-Keys, right <div style="border: 1px solid black; border-radius: 5px; padding: 2px; display: inline-block; margin: 5px;">R1</div> to <div style="border: 1px solid black; border-radius: 5px; padding: 2px; display: inline-block; margin: 5px;">R8</div>	CTRL + ALT + SHIFT RIGHT + X ASCII block X: 1 ... 8 (not NUM block)

Fig. 6-9: Key combinations for the keys of the VPP 16.1BK and VPP 40.1BI

**Requesting M-Keys via ISA Bus** The M-Keys can be requested via the ISA bus under address 0x142 (16 bit word access). **Pressed M-Keys have value "0"**; if the M-Keys are not pressed, they have value "1". The following assignment applies:

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
L8	L7	L6	L5	L4	L3	L2	L1	R8	R7	R6	R5	R4	R3	R2	R1

Fig. 6-10: Assignment of the M-Keys to address 0x142 of the ISA bus

**Requesting M-Keys via COM3** The states of the M-Keys can be transferred to a soft control via the serial interface COM3. For this, select the setting "Keyboard-Controller" in the **ProfiBus / Mode COM3** tab described on page 9-10. The soft control has to send a request telegram and receives as response a keyboard telegram containing all key states.

The request telegram has to consist of one byte with value 0xB2.

The keyboard telegram is send not later than 10 ms after the reception of the request telegram. **Pressed M-Keys have value "0"**; if the keys are not pressed, they have value "1". The keyboard telegram has the following structure:

Byte 3	Byte 2	Byte 1	Byte 0
CRC	Status	M-Keys right (Bit 0 = R1 to Bit 7 = R8)	M-Keys left (Bit 0 = L1 to Bit 7 = L8)

Fig. 6-11: Keyboard telegram



In byte 2 a status is transmitted with the following meaning:

Value	Meaning
0x00	No failure
0x01	Directly after Reset, during the self-test a M-Key is pressed
0x02	Incoming request telegram before the current keypad telegram is finished

Fig. 6-12: Status byte

Value 0x01 means that during the self test executed directly after the reset, a M-Key was recognized as pressed. As, however, after a reset no key is activated, thus, a defective key can be recognized.

In byte 3 a CRC is transmitted. To calculate byte 3, byte 0 is bitwise linked with byte 1 by XOR. Then, the result is bitwise linked with byte 2 by XOR. After that, this result is transferred as CRC in byte 3.

#### Output of the M-Keys via the Profibus DP

The M-Keys are output at the optionally provided connection XDP (see page 7-9) as output bits of a Profibus DP slave, so that they can be read by a connected Profibus DP master as inputs. The corresponding GSD file is stored in folder C:\SUPPORT\PROFIBUS. **Pressed M-Keys have value "1";** if the keys are not pressed, they have value "0".

Byte 1								Byte 0							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
R8	R7	R6	R5	R4	R3	R2	R1	L8	L7	L6	L5	L4	L3	L2	L1

Fig. 6-13: Assignment of the M-Keys at the Profibus DP

## VPP 60.1

### Function and Special Keys (F... + S...)

The assignment of the function and special keys is determined by the respective application software / the used operating system.

### Use of an External Keyboard

Concerning the VPP 60.1 the function and special keys can also be activated with an external keyboard by pressing the following key combinations:








Key combinations for the keys of the VPP 60.1BL	Corresponding key of a standard keyboard
Overview (binoculars) 	SHIFT + SPACE
Calling-up the basic screen (stairs) 	CTRL + HOME
Info 	SHIFT + RETURN
Function keys  to 	F1 – F8
Special keys  to 	SHIFT + F1 - SHIFT + F8

Fig. 6-14: Key combinations for the keys of the VPP 60.1BL

### M-Keys

Eight M-Keys (machine function keys) are allocated at the right and the left side of the display (see Fig. 6-7). The M-Keys on the right and the left side of the display are labeled with 1 to 8.

The M-Keys can also be activated with an external PC keyboard by pressing the following key combinations:

Key combinations for the keys of the VPP 60.1BL	Corresponding key of a standard keyboard
M-Keys, left 1 – 4 <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">1</div> to <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">4</div>	F9 – F12
M-Keys, left 5 – 8 <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">5</div> to <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">8</div>	SHIFT + F9 - SHIFT + F12
M-Keys, right 1 – 4 <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">1</div> to <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">4</div>	CTRL + F9 - CTRL + F12
M-Keys, right 5 – 8 <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">5</div> to <div style="border: 1px solid black; border-radius: 5px; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">8</div>	CTRL + SHIFT + F9 - CTRL + SHIFT + F12

Fig. 6-15: Key combinations for the keys of the VPP 60.1BL

#### Assignment and coding:

The function and special keys as well as the M-Keys are send as PS/2 signals to the PC.

#### Output of the M-Keys and Function Keys via the Profibus DP

This keys can also be issued via the optional plug XDP as outputs of a PROFIBUS DP slave.

The keys are located in the first input byte. If no key is pressed, 0x00 is output.

The output of the function keys is code 0x20 to 0x2F.

Function keys F1 – F8	0x20 - 0x27
Special keys S1 – S8	0x28 - 0x2F

Fig. 6-16: Code 0x20 to 0x2F

The output of the M-Keys is code 0x10 to 0x1F.

M-Keys, left 1 – 8	0x10 - 0x17
M-Keys, right 1 – 8	0x18 - 0x1F

Fig. 6-17: Code 0x10 to 0x1F

### Alphanumeric Block

The keys of the alphanumeric block send the default PS/2 codes to the PC.

The alpha key is locking "toggeling" and its output is no code, but only controls the keyboard controller. If the alpha key is active, the key LED flashes. Additional signs like @ and " are entered while pressing the alpha key.

The alphanumeric block works exactly like a standard PC keyboard as for the behavior of the "CTRL", "ALT" and "SHIFT" keys.

## 6.4 Touch Screen

Settings can be modified via setup programs (see chapter "Touch Screen Software" on page 9-12).

The icons available on the touch screen depend on the used application software.

## 7 PC Box

### 7.1 View on the Connector Panel

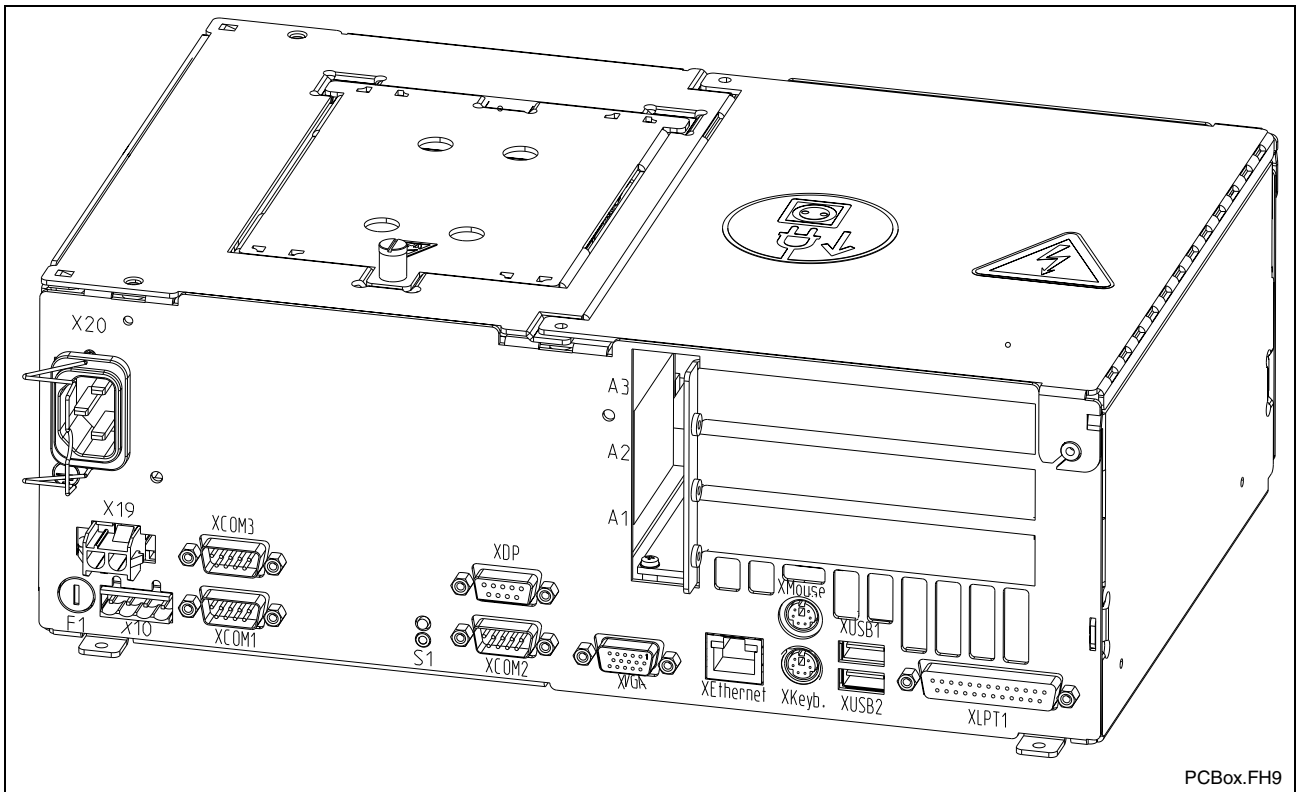


Fig. 7-1: Position of the interfaces

### 7.2 Interfaces

**Note:** Not each variant provides all the described interfaces. Which interfaces are integrated in the respective device depends on the device configuration.

**Note:** Malfunctions caused by insufficient shielding! Use only shielded cables and metallic/conductive connector or coupling covers with large-area screen contact.

## Overview

	Des. on the housing	Type of connection	Type of connector (integrated)	Mating connector or cable (from outside)
o	XCOM1, XCOM2, XCOM3	Serial interfaces: RS232 (UART 16550), not assigned	D-Sub male connector, 9-pin	D-Sub female connector, 9-pin
o	XLPT1	Parallel interface: supports standard SPP-, EPP-, ECP-mode	D-Sub female connector, 25-pin	D-Sub male connector, 25-pin (e. g. printer cable)
o	XUSB1, XUSB2	USB Interfaces	USB female connector, 4-pin, type A	USB male connector, 4-pin
o	XEthernet	Network connection: Ethernet 10Base T / 100Base X	RJ45 female connector, 8-pin	RJ45 connector (twisted pair, 8-core)
o	XVGA	VGA connection of an external CRT monitor	VGA HD female connector, 5-pin	VGA HD male connector, 15-pin
o	XKeyb.	PS/2 Keyboard/Mouse	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 male connector, 6-pin
o	XMouse	PS/2 mouse	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 male connector, 6-pin
o	XDP	DP-Bus Slave	D-Sub female connector, 9-pin	D-Sub male connector, 9-pin
o	X10	PC power supply: 24 VDC (as an alternative to X20)	Male connector terminal, MSTB 1.5, 4-pin	Female connector terminal, MSTB 1.5, 4-pin
o	X19	Battery for uninterruptible power supply	Tyco/AMP MATE-N-LOK, 2-pin	Cable to the battery of the UPS
o	X20	PC power supply: 230/115 VAC	Inlet male connector for non-heating apparatus	Inlet female connector for non-heating apparatus
c	-	M-Key (X128 on carrier board)	Male connector strip, 20-pin	
c	-	IDE Secondary hard disk (X111 on carrier board)	Male connector strip, 44-pin (on carrier board)	Female connector strip, 44-pin (IDE data for hard disk)
c	-	IDE Primary (X112 on carrier board)	Male connector strip, 40-pin (on carrier board)	Female connector strip, 40-pin (IDE data for hard disk)
c	-	IDE Primary (X113 on carrier board)	Male connector strip, 44-pin (on carrier board)	Female connector strip, 44-pin (IDE data for hard disk)
f	USB	USB interface	USB female connector, 4-pin, cap in degree of protection IP 65	USB male connector, 4-pin
c	USB	USB interface	USB female connector, 4-pin	USB male connector, 4-pin

Connection point:      o= Top side of the housing      f= Front of the operator terminal      c= On the carrier board (in the device)

Fig. 7-2: Connector types for VPP 16.1 / VPP 40.1 / VPP 60.1

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**Note:** The data of fuse F1 are described in chapter 8.7.

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## Serial Interfaces XCOM1 to XCOM3

**XCOM1 to XCOM3 – Serial Interfaces** Depending on the device variant up to three serial standard interfaces are available at the connections XCOM1 to XCOM3.

D-Sub male connector, 9-pin			
Type:	RS232		
Cable length:	Max. 15 m		
Cable type:	Shielded, cross section min. 0.14 mm <sup>2</sup>		
Transmission rate:	Max. 115200 bits/s		
Handshake:	Hardware and software handshake (XON, XOFF)		
	<b>XCOM1</b>	<b>XCOM2</b>	<b>XCOM3</b>
Interrupt (IRQ):	4	3	10
I/O address:	AUTO (or 3F8H)	AUTO (or 2F8H)	3E8H
BIOS presettings:	Enabled	Enabled	Enabled

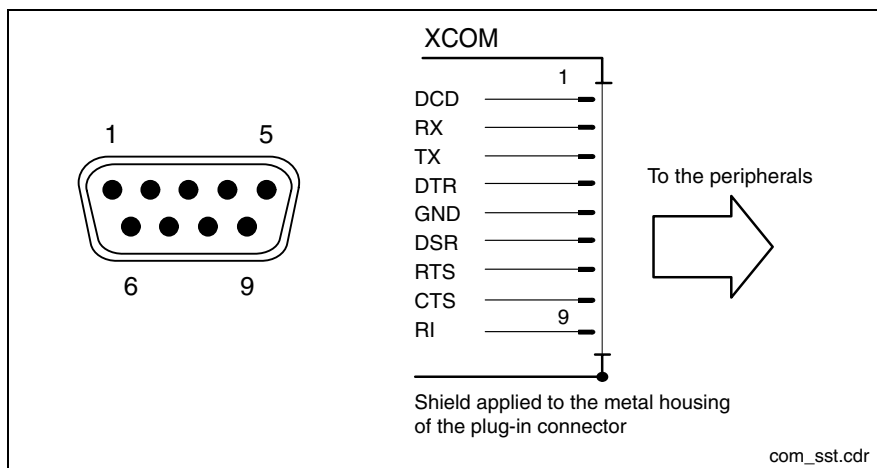


Fig. 7-3: Pin assignment XCOM1 to XCOM3

**Note:** Depending on the variant and the used software packages the interfaces can be already taken.

## Settings of the Serial Interfaces

**Control Panel** To find out settings of the transfer parameters for the serial interfaces please refer to the description of the installed operating system (for WindowsXP: select "Settings, Control Panel, ...")

**BIOS** The standard BIOS setting of the COM1 (Serial Port A) and COM2 (Serial Port B) is **AUTO** (automatic parameter assignment). If a direct parameter assignment is required, you should choose the following settings:

- COM1 = 3F8H
- COM2 = 2F8H

COM3 and COM4 are set ex works as "**Enabled**".

**Note:** Interrupt (IRQ) and I/O address must coincide with the settings made in BIOS.

If an address conflict regarding COM3 occurs, e. g., IRQ 10 or 11 are already occupied by other extension cards of the PC, free IRQs have to be used.

# Parallel Interface XLPT1

**XLPT1 – Parallel Interface for Printer, Scanner, etc.**

D-Sub female connector, 25-pin	
Type:	SPP (ex works), EPP, ECP
Cable length:	Max. 3 m
Cable type:	Shielded, cross section min. 0.14 mm <sup>2</sup>
Interrupt (IRQ):	7
I/O address:	AUTO or 378H (recommended)

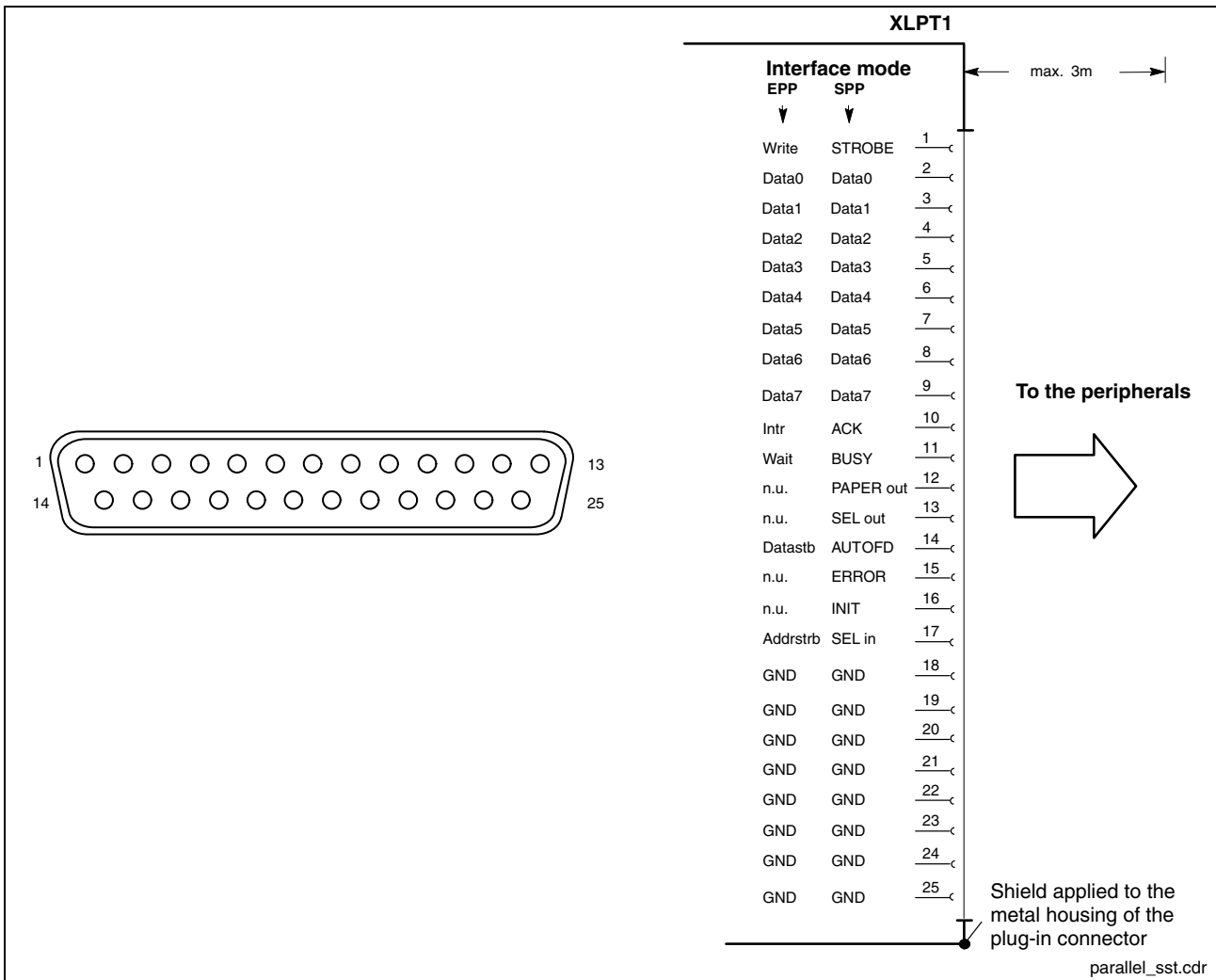


Fig. 7-4: XLPT1 interface

The parallel interface normally runs in the standard mode SPP. Furthermore, it can be operated in the EPP mode (Enhanced Parallel Port) or in the ECP mode (Extended Capabilities Port), if the suitable peripheral equipment is available. The mode can be changed in the BIOS settings.



## USB Interfaces

### XUSB – Serial Interfaces for Printer, Scanner, CD-ROM Drive

The devices feature two USB interfaces on the connector panel (XUSB1 and XUSB2), one in the device (on the carrier board) and one on the front panel (This is not the case for devices for the food industry.).

**Note:** The maximum power consumption of the connected device must not exceed 500 mA. If the load exceeds 500 mA, the internal current monitoring is activated.

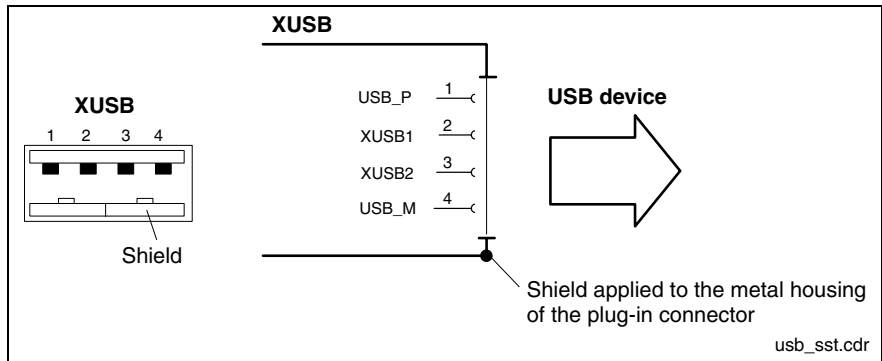


Fig. 7-5: USB interfaces XUSB1 and XUSB2

Pin	Function
1	USB power supply (max. 500 mA)
2	Data -
3	Data +
4	USB ground

## Ethernet Interface XEthernet

**XEthernet – Network connection** The operator terminal can be connected with an Ethernet network via the XEthernet interface.

RJ45 female connector, 8-pin	
Type:	Ethernet 10Base T / 100Base X
Cable length:	Max. 100 m
Cable type:	Shielded, twisted pair
Transmission rate:	10 or 100 Mbits/s

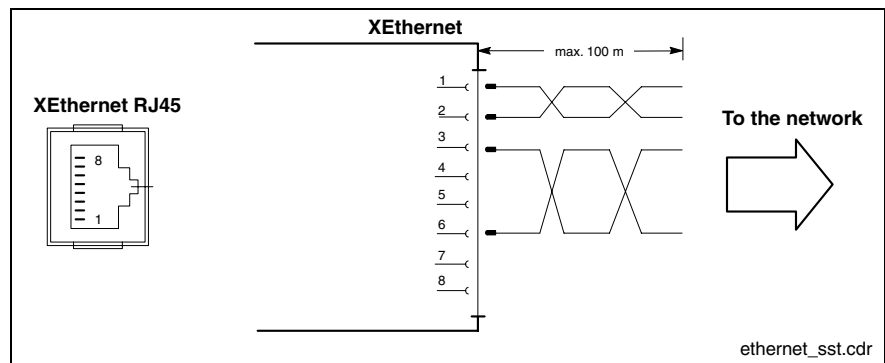


Fig. 7-6: Ethernet interface XEthernet

The driver configuration of the network connection can be called up in the task bar or in the "Control Panel" with icon "Network Board". Here you can set among other values, if the data transmission shall occur with 10 Mbits/s and/or with 100 Mbits/s.

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**Note:** Please observe that the network board of the outstation has to be able to process the same data transmission rate.

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## VGA Interface XVGA

**XVGA – Connection for an External Monitor**

An external monitor (CRT) can be connected to the VGA connection (XVGA) and can be operated parallel to the integrated flat screen via the integrated video adapter.

- Video RAM: Max. 8 MB

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**Note:** Please observe that the external monitor has to be already connected during the booting process of the operator terminal, as otherwise the VGA interface is not initialized by the BIOS.

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**Note:** Before plugging-in a graphics card the video adapter integrated in BIOS has to be switched off.

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HD female connector, 15-pin	
Cable length:	Max. 1.5 m
Cable type:	Shielded, cross section min. 0.14 mm <sup>2</sup>
Max. resolution:	1600 x 1200 pixels, max. 4294 mill. colors

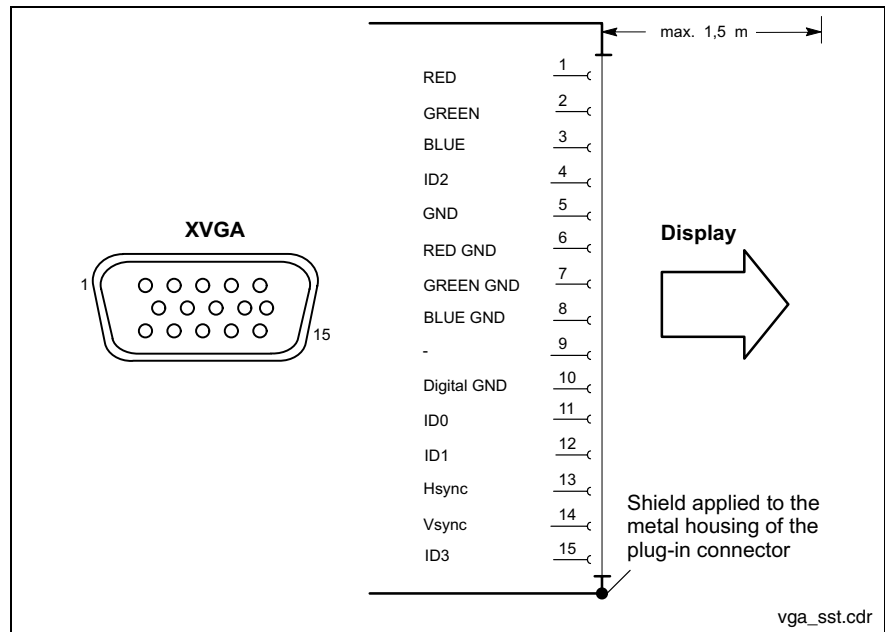


Fig. 7-7: XVGA interface

**Resolution** The following standard resolutions can be operated with an image refresh rate of min. 72 Hz.

- VGA mode: 640 x 480 pixels 32 bits colors
- SVGA mode: 800 x 600 pixels 32 bits colors
- XGA mode: 1024 x 768 pixels 32 bits colors
- SXGA mode: 1280 x 1024 pixels 24 bits colors

The resolution and number of the colors is set in the Control Panel of the operating system.



**CAUTION!**

**Setting incorrect resolutions and colors may destroy your monitor!**

⇒ Please observe the technical data of your monitor and adapt the operating system parameters accordingly.

Recommended monitors for external use are low-radiation models according to TCO95. In addition, you should achieve the desired display resolution with a refresh rate of at least 72 Hz.

## Combined Keyboard/Mouse Interface

### XKeyb. – PS/2 Mini DIN Keyboard / Mouse Interface

<b>PS/2 Mini-DIN female connector, 6-pin</b>	
Cable length:	Max. 1.5 m
Cable type:	Shielded, cross section min. 0.14 mm <sup>2</sup>

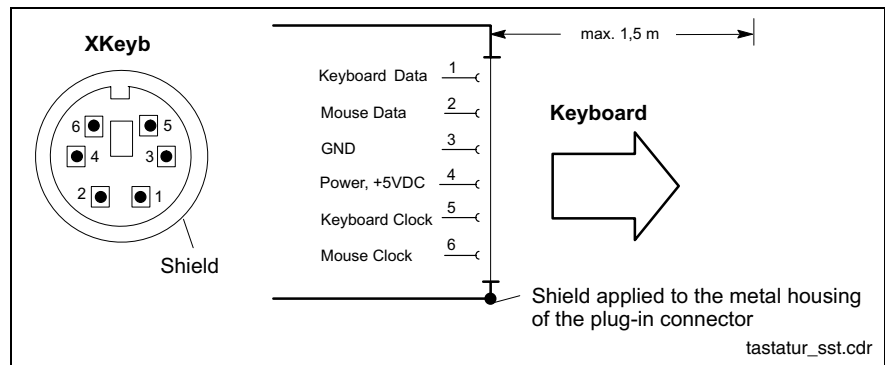


Fig. 7-8: Combined keyboard/mouse interface XKeyb.

## Mouse Interface

### XMouse – PS/2 Mouse Interface

<b>PS/2 Mini DIN female connector, 6-pin</b>	
Cable length:	Max. 1.5 m
Cable type:	Shielded, cross section min. 0.14 mm <sup>2</sup>
Interrupt (IRQ):	12
BIOS presettings:	PS/2 mouse support: Enabled PS/2 mouse: Auto detect

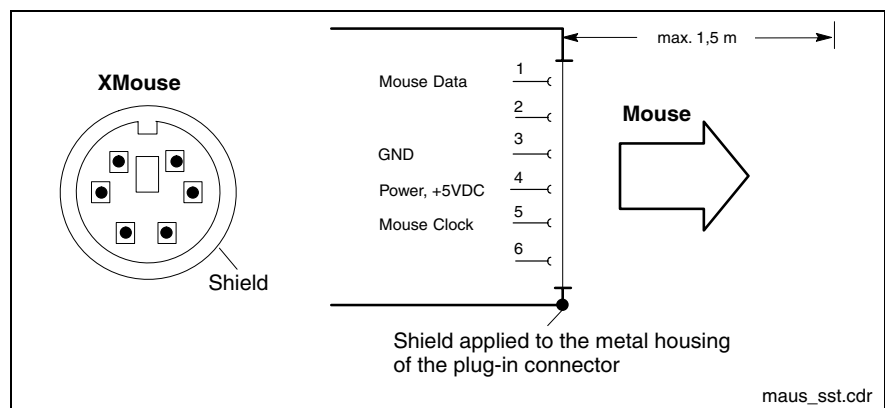


Fig. 7-9: Mouse interface XMouse

If a PS/2 mouse is not recognized by the system, the mouse has to be activated in the BIOS by switching from "Disabled" to "Autodetect". The operating system will not recognize the plugging-in of an external mouse after completed startup, because the mouse initialization occurs during the booting process.

**Note:** The connected mouse must be PS/2-compatible. Normally, the BIOS reserves IRQ 12 for the PS/2 mouse. If there are address conflicts, e. g., if IRQ 12 has already been used by another PC extension card, you should change the IRQ of this extension card to another IRQ, that is still not-assigned.

**Note:** If you use a mouse, please ensure that it is appropriate for industrial use. Most of the mice designed for the use in offices are very susceptible to electromagnetic disturbances.

## PROFIBUS DP Interface XDP

**XDP – PROFIBUS DP Interface** Optionally, the connection XDP provides a PROFIBUS DP SLAVE interface according to DIN EN 50170, Part 2. This interface allows to request the states of the M-Keys available for devices with keypad (see section M-Keys in chapter 6-3).

D-Sub female connector, 9-pin	
Type:	RS485
Cable type:	Shielded, twisted pair
Transmission rate:	10 or 100 Mbits/s

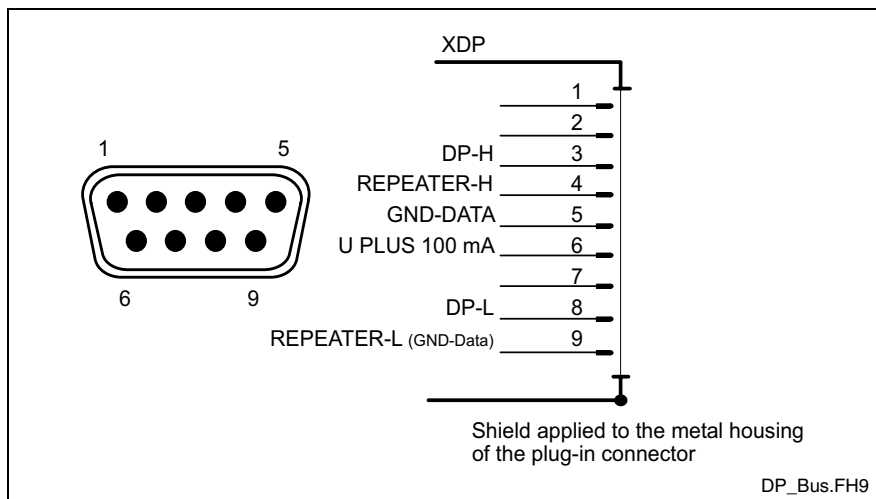


Fig. 7-10: PROFIBUS DP interface

The bus cable is specified as cable type A according to EN 50170, part 8-2. It must comply with the following cable parameters:

Surge impedance at a frequency within a range from 3 to 20 MHz	135 to 156 ohms
Operating capacity	≤ 30 pF/m
Loop resistance	≤ 110 ohms/km
Outside diameter	> 0.64 mm
Core cross-section	> 0.34 mm <sup>2</sup>

Fig. 7-11: Parameters for PROFIBUS DP line

The above mentioned cable parameters of a standard cable of cable type A result in the following length extensions of a bus segment for the particular transmission rates:

Transmission rate in kbits/s	9,6	19,2	45,45	93,75	187,5	500	1500	3000	6000	12000
Max. segment length in m	1200	1200	1200	1200	1000	400	200	100	100	100

Fig. 7-12: Maximum segment length in relation to the transmission rate

**Note:** The respective PROFIBUS slave address is set with the USP software (see page 9-10). The corresponding GSD file is C:\SUPPORT\PROFIBUS\Rx010135.gsd.

### X10 – 24-VDC Power Supply

This connection is used for device variants for 24 VDC. All internally required voltages are generated with electrical isolation via a DC/DC converter. The connection is designed as connector terminal MSTB 1.5, 4-pin. Cables with a cross section of maximum 1.5 mm<sup>2</sup> can be connected to this connector terminal.

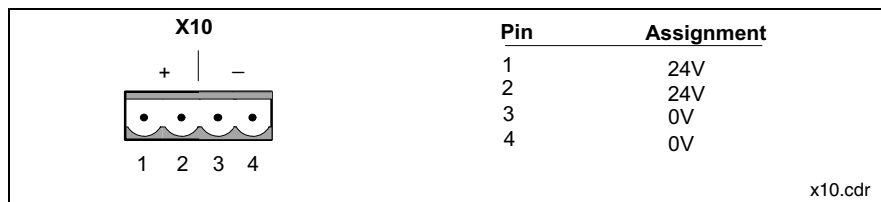


Fig. 7-13: Pin assignment of the 24 VDC connection X10

Parameters	Value
Rated voltage $U_N$	24 VDC +20 %, -15 %
Residual ripple for $U_N$	See figure below
Noise and surge immunity	$U_{max} = 35 \text{ V}$ (for $t < 100 \text{ ms}$ )
Current consumption for $U_N$	Max. 4.8 A
Line-side fuse	M6.3A (5x20), time-lag (see also chapter 8.7, Replacing Fuses)
Reverse voltage protection	Via isolating diode The line-side fuse is activated when polarity reversal occurs.

Fig. 7-14: Technical data of the 24 VDC connection



**DANGER**

**Danger without protective separation!**

- ⇒ The 24 VDC input voltage must comply with the requirements of the "Protective separation".
- ⇒ Plug and unplug the connector only in no-voltage condition!

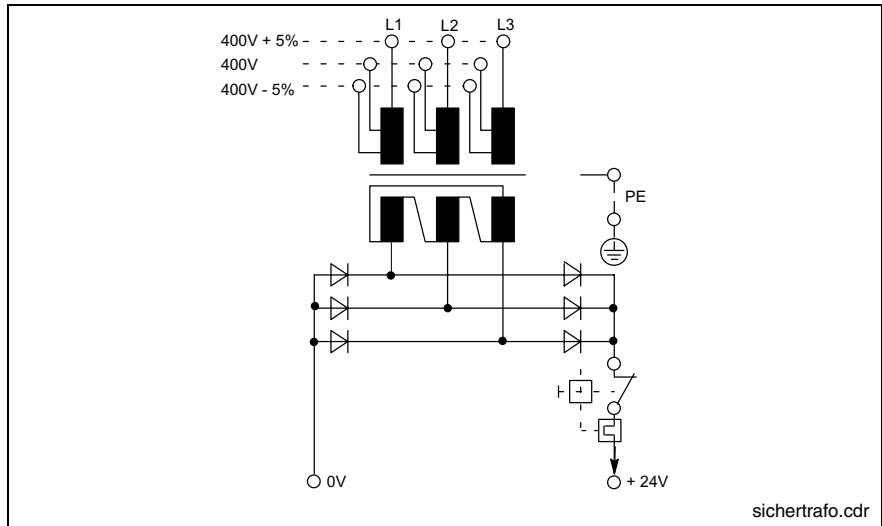


Fig. 7-15: Safety transformer according to EN 60742

Interfering AC voltage components such as resulting from an uncontrolled 3-phase current bridge connection without smoothing with a ripple factor (see DIN 40110/10.75, section 1.2) of 5 % are permissible.

It follows from the above that as upper voltage limit the greatest absolute value is 30.2 V and as lower voltage limit the lowest absolute value is 18.5 V.

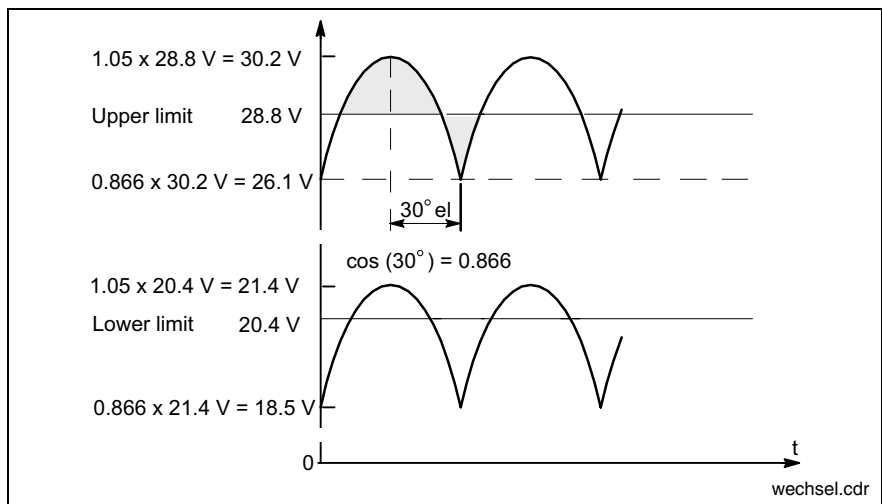


Fig. 7-16: Illustration of the limit values for the 24 VDC voltage

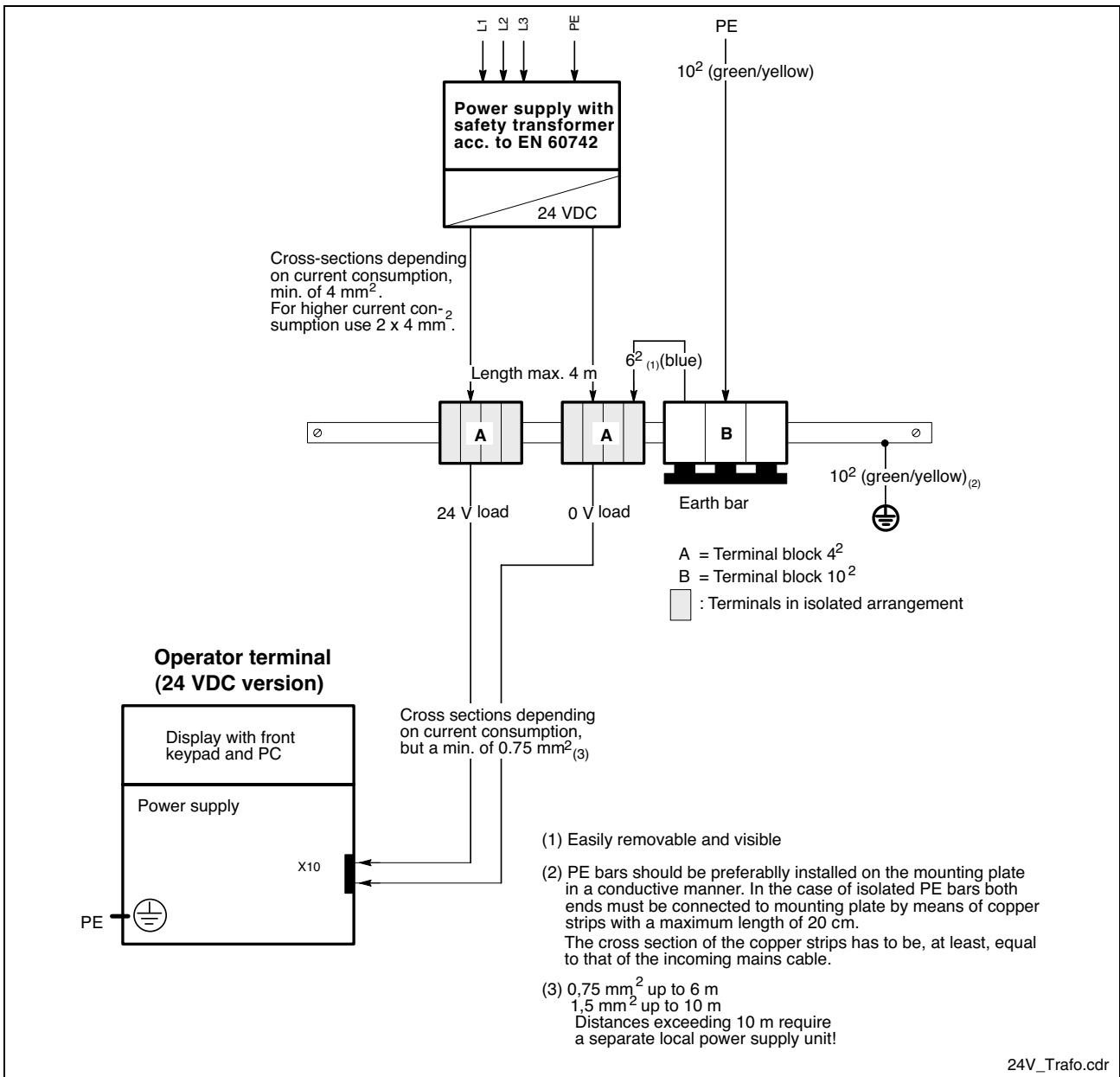


Fig. 7-17: Wiring of the power connection 24 VDC and the operator terminal



**X20 – 230/115 VAC Power Supply**

This connection is used for device variants for 230/115 VAC. All internally required voltages are generated by the 230/115 VAC power supply unit.



**CAUTION**

**The supply voltage must comply with overvoltage category II! Otherwise the integrated power supply unit might be destroyed.**

⇒ Use an isolating transformer to generate the 230/115 VAC (see following page).

The 230/115 VAC connection occurs via a 3-pin inlet connector for non-heating apparatus on the connector panel. The maximum cable cross section for the connected cables is 1.5 mm<sup>2</sup>.

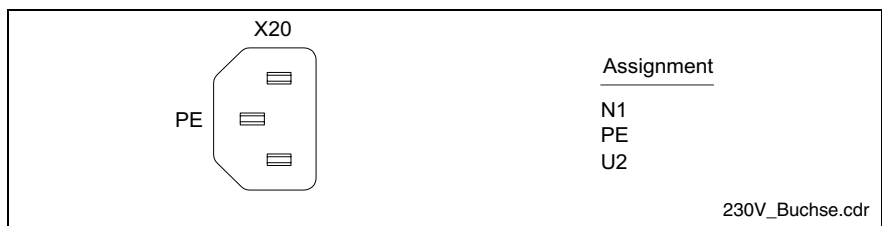


Fig. 7-18: Pin assignment of the 230/115 VAC connection X20

Parameters	Value
Rated voltage	85 VAC ... 264 VAC auto range
Power consumption for U <sub>N</sub> = 230 VAC	0.7 A
Power consumption for U <sub>N</sub> = 115 VAC	1.4 A
Inrush current for U <sub>N</sub> = 230 VAC	30 A cold start 25 °C
Inrush current for U <sub>N</sub> = 115 VAC	15 A cold start 25 °C
Line-side fuse	2 A T (5x20) (see also chapter 8.7, Replacing Fuses)

Fig. 7-19: Technical data 230/115 VAC connection

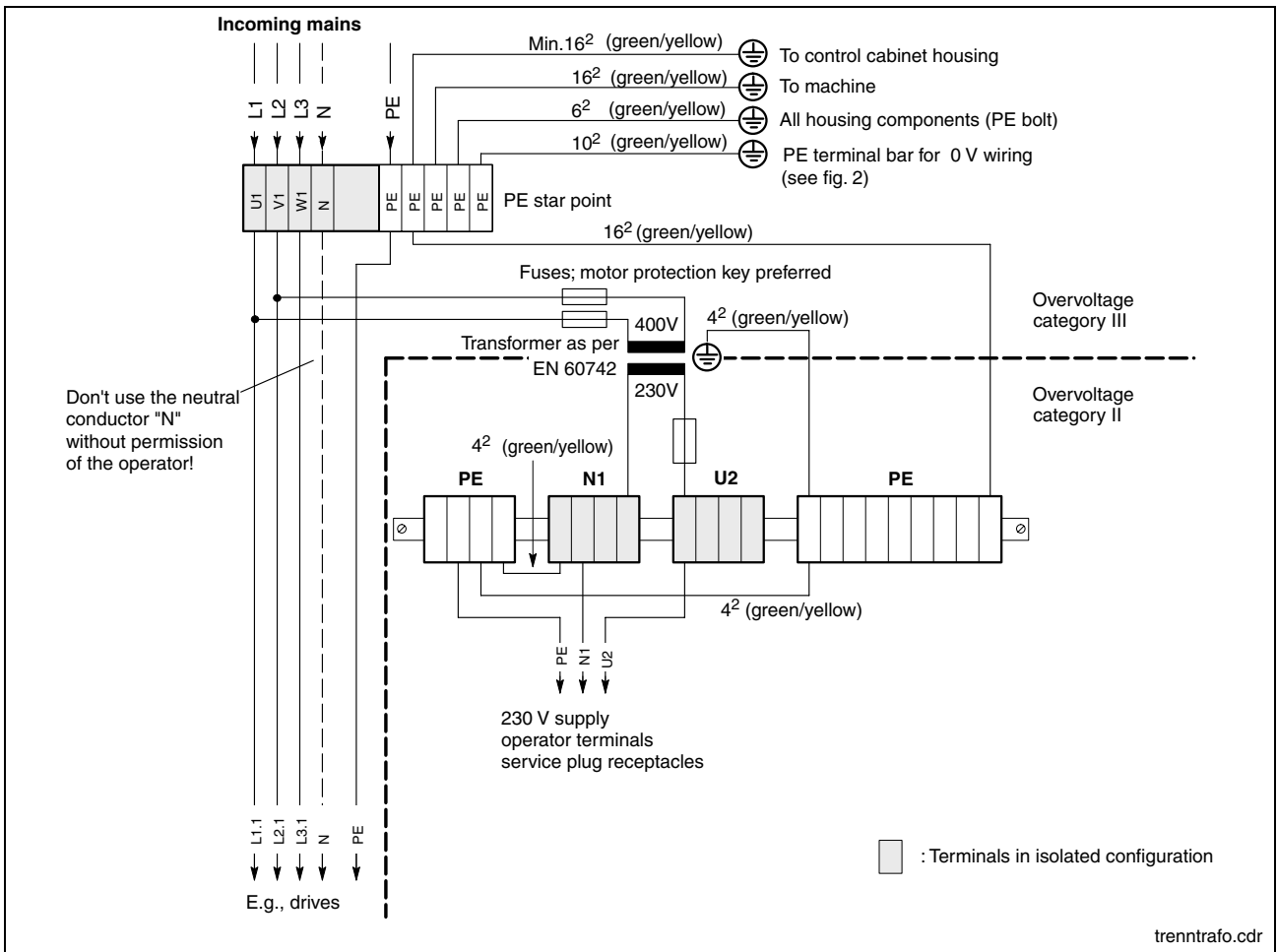


Fig. 7-20: Voltage connection 230 VAC via isolating transformer

### Battery Connection

**X19 – Battery connection**

Connection terminal for an external battery for the integrated UPS:

<b>2-pin</b>	
Cable length	Max. 3.0 m
Cable type	Unshielded, cross section 1.5 mm²

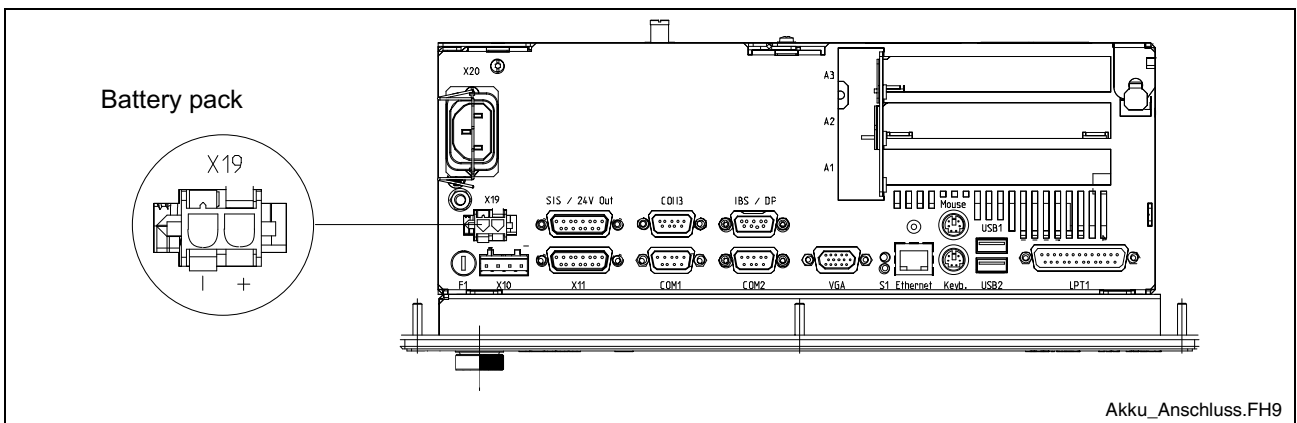


Abb. 7-21: Battery connection

## 8 Maintenance and Installation

### 8.1 Wear Parts

VPP-type operator terminals are maintenance-free. However, some components are subject to wear and must be replaced (see chapter "Wear parts" on page 4-5).

**Maintenance** Include the following measures in your maintenance schedule:

- Clean the screen surface at least once a week with an anti-static cloth or window cleaning agent containing denatured alcohol.



**Dissolution of the keypad surface and the display seal through contact with solvents!**

⇒ Do not use any solvents (e. g. paint thinner)!

**CAUTION!**

- 
- At least once a year, check all plug and terminal connections for proper tightness and damage. Check that cables are not broken or crushed. Replace damaged parts immediately.
  - Check the fan at least once a year.



**Risk of injury through rotating fan impeller!**

⇒ Keep hands and fingers clear of the fan impeller, and do not insert any items.

**DANGER**

- 
- Ensure that the batteries of the operator terminal are fully functional. Activate the battery test of the UPS program, so that the battery pack is checked during each restart.

## 8.2 Hard Disk

The installation frame of the hard disk can be accessed from the rear side of the operator terminal. The hard disk can be replaced including the installation frame.



**CAUTION!**

### Loss of data!

⇒ Back-up all required application data as well as operating system settings to an external storage medium!



**CAUTION!**

### Risk to damage the operator terminal by electrostatic discharges!

⇒ Comply with all ESD-protection measures during working with modules and components! Avoid electrostatic discharges!

**Note:** To store user data and to avoid the re-installation of the operating system and application programs after a hard disk exchange, you should back-up the well-working hard disk at regular intervals.

**Note:** The hard disk to be inserted must already have an installed operating system, if no floppy disk drive is connected to the operator terminal. In any case, it is recommended to have a completely installed operating system on the hard disk, to shorten the installation time!

1. Save all required user data as well as the operating system settings of your system on an external storage medium or via the network connection!
2. Disconnect the power supply.
3. Wait until the power supply unit switches off automatically after UPS operation (the illuminated symbol UPS on the front panel flashes red until the UPS switches off the power supply unit). If required, unplug all connectors and the battery cable at interface X19.
4. Loosen the retaining screw of the hard disk's installation frame on the rear side of the operator terminal (see Fig. 8-1). Lift the hard disk frame and after releasing the retaining spring unplug the ribbon cable, with which the hard disk is connected to the main board. Now, the installation frame with hard disk can be removed.

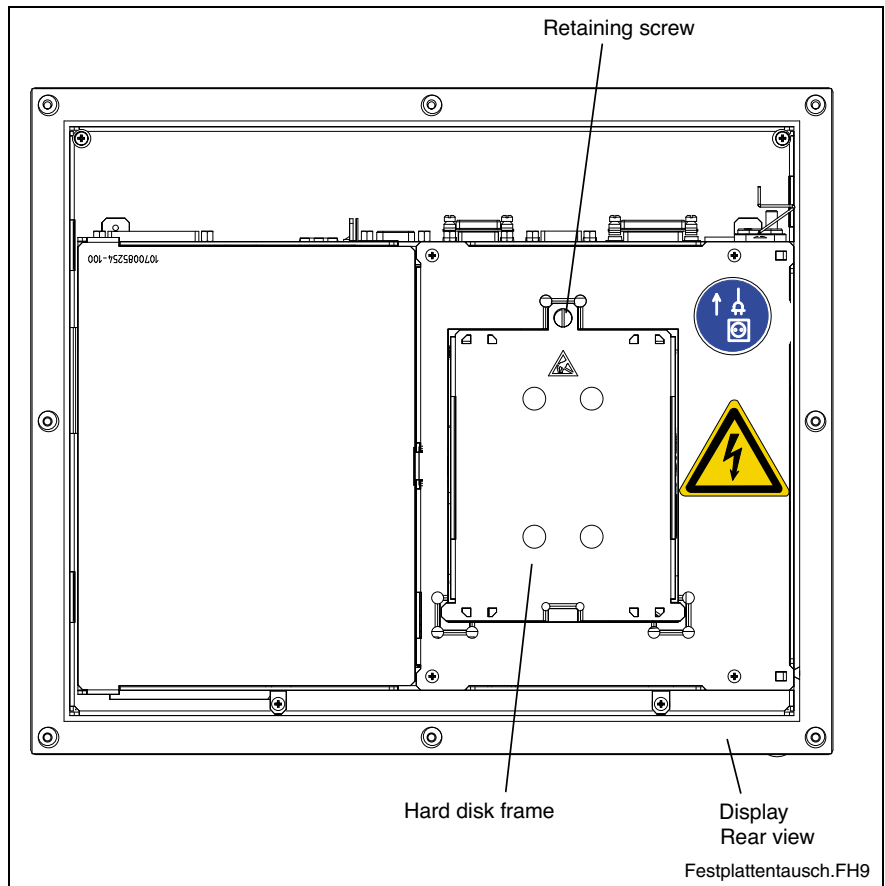


Fig. 8-1: Position of the hard disk's installation frame and the retaining screw

5. The new hard disk is delivered including the installation frame. The new hard disk is always mounted with the installation frame in reverse order as described above.

**Note:** Check the cable connections leading to the hard disk and the interface connectors for tightness and verify, if the power supply is ready for use.

6. The new hard disk parameters are automatically recognized by the system. If the operating system does not boot automatically after switching on the VPP, interrupt the power supply for at least 10 seconds and restart.
7. After properly booting the PC the user data and the operating system settings for the normal operating mode have to be restored.

## 8.3 LCD Display

A fading backlight causes a progressive deterioration of the LCD display's readability, so that a backlight exchange is necessary. For further information please contact the Bosch Rexroth Service.

## 8.4 CMOS Battery

The battery, with which RAM and clock are buffered, has a limited service life (see chapter "Wear parts" on page 4-5).

This lithium battery may not be changed by the user. The battery may only be exchanged by the Bosch Rexroth Service (see chapter 13) or by personnel specially trained and authorized by the Service.

## 8.5 Rechargeable Battery Pack

For the VPP devices an external battery pack for cabinet mounting is available.

### Battery Connection

The battery pack is connected with the 2-pin male connector strip X19 situated at the connector panel on the upper side of the PC box. For this, an unshielded cable with a cross section of at least 1.5 mm<sup>2</sup> is used. The cable length is maximum 3.0 m.

Bosch Rexroth provides ready-made cables with a length of 1.0 m and 3.0 m (see chapter "Rechargeable Battery Pack and Cables" on page 10-7).

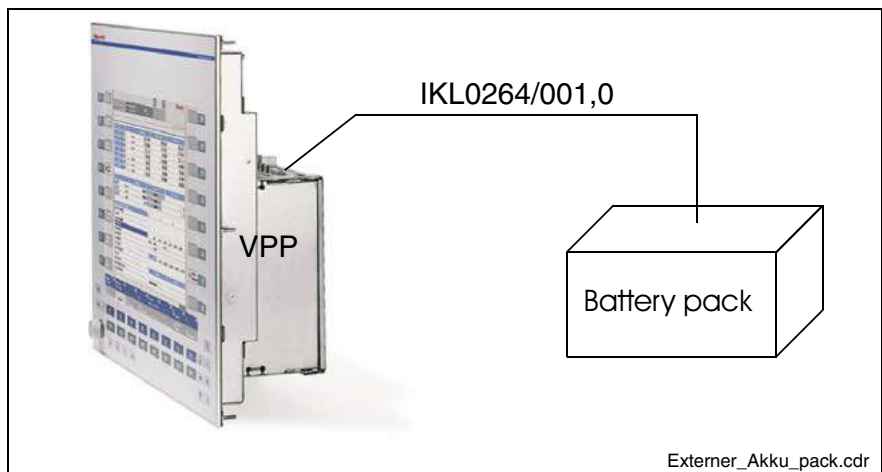


Fig. 8-2: External battery pack

To connect the external batteries proceed as follows:

1. Fix the battery pack in the control cabinet.
2. Switch off the supply voltage for the operator terminal. If required, unplug all connectors from the operator terminal.
3. Connect the 2-pin battery cable to connection X19 of the operator terminal. The original cable is reverse voltage protected.

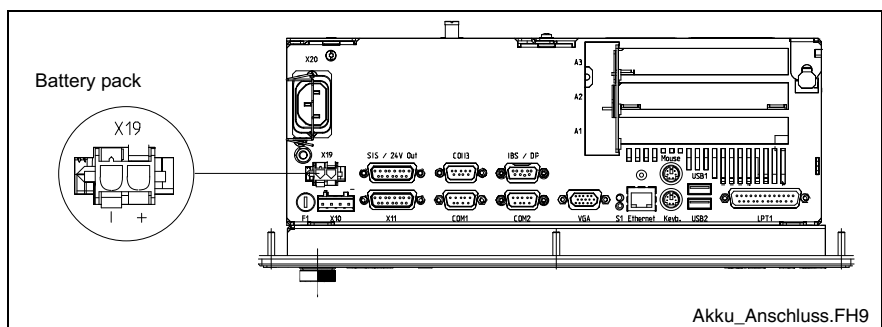


Fig. 8-3: Position and pin assignment of the battery connection

**DANGER**

⇒ Ensure that the polarity of the batteries is correct. In the case of a polarity reversal of the battery pack a F10A (5x20) fuse is released on the power supply unit (to change the fuse, please refer to 8.7).

4. Switch on the supply voltage for the operator terminal again.
5. Observe the illuminated symbol "UPS" on the front panel:
  - UPS symbol OFF: Batteries already charged
  - UPS symbol flashes red: Batteries discharged

Wait approximately 5 hours until the batteries are charged and the UPS symbol extinguishes.

**Note:** If the new battery pack is not yet charged, during the charging time there's no sufficient USP protection enabling a controlled shutdown of the PC. Therefore, use completely charged batteries, if possible. The charging time of a 2.5Ah battery is approximately 5 hours.

#### Changing the Battery Pack

The battery pack must be replaced in the following cases:

- The battery test fails during system startup.
- The number of charging cycles exceeds the value depending on the surrounding air temperature and specified in Fig. 8-4.
- The red illuminated symbol "UPS" on the front panel flashes for longer than 8 hours.

**CAUTION!**

#### Risk of data loss in the RAM during battery exchange!

⇒ Before replacing the battery backup important data, because during battery exchange a voltage breakdown might occur. Data in the RAM might be lost.

#### Charging Cycles

A charging cycle is determined by switching the PC power supply unit on and off. As long as the operator terminal is connected to the supply system, a total discharge of the battery pack is avoided.

The number of charging cycles of the battery pack and thus, its service life is dependent on the surrounding air temperature, in which the battery pack is used. Surrounding air temperature is defined as the temperature, in which the operator terminal and the battery pack are situated, e. g. the internal temperature of the control cabinet or in an operator panel housing.

The following table can be used as guideline:

Surrounding air temperature	Charging cycles	Maintenance interval
+25 °C	4000 cycles	6 years
+35 °C	2000 cycles	3 years
+45 °C	1000 cycles	1.5 years

Fig. 8-4: Number of charging cycles

**Note:** The used batteries are recyclable and can be returned to Bosch Rexroth after replacement. They must not be disposed in the standard household refuse.

## 8.6 Extension Cards

To place extensions cards slots for PCI bus and ISA bus are available. Corresponding to the PC box type according to Fig. 4-3 on page 4-2 a maximum of four PCI cards and one ISA card are possible. The maximum permissible card length is 180 mm.



**CAUTION!**

**Risk of damage to the operator terminal or the extension cards by electrostatic discharges!**

⇒ Comply with all ESD-protection measures during working with modules and components! Avoid electrostatic discharges!



**CAUTION!**

**Risk of damage to the operator terminal or corruption of application software by integrating non-released extension cards!**

⇒ Install only released extension cards, and have them installed by skilled employees.

### Inserting an Extension Card

1. Disconnect the power supply. If required, unplug all connectors from the operator terminal.
2. Wait until the power supply unit switches off automatically after UPS operation (the illuminated symbol UPS on the front panel flashes red until the UPS switches off the power supply unit).
3. Now, unplug the battery cable (interface X19).
4. Remove the housing cover at the rear side. For this, only the fastening screw at the side, at which the extension card slots are situated, has to be loosened. Then, this part of the housing cover can be removed.



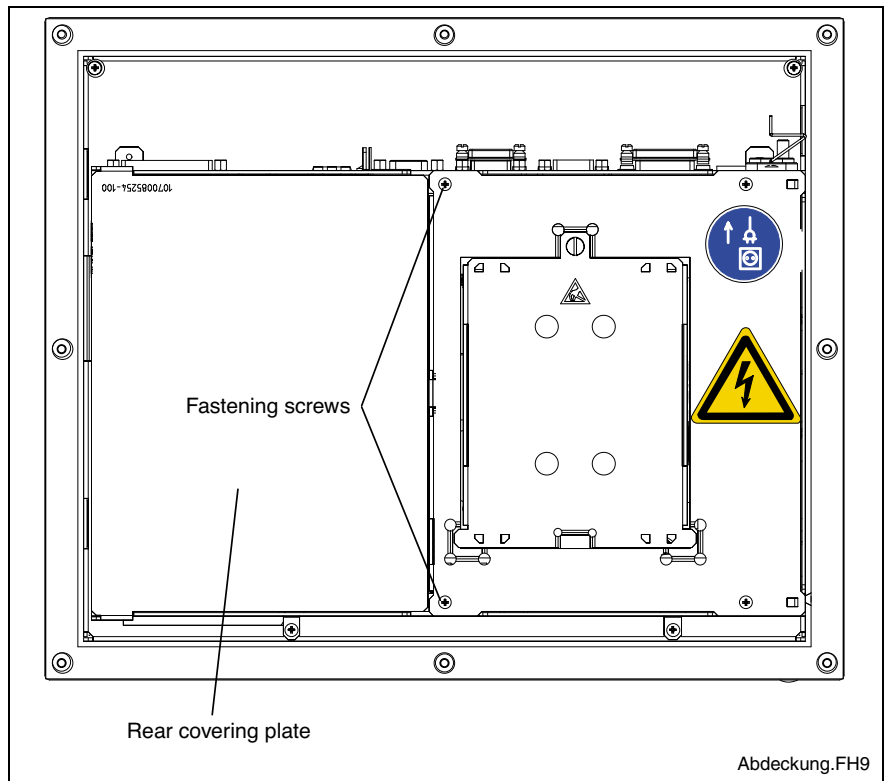


Fig. 8-5: Position of the housing cover and the fastening screw

5. The cover closing the air gap must be removed.
6. Remove the fastening screws from the slot cover.
7. Place the extension card and fix it with the fastening screw.

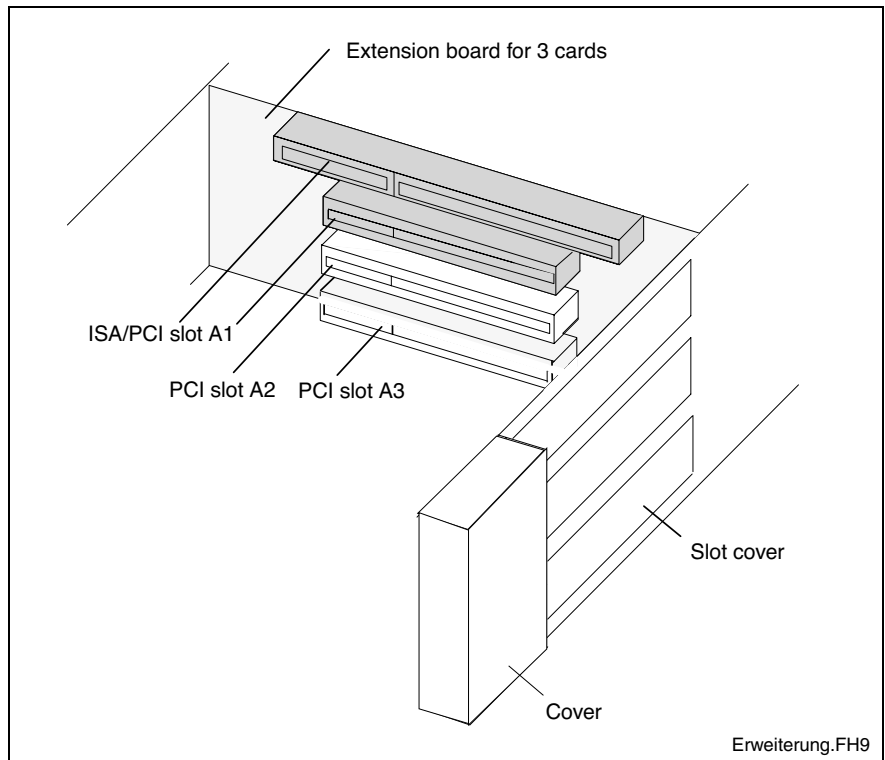


Fig. 8-6: Position of the slots for extension cards

8. Then, snap in the cover again.
9. Now, mount the slot cover.
10. Plug in the battery cable again.

**CAUTION!**
**Risk of destruction of the extension card or the main board!**

⇒ The combined PCI/ISA bus slot must never be equipped with a PCI card and an ISA card at the same time!

If the card is equipped with a Plug and Play (PnP) function, it is automatically recognized by the operating system and integrated in the system, provided that no hardware conflicts (IRQ etc.) with other extension cards or connected devices occur.

In the event that after a system reboot the functions based on the new card are not available, there may be several reasons:

- The card is not properly seated in the PCI or ISA slot.
- The driver software of the card has not been installed or its installation is faulty.
- IRQ (Interrupt) conflict with other PC hardware components.
- The software of the card has not been installed.

**CAUTION!**
**Risk of destruction of the main board or the ISA card because of address conflicts (IRQ, memory access, I/O address)!**

⇒ Observe the information provided by the card manufacturer. You may have to set new configurations in the BIOS and the operating system.

## BIOS Settings

**Note:** IRQ0-IRQ6, IRQ8-IRQ13 and IRQ15 are already assigned and are not available for PCI and ISA extension cards!

**PCI Slot** In the BIOS submenu "PnP/PCI Configurations" you can assign each PCI slot to an IRQ address. By specifying the IRQ address you specify simultaneously the priority.

If solely PnP cards are used, keep the setting "AUTO".

**Option:** Manually, Auto, IRQ: 3, 4, 5, 7, 9, 10, 11, 12, 14, 15

**Default:** AUTO

## 8.7 Replacing Fuses

Several fuses are integrated in the VPP-devices. The two following figures show their position. If a fuse has to be replaced, the new fuse must have the values specified in Fig. 8-9. Furthermore, it has to be UL-certificated.



### Lethal electric shock by live parts with more than 50 V!

⇒ Before you open the operator terminal to change the fuse disconnect the operator terminal from the power supply!



### Risk to damage the operator terminal by electrostatic discharges!

⇒ Comply with all ESD-protection measures during replacing a fuse! Avoid electrostatic discharges!



Fig. 8-7: Fuse F1 on the connector panel

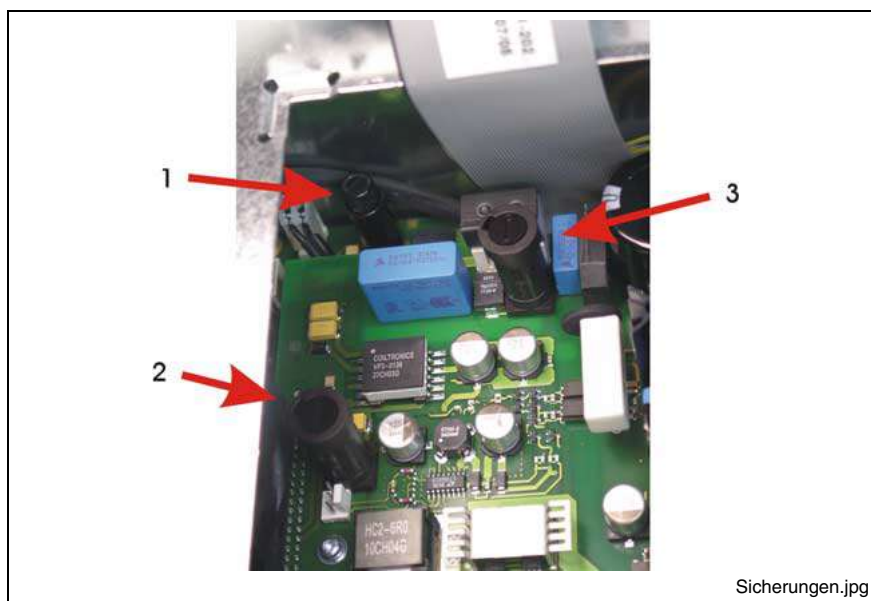


Fig. 8-8: Fuses on the power supply unit and the carrier board (under the harddisk case)

Position	Function	Values	Order number
Connector panel (F1, Fig. 8-7)	Input voltage 24 V	6.3 A, time-lag (5 x 20)	1070 922 300
Power supply board (no. 3 in Fig. 8-8)	Input voltage 230 V	2 A, time-lag (5 x 20)	1070 906 959
Carrier board (no. 1 in Fig. 8-8)	Battery minus	10 A, fast-acting (5 x 20)	1070 904 575
Carrier board (no. 2 in Fig. 8-8)	Battery plus	10 A, fast-acting (5 x 20)	1070 904 575

Fig. 8-9: Fuses


## 9 Software

### 9.1 Application Software of the Monitoring Function

#### Temperature Monitoring

The surrounding air temperature of the operator terminal must not exceed +45 °C. To ensure operational reliability, a temperature monitoring function measures the internal housing temperature.

1. For **temperatures > 50 °C** in the housing a temperature warning is indicated:

- via the red flashing symbol  on the front panel or
- via a message window displayed by the operating system.

This message must also be evaluated by all application programs, especially by I/O processes.

The temperature warning can be disabled by the program UPS<sub>NT</sub> for Windows (see section "UPS Program – Functionality, page 9-2).

2. If the temperature in the housing exceeds **65 °C**, all variants of the operator terminal will be **shut down and switched off** via the UPS logic circuit (see page 9-2).



**DANGER**

#### **Uncontrolled machine movements!**

⇒ Always ensure that temperatures remain within the non-critical range. In the case of application-sensitive procedures, ensure that machine movements are terminated in a controlled manner before the temperature monitoring function switches off the operator terminal.

---

## Uninterruptible Power Supply (UPS)

### Operating Principle

In the event of a voltage breakdown or if the temperature exceeds 65 °C (see page 9-1) the UPS logic of the operator terminal's power supply unit allows a safe operating system shutdown by means of a battery pack.

If the **voltage breakdown exceeds 20 ms**, the UPS program switches over to battery operation (provided that the battery pack is ready for operation).

---

**Note:** The UPS logic of the operator terminal's power supply unit is designed for a safe shutdown of all application programs and the operating system. It is not designed to maintain the operation over a longer voltage breakdown!

---



**DANGER**

### Uncontrolled machine movements or data loss, if the batteries are defective!

- ⇒ If there are no batteries in the unit or if the batteries are discharged, the operator terminal will start a system RESET after a voltage breakdown greater than 20 ms!
  - ⇒ Possible consequences will be uncontrolled movements or a loss of data.
- 

#### Voltage Breakdown < 800 ms

If the duration of the voltage breakdown is below 800 ms, the power supply unit switches automatically from battery operation to the normal operating mode.

#### Voltage Breakdown between 800 ms and 60 s

If the voltage breakdown is greater than 800 ms, the operation system initiates a system shutdown **after** a selectable delay time. This delay time shall be used to close all active applications by the user or by special routines.

If the supply voltage is available again within 60 seconds, the UPS interrupts the operating voltage for further 8 seconds. After that, the operating system is rebooted.

#### Voltage Breakdown > 60 s

If the interruption of the supply voltage lasts longer than 60 seconds, the UPS switches off the power supply unit.

---

**Note:** Set the delay time in the additional software "UPS<sub>NT</sub>" (see page 9-6).

---

### UPS Program – Functionality

The program "UPS<sub>NT</sub>" serves to control and monitor the integrated uninterruptible power supply (UPS). In addition, the program has the task to:

- monitor the system temperature in the device
- monitor the function of the fans
- monitor the internal operating voltages
- check the charging status of the batteries, if required
- Select the PROFIBUS address
- Setting of the COM3 interface to the keyboard controller or to XCOM3

The communication between program and UPS occurs via the serial interface COM4.

The program consists of two parts, a Control Panel Applet and the Windows NT service.

The task of the UPS program is in case of a voltage breakdown within a determinable time (delay time: maximum 60 seconds) to

- send a message to all active applications, so that they can be closed by the user or via special user routines and
- to shutdown the operating system after the expiration of the delay time.

Once the voltage monitoring is activated, it is not possible to stop the system shutdown.

Closing all active applications prevents data loss in the event of an unexpected voltage interruption. After a maximum of 60 seconds the USP switches off the PC power supply unit, if the supply voltage has not been restored (see Switch off conditions on page 9-2).

In the normal mode the user has no access to the UPS<sub>NT</sub> program. Only if the user has special access rights and after re-starting the operating system operation is possible and settings can be made.

---

**Note:** Modifications of the parameters set in the UPS<sub>NT</sub> may only be carried out after consulting Bosch Rexroth.

---

## Operation and Configuration of UPS NT

---

**Note:** To operate UPS<sub>NT</sub> administrator rights are necessary!

---

**Start/Stop** During booting Windows NT the UPS<sub>NT</sub> program is **automatically** started. If the service shall be stopped, terminated or re-started (e.g. because of a re-installation or update), select the service manager in the Windows Control Panel.

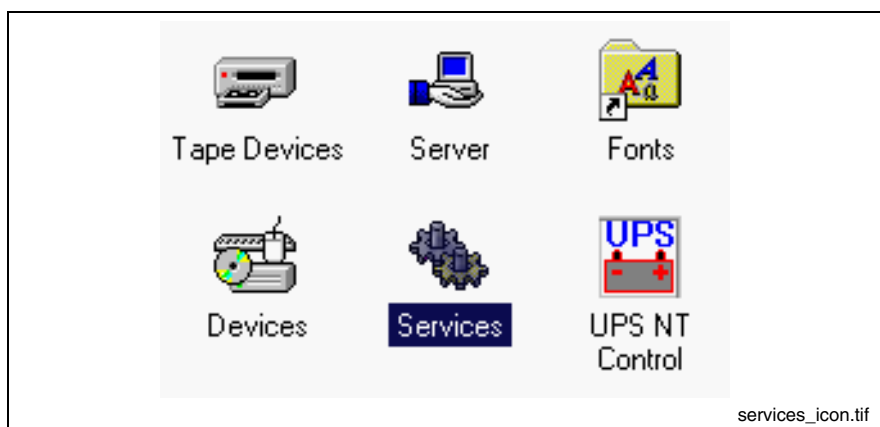
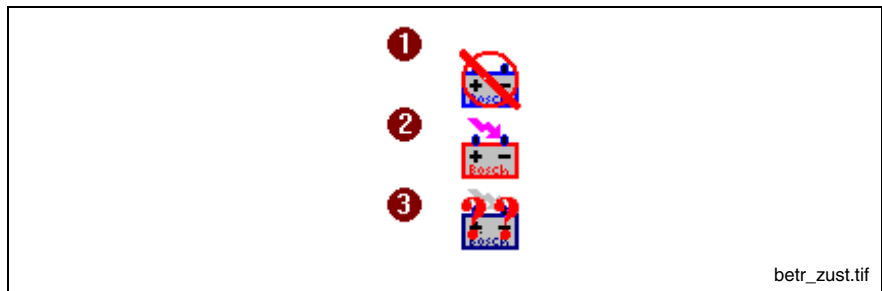


Fig. 9-1: Service manager of the Windows Control Panel

The respective operating status of the service is indicated in the Windows task bar.



Legend: 1: Service has been started, but is not ready for operation yet  
 2: Service is in operation  
 3: Service is in operation, however errors have been indicated during the start (battery, temperature, fan and voltage errors)

Fig. 9-2: Indication of the operating status of the service in the Windows task bar

In the service manager of Windows NT the status of the UPS<sub>NT</sub> service is indicated:

- UPS<sub>NT</sub> stopped: No entry in the status column
- UPS<sub>NT</sub> started: Entry "Started" in the status column

The marked entry UPS<sub>NT</sub> service is started or stopped via the **Start** or **Stop** button.

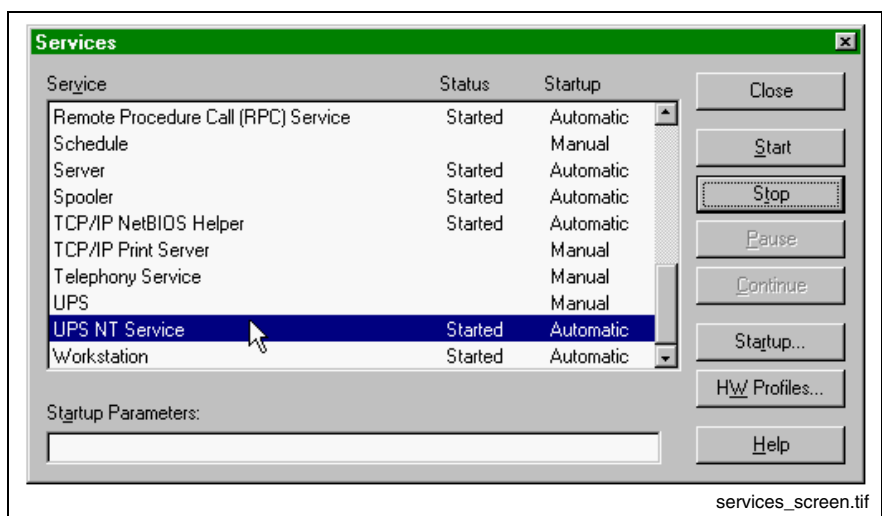


Fig. 9-3: The window "Services"



**Configuration** Select the UPS<sub>NT</sub> program **UPS NT Control** in the system control (see Fig. 9-4).

**Note:** The UPS<sub>NT</sub> program always runs as a Windows NT service. User changes have no influence on this behavior. The user can not terminate the program without administration rights or stop the monitoring.

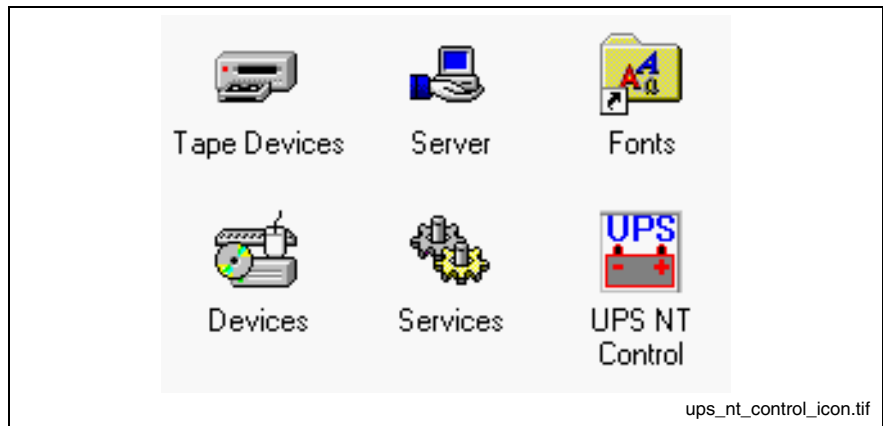


Fig. 9-4: Symbol "UPS NT Control" in the Windows Control Panel

**USV Properties and Maintenance** After selecting symbol **UPS NT Control**, the window **USV Properties and Maintenance** appears.

The window offers the following tabs, in which further settings can be made.

- **UPS General** tab
- **System Health** tab
- **Profi Bus /Mode COM3** tab
- **About** tab

**UPS General** After calling up **UPS Properties and Maintenance**, first, the **UPS General** tab is active, with which the basic settings of the starting and run time behavior of the UPS are specified.

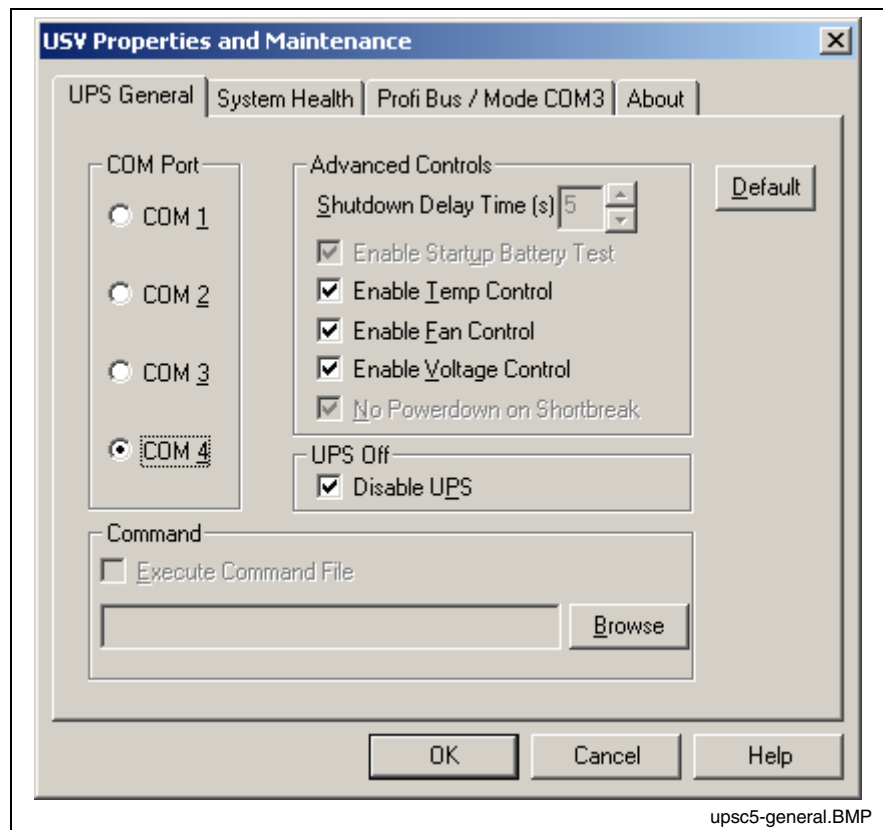


Fig. 9-5: "UPS General" tab

**Note:** To activate parameter modifications the UPS program is automatically stopped and re-started. During this time (5...10 sec) no monitoring takes place.

**COM Port:** At this place, the serial communication interface is selected, to which the UPS is connected. If in BIOS one or more serial interfaces are deactivated, the remaining interfaces of Windows NT are re-numbered. Therefore, a new interface must be selected in the configuration dialog under COM port. If no interface is found during the starting process of the service, a corresponding dialog is opened and the service is terminated.

In the **Advanced Controls** zone the following settings are possible:

**Shutdown Delay Time:** Here, a delay time for the shutdown from 0...45 s is determined. This is the time the user has to back up his data. After the expiration of the delay time all application programs are terminated without safety prompt.

When you determine the **Shutdown Delay Time**, observe that between the end of the **Shutdown Delay Time** and the expiration of the 60 seconds after the power down signal remains enough time to shut down the operating system (for closing the Windows system files and generating backups). If the time is too short, the shutdown process is interrupted, because the UPS interrupts the voltage of the power supply unit. This can cause a loss of data.

---

**Note:** After the expiration of the **Shutdown Delay Time** the operating system is shut down without safety prompt. Data of opened application programs without backup are then lost.

---

**Enable Startup Battery Test:** If the check box is activated, a test of the battery pack is carried out after each restart of the system. In error case an error dialog is generated and a message is sent to the whole system. The UPS program is still running.

After 12 hours the battery test is automatically repeated:

- If errors don't occur any longer, the battery test is automatically repeated every 12 hours.
- If an error occurs, an error dialog is generated, a message is sent to the whole system and the UPS program is terminated.

**Enable Temp Control:** If this check box is activated a continuous monitoring of the surrounding air temperature takes place. If +50 °C are exceeded, a warning window and the corresponding symbol (see Fig. 6-4 on page 6-4) at the front side of the device flashes red. The temperature warning can be deactivated.

For temperatures greater than +65 °C the system is always shut down and switched off via the UPS logic.

The voltage monitoring is still active after a temperature warning.

**Enable Fan Control:** If this check box is activated, the existing housing and CPU fans are monitored. In error case a corresponding message is indicated and sent to the whole system.

**Enable Voltage Control:** If the check box is activated, the internal supply voltages are monitored. In error case a corresponding message is indicated and sent to the whole system.

**No Powerdown on Shortbreak:** If the check box is activated, interruptions of the supply voltage up to 5 sec are permissible and do not influence the operation. Only for voltage breakdowns greater than 5 sec the UPS logic is started and the shutdown of the system is introduced.

**UPS Off, Disable UPS:** The function **UPS Off, Disable UPS** deactivates the UPS monitoring and the delay, when the power supply unit is switched off:

- If a voltage breakdown occurs, the PC switches immediately off.
- After a conventional shutdown of the system, there's no waiting time of approximately 60 sec until the power supply unit switches off.

This function shortens the waiting time during commissioning and software installation. However, this check box must not be activated in the normal mode.

---



**CAUTION**

**Loss of data!**

⇒ If this check box is activated, a proper system shutdown is no longer possible during a voltage breakdown. The device switches off immediately!

---

In the **Command** area an executable program (\*.exe; \*.bat) can be entered or activated, that shall still be started and carried out after the initialization of the shutdown. This is always reasonable, if applications which do not respond to the system messages, have to be backed up or stopped. For this, corresponding clearing and terminating programs can be entered and activated. If several programs have to be executed or if the programs have transfer parameters, they have to be combined and entered in a batchfile.

---

**Note:** The entry must not contain any request parameters and the specified program must not start any shutdown!

---

If you activate the **Default** button, all settings are reset to their **standard values**.

These are:

- COM Port: COM4
- Shutdown Delay Time: 30 sec
- Enable Startup Battery Test: active
- Enable Temp Control: active
- Enable Fan Control: active
- Enable Voltage Control: active
- Disable UPS: inactive
- No Powerdown on Shortbreak: active
- Execute Command File: inactive

**System Health** This tab indicates the current measured values of the internal operating voltages, the battery voltage, the system temperature and the status of the fan function.

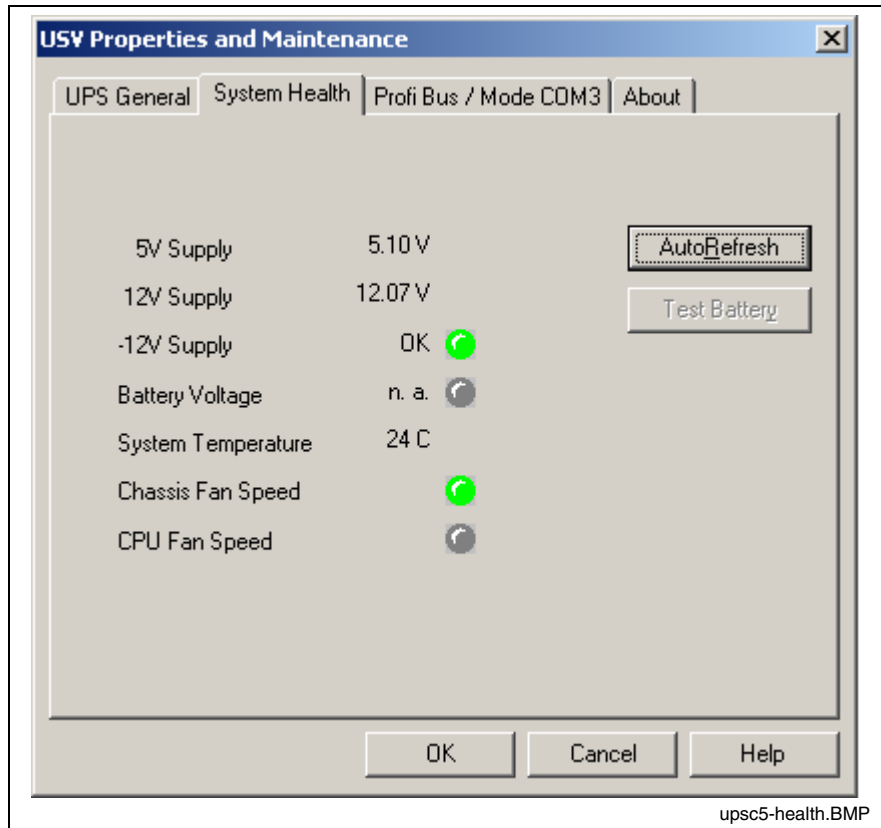


Fig. 9-6: "System Health" tab

The value of the battery voltage (**Battery Voltage**) is only updated after a battery test. The battery test occurs automatically after a system start and then every 12 hours or after pressing the **Test Battery** button.

- The LED flashes red, if the value of the battery voltage measured on load is too low.
- The LED flashes green, if the battery pack is ready for operation.

**Note:** Excessive battery tests will discharge the battery pack. Never perform more than five battery tests within a period of 24 hours.

The following applies to the fan monitoring (**Fan Speed**):

- Red LED: Fan stands still, or fan speed is too low or too high.
- Green LED: Fan is working properly.

Pressing the **StopAutoRefresh** button disables the automatic updating of the measured values and the labeling on the button changes to **AutoRefresh**.

Pressing the **AutoRefresh** button disables the automatic updating of the measured values and the labeling on the button changes to **StopAutoRefresh**.

**PROFIBUS and Further Settings**

The **ProfiBus/Mode COM3** tab is divided into two segments:

- Select the PROFIBUS address
- Selection, if the COM3 interface is provided as serial interface at the XCOM3 plug or is internally connected with the keyboard controller.

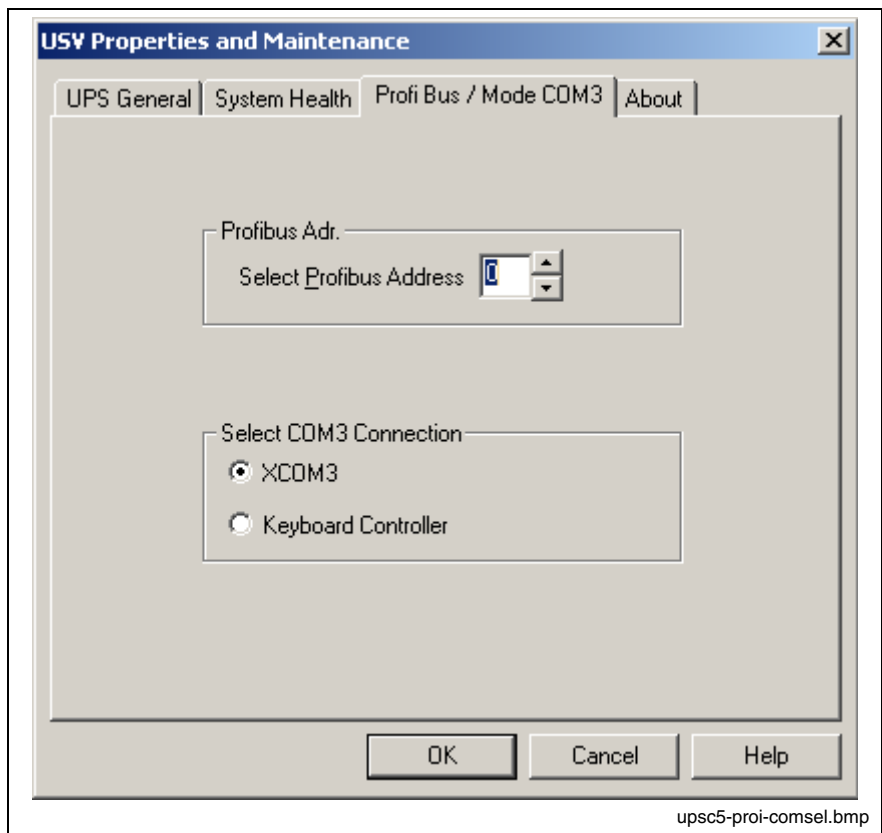


Fig. 9-7: "Profi Bus /Mode COM3" tab

Select COM3 connection	
XCOM3	COM3 is accessible at connection XCOM3
Keyboard Controller	COM3 is internally connected with the Keyboard Controller to - request the status of the M-Keys via the serial interface (see section M-Keys in chapter 6) or - reload firmware into the Keyboard Controller

Fig. 9-8: Select COM3 connection

**Note:** The following applies to all settings: The UPS service is stopped. All changes will only be effective, when the PC is restarted (switch off and switch on the supply voltage again).

**About** The **Shutdown Count** value indicated in the **About** tab indicates, how often the UPS has already shut down the system. A battery change is recommended after more than 3000 trips by the UPS, but not later than the recommended maintenance interval (see sections 4-7 and 8-5).

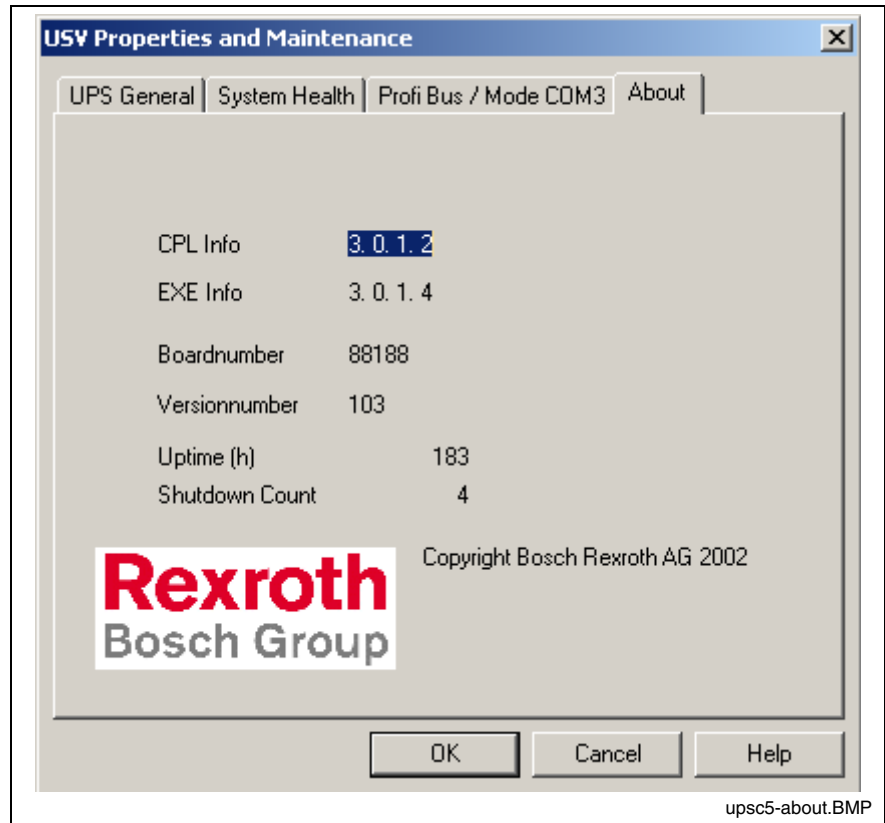


Fig. 9-9: "About" tab

## 9.2 Touch Screen Software

For the VPP 16.1DB as well as VPP 40.1DE and VPP 40.1DG devices a touch screen is used, that allows the operation via the touch-sensitive surface of the display.

To ensure the communication of the touch screen controller with the PC, the serial interface COM2 is used. Therefore, concerning devices with touch screen the COM2 interface is not situated on the connector panel.

The required driver software is already installed ex works. Changes are possible in the application "Pointer Devices" in the Windows Control Panel. You can reach the same setup program via "Start -> Programs -> UPDD -> Settings".

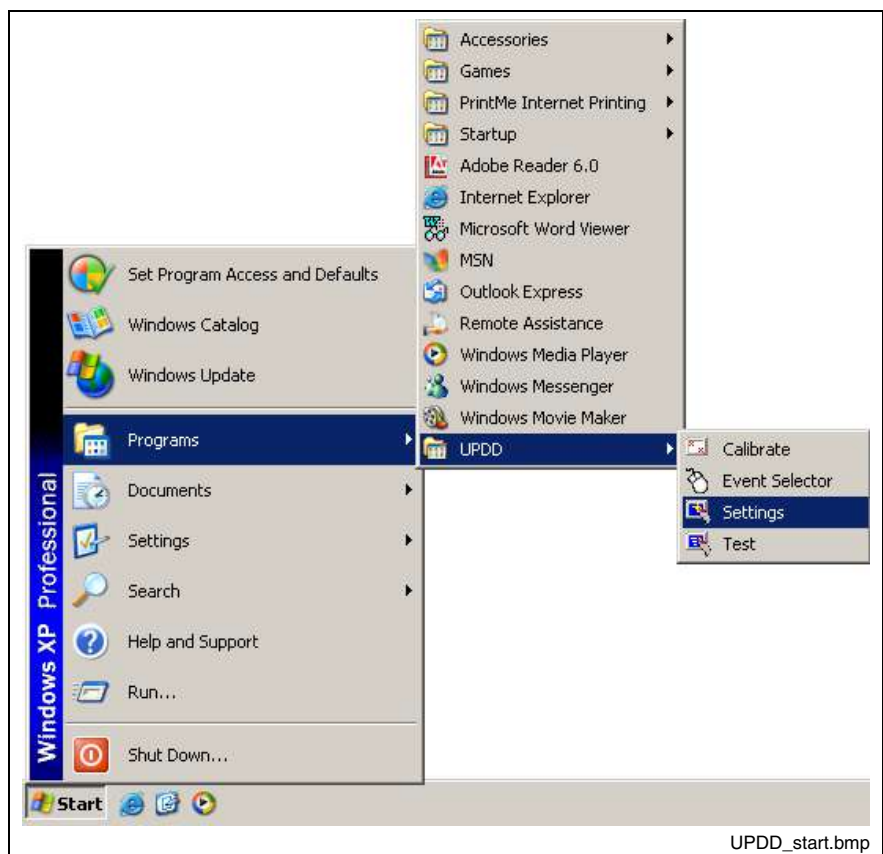


Fig. 9-10: UPDD setup programs for the touch screen



A dialog window appears for the different settings:

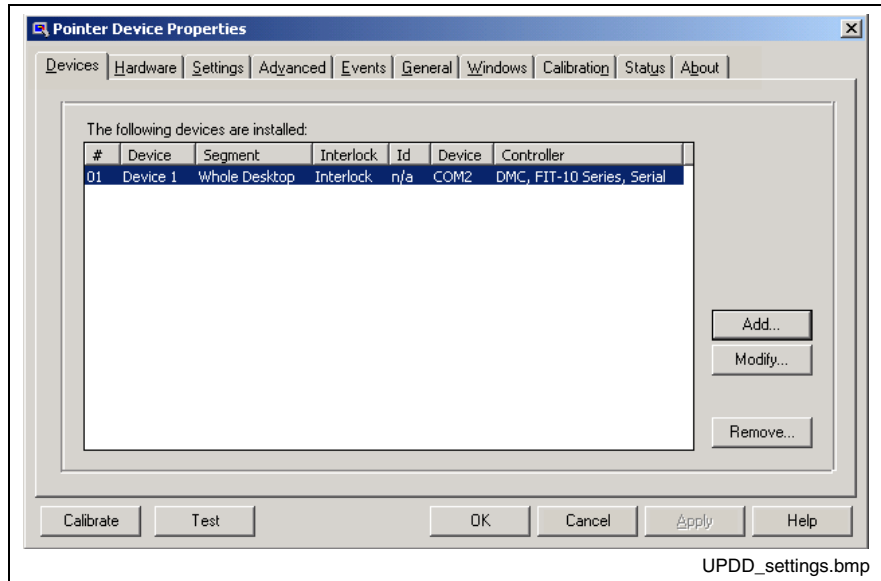


Fig. 9-11: Dialog window to set the touch screen

For further information please select the **Help** button on the respective tab.

Via "Start -> Programs -> UPDD" you reach further useful programs, if required.

The program **Calibrate** might be of special interest. If required, you can calibrate the touch mouse with the help of this program. For this, touch, one after the other, the middle of the four crosses displayed on the screen.

For further information on this programs refer to the online help, which you can start directly as file GENER-EN.CHM in folder D:\ProgramFiles\UPDD\.



# 10 Ordering Information

## 10.1 Type Code

According to the following type codes there are different variants of the displays VPP 16.1, VPP 40.1 and VPP 60.1.

### VPP 16.1

Abbrev. Column	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0									
Example:	V	P	P	1	6	.	1	D	B	A	-	5	1	2	N	N	-	M	1	C	-	B	N	-	N	N	-	F	W										

1. **Product**
  - 1.1 VPP ..... = VPP
2. **Line**
  - 2.1 16..... = 16
3. **Design**
  - 3.1 1..... = 1
4. **Front panel and display**
  - 4.1 **Rexroth design**
    - 4.1.1 12", with 16 machine function keys (MTX) ..... = BK
    - 4.1.2 12", Touch-Screen (universal) = DB
5. **PC-Box**
  - 5.1 3 slots ..... = A
  - 5.2 4 slots ..... = C
6. **Memory capacity (RAM)**
  - 6.1 512 MB ..... = 512
7. **Interface**
  - 7.1 without special interface ..... = NN
  - 7.2 PROFIBUS-DP slave ..... = PS
8. **System configuration**
  - 8.1 Celeron ..... = M1
9. **Supply voltage**
  - 9.1 AC 115 to 230 V, 50 to 60 Hz. .... = C
  - 9.2 DC 24 V ..... = D
10. **Hard disc (HD)**
  - 10.1 2.5", mind. 20 GB, installed on anti-vibration mountings ..... = B

TypenschlüsselVPP161.FH9

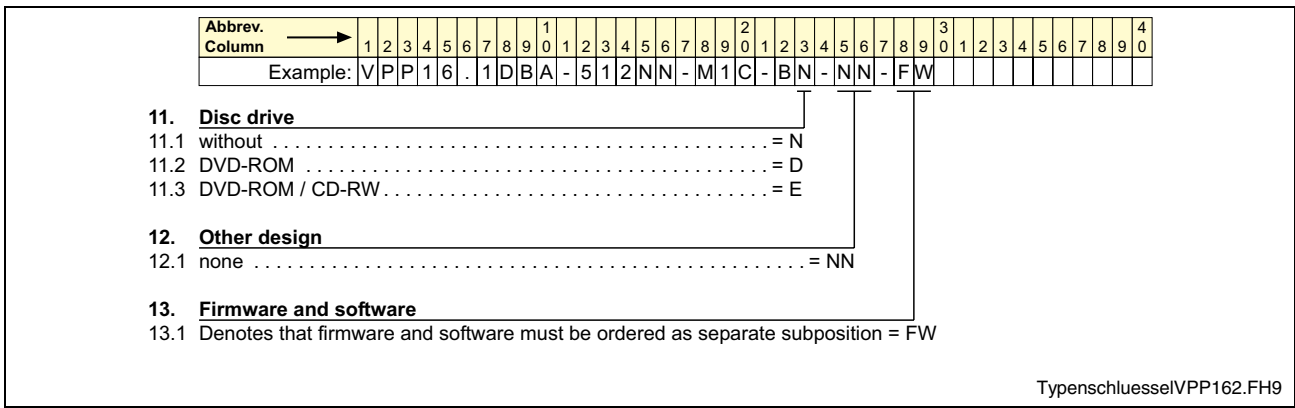


Fig. 10-1: Type code of the VPP 16.1

VPP 40.1

Abbrev. Column	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	2	1	2	3	4	5	6	7	8	9	3	1	2	3	4	5	6	7	8	9	4
Example:	V	P	P	4	.	1	D	E	A	-	5	1	2	N	N	-	M	1	C	-	B	N	-	N	N	-	F	W											

- 1. **Product**
  - 1.1 VPP..... = VPP
- 2. **Line**
  - 2.1 40 ..... = 40
- 3. **Design**
  - 3.1 1 ..... = 1
- 4. **Front panel and display**
  - 4.1 **Rexroth design**
    - 4.1.1 15", with 16 machine function keys (MTX) ..... = BI
    - 4.1.2 15", Touch-Screen (universal) = DE
    - 4.1.3 17", Touch-Screen (universal) = DG
- 5. **PC-Box**
  - 5.1 3 slots ..... = A
  - 5.2 4 slots ..... = C
- 6. **Memory capacity (RAM)**
  - 6.1 512 MB ..... = 512
- 7. **Interface**
  - 7.1 without special interface ..... = NN
  - 7.2 PROFIBUS-DP slave ..... = PS ①
- 8. **System configuration**
  - 8.1 Celeron ..... = M1
- 9. **Supply voltage**
  - 9.1 AC 115 to 230 V, 50 to 60 Hz. .... = C
  - 9.2 DC 24 V ..... = D
- 10. **Hard disc (HD)**
  - 10.1 2.5", mind. 20 GB, installed on anti-vibration mountings ..... = B

TypenschlüsselVPP401.FH9

VPP40.1, High-end operator terminal for IndraControl V

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RNC 48244-001 : 2005-01-18

Abbrev. Column	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	
Example:	V	P	P	4	0	.	1	D	E	A	-	5	1	2	N	N	-	M	1	C	-	B	N	-	N	N	-	F	W						

- 11. **Disc drive**
  - 11.1 without ..... = N
  - 11.2 DVD-ROM ..... = D
  - 11.3 DVD-ROM / CD-RW ..... = E
- 12. **Other design**
  - 12.1 without ..... = NN
- 13. **Firmware and software**
  - 13.1 Denotes that firmware and software must be ordered as separate subposition = FW

**Note:**  
① Interface "PS" is not available with front panel and display "DE" and "DG"

TypenschlüsselVPP402.FH9

Fig. 10-2: Type code of the VPP 40.1



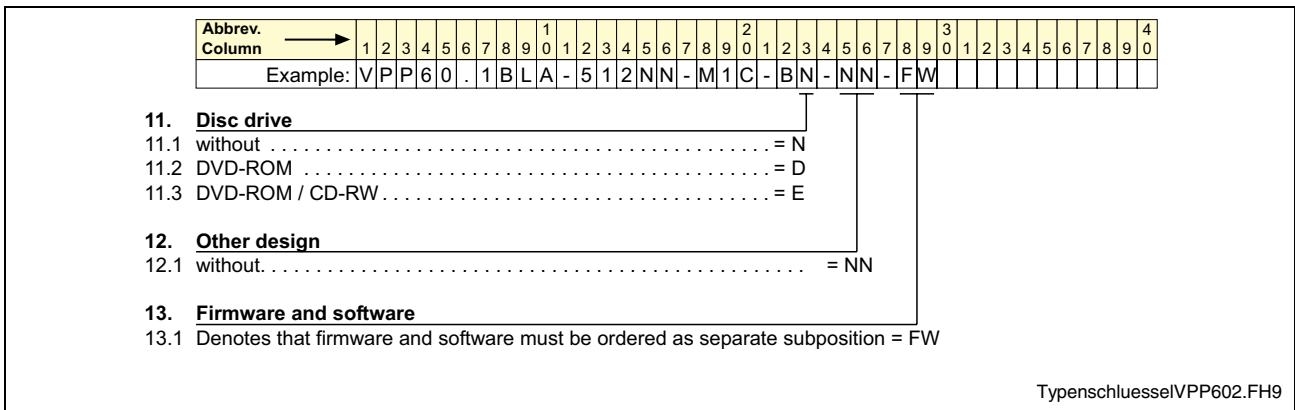


Fig. 10-3: Type code of the VPP 60.1



## 10.2 Accessories

### Connectors and Ready-Made Cables

Ordering designation	Part number	Description
B-AC STECKER NETZ 230V	1070 912 881	Mains connector 230 V, male inlet connector for non-heating apparatus, angular, for self-mounting
BKS-U-N-NTZKAB-IPCRHO-002,5-P	1070 048 937	Mains cable 230 V with female inlet connector for non-heating apparatus, angular, cable length 2.5 m

Fig. 10-4: Plugs and cables for VPP 16.1, VPP 40.1 and VPP 60.1

### Battery Pack and Cables

Ordering designation	Part number	Description
SUP-E01-BTV 16/40	1070 170 041	External battery pack for BTV 16/40 and VPP 16/40/60
IKL0265/003,0	1070 170 040	Connection cable for external battery pack VPP 16/40/60, cable length 3.0 m
IKL0264/001,0	1070 170 156	Connection cable for external battery pack VPP 16/40/60, cable length 1.0 m

Fig. 10-5: Battery pack and cables for the VPP 16.1, VPP 40.1 and VPP 60.1

### Storage Media

Ordering designation	Part number	Description
MC OSFLASHUSB-064M	1070 170 184	USB memory stick 64 Mbytes

Fig. 10-6: Storage media for the VPP 16.1, VPP 40.1 and VPP 60.1



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## 13 Service & Support

### 13.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

- telefonisch - by phone:  
über Service Call Entry Center  
- via Service Call Entry Center **+49 (0) 9352 40 50 60**  
Mo-Fr 07:00-18:00  
Mo-Fr 7:00 am - 6:00 pm
- per Fax - by fax: **+49 (0) 9352 40 49 41**
- per e-Mail - by e-mail: [service.svc@boschrexroth.de](mailto:service.svc@boschrexroth.de)

### 13.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

After helpdesk hours, contact our service department directly at

**+49 (0) 171 333 88 26**  
oder - or **+49 (0) 172 660 04 06**

### 13.3 Internet

Unter [www.boschrexroth.com](http://www.boschrexroth.com) finden Sie ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen \*) unserer auf den folgenden Seiten aufgeführten Vertriebs- und Servicebüros.

- Verkaufsniederlassungen
- Niederlassungen mit Kundendienst

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit unserem für Sie nächstgelegenen Ansprechpartner auf.

\*) Die Angaben in der vorliegenden Dokumentation können seit Drucklegung überholt sein.

At [www.boschrexroth.com](http://www.boschrexroth.com) you may find additional notes about service, repairs and training in the Internet, as well as the **actual** addresses \*) of our sales- and service facilities figuring on the following pages.

- sales agencies
- offices providing service

Please contact our sales / service office in your area first.

\*) Data in the present documentation may have become obsolete since printing.

### 13.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

1. detaillierte Beschreibung der Störung und der Umstände.
2. Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.
3. Tel./Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

## 13.5 Kundenbetreuungsstellen - Sales & Service Facilities

### Deutschland – Germany

vom Ausland:

(0) nach Landeskennziffer weglassen!

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don't dial (0) after country code!

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<b>Vertriebsgebiet Süd</b> Germany South Bosch Rexroth AG Landshuter Allee 8-10 80637 München Tel.: +49 (0)89 127 14-0 Fax: +49 (0)89 127 14-490	<b>Vertriebsgebiet West</b> Germany West Bosch Rexroth AG Regionalzentrum West Borsigstrasse 15 40880 Ratingen Tel.: +49 (0)2102 409-0 Fax: +49 (0)2102 409-406 +49 (0)2102 409-430	<b>Gebiet Südwest</b> Germany South-West Bosch Rexroth AG Service-Regionalzentrum Süd-West Siemensstr. 1 70736 Fellbach Tel.: +49 (0)711 51046-0 Fax: +49 (0)711 51046-248	
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**vom Ausland:** (0) nach Landeskennziffer weglassen, **Italien:** 0 nach Landeskennziffer mitwählen  
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