

Rexroth BTV 16 and Rexroth BTV 40

R911293569
Edition 02

Project Planning Manual



Title Rexroth BTV 16 and
Rexroth BTV 40

Type of Documentation Project Planning Manual

Document Typecode DOK-SUPPL*-BTV16/40***-PR02-EN-P

Internal File Reference Document Number, 120-2100-B341-02/EN

Purpose of Documentation This documentation describes the different variants of the IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1).

Record of Revisions

Description	Release Date	Notes
120-2100-B341-02/EN	12/03	First English Edition

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Published by Bosch Rexroth AG
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Note This document has been printed on chlorine-free bleached paper.

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1 System Presentation

1.1 Brief Description IndraView P16 and IndraView P40

The operator terminals IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) are PC-based machine operator terminals. Depending on the respective application or configuration they can also perform control functionalities. The number of plug-in cards that can be integrated depends on its design and the used PC box. At the moment, three, four or six slots are provided.

1.2 Variants

Distinguishing Features

The operator terminals are provided as different variants. Essentially, they differ in display size and touch screen capability.

BTV 16.1 (Rexroth Indramat or Bosch design)	AB	AC	AD
BTV 16.1 (Rexroth design)	BB	BC	BD
Display	12" TFT		
Touch screen	Yes	Yes	No

Fig. 1-1: Distinguishing features for the front of the IndraView P16

BTV 40.1 (Rexroth Indramat or Bosch design)	AE	AG	AH
BTV 40.1 (Rexroth design)	BE	BG	BH
Display	15" TFT		
Touch screen	Yes	Yes	No

Fig. 1-2: Distinguishing features for the front of the IndraView P40

Every IndraView P16 (type BTV 16.1) is equipped with a PC box type A or type C, an IndraView P40 (type BTV 40.1) can be equipped with the PC box type A, type B or type C. The most important features are:

PC box	Type A	Type B	Type C
Free slots	3	6	4
Power Supply	85 ... 264 VAC or 24 VDC		
Integrated UPS	Integrated UPS_Logic, battery pack to be externally connected	If desired with integrated battery pack	Integrated UPS_Logic, battery pack to be externally connected

Fig. 1-3: PC box, type A, B and C

Operator Terminals with Keypad

The front panel with keypad consists of a 4 mm thick aluminum panel with tapered edges covered by a chemical resistant polyester foil with embossed keys. Machine functions keys (M-Keys) with separators preventing the user from accidental key activation are integrated in the user-oriented functional keypad.

Operator Terminals with Touch Screen

The front panel with touch screen allows to operate the application software via the touch-sensitive surface of the display without keyboard and mouse.

Variants IndraView P16 (BTV 16.1)

BTV 16.1BB with Touch Screen (Rexroth Design)



Fig. 1-4: BTV 16.1 with touch screen

BTV 16.1AB with Touch Screen (Bosch Design)

Comparable with BTV 16.1BB, but different coloring.

BTV 16.1BC with Touch Screen, Suitable for the Food Industry, without Front USB (Rexroth Design)

BTV 16.1AC with Touch Screen, Suitable for the Food Industry, without Front USB (Bosch Design)

These two variants are available for special applications, e.g. for the food production, with special front panel.

Principally, they differ from the standard variant in its tapered edges, the missing USB connection and the different mounting dimensions.

BTV 16.1BD with Keypad and 16 M-Keys, Standard Versions (Rexroth Design)

BTV 16.1AD with Keypad and 16 M-Keys, Standard Version (Rexroth Indramat Design)



IndraViewP16_AD.eps

Fig. 1-5: BTV 16.1 with keypad

Variants IndraView P40 (BTV 40.1)

BTV 40.1BE with Touch Screen (Rexroth Design)



Fig. 1-6: BTV 40.1 with touch screen

BTV 40.1AE with Touch Screen (Bosch Design)

Similar device as BTV 40.1BB, but different coloring.

BTV 40.1BG with Touch Screen, Suitable for the Food Industry, without Front USB (Rexroth Design)

BTV 40.1AG with Touch Screen, Suitable for the Food Industry, without Front USB (Bosch Design)

These two variants are available for special applications, e.g. for the food production, with special front panel. Principally, they differ from the standard variant in its tapered edges, the missing USB connection and the different mounting dimensions.

BTV 40.1BH with Keypad and 16 M-Keys, Standard Version (Rexroth Design)

BTV 40.1AH with Keypad and 16 M-Keys, Standard Version (Rexroth Indramat Design)



IndraViewP40_AH.eps

Fig. 1-7: BTV 40.1 with keypad

1.3 Operating System

For license reasons IndraView P16 and IndraView P40 are only delivered with already installed operating system.

The delivered operating systems may only be used in the industrial environment. Use in the office area, e.g. on a secretary's computer, is not allowed.

1.4 Commissioning

Mount the device properly (for this, see chapter 5 "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.

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.

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

IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) are PC-based machine and visualization terminals, that can – depending on the application and configuration - also perform control functionalities. These operator terminals made by Bosch Rexroth are designed for use in the following cases:

- as operator, visualization and programming terminal with integrated soft control in stand-alone machines,
- as operator, visualization and programming terminal for connected RECO controls.

Note: IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) 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.

IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) are designed for control tasks in an installation with multiple axes.

Available for an application-specific use of the terminals are unit types with differing equipment and interfaces.

Typical areas of application of IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) are:

- lathes
- milling machines and
- machining centers.

IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) 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 IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) 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".

IndraView P16 (BTV 16.1) and IndraView P40 (BTV 40.1) may not be used, if

- they are 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 extreme maximum temperatures or if
- Bosch Rexroth has not specifically released them for that intended purpose. Please note the specifications outlined in the general Safety Instructions!

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.



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
	Death or severe bodily harm will occur.
	Death or severe bodily harm may occur.
	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.

For example, the following areas of use are not permitted: 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 sensitive to high frequency, 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

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

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 five (5) 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 mm² 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.



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.

Notes

4 Technical Data

4.1 Front Panel

	BTV 16.1BB	BTV 16.1BC	BTV 16.1BD
Display	12"-TFT, 800 x 600 pixel 256.000 colors		
Operation	Touch screen		Keypad
Surface – Front panel	Color: RAL 7035 light gray		
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529		
Interface	USB connection, Cover's degree of protection IP 65	No USB connection	USB connection, Cover's degree of protection IP 65

Fig. 4-1: Technical data: front of the IndraView P16 (Rexroth design)

	BTV 16.1AB	BTV 16.1AC	BTV 16.1AD
Display	12"-TFT, 800 x 600 pixel 256.000 colors		
Operation	Touch screen		Keypad
Surface – Front panel	Graphite gray (Bosch design)		Color: RAL 7035 light gray (Rexroth Indramat design)
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529		
Interface	USB connection, Cover's degree of protection IP 65	No USB connection	USB connection, Cover's degree of protection IP 65

Fig. 4-2: Technical data: front of the IndraView P16
(Rexroth Indramat or Bosch design)

	BTV 40.1BE	BTV 40.1BG	BTV 40.1BH
Display	15"-TFT, 1024 x 768 pixel 256.000 colors		
Operation	Touch screen		Keypad
Surface – Front panel	Color: RAL 7035 light gray		
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529		
Interface	USB connection, Cover's degree of protection IP 65	No USB connection	USB connection, Cover's degree of protection IP 65

Fig. 4-3: Technical data: front of the IndraView P16 (Rexroth design)

	BTV 40.1AE	BTV 40.1AG	BTV 40.1AH
Display	15"-TFT, 1024 x 768 pixel 256.000 colors		
Operation	Touch screen		Keypad
Surface – Front panel	Graphite gray (Bosch design)		Color: RAL 7035 light gray (Rexroth Indramat design)
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529		
Interface	USB connection, Cover's degree of protection IP 65	No USB connection	USB connection, Cover's degree of protection IP 65

Fig. 4-4: Technical data: front of the IndraView P40
(Rexroth Indramat or Bosch design)

4.2 PC Box

PC box	Type A	Type B	Type C
Processor	Pentium III with minimum 400 MHz and integrated graphic controller with maximum 8 MB video memory		
Working memory	Max. 256 MB		
Hard disk	Min. 5 GB		
Optional drives	CD ROM	None	CD ROM
Interfaces available in all variants	<ul style="list-style-type: none"> • 1 x parallel interface (25-pin, D-Sub) • 1 x external VGA connection (15-pin, HD-Sub) • 2 x USB connection (type A) • 1 x Ethernet connection (RJ 45, 10/100 Base-T) • 1 x keyboard connection (PS/2) • 1 x mouse connection (PS/2) • 1 x external battery connection • 1 x floppy disk connection 		
Additional interfaces			
For variant without special interfaces	<ul style="list-style-type: none"> • 2 to 3 serial standard interfaces RS232 (9-pin, D-Sub) ¹ 		
For variant with PROFIBUS DP slave and 24 V I/O	<ul style="list-style-type: none"> • 2 to 3 serial standard interfaces RS232 (9-pin, D-Sub) ¹ • 1 x PROFIBUS DP slave (9-pin, D-Sub) • 1 x 24 V I/O 		
For variant with SIS and BT bus	<ul style="list-style-type: none"> • 1 x serial standard interface RS232 (9-pin, D-Sub) ² • 1 x serial multi-mode interface RS232, RS422, RS485 SIS (15-pin, D-Sub) (SIS interface according to Rexroth standard) • 1 x BT bus master (9-pin, D-Sub) • 1 x "Ready" relay contact (3-pin, Weidmüller) 		
Slots	2 x PCI, 1 x PCI / ISA	2 x PCI, 1x PCI / ISA, 3 x ISA	3 x PCI, 1 x PCI / ISA
Degree of protection	PC box IP 00		
Power supply	85/264 VAC or 24 VDC		
Max. power consumption	125 W		

Fig. 4-5: Technical data: PC box

¹ For devices with touch screen 2 serial interfaces

² For devices with touch screen no serial interface

4.3 Power Supply Unit 115 V / 230 V

Nominal input voltage:	115 VAC / 230 VAC	
Input voltage range:	85 ... 264 VAC	
Input current:	0,7 A for nominal voltage 230 VAC 1,4 A for nominal voltage 115 VAC	
Max. inrush current (cold start 25 °C)	30 A for nominal voltage 230 VAC 15 A for nominal voltage 115 VAC	
Output voltages: + 5 V + 12 V	Current (max.)* 16 A 3 A	Tolerance (incl. residual ripple) +/- 5 % +/- 5 %
Max. output power:	100 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 both output voltages, as the maximum total output power (= 100 W) must not be exceeded.

Fig. 4-6: 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 _{max} = 35 V (for t < 100 ms)	
Max. input current:	4 A for nominal voltage 24 V	
Max. inrush current:	25 A for nominal voltage 24 V	
Output voltages: + 5 V + 12 V	Current (max.)* 11 A 3 A	Tolerance (incl. residual ripple) +/- 5 % +/- 5 %
Max. output power:	80 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 both output voltages, as the maximum total output power (= 80 W) must not be exceeded.

Fig. 4-7: Technical data of the power supply unit 24 V

4.5 Ambient Conditions

	In operation	Storage/transport
Max. ambient temperature	+ 5 ... +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 2000 m above sea level 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

Fig. 4-8: Ambient conditions

4.6 Compatibility Test

All Rexroth controls and drives are developed and tested according to the technological 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.

4.7 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
.IS.114	X-ray radiation directive according to Official Federal Gazette

Fig. 4-9: 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.

4.8 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:
 - 12": 40,000 hours
 - 15": 35,000 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 ambient temperature, in which the battery pack is used. Ambient 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.

Ambient 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. 4-10: 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
	Accesses	30 % of the operating hours
Storage conditions	Temperature	< 30 °C
	Rel. humidity	< 70 %
	Duration	< 3 months

Fig. 4-11: 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 be reduced. 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:

Ambient temperature	Service life
40 °C	70,000 hours
70 °C	35,000 hours

Fig. 4-12: Service life of the fan

5 Dimensions

5.1 Housing Dimensions

Housing Dimensions of the IndraView P16

Independent of the design of the BTV 16:1 with M-Keys or touch screen the front panel width is 350 mm and the height is 290 mm.

The front panel width of the BTV 16.1 for the food industry is 360 mm and the height is 300 mm.

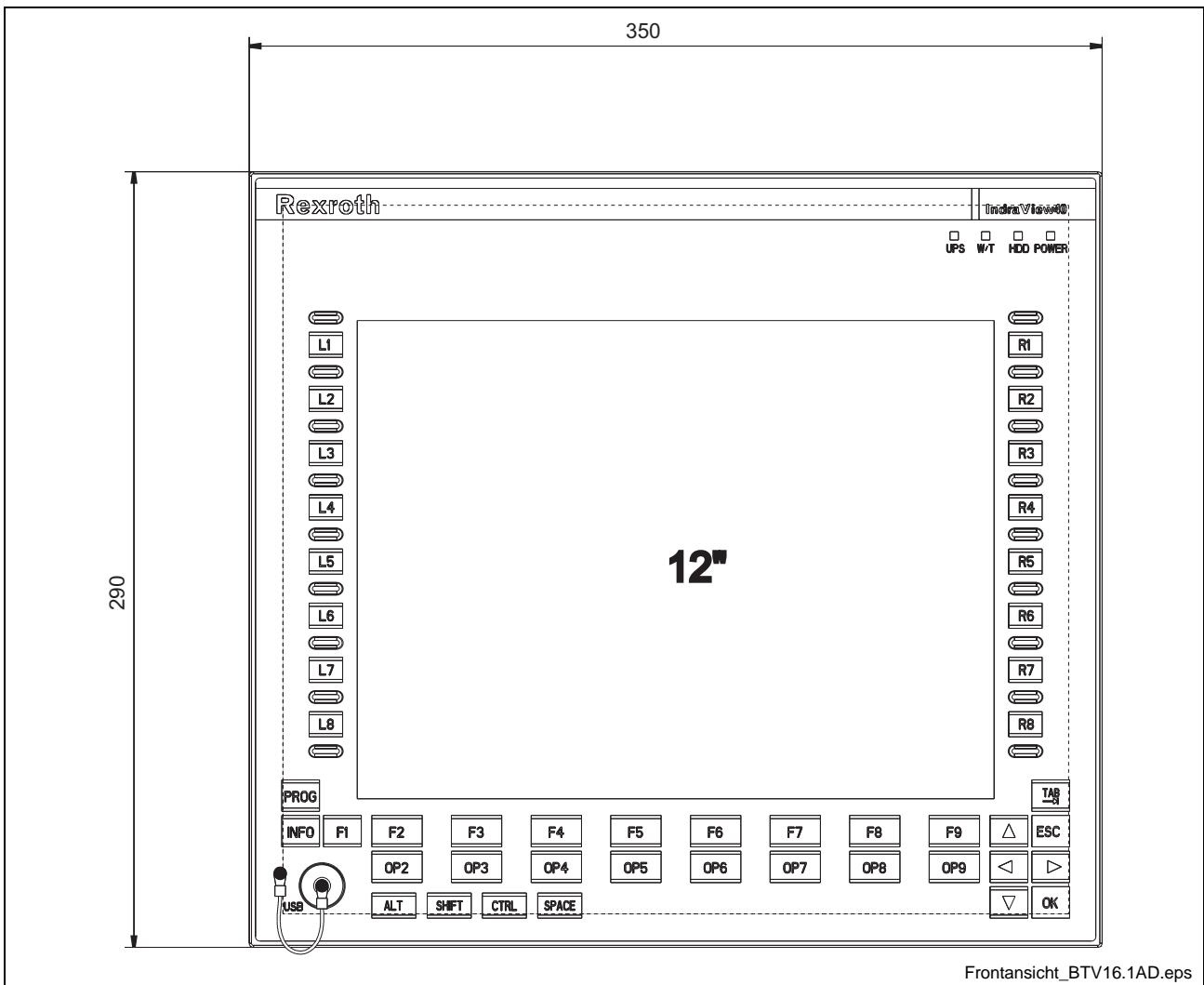


Fig. 5-1: Dimensions – Front panel BTV 16.1BD and BTV 16.1AD
 The front panel of the BTV 16.1BB and the BTV 16.1AB with touch screen have the same dimensions.

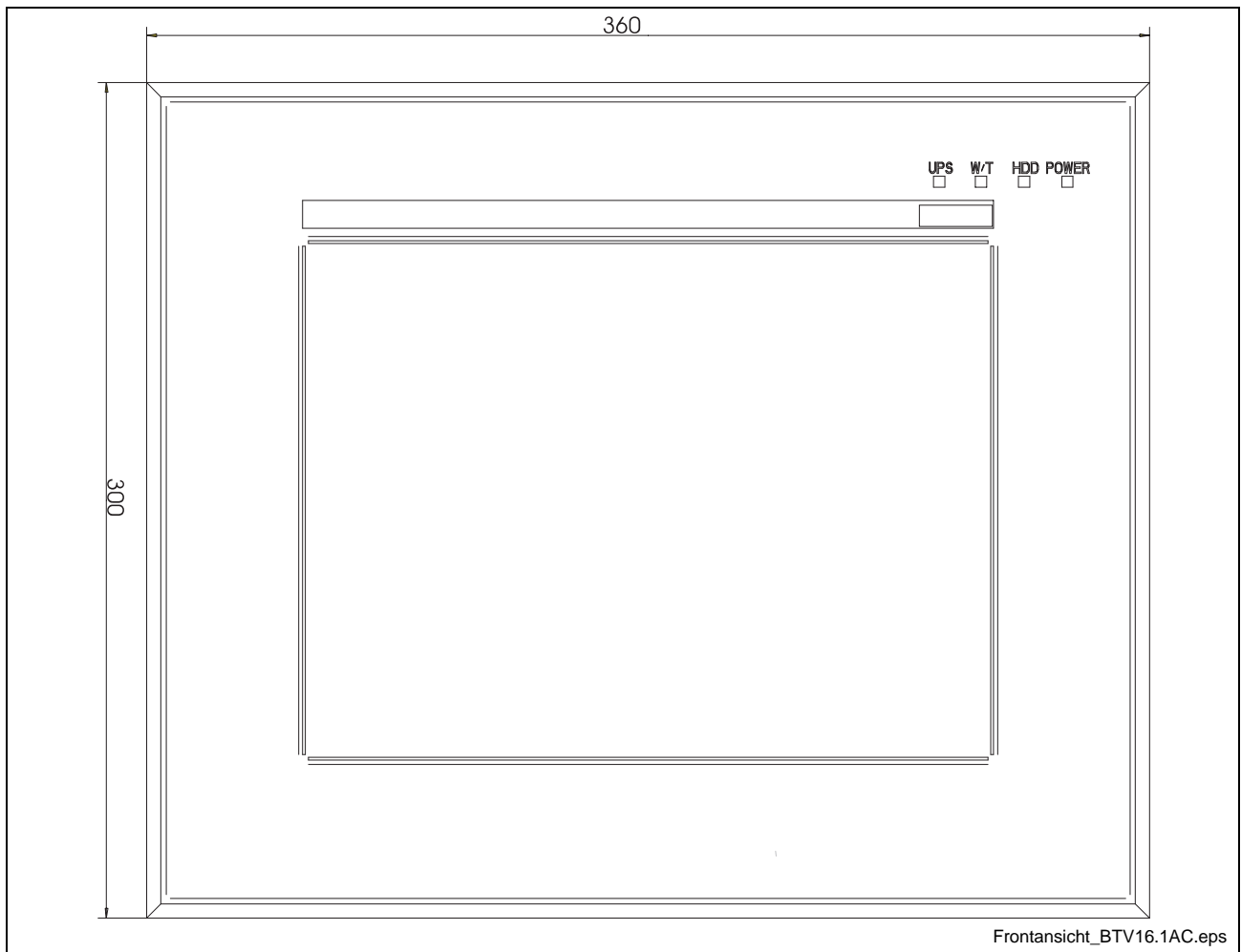


Fig. 5-2: Dimensions – Front panel BTV 16.1BC and BTV 16.1AC (Design for the food industry)

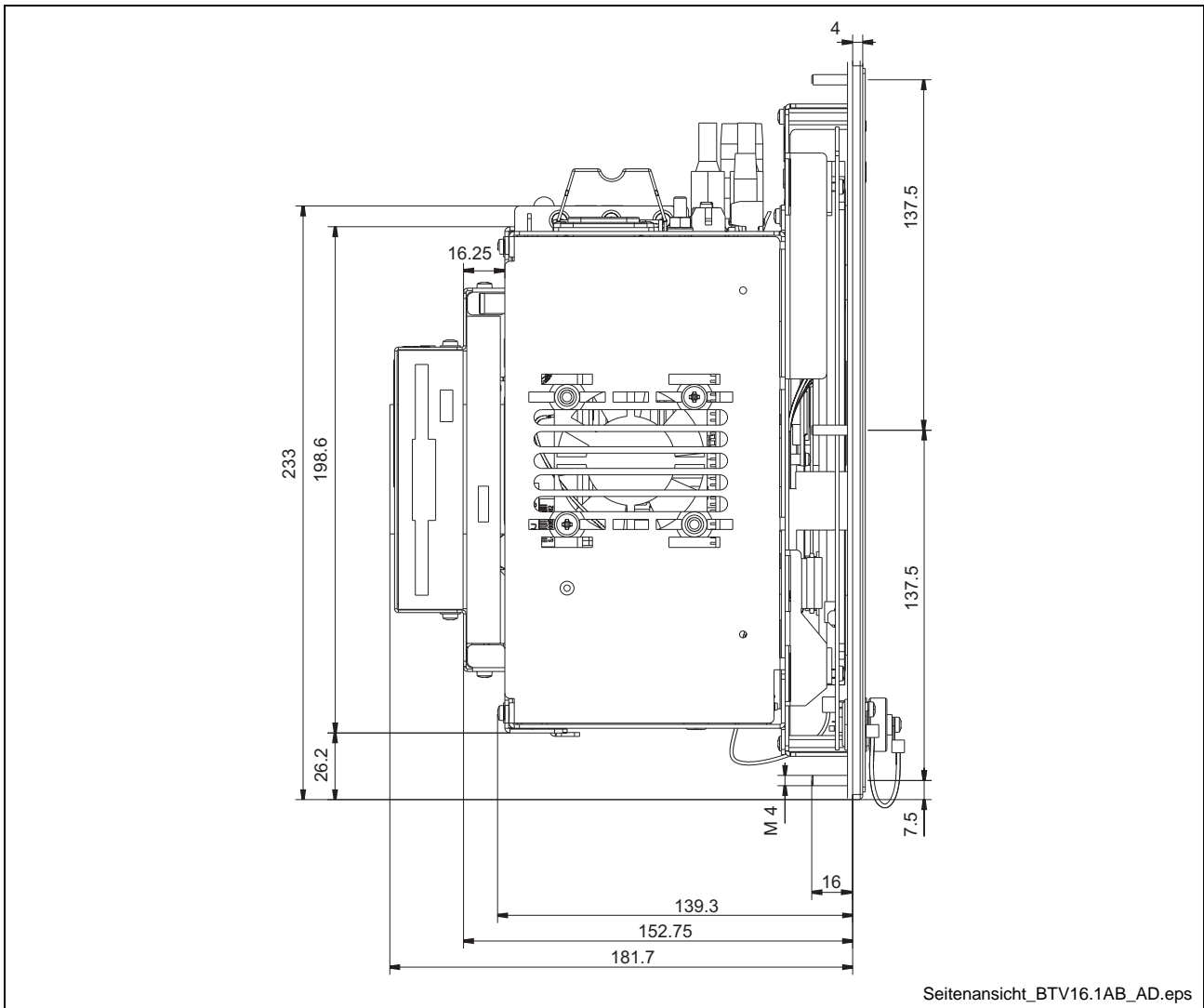


Fig. 5-3: Side view BTV 16.1BB/BD and BTV 16.1AB/AD

Type A 3 slots Type C: 4 slots	BTV 16.1BB + BD and BTV 16.1AB + AD
Installation depth PC box Type A	146.5 mm
Installation depth PC box Type A + CD ROM	165.5 mm
Installation depth PC box Type A + CD ROM + LS 120	181.7 mm
Installation depth PC box Type C	167.0 mm
Installation depth PC box Type C + CD ROM	186.0 mm
Installation depth PC box Type C + CD ROM + LS 120	202.2 mm

Fig. 5-4: Installation depth BTV 16.1BB/BD and BTV 16.1AB/AD

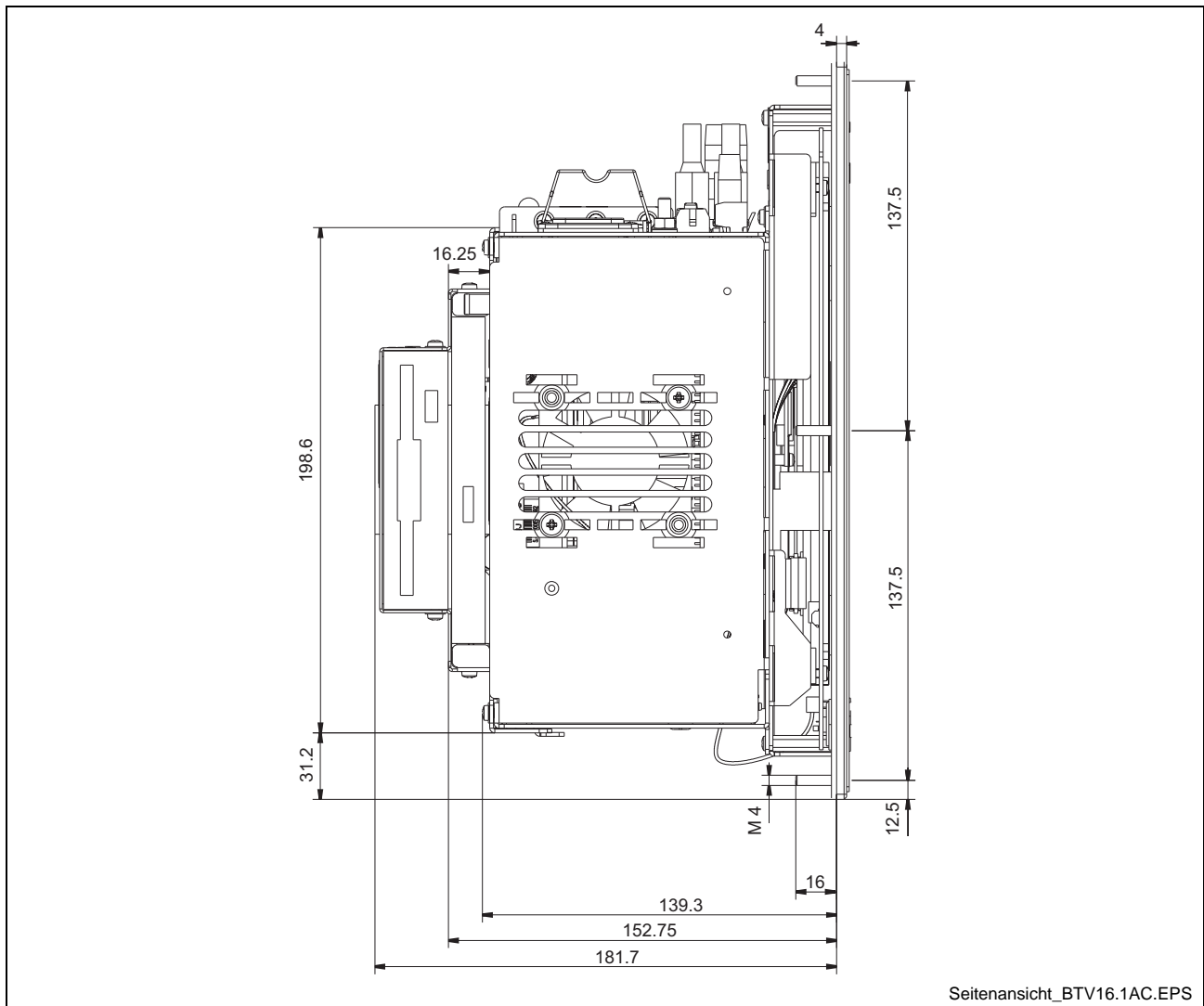


Fig. 5-5: Side view BTV 16.1BC and BTV 16.1AC

Type A: 3 slots Type C: 4 slots	BTV 16.1BC and BTV 16.1AC
Installation depth PC box Type A	146.5 mm
Installation depth PC box Type A + CD ROM	165.5 mm
Installation depth PC box Type A + CD ROM + LS 120	181.7 mm
Installation depth PC box Type C	167.0 mm
Installation depth PC box Type C + CD ROM	186.0 mm
Installation depth PC box Type C + CD ROM + LS 120	202.2 mm

Fig. 5-6: Installation depth BTV 16.1BC and BTV 16.1AC

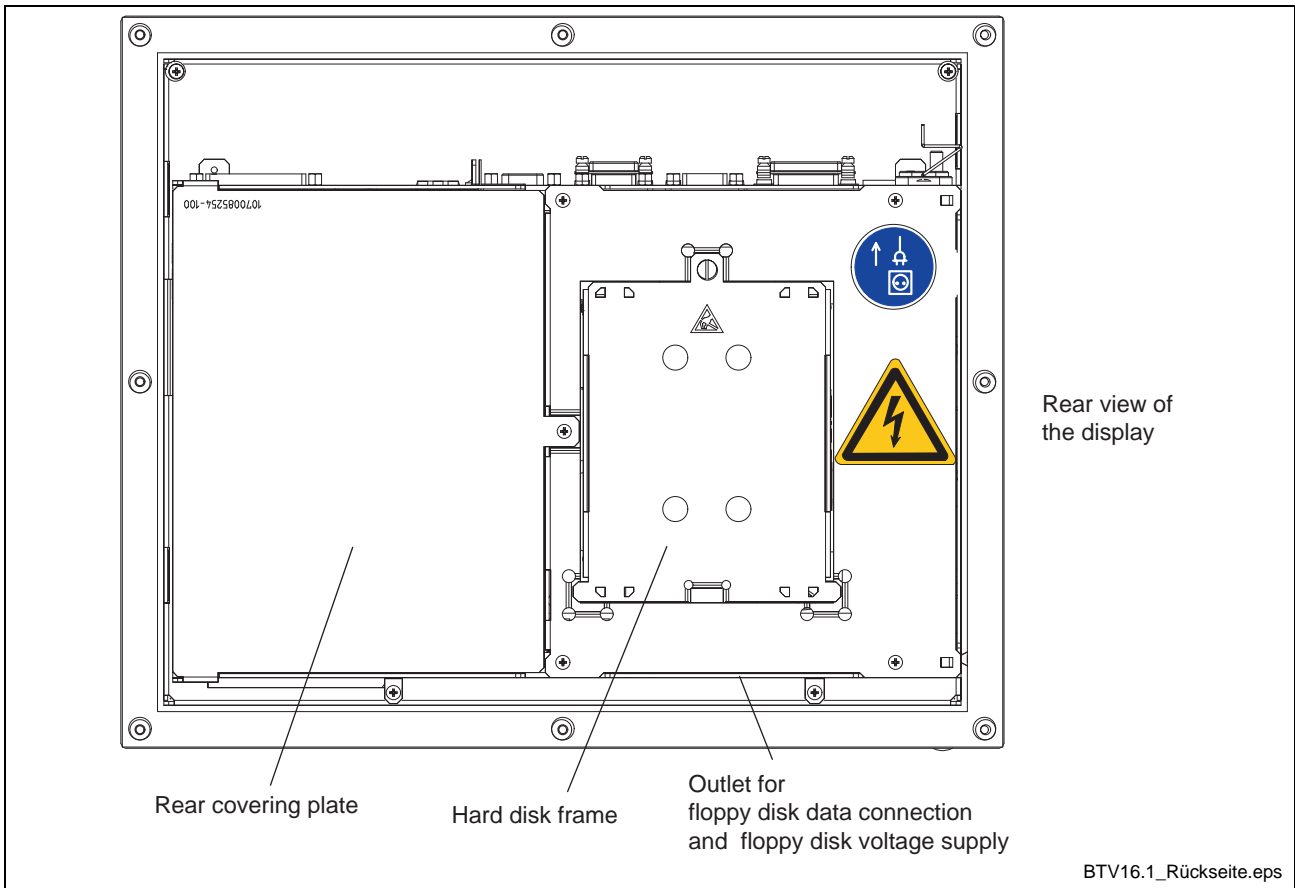


Fig. 5-7: Rear view BTV 16.1

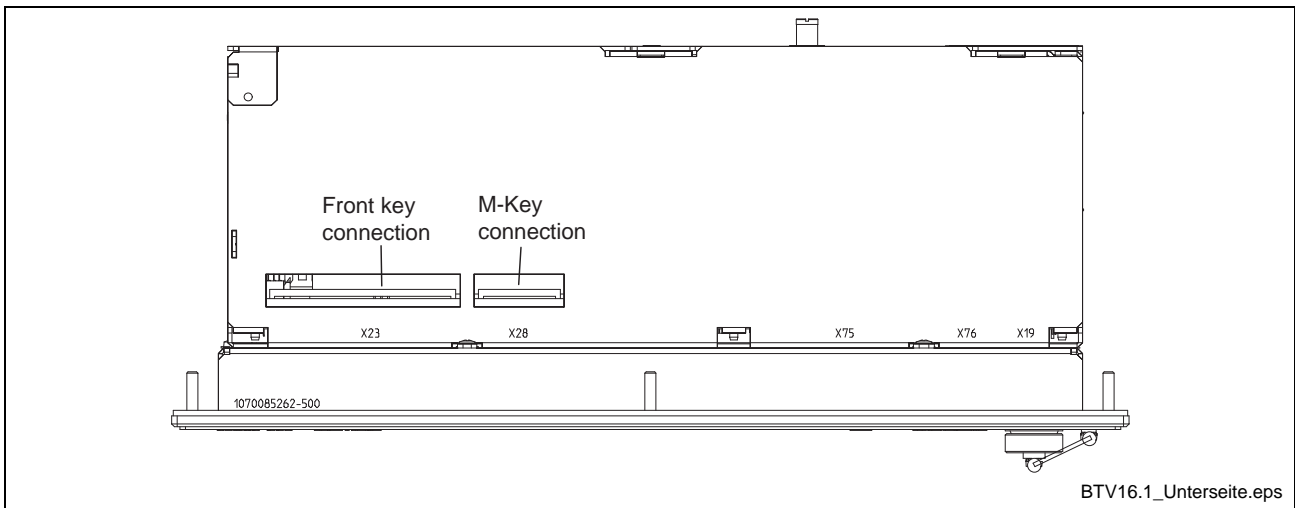


Fig. 5-8: Bottom view of the BTV 16.1

Housing Dimensions of the IndraView P40

Independent of the design of the BTV 40.1 with M-Keys or touch screen the front panel width is 407 mm and the height is 370 mm.

The front panel width of the BTV 40.1 for the food industry is 417 mm and the height is 380 mm.

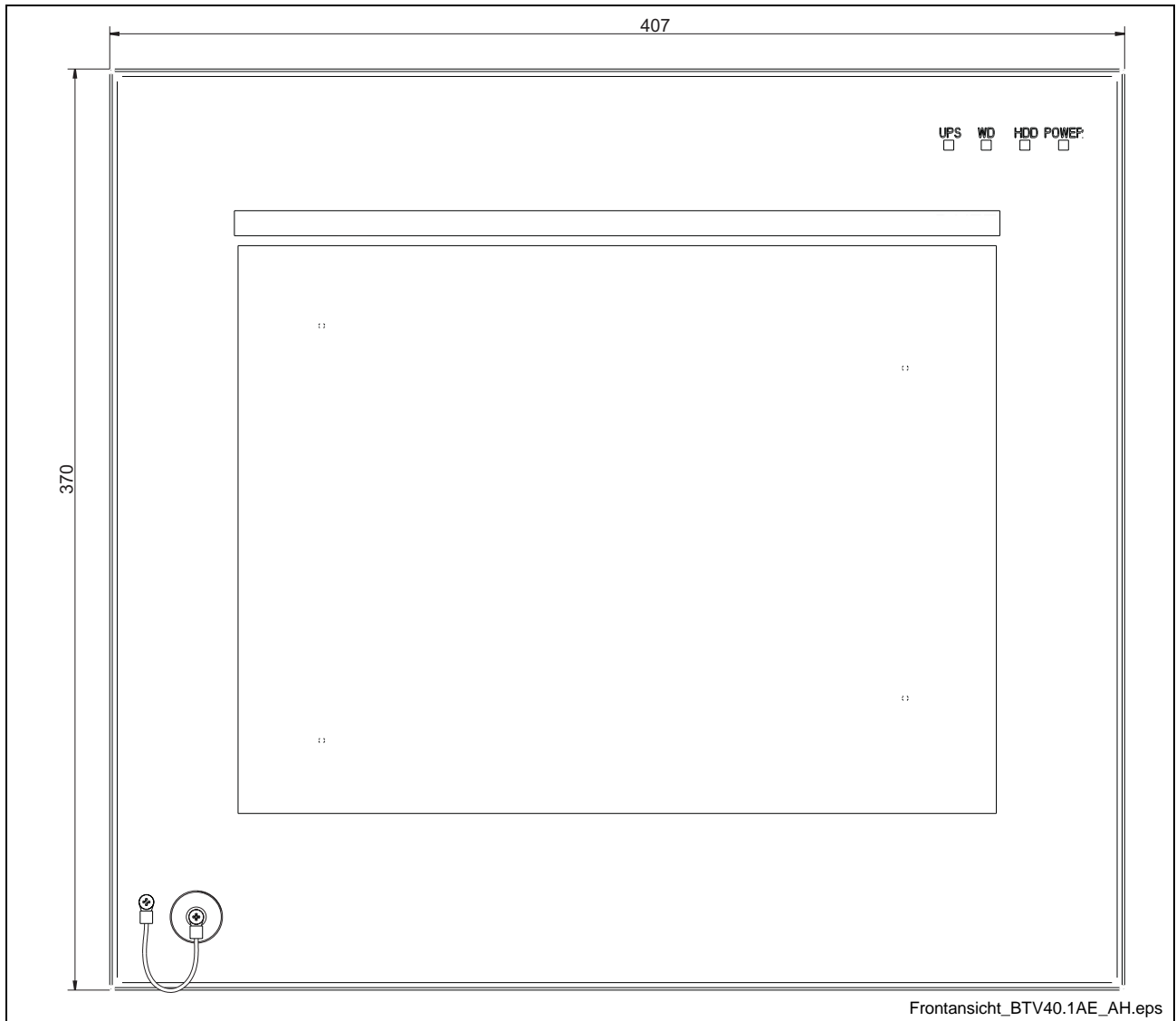


Fig. 5-9: Dimensions – Front panel BTV 40.1BE/BH and BTV 40.1AE/AH

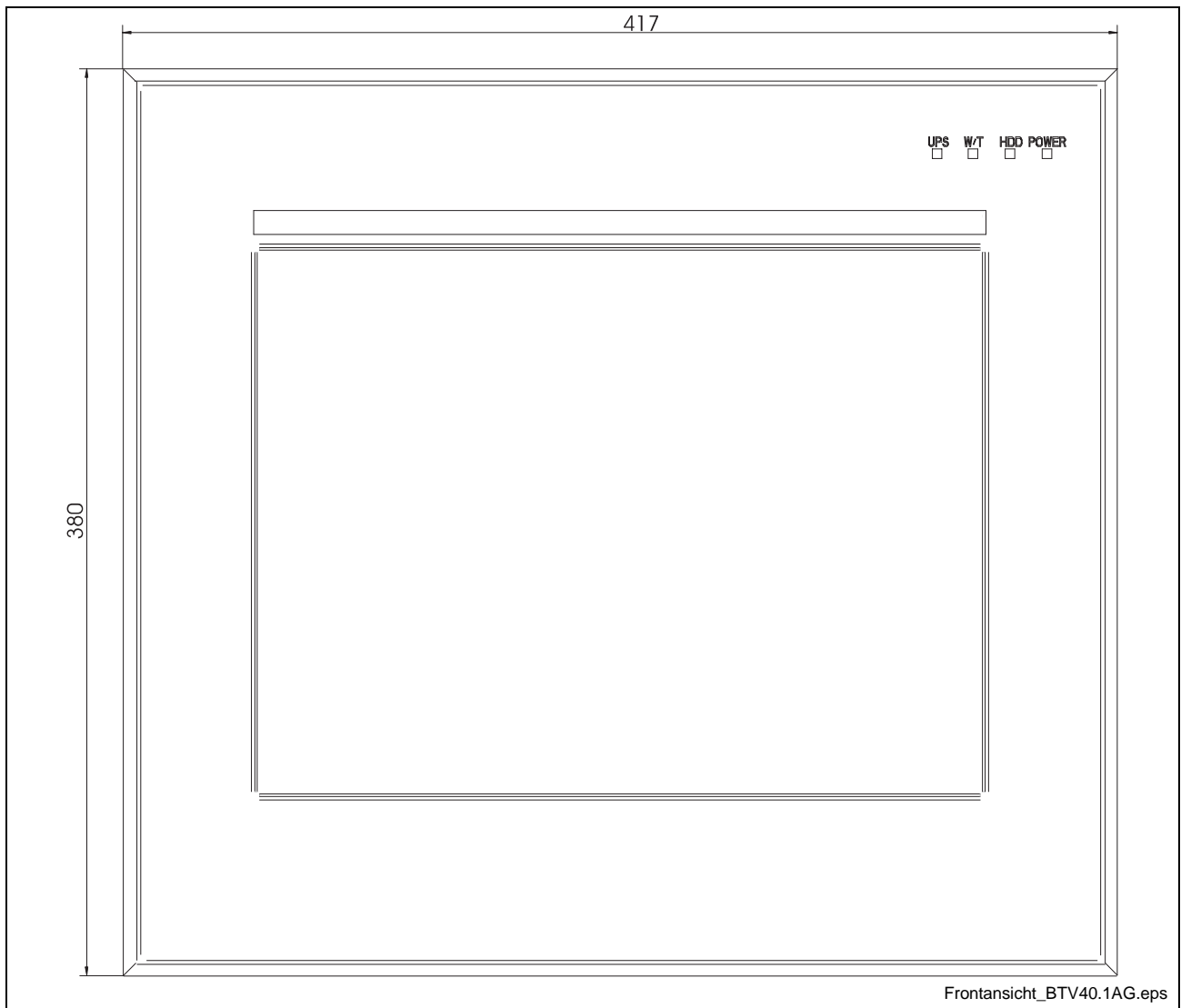


Fig. 5-10: Dimensions – Front panel BTV 40.1BG and BTV 40.1AG (Design for the food industry)

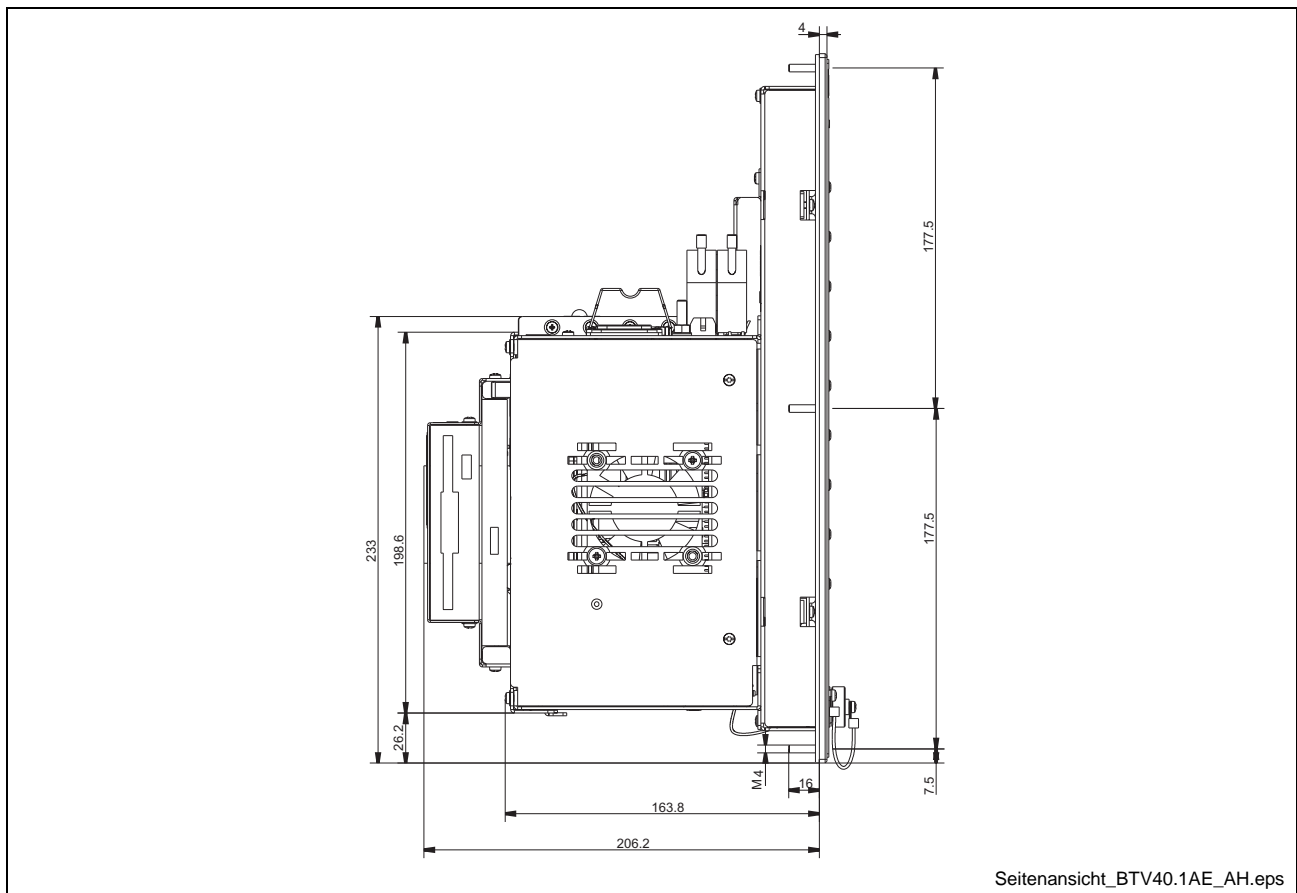


Fig. 5-11: Side view BTV 40.1BE/BH and BTV 40.1AE/AH

Type A: 3 slots Type B: 6 slots Type C: 4 slots:	BTV 40.1BE + BH and BTV 40.1AE + AH
Installation depth PC box Type A	150.5 mm
Installation depth PC box Type A + CD ROM	169.5 mm
Installation depth PC box Type A + CD ROM + LS 120	185.7 mm
Installation depth PC box Type B	214.8 mm
Installation depth PC box Type C	171.0 mm
Installation depth PC box Type C + CD ROM	192.0 mm
Installation depth PC box Type C + CD ROM + LS 120	206.2 mm

Fig. 5-12: Installation depth BTV 40.1BE/BH and BTV 40.1AE/AH

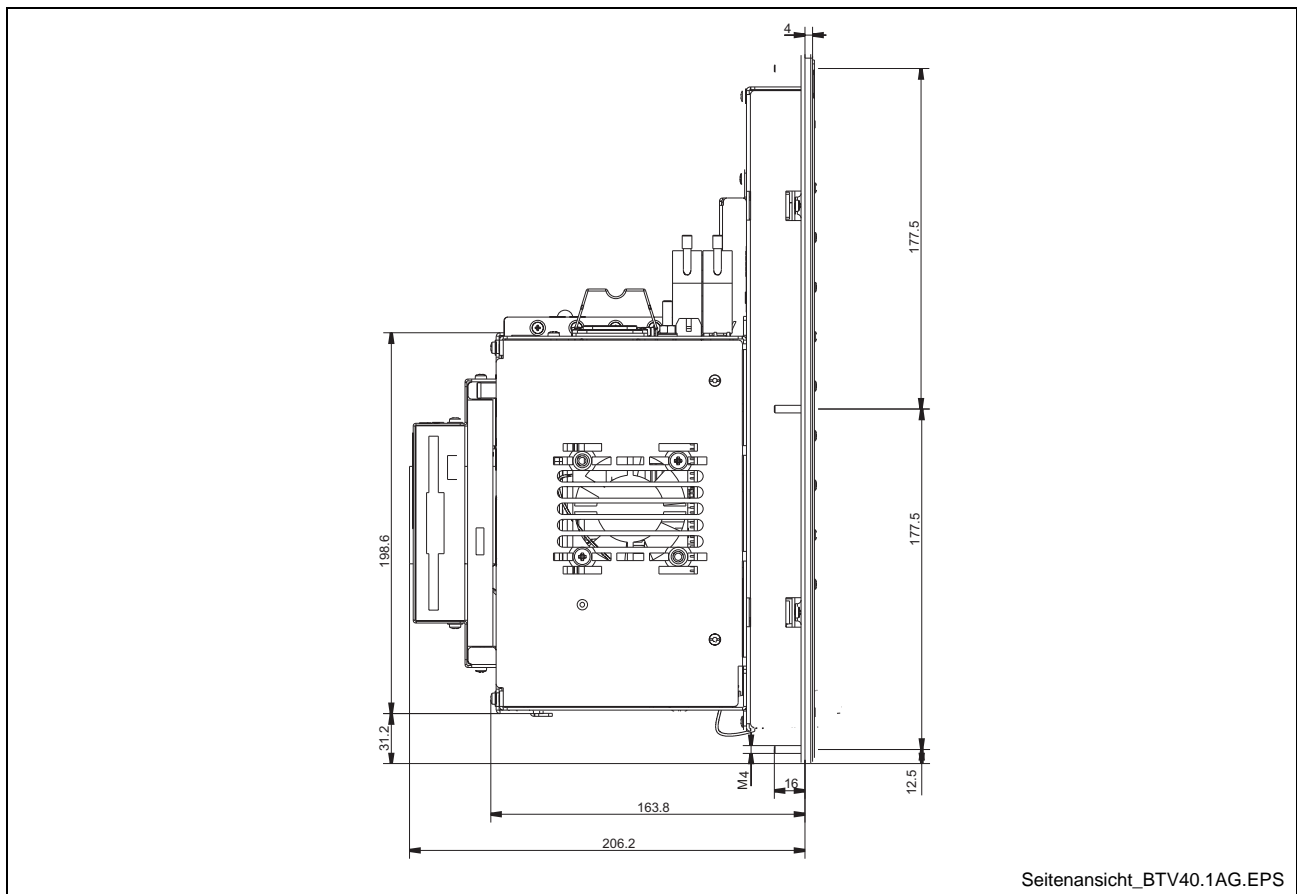


Fig. 5-13: Side view BTV 40.1BG and BTV 40.1AG

Type A: 3 slots Type B: 6 slots Type C: 4 slots:	BTV 40.1BG and BTV 40.1AG
Installation depth PC box Type A	150.5 mm
Installation depth PC box Type A + CD ROM	169.5 mm
Installation depth PC box Type A + CD ROM + LS 120	185.7 mm
Installation depth PC box Type B	214.8 mm
Installation depth PC box Type C	171.0 mm
Installation depth PC box Type C + CD ROM	192.0 mm
Installation depth PC box Type C + CD ROM + LS 120	206.2 mm

Fig. 5-14: Installation depth BTV 40.1BG and BTV 40.1AG

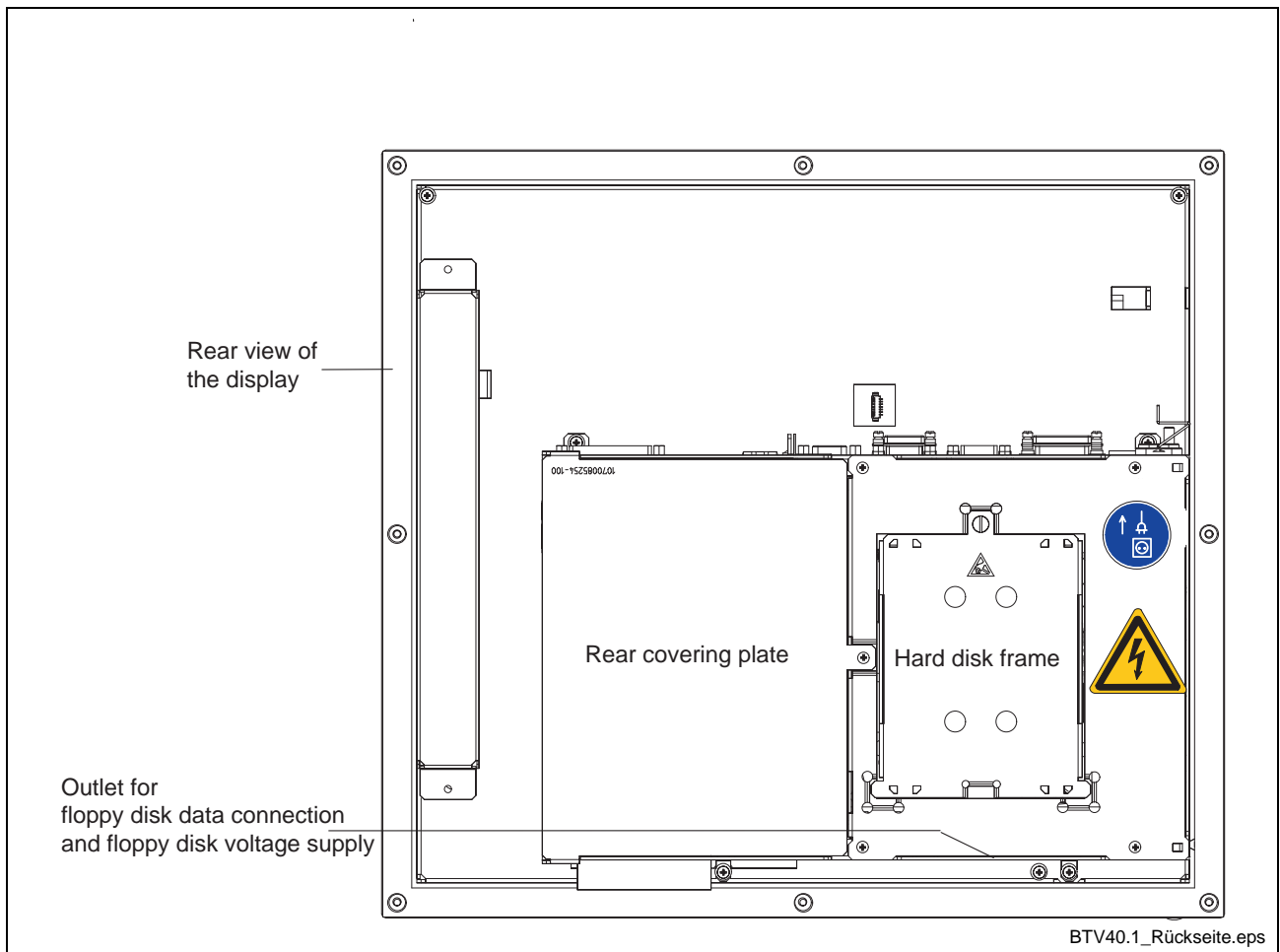


Fig. 5-15: Rear view BTV 40.1

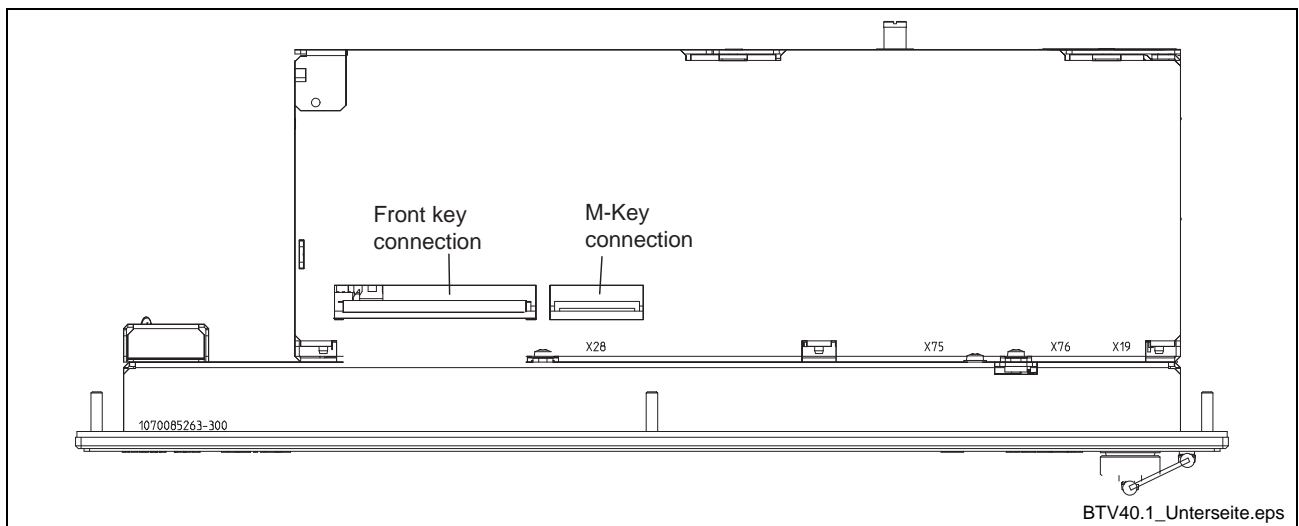


Fig. 5-16: Bottom view of the BTV 40.1

5.2 Installation

Installation Notes

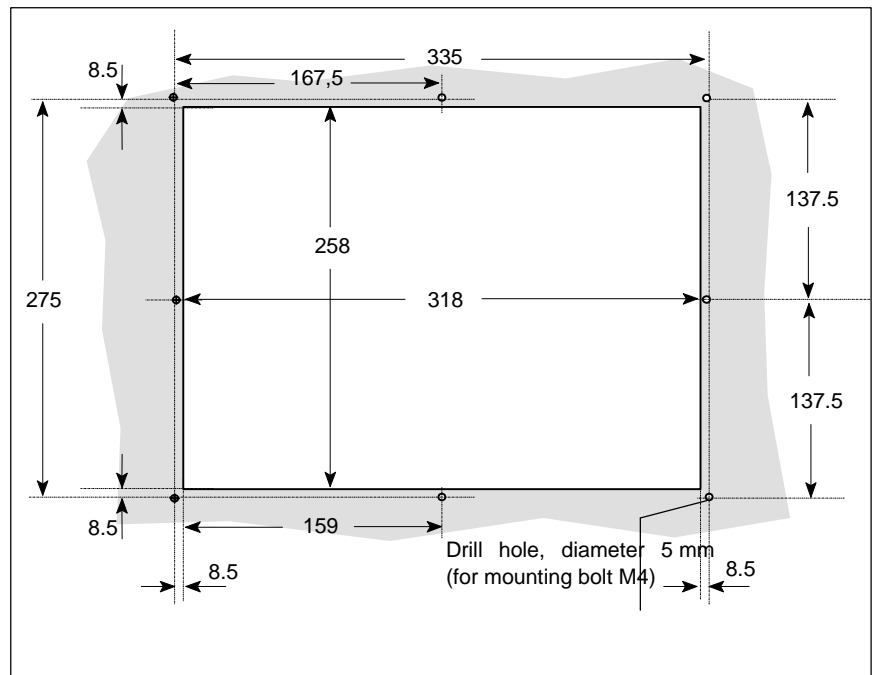
- When installing the operator terminal observe to ensure an ergonomic operation. Additionally, ensure that all moving machine components are in sight of the operator.
- Avoid installation locations exposed to direct sunlight, as the screen readability is reduced and additional heat development can occur.
- 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

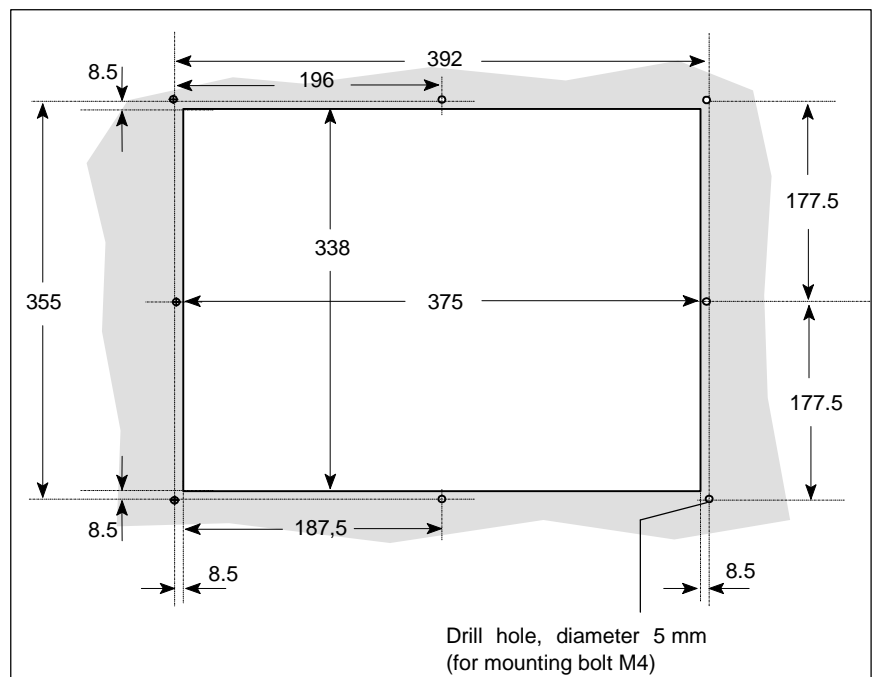
For mounting the operator terminal proceed as follows:

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

Mounting Dimensions of the IndraView P16



Mounting Dimensions of the IndraView P40



6 Display and Operating Components

6.1 Backlight Switch-Off

The backlight as background lighting of the display has a limited lifetime (see section "Wear Parts" on page 4-8).

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 BIOS settings and in the Windows Control Panel.

How to activate the backlight switch-off:

- Select in the BIOS setup program menu item "Power Management Setup" and then submenu item "OnBoard LCD Backlight Timer OFF" and choose as time interval between "28 sec and 14 min".
- Install a screen saver in the operating system, that will switch the display to a "black signal" (blank screen, i.e. no objects visible on the screen). Thereby, select the time interval, after which the screen saver might be activated. The selected time is added to the "Backlight Timer OFF" time set in the BIOS.

Note: Ensure that the set interval for the screen saver activation is shorter than the time for the activation of the backlight switch-off. If this is not the case, problems to reactivate the display might occur.

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

In the upper part of the front panel there are 4 LEDs to indicate the device states and errors. Start the measures specified in the following table, if one of the succeeding LEDs indicates an error or a note.

LED	Indicator	Meaning	Measure
Power	LED green	Normal mode	-
	LED OFF	No supply voltage 230/115 VAC or 24 VDC	Check supply voltage at the power supply unit!
HDD	LED yellow	Hard disk access	-
W/T	For devices with interface variant "S" and integrated soft control:		
	LED green	Watchdog at least one time triggered (boundary conditions: the temperature is in an acceptable range and shut-down of the PC not started)	-
	LED red	Monitoring one time activated, i.e. temperature > 65 °C or shut-down of the PC started.	Reduce ambient temperature! Check fan at the PC! Warning can only be deleted with Power-On or Watchdog Reset command.
	LED OFF	Watchdog not triggered yet (status after reset)	-
	For device with interface variant "N" or "P" (also see chapter 7.1 and 7.2 on page 7-1).		
	LED green	Temperature in the safe range	
	LED red flashing	Temperature > 50 °C	Reduce ambient 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 power supply and initiate controlled BTV restart!
	LED red flashing	Battery pack discharged, defective or not connected	Check battery pack! Maintain the charging time of 5 hours!

Fig. 6-1: LEDs to indicate operations and errors on the front panel

6.3 Keypad

System Preconditions

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

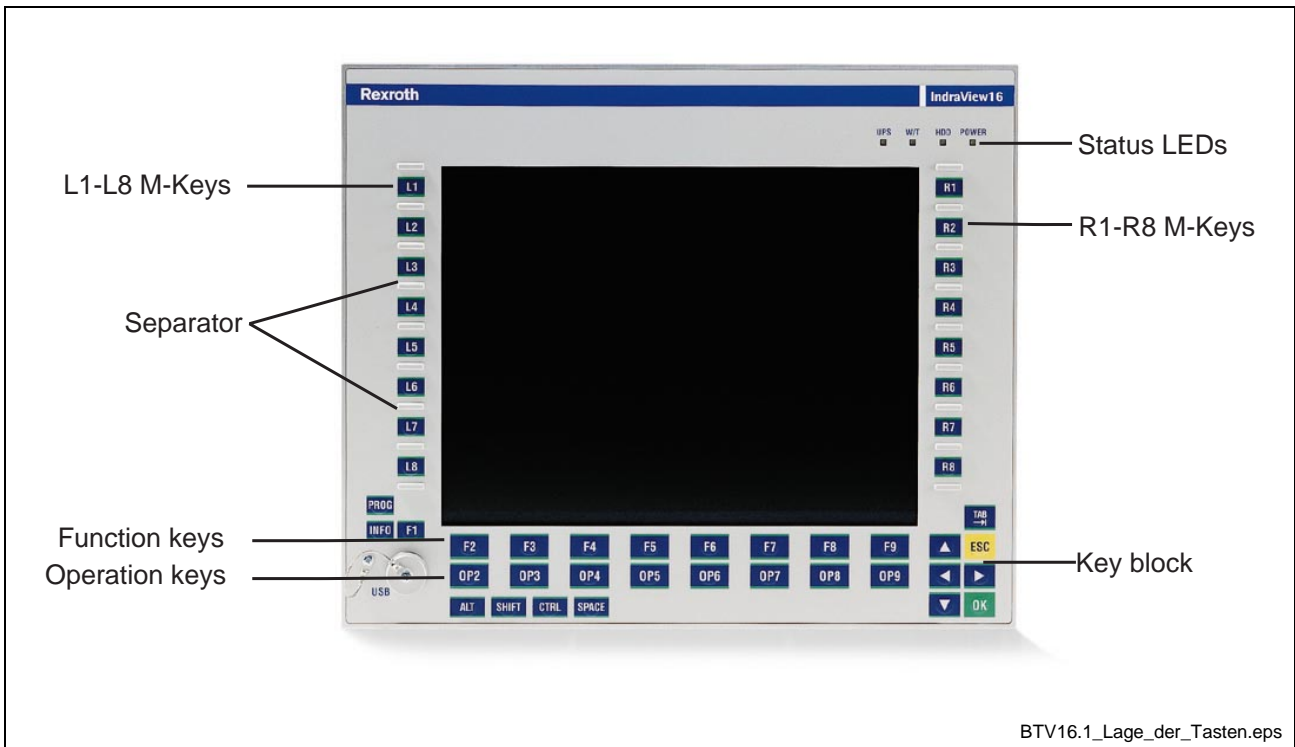


Fig.6-2: Position of the keys

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. To be able to call up as many functions as possible with one key, the function level was extended by the operation keys.

Use of an External Keypad

Concerning the BTV 16.1BD and BTV 16.1AD as well as the BTV 40.1BH and BTV 40.1AH with keypad the key functions can also be activated with an external PC keyboard by pressing the following key combinations:





Key of the BTV 16.1BD and BTV 16.1AD as well as of the BTV 40.1BH and the BTV 40.1AH	Corresponding key of a standard keyboard
 bis	STRG + SHIFT + ALT + F2
	STRG + SHIFT + ALT + F9
	STRG + SHIFT + ALT + Q
	STRG + SHIFT + ALT + I

Fig. 6-3: Key combination for the keys of the BTV 16.1BD/AD and the BTV 40.1BH/AH

M-Keys

Eight M-Keys (machine functions keys) are allocated at the right and the left side of the display (see Fig. 6-2).

Addressing of the M-Keys

There's no keyboard controller to manage the M-Keys, but they are directly routed as switching contacts to a 20-pin connector strip. In addition, the signals can be retrieved via the ISA bus under address 0x142 (16 bits access).

6.4 Touch Screen

Settings can be modified via the setup program (see chapter "Screen Software" on page 9-3).

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

7 PC Box

7.1 View on the Connector Panel without Special Interfaces

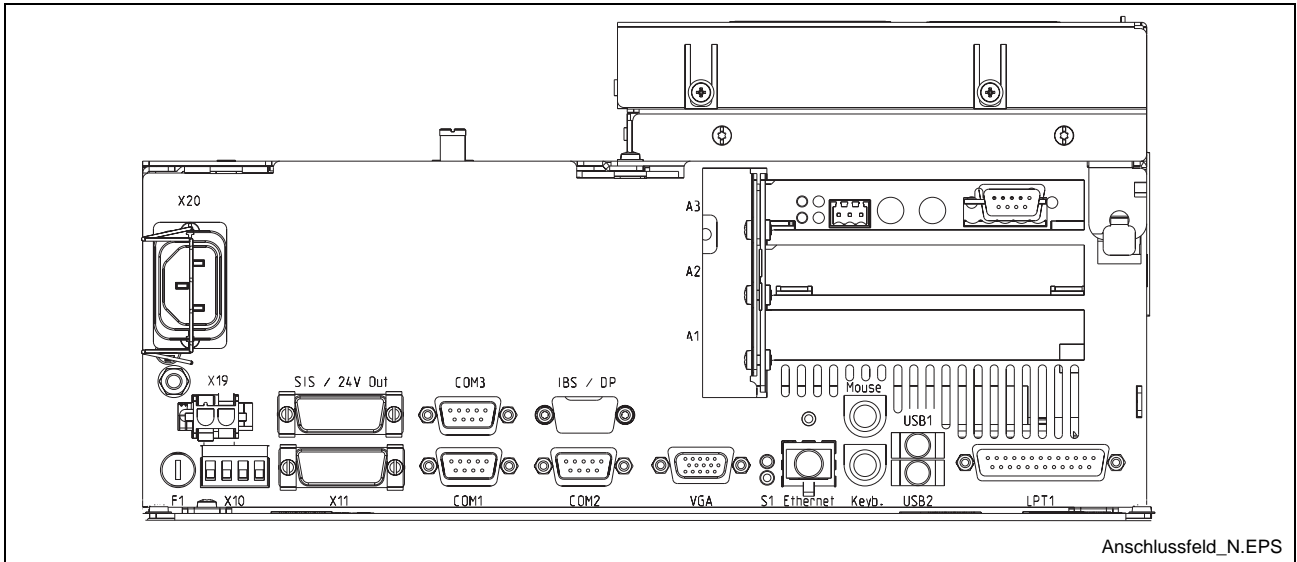


Fig. 7-1: Connector panel N without special interfaces
(housing shape varies according to the device variant)

7.2 View on the Connector Panel with PROFIBUS DP Slave and 24 V Outputs

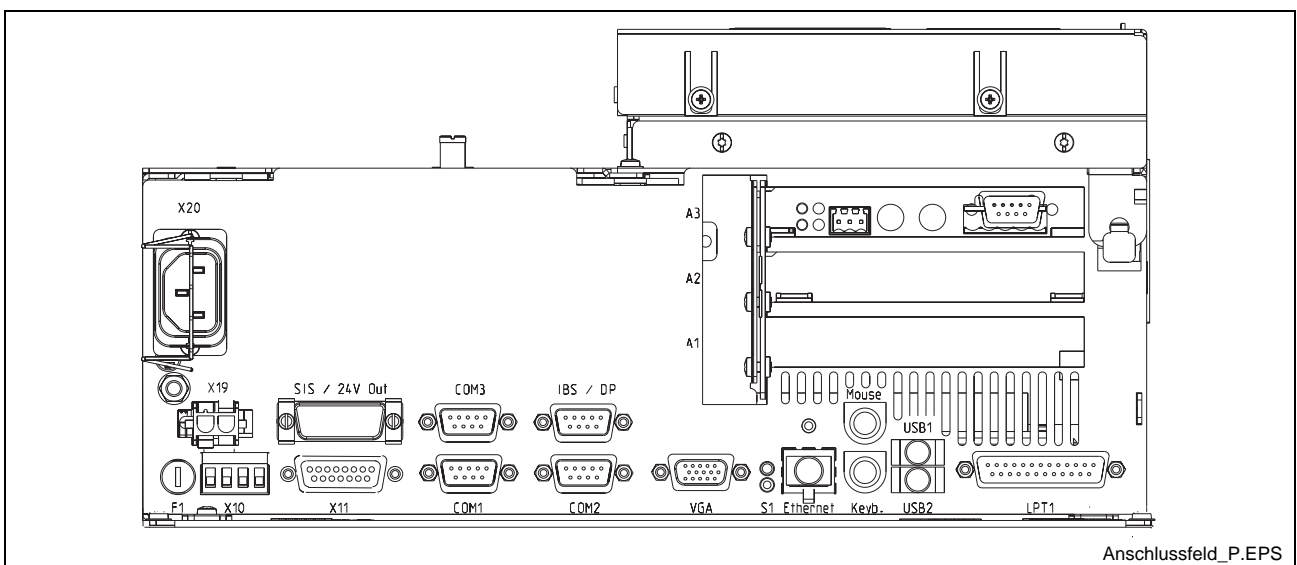


Fig. 7-2: Connector panel P with PROFIBUS DP slave and 24 V outputs
(housing shape varies according to the device variant)

7.3 View on the Connector Panel with SIS Interface and Operator Terminal Bus

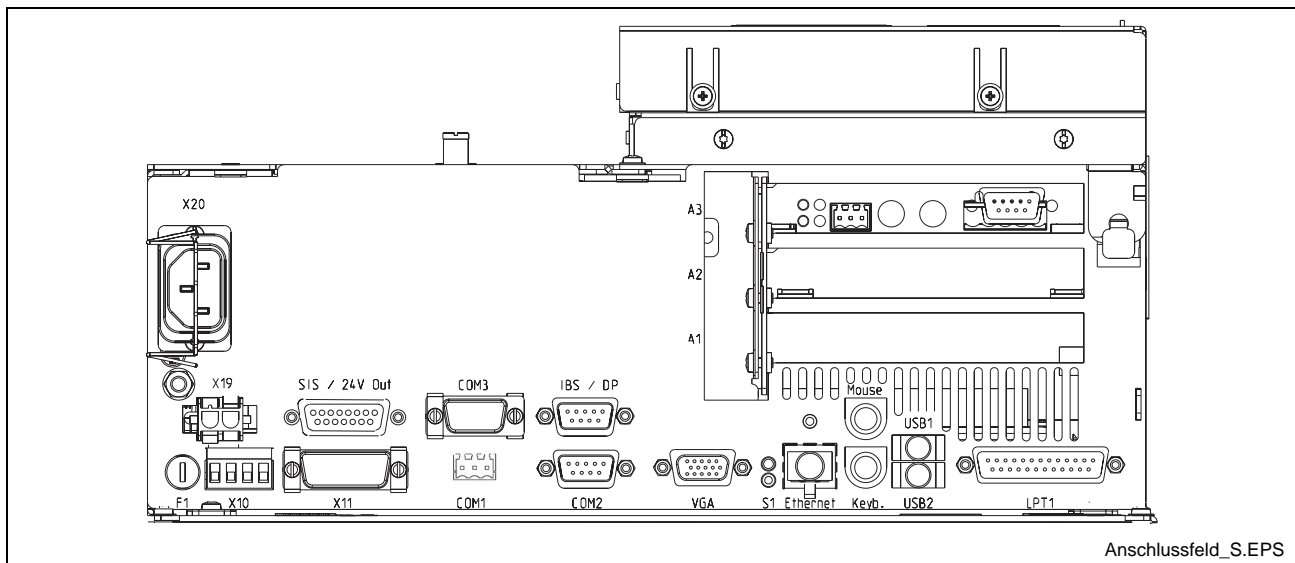


Fig. 7-3: Connector panel S with SIS interface and operator terminal bus (housing shape varies according to the device variant)

7.4 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	Mouse	PS/2 – Mouse	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 connector, 6-pin
o	Keyb.	PS/2 – Keyboard/Mouse	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 connector, 6-pin
o	SIS / 24V Out X11	SIS (upper female connector): Serial interface according to Rexroth standard (RS-232, RS-422, RS-485)	D-Sub female connector, 15-pin	D-Sub connector, 15-pin
		24 V Out (lower female connector): 8 x 24 V output, 500 mA	D-Sub female connector, 15-pin	D-Sub connector, 15-pin
o	Ethernet	Network connection: Ethernet 10Base T / 100Base X	RJ45 female connector, 8-pin	RJ45 connector (twisted pair 8-core)
o	VGA	VGA connection of an external CRT monitor	VGA-HD female connector, 15-pin	VGA-HD connector, 15-pin
o	IBS / DP	IBS: BT bus interface	D-Sub female connector, 9-pin	D-Sub bus connector IP20, 9-pin
		DP: PROFIBUS DP slave		
o	COM1, COM2, COM3	Serial interfaces: RS-232 (UART 16550), not assigned	D-Sub connector, 9-pin	D-Sub female connector, 9-pin
o	LPT1	Parallel interface: supports standard SPP-, EPP-, ECP mode	D-Sub female connector, 25-pin	D-Sub connector, 25-pin (e.g. printer cable)
o	USB1, USB2	USB interfaces	USB female connector, 4-pin, type A	USB connector, 4-pin
o	X20	PC power supply: 230/115 VAC	Inlet connector for non-heating apparatus	Inlet female connector for non-heating apparatus
o	X10	PC power supply: 24 VDC (as an alternative to X20)	Weidmüller 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
c	-	Floppy power supply +5 VDC (X76 on carrier board)	FDD female connector, 4-pin	FDD power line with connector, 4-pin
c	-	Data connection for 3,5" or 5,25" floppy disk drive (SD, HD, ED) (X75 on carrier board)	Male connector strip 34-pin (IDC)	Female connector strip 34-pin (IDC) (data line for floppy disc drive)
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 (X112 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 to be used as an alternative to USB2 on the bottom side of the housing (connector panel)	USB female connector, cap in degree of protection IP 65	USB connector, 4-pin
c	USB	USB interface to be used as an alternative to USB1 on the bottom side of the housing (connector panel)	USB female connector, 4-pin	USB connector, 4-pin

Connection point:

o= Top side of the housing, f= Front of the operator terminal

Fig. 7-4: Connector types for IndraView P16 / IndraView P40

Serial Interface COM1 to COM3

COM1 to COM3: Depending on the device variant up to three serial standard interfaces are available at the connections COM1 to COM3.
Serial Interfaces:

D-Sub Connector, 9-pin			
Type:	RS-232		
Cable length:	Max. 15 m		
Cable type:	Shielded, cross section min. 0.14 mm ²		
Transmission rate:	Max. 115200 bits/s		
Handshake:	Hardware and software handshake (XON, XOFF)		
	COM1	COM2	COM3
Interrupt (IRQ):	4	3	10
I/O address:	AUTO (or 3F8H)	AUTO (or 2F8H)	3E8H
BIOS presettings:	Enabled	Enabled	Enabled

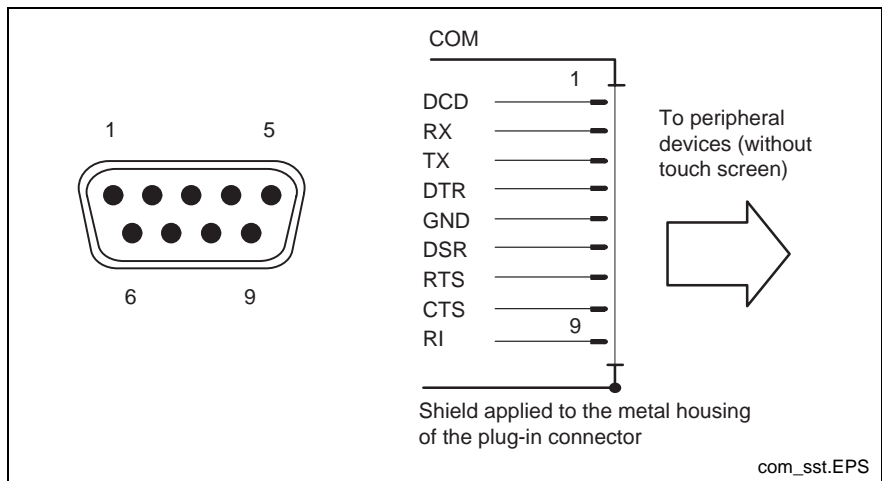


Fig. 7-5: Pin assignment for COM1 to COM3

Serial Multi-Mode Interface According to Rexroth Standard "SIS"

SIS:
Serial Interface according to
Rexroth Standard

The serial interface SIS is a multi-mode interface (according to the Rexroth standard) that provides data of the internal COM1 interface with RS232 as well as with RS422 levels.

The 15-pin D-Sub female connector of the SIS interface has the following pin assignment:

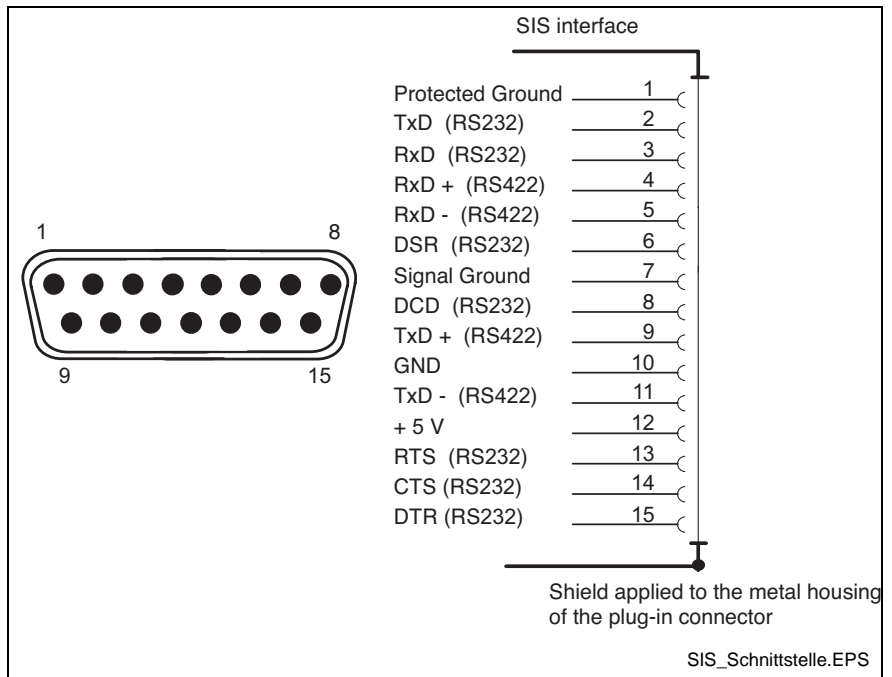


Fig. 7-6: Pin assignment of the SIS interface

Configuration

The configuration is specified in the Windows UPS Utility Software (see chapter 9 "Software").

IBS: BT Bus Interface

IBS: BT Bus Interface

The 9-pin D-Sub female connector denoted with "IBS" provides a BT bus connection. Up to four operator terminals can be connected via the BT bus. The length of the bus cable from the power-on unit to the last operator terminal may not exceed 50 m.

The internal interface COM3 of the PC is used for the BT bus, so that the standard interface COM3 is not available at the connector panel for devices with BT bus.

The BT bus has the following pin assignment:

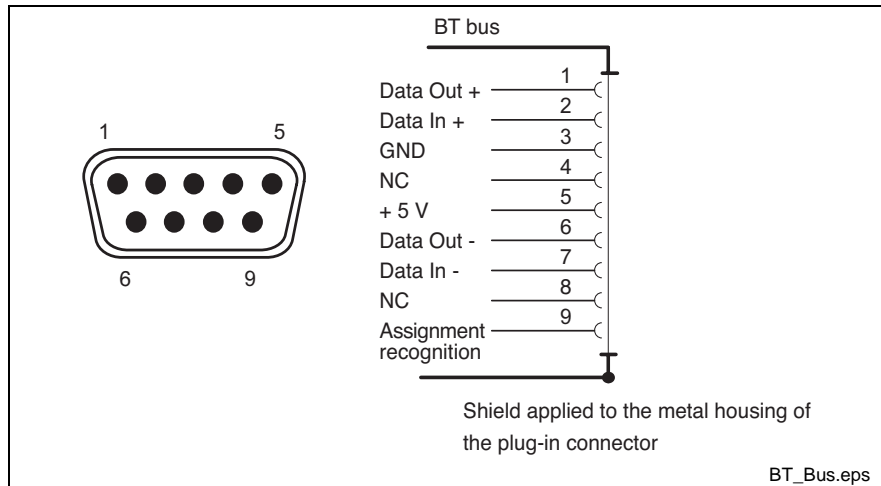


Fig. 7-7: Pin assignment of the BT bus

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. Windows 95/NT: 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 LPT1

LPT1 – Parallel Interface for Printer, Scanner, CD ROM, 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 ²
Interrupt (IRQ):	7
I/O address:	AUTO or 378H (recommended)

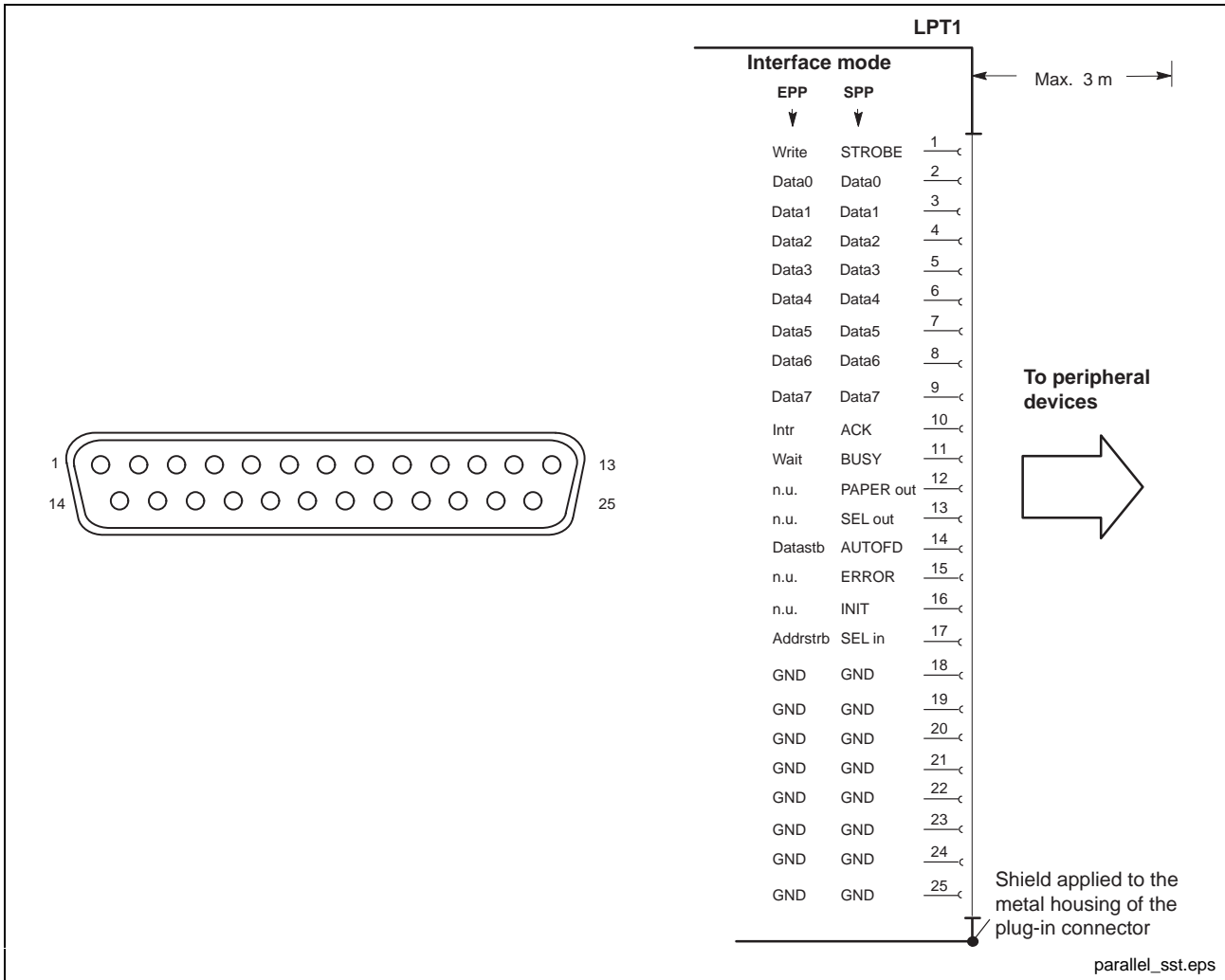


Fig. 7-8: LPT1 interface

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

LPT1 – Parallel Interface for
Printer, Scanner, CD ROM drive

The devices feature two USB interfaces (USB1 and USB2).

Via the USB interfaces up to 128 devices can be connected in series, that are also provided with USB (Universal Serial Bus).

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

Note: The USB interfaces are not supported by the operating system Windows NT4.0.

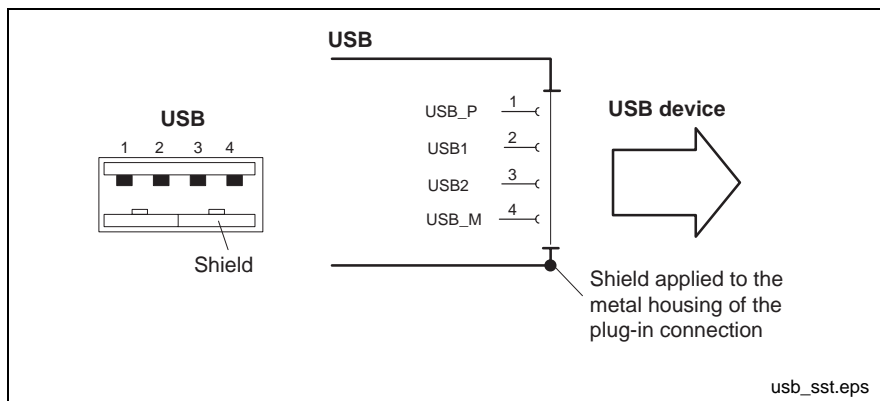


Fig. 7-9: USB interfaces

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

The USB1 as well as the USB2 interface are provided on the connector panel. The signals of interface USB1 are also available on a female connector on the carrier board in the PC box (e.g. to connect a dongle). Additionally, the signals of interface USB2 are lead to the front panel; the corresponding female connector is mounted behind the covering on the left bottom side.

Note: Only one of the two connections of the USB interfaces should be used:
 USB1: either at the connector panel or inside the PC box
 USB2: either at the connector panel or on the front panel.
 Otherwise a faultless operation can't be ensured.

Ethernet Interface

Ethernet – Network Connection

The operator terminal can be connected with an Ethernet network via an Ethernet interface.

RJ45, female connector, 8-pin	
Type:	Ethernet 10Base T / 100Base X
Cable length:	Max. 100 m
Cable type:	Shielded, 2-core, twisted
Transmission rate:	10 or 100 Mbits/s

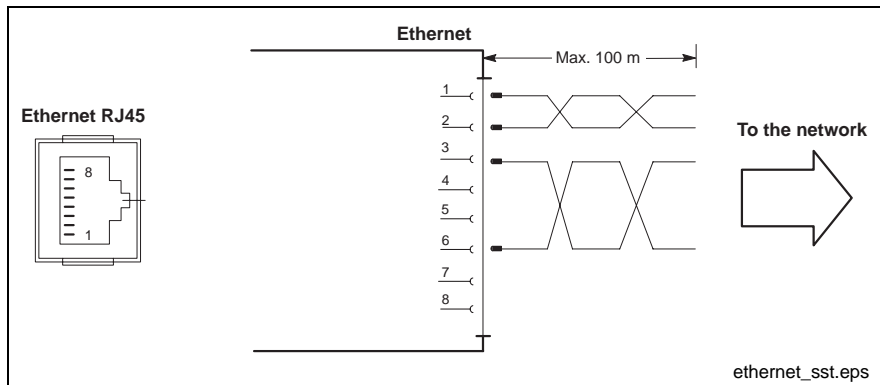


Fig. 7-10: Ethernet interface

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 transfer shall occur with 10 Mbits/s and/or with 100 Mbits/s.

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

VGA Interface

VGA Connection of an External Monitor

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

- Video RAM: Max. 8 MB

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.

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

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

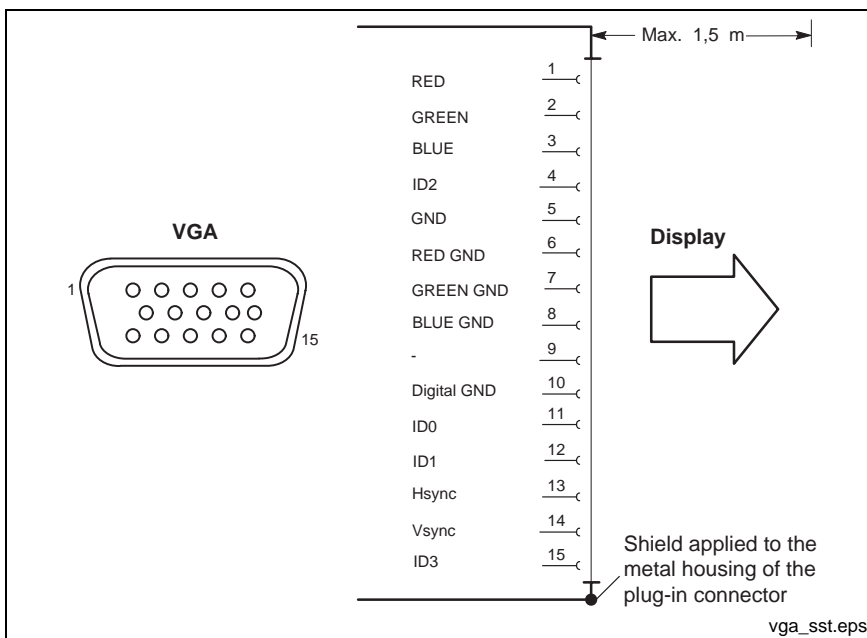


Fig. 7-11: VGA interface

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 can 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 TCO99. In addition, you should achieve the desired display resolution with a refresh rate of at least 72 Hz.

Combined Keyboard/Mouse Interface

Keyb. - PS/2 Mini DIN Keyboard /
Mouse Interface

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

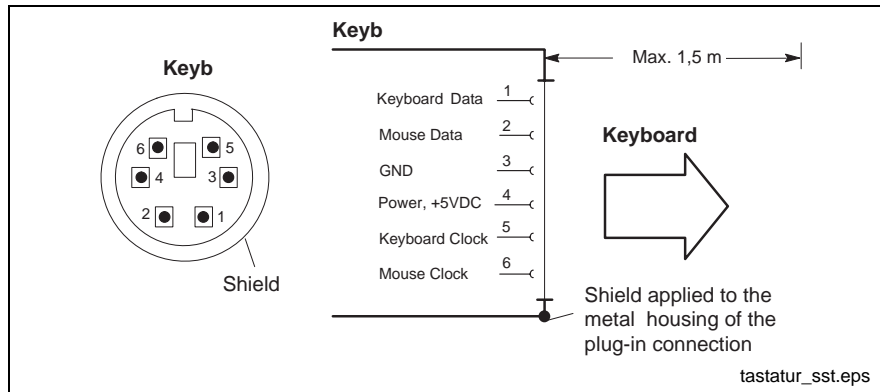


Fig. 7-12: Combined keyboard/mouse interface

Mouse Interface

Mouse - PS/2 Mouse Interface

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

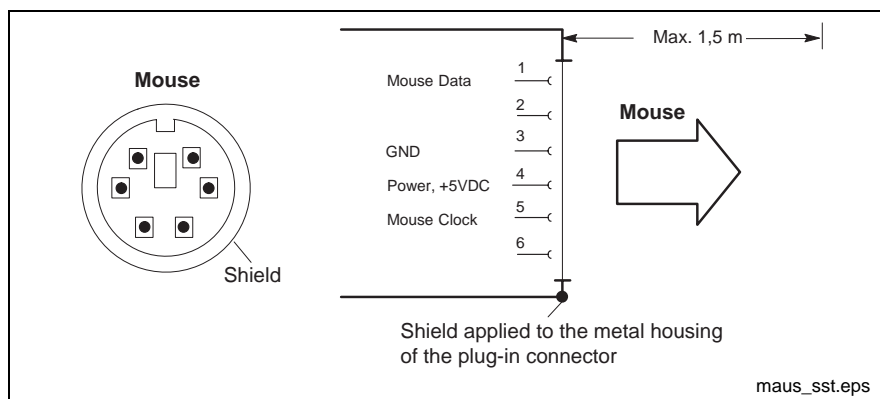


Fig. 7-13: Mouse interface

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 occupied by another PC extension card, you should change the IRQ of this extension card to another IRQ, that is still free.

24 V Outputs

24 V Out The connections 1 to 8 of the D-Sub female connector "24 V Out" provide eight digital 24 V outputs. The ground connections are the pins 9 to 15.

D-Sub female connector, 15-pin	
Cable length	Max. 20 m
Cable type	Shielded, min. 0.14 mm ²
Rated current (1 signal)	250 mA
Current range for 1 signal for 24 V (permanent)	Max. 300 mA
Voltage drop for 600 mA	Max. 3 V
Leakage current (0 signal)	Max. 2 mA
Short-circuit current with over-temperature	Max. 2,5 A
Switching time	Max. 300 us

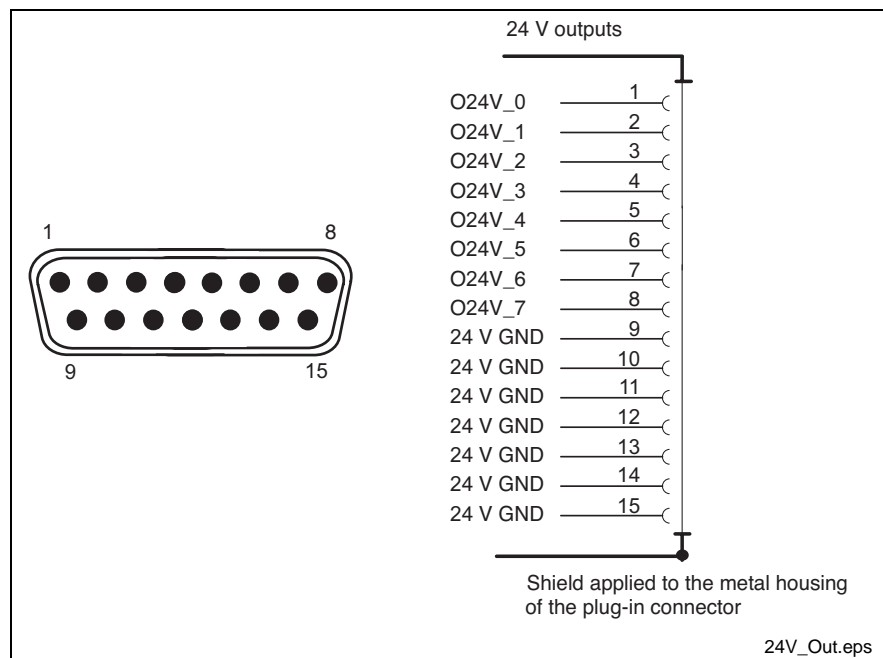


Fig. 7-14: Pin assignment of the 24 V outputs

Note: If the 24 V outputs are used, a voltage of 24 VDC has to be applied at connector X10 to supply devices with a 230/115 VAC voltage connection.

Relay Contact "Ready"

Devices with SIS and BT interface feature a relay contact at a 3-pin connector, which is integrated instead of the serial interface COM1. This contact is closed, if the W/T LED (see chapter 6-2) flashes green.

Characteristic values of the relay	
Switching capacity	0,5 A / 30 VDC
Response time	4 ms
Fall time	3 ms
Bounce time	2 ms

The assignment of the 3-pin Weidmüller connector is as follows:

PIN	Signal designation
1	Relay
2	Relay
3	N.C.

Fig. 7-15: Connection of the relay contact

PC Power Supply

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 NDTB 1.5, 4-pin. To this connector terminal, cables with a cross section of maximum 1.5 mm² can be connected.

Note: Also for devices with a 23/115 VAC voltage connection an additional voltage of 24 V has to be applied, if the device features 24 V outputs.

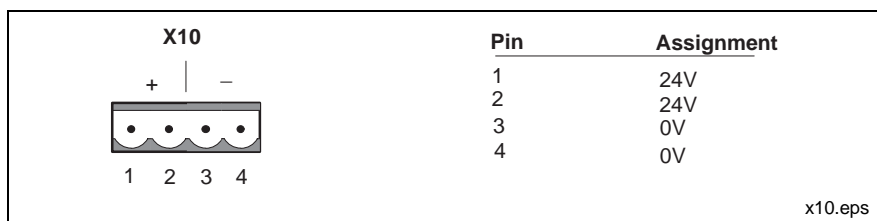


Fig. 7-16: Pin assignment of the 24 VDC connection X10

Parameter	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) medium time-lag
Reverse voltage protection	Via isolating diode The line-side fuse is activated when polarity reversal occurs.

Fig. 7-17: 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!

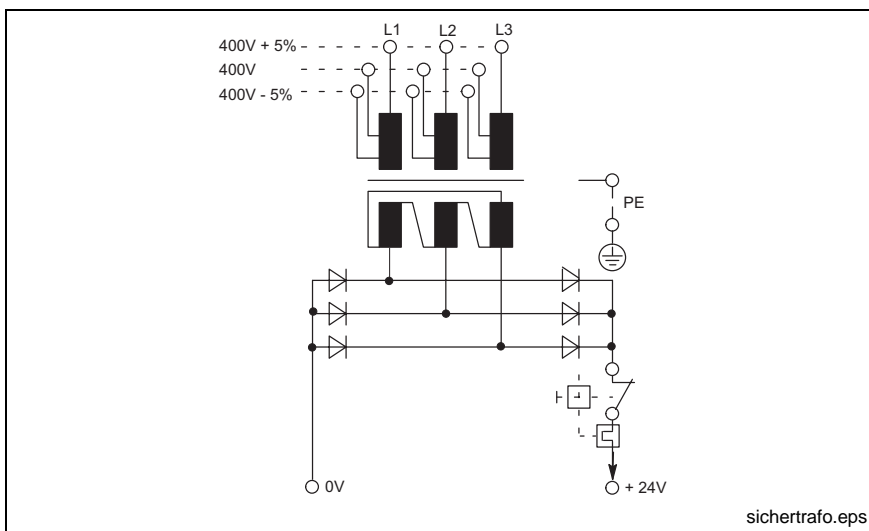


Fig. 7-18: Safety transformer according to EN 60742

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.

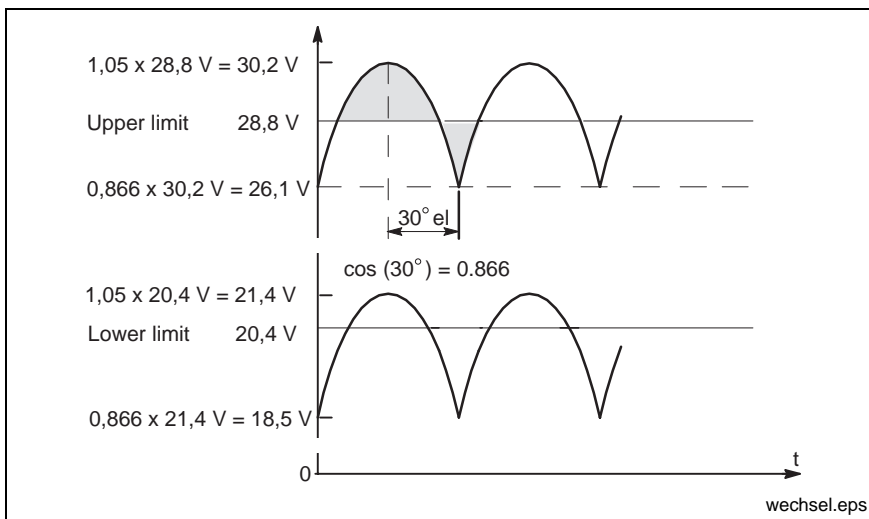


Fig. 7-19: Representation of the limit values for the 24 VDC voltage

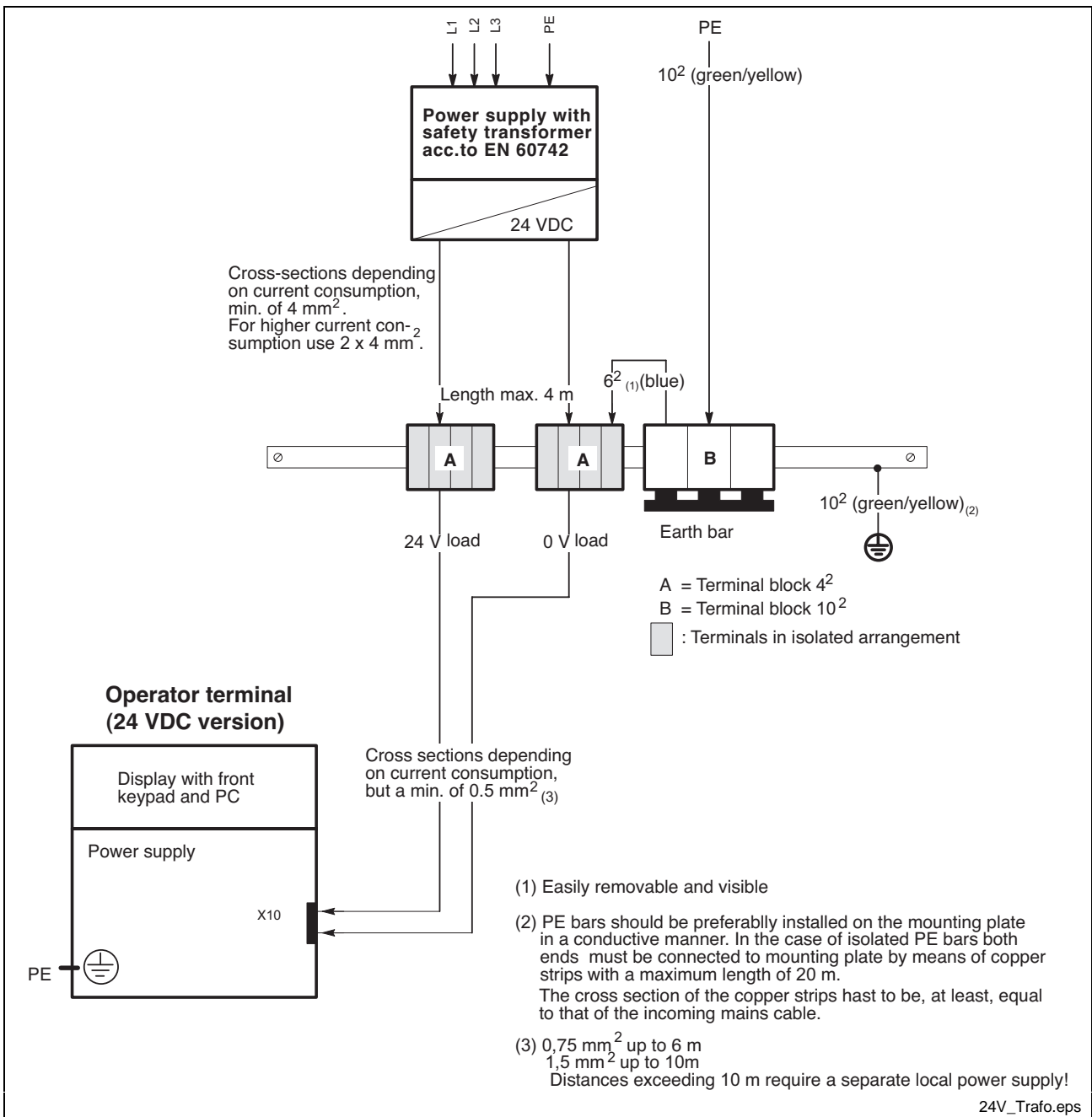


Fig. 7-20: Wiring of the power connection 24 VDC and the operator terminal

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.

Note: Also for devices with a 230/115 VAC voltage connection an additional voltage of 24 V has to be applied at connector X10, if the device features 24 V outputs.



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. Maximum cable cross section for the connected cables is 1.5 mm².



Fig. 7-21: Pin assignment of the 230/115 VAC connection X20

Parameter	Value
Rated voltage	85 VAC ... 264 VAC auto range
Power consumption for $U_N = 230$ VAC	0.7 A
Power consumption for $U_N = 115$ VAC	1.4 A
Inrush current for $U_N = 230$ VAC	30 A cold start 25 °C
Inrush current for $U_N = 115$ VAC	15 A cold start 25 °C
Line-side fuse	1.6 A (5x20)

Fig. 7-22: Technical data 230/115 VAC connection

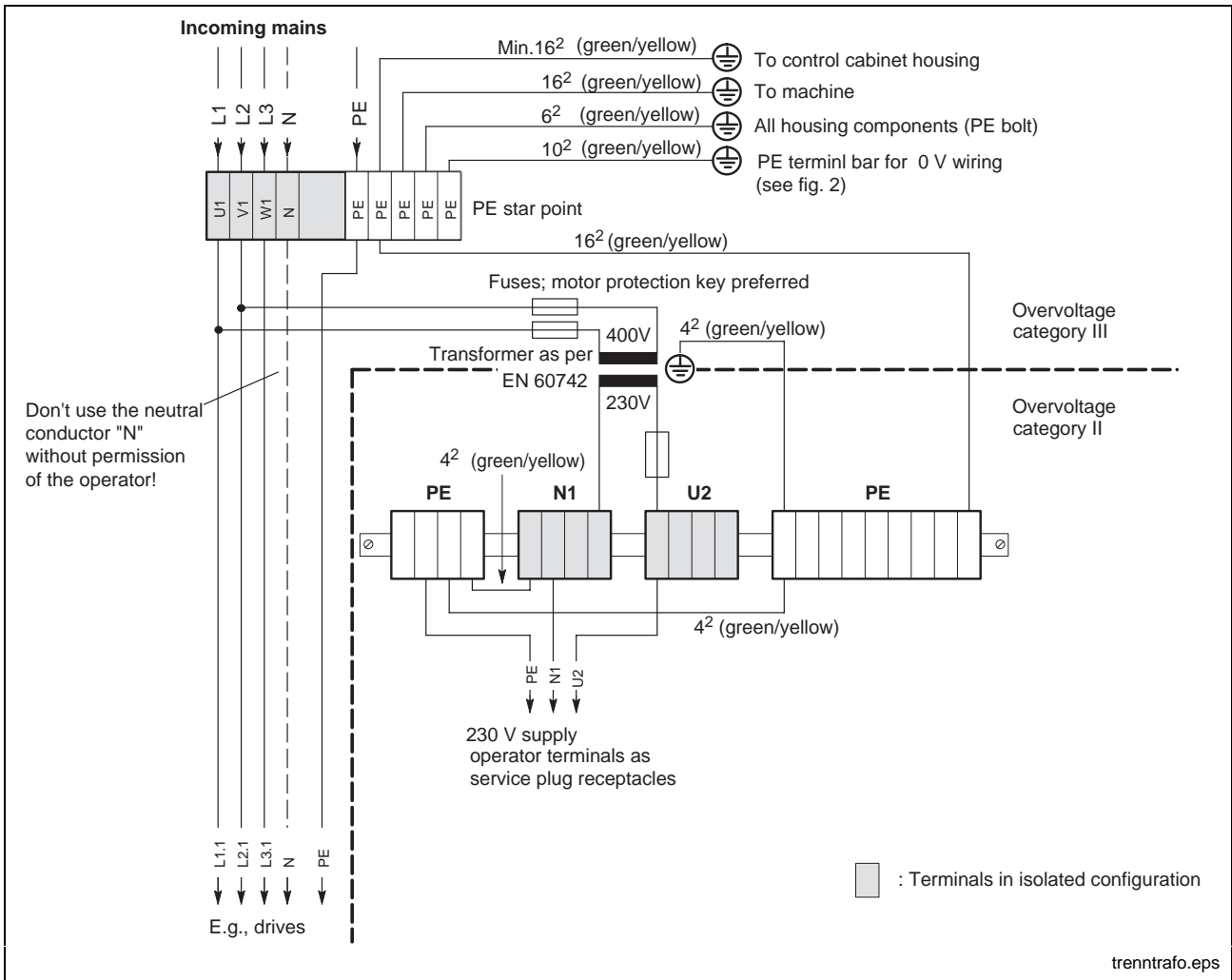


Fig. 7-23: Voltage connection 230 VAC via isolating transformer

Floppy Disk Connection

The male connectors to connect a floppy disk drive are inside the housing. The ribbon cables are guided through a clearance in the housing outwards (see section Abb. 4-5).

X75 – Connection drive "A"

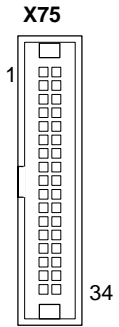
The integrated floppy disk adapter supports the following drives:

- 5.25 " or 3.5 "
- Double density (360 kB or 720 kB)
- High density (1.2 MB or 1.44 MB)
- Enhanced floppy mode (2.88 MB)

Note: Only one drive type can be connected at the same time.

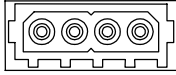
Male connector strip, 34-pin	
Type:	3,5" FD (standard)
Cable length:	Max. 0.5 m
Cable type:	34-pin ribbon cable, unshielded
Interrupt (IRQ):	Free
I/O address:	300H
BIOS presettings:	Onboard FDC: AUTO Floppy disk controller: Enabled

Pin	Assignment	Pin	Assignment
1	GND	2	Density Select
3	GND	4	N/C
5	GND	6	N/C
7	GND	8	Index
9	GND	10	Motor Enable A
11	GND	12	Drive Sel B
13	GND	14	Drive Sel A
15	GND	16	Motor Enable B
17	GND	18	Direction
19	GND	20	Step
21	GND	22	Write Data
23	GND	24	Floppy Write Enable
25	GND	26	Track 0
27	GND	28	Write Protect
29	GND	30	Read Data
31	GND	32	Head Select
33	GND	34	Disk Change



X76 – Power Supply of the Floppy Disk Drive

Power supply of an external floppy disk drive.

Female connector, 4-pin		
Supply:	Max. +5 V, +12 V, 0,9 A	
	Pin	Assignment
X76, female connector		
1 2 3 4	1	+12 V
	2	GND
	3	GND
	4	+5 V

Note: The voltages +5 V and +12 V are monitored to avoid over- and under-voltages. If a voltage error occurs, the PC power supply unit switches immediately off.

Battery Connection

X19 Battery Connection

Connection terminal for an external battery for the integrated UPS:

2-pin	
Cable length	Max. 3.0 m
Cable type	Unshielded, cross section 1.5 mm ²

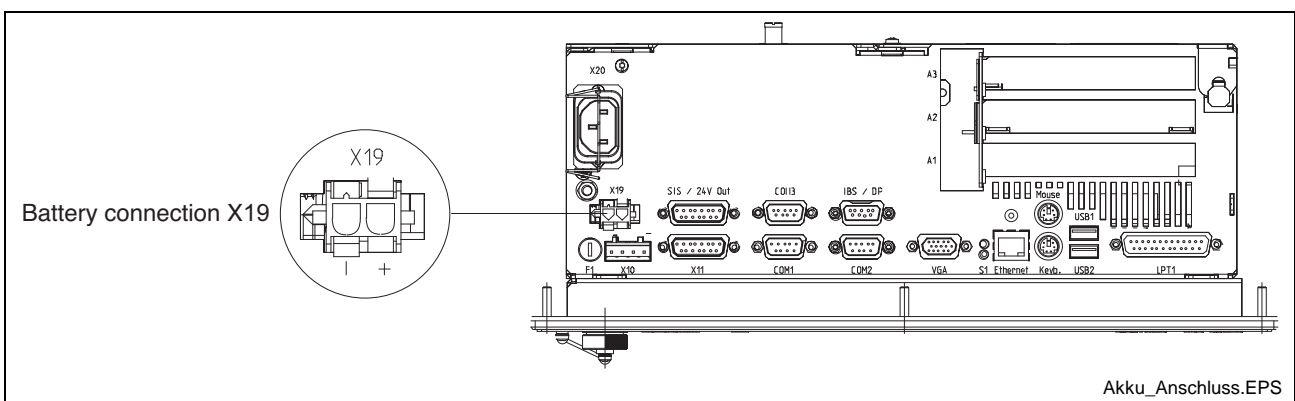


Fig. 7-24: Battery connection

8 Maintenance and Installation

8.1 General Information

The operator terminals are maintenance-free. Some components are subject to wear and must be replaced.

Maintenance Include the following tasks 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.



CAUTION!

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

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

-
- 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.



DANGER

Risk of injury through rotating fan impeller!

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

-
- 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.

Note: Concerning spare parts function compatibility is ensured for at least 5 years.

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 UPS LED on the front panel flashes red until the UPS switches off the power supply unit). If required, unplug all connectors.
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.

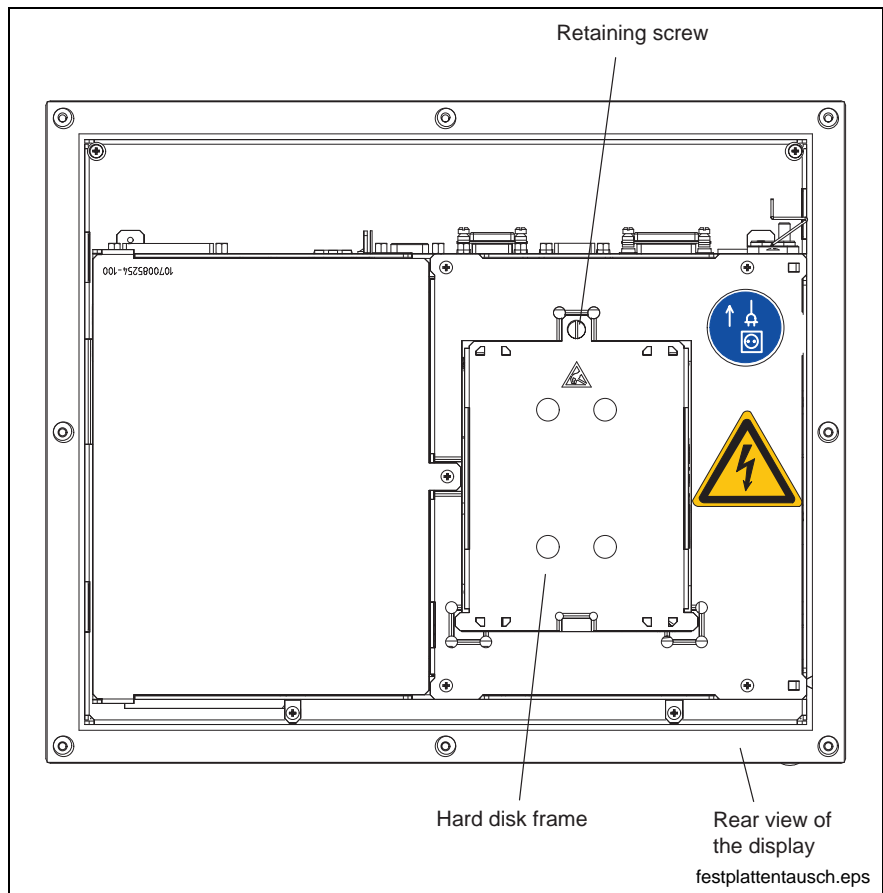


Fig. 8-1: Position of the hard disk's installation frame and the retaining screw

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.
6. The new hard disk parameters are automatically recognized by the system. If the operating system does not boot automatically after switching on the operator terminal, interrupt the power supply for at least 10 seconds and restart.
7. If there's still no system available, check cable connections leading to the hard disk and the interface connectors for tightness and verify, if the power supply is ready for use.
8. 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 Rechargeable Battery Pack



CAUTION!

Risk of data loss in the RAM during battery exchange!

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

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 ambient temperature and specified in the table below.
- The red LED "UPS" on the front panel flashes for longer than 8 hours.

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 ambient temperature, in which the battery pack is used. Ambient 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 an operator panel housing.

The following table can be used as guideline:

Ambient 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. 8-2: 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.

External Battery

For the BTV 16.1 and the BTC 40.1 an external battery pack for cabinet mounting is available.

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.

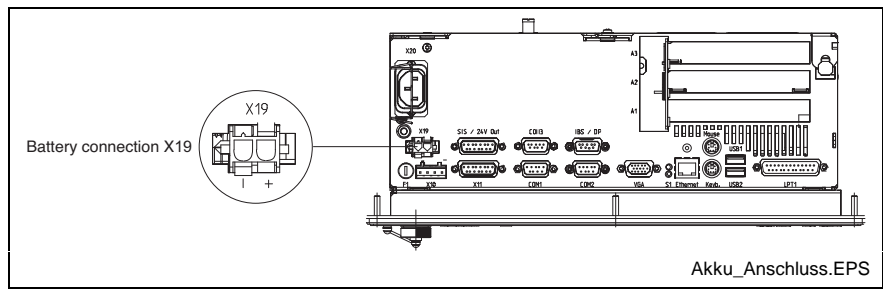


Fig. 8-3: Position and pin assignment of the battery connection



DANGER

⇒ Ensure that the polarity of the batteries is correct. In the case of a polarity reversal of the batteries a F10A (5x20) fuse is released on the power supply unit.

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.

Testing the New Component

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

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

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 mm² 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.

To place extensions cards slots for PCI bus and ISA bus are available. Corresponding to the PC box type according to Fig. 4-5 on page 4-2 a maximum of four PCI and four ISA cards 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 not-released extension cards!

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

Installing 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 UPS LED on the front panel flashes red until the UPS switches off the power supply unit).
3. Remove the housing cover at the rear side. For this, only the mounting 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.

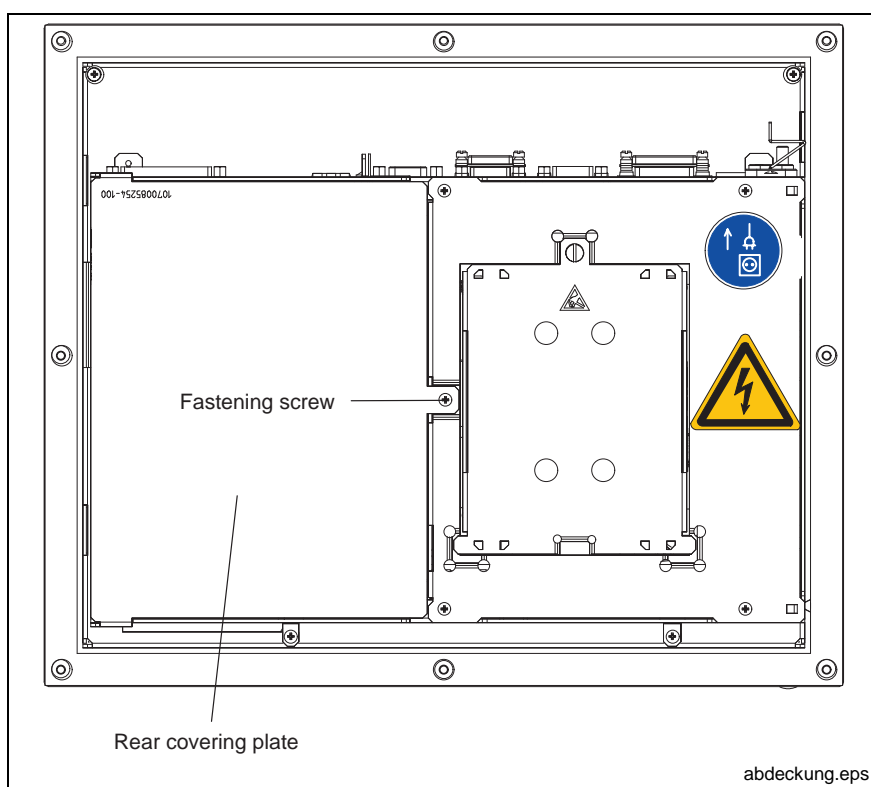


Fig. 8-4: Position of the housing cover and the mounting screw

4. Remove the fastening screw from the slot cover.
5. Place the extension card and fix it with the fastening screw.

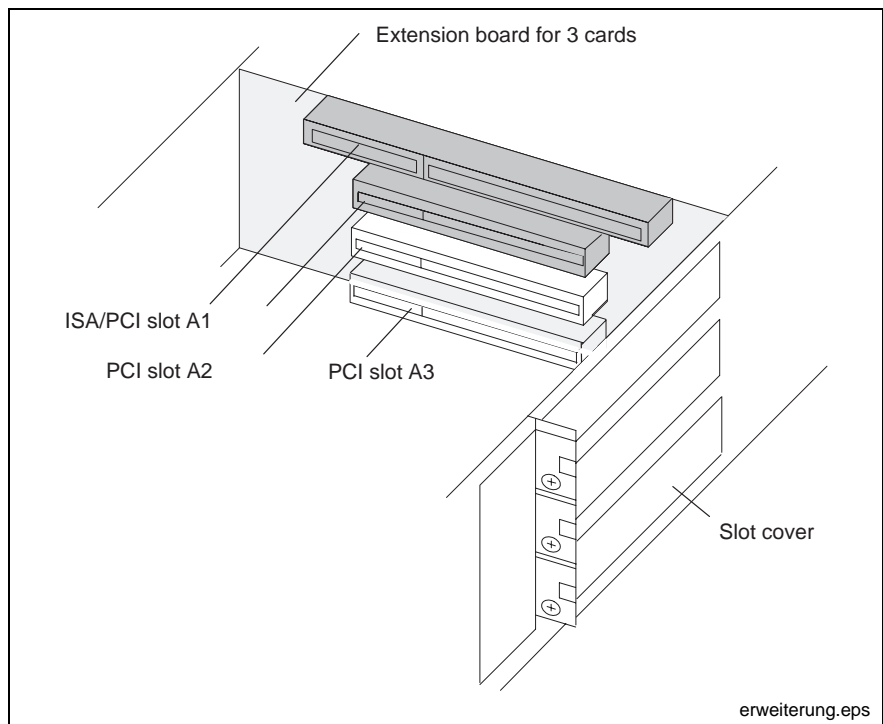


Fig. 8-5: Position of the slots for extension cards exemplified by variants BTV16.1ABA, -ACA and -ADA

6. Mount the housing cover.



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 (e.g. Control Panel of NT).

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 "The Advanced Menu / PCI Configuration sub menu" 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"
BIOS selection: PCI IRQ line 1, PCI IRQ line 2, PCI IRQ line 3, PCI IRQ line 4
Option: Disabled, Auto, IRQ: 3, 4, 5, 7, 9, 10, 11, 12, 14, 15
Default: AUTO
- ISA Slot (IRQ)** In the BIOS menu "The Advanced Menu / PCI Configuration sub menu / PCI/PNP ISA IRQ Resource Exclusion / IRQx" the IRQ address for not "Plug and Play"-compliant ISA cards (= Legacy ISA cards) is set.
BIOS selection: IRQ:3, 4, 5, 7, 9, 10, 11, 15
Option: Available, Reserved
Default: Available
- ISA Slot (UMB)** In the BIOS menu "The Advanced Menu/PCI Configuration sub menu / PCI/PNP ISA UMB Region Exclusion" for Legacy ISA cards a specific block is reserved in the upper memory.
BIOS selection: C800 - CBFF, CC00 - CFFF, D000 - D3FF, D400 - D7FF, D800 - DBFF, DC00 - DFFF
Option: Available, Reserved
Default: Available

9 Software

9.1 Application Software of the Monitoring Function

Temperature Monitoring

The ambient 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 exceeding **50 °C** inside the housing a temperature warning is indicated (only for devices with interface variant "N" or "P") as follows:

- via the red flashing LED "W/T" 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_{NT} for Windows NT 4.0 or Windows2000 (see section "UPS Program" on page 9-3).

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)

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_{NT}" (see page 9-3).

UPS Program

Functionality

The program "UPS_{NT}" 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
- set the PROFIBUS address
- set the COM interface for the touch screen controller
- set the SIS interface mode

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

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_{NT} 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_{NT} may only be carried out after consulting Bosch Rexroth.

Operation and Configuration of UPS NT

Note: To operate UPS_{NT} administrator rights are necessary!

Start/Stop During booting Windows NT the UPS_{NT} 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.

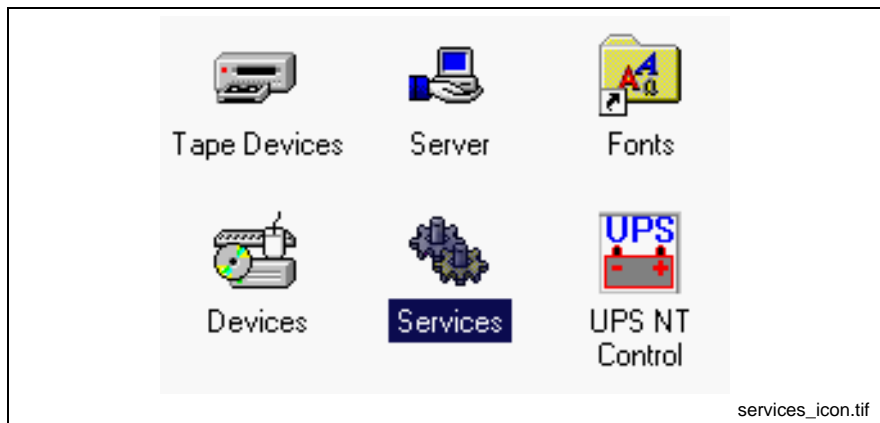
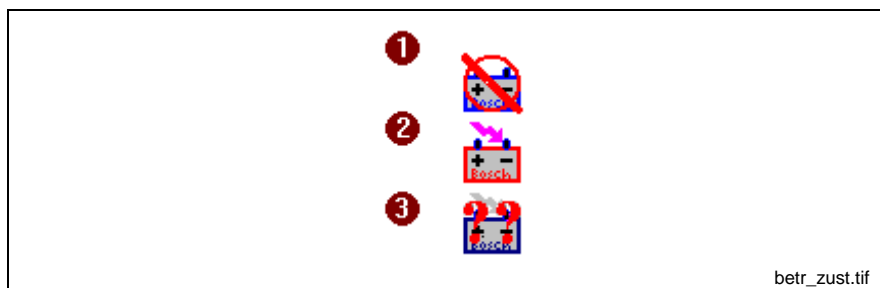


Fig. 9-1: Service-Manager of the Windows Control Panel

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



Key:

- 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_{NT} service is indicated:

- UPS_{NT} stopped: No entry in the status column
- UPS_{NT} started: Entry "Started" in the status column

The marked entry UPS_{NT} service is started or stopped via the **Start** or **Stop** button.

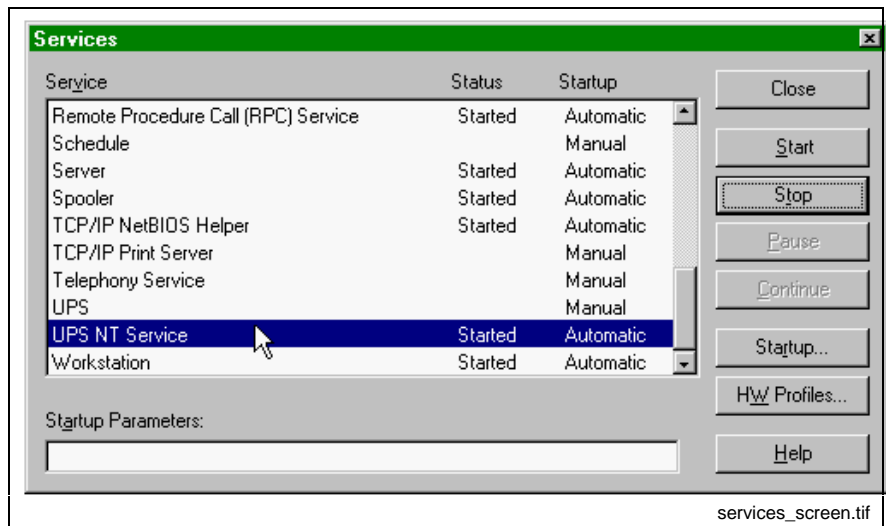


Fig. 9-3: The window "Services"

Configuration Select the UPS_{NT} program **UPS NT Control** in the system control (see Fig. 9-4).

Note: The UPS_{NT} 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.

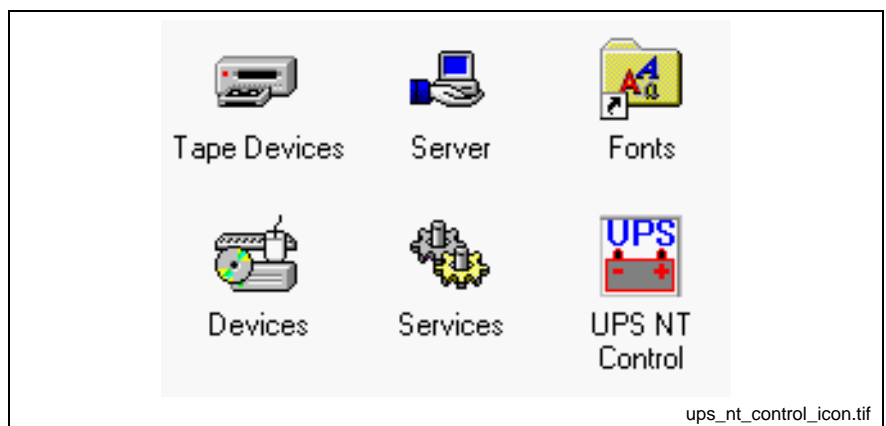


Fig. 9-4: Symbol "UPS NT Control" in the Windows Control Panel

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

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

- Register **UPS General**
- Register **System Health**
- Register **Profi Bus / Touch Mode**
- Register **SIS Bus Mode**
- Register **About**
- Register **Maintenance**.

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

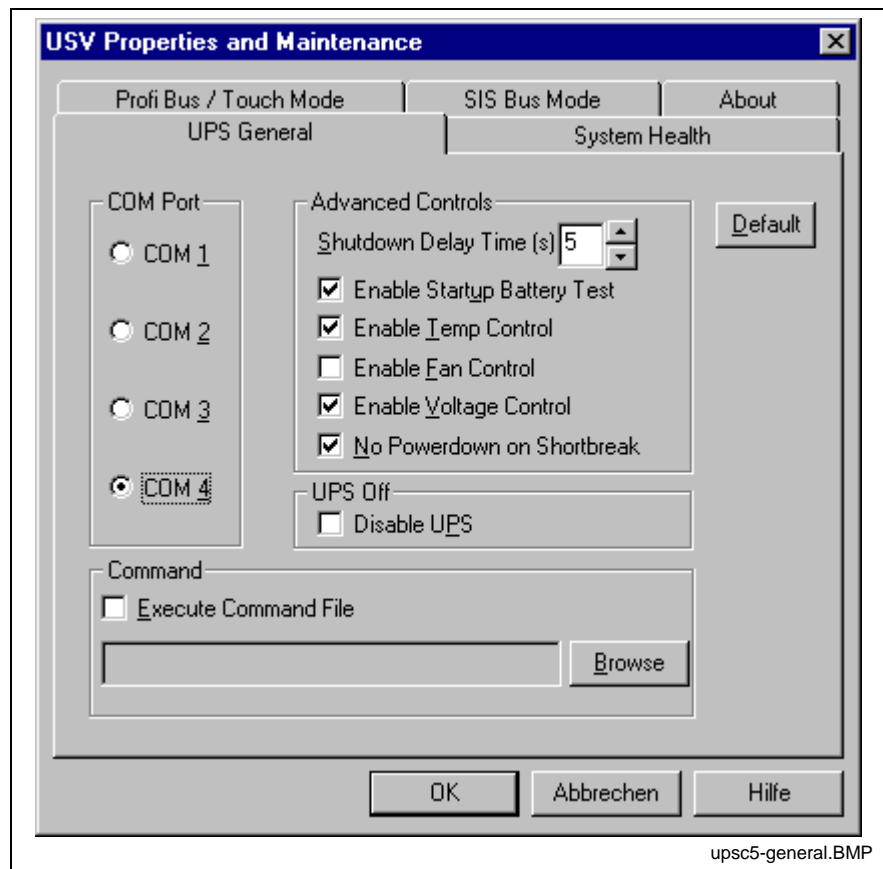


Fig. 9-5: Register **UPS General**

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 range **Advanced Controls** 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 send 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 send to the whole system and the UPS program is terminated.

Enable Temp Control: If this check box is activated a continuous monitoring of the ambient temperature takes place. A warning window pops up, if the temperature exceeds +50 °C and the LED Temp at the unit's front side is flashing. 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 Temp Control: If this check box is activated, the existing housing and CPU fans are monitored. In error case a corresponding message is indicated and send to the whole system.

Enable Temp Control: If the check box is activated, the internal supply voltages are monitored. In error case a corresponding message is indicated and send 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 can 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 Temp Control: active
- Enable Temp Control: active
- Disable UPS: inactive
- No Powerdown on Shortbreak: active
- Execute Command File: inactive

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

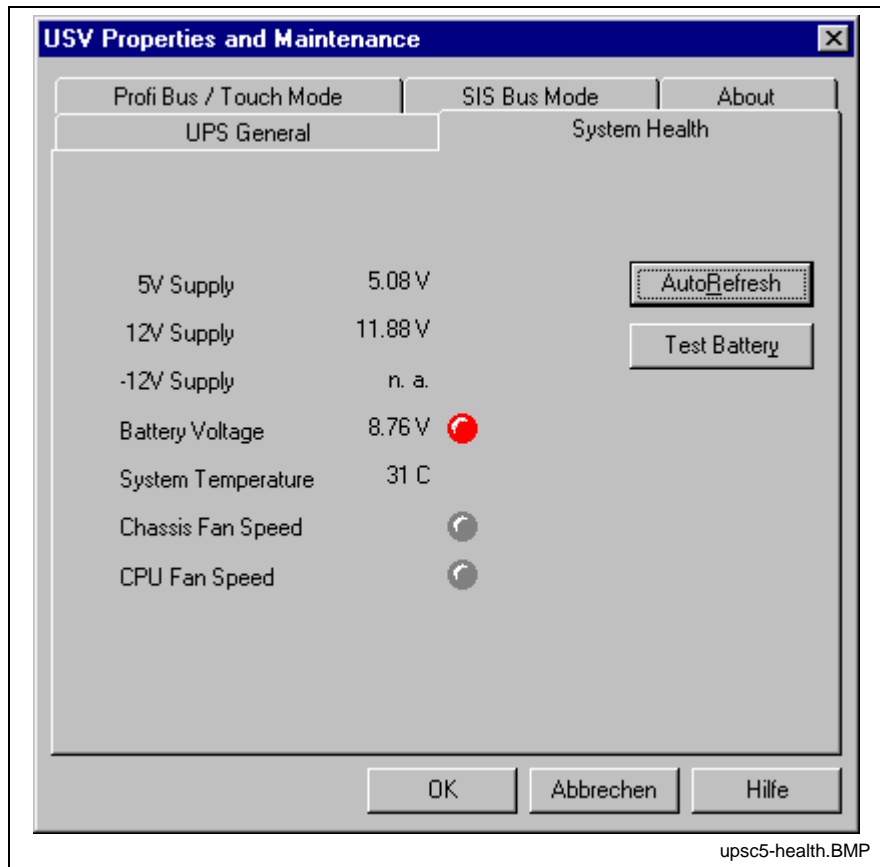


Fig. 9-6: Register **System Health**

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 button **Test Battery**.

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

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

PROFIBUS and Further Settings The register **ProfiBus/Touch Mode** is divided into two segments:

- Select PROFIBUS Address
- Select COM for Touch

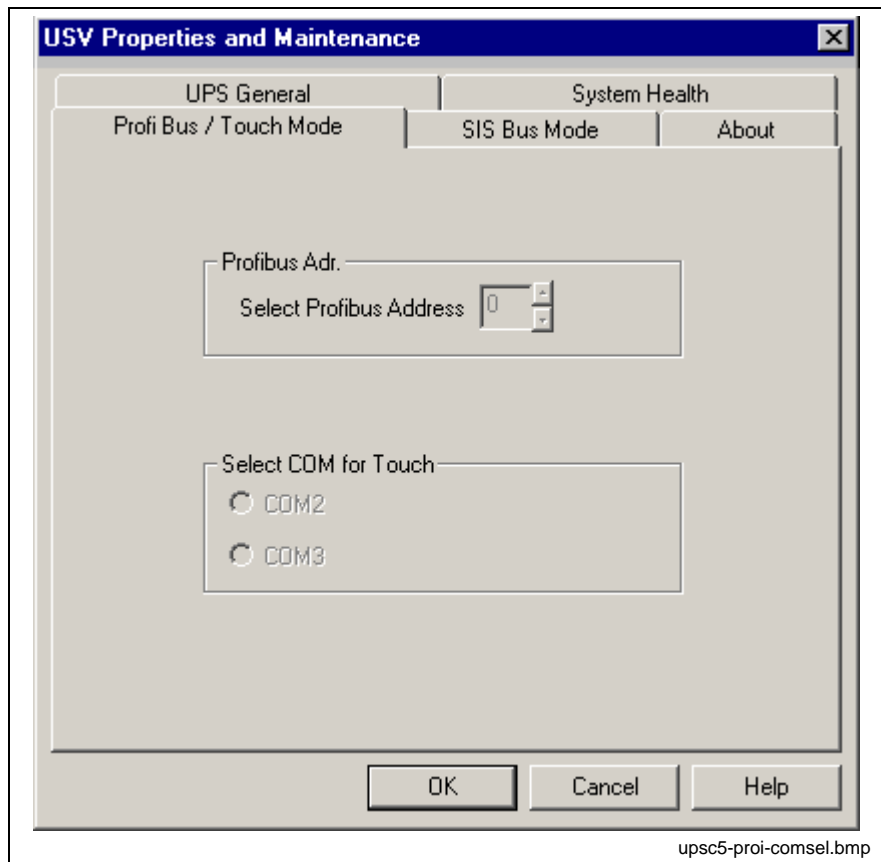


Fig. 9-7: Register **Profi Bus / Touch Mode**

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).

Profibus Adr.: At this place, the PROFIBUS address can be entered in the range between 0 to 127.

Select COM for Touch: This range is only active concerning operator terminals with touch screen. Depending on the hardware variant the COM interface for the touch screen controller can be selected.

SIS Bus Mode In the register **SIS Bus Mode** the desired function of the serial interface according to the Rexroth standard (SIS interface, RS485, RS422) is set.

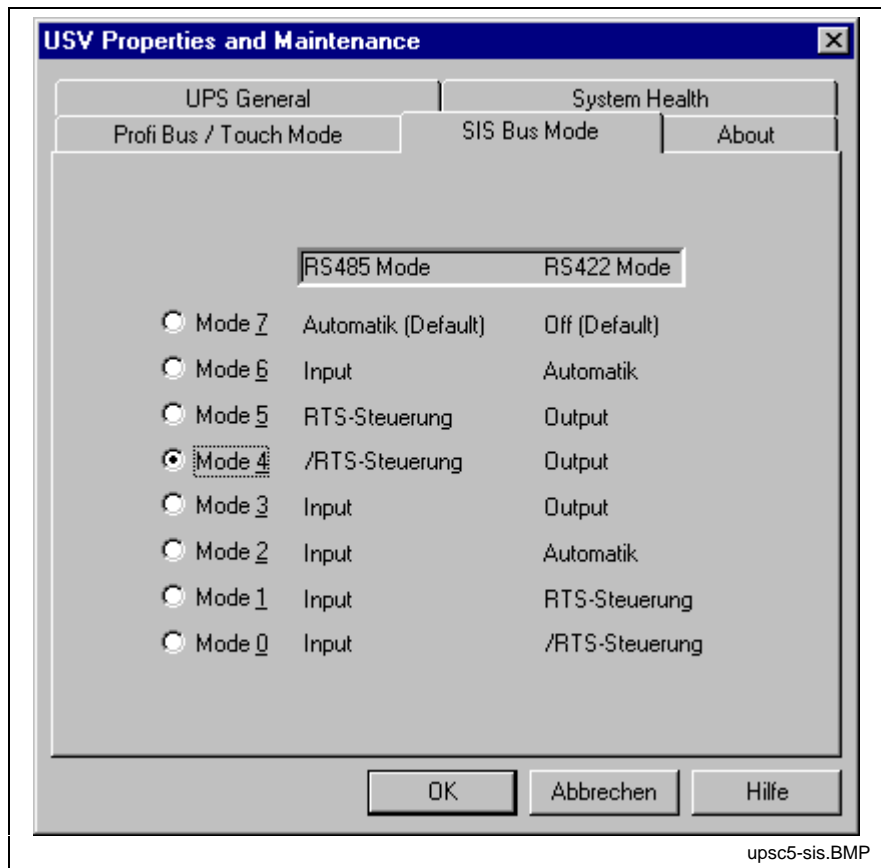


Fig. 9-8: Register **SIS Bus Mode**

Note: For the settings in this register the following applies: The UPS service is stopped and afterwards started again. The changes made are immediately effective.

About The value **Shutdown Count** indicated in register **About** indicates, how often the UPS has already shut down the system. A change of the batteries is recommended after more than 3000 trips initiated by the UPS.

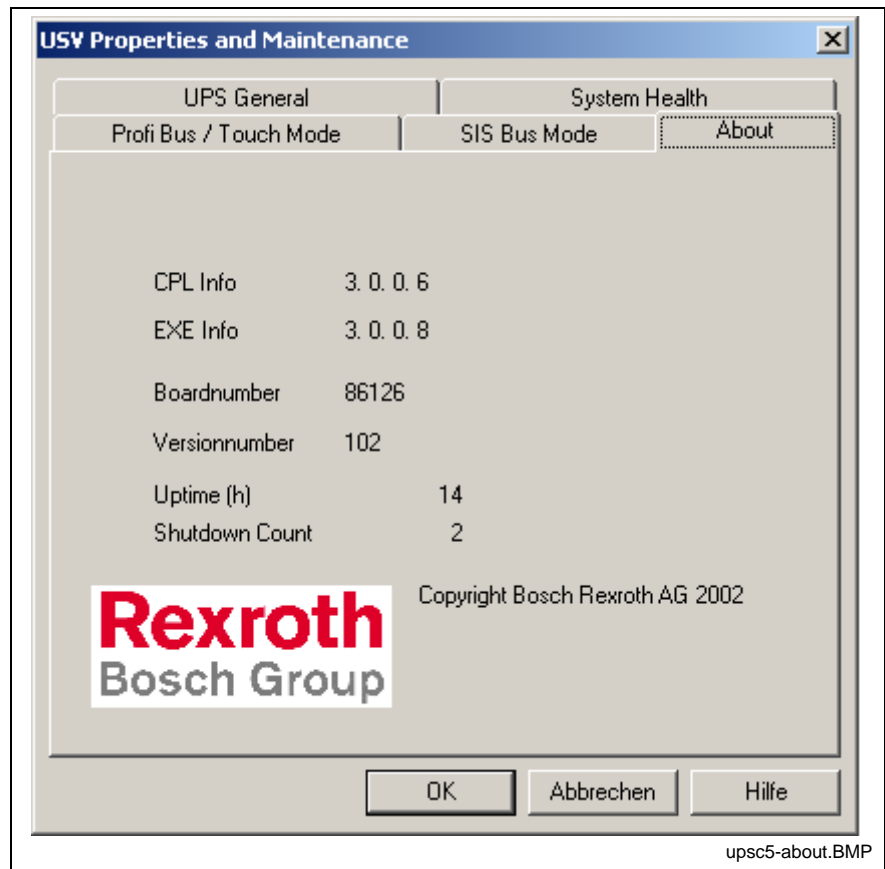


Fig. 9-9: Register "About"

9.2 Touch Screen Software

For the devices IndraView P16 BTV 16.1BB, BTV 16.1BC, BTV 16.1AB, BTV16.1 AC as well as IndraView P40 BTV 40.1BE, BTV 40.1BG, BTV 40.1AE and BTV 40.1AG a touch screen is used, that allows the operation of the application software 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.

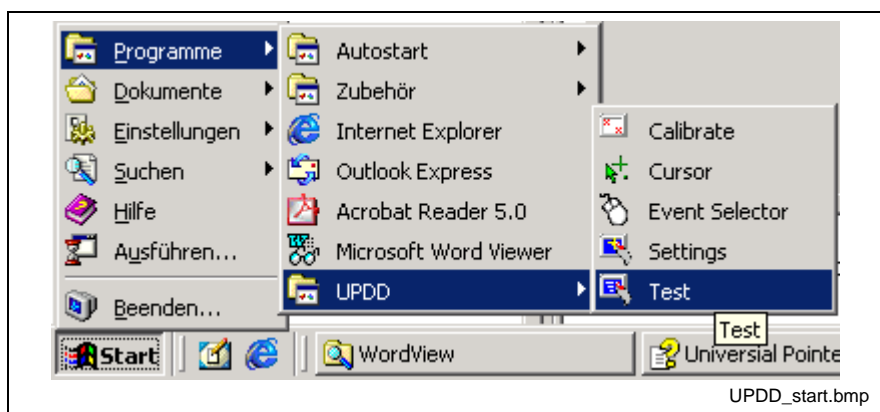


Fig. 9-10: UPDD setup programs for the touch screen

A dialog window appears for the different settings:

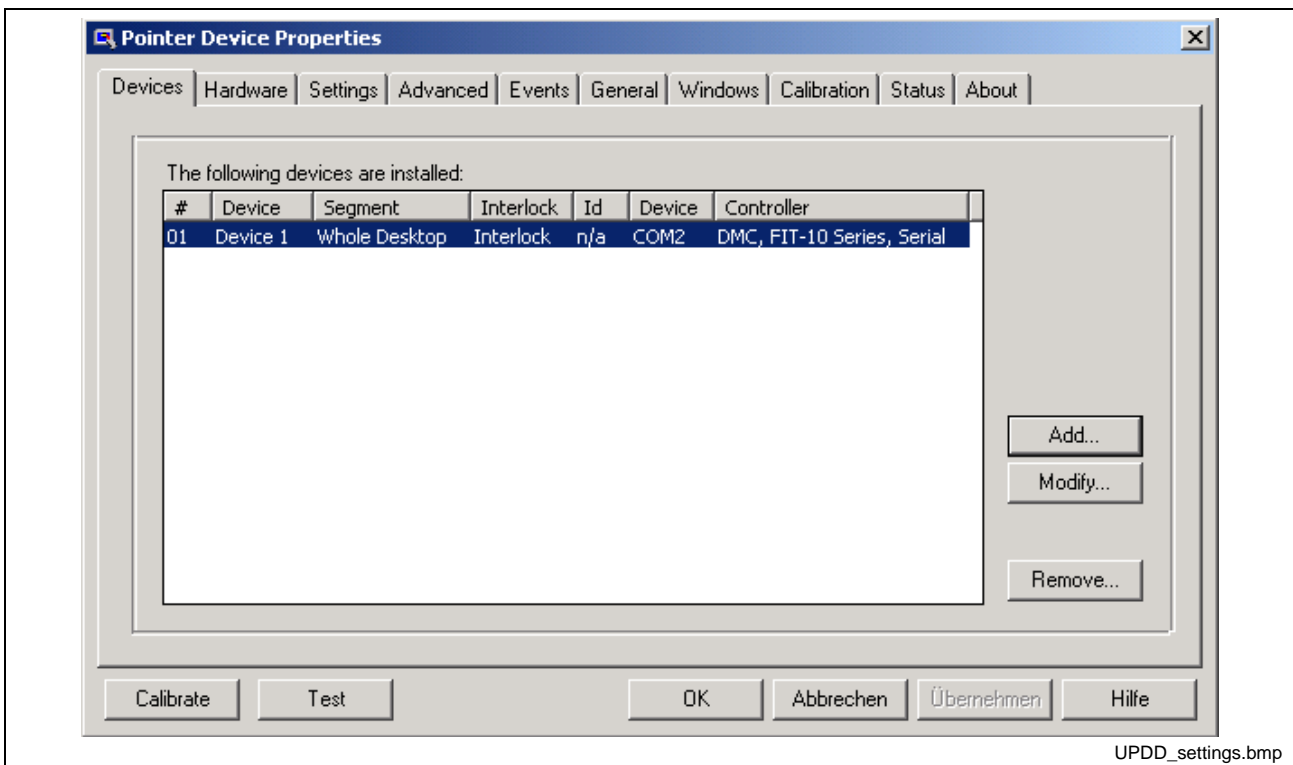


Fig. 9-11: Dialog window to set the touch screen

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

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:\Programs\UPDD\.

10.2 Accessories

Connectors and Ready-Made Cables

Ordering designation	Part number	Description
B-AC PLUG NET 230V	1070 912881	Mains connector 230 V, male inlet connector for non-heating apparatus, angular, for self-mounting
BKS-U-N-NTZKAB-IPCRHO-002,5-P	1070 048937	Mains cable 230 V with female inlet connector for non-heating apparatus, angular, cable length 2.5 m
SUP-E01-BTV16/40	1070 170041	External battery pack BTV 16/40
IKL0265/003,0	1070 170040	Connection cable for external battery pack BTV 16/40, cable length 3.0 m
IKL0264/001,0	1070 170156	Connection cable for external battery pack BTV 16/40, cable length 1.0 m

Fig. 10-3: Connectors and cables for IndraView P16 and IndraView P40

Storage Media

Ordering designation	Part number	Description
MC OSFLASHUSB-064M	1070 170184	USB memory stick 64 Mbytes
PCD03.3UH	1070 170239	USB floppy disk drive for top-hat rail mounting
PCD03.3UF	1070 170238	USB floppy disk drive for front mounting

Fig. 10-4: Storage media for IndraView P16 and IndraView P40

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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

- telefonisch - by phone:
über Service Call Entry Center
- via Service Call Entry Center
- per Fax - by fax:
- per e-Mail - by e-mail: service.svc@boschrexroth.de

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

49 (0) 9352 40 50 60
Mo-Fr 07:00-18:00
Mo-Fr 7:00 am - 6:00 pm

+49 (0) 9352 40 49 41

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 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 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!

from abroad:

don't dial (0) after country code!

<p>Vertriebsgebiet Mitte Germany Centre</p> <p>Rexroth Indramat GmbH Bgm.-Dr.-Nebel-Str. 2 / Postf. 1357 97816 Lohr am Main / 97803 Lohr</p> <p>Kompetenz-Zentrum Europa</p> <p>Tel.: +49 (0)9352 40-0 Fax: +49 (0)9352 40-4885</p>	<p>SERVICE</p> <p>CALL ENTRY CENTER MO – FR von 07:00 - 18:00 Uhr from 7 am – 6 pm</p> <p>Tel. +49 (0) 9352 40 50 60 service.svc@boschrexroth.de</p>	<p>SERVICE</p> <p>HOTLINE MO – FR von 17:00 - 07:00 Uhr from 5 pm - 7 am</p> <p>+ SA / SO</p> <p>Tel.: +49 (0)172 660 04 06 oder / or Tel.: +49 (0)171 333 88 26</p>	<p>SERVICE</p> <p>ERSATZTEILE / SPARES verlängerte Ansprechzeit - extended office time -</p> <ul style="list-style-type: none"> ◆ nur an Werktagen - only on working days - ◆ von 07:00 - 18:00 Uhr - from 7 am - 6 pm - <p>Tel. +49 (0) 9352 40 42 22</p>
<p>Vertriebsgebiet Süd Germany South</p> <p>Bosch Rexroth AG Landshuter Allee 8-10 80637 München</p> <p>Tel.: +49 (0)89 127 14-0 Fax: +49 (0)89 127 14-490</p>	<p>Vertriebsgebiet West Germany West</p> <p>Bosch Rexroth AG Regionalzentrum West Borsigstrasse 15 40880 Ratingen</p> <p>Tel.: +49 (0)2102 409-0 Fax: +49 (0)2102 409-406 +49 (0)2102 409-430</p>	<p>Gebiet Südwest Germany South-West</p> <p>Bosch Rexroth AG Service-Regionalzentrum Süd-West Siemensstr.1 70736 Fellbach</p> <p>Tel.: +49 (0)711 51046-0 Fax: +49 (0)711 51046-248</p>	
<p>Vertriebsgebiet Nord Germany North</p> <p>Bosch Rexroth AG Walsroder Str. 93 30853 Langenhagen</p> <p>Tel.: +49 (0) 511 72 66 57-0 Service: +49 (0) 511 72 66 57-256 Fax: +49 (0) 511 72 66 57-93 Service: +49 (0) 511 72 66 57-783</p>	<p>Vertriebsgebiet Mitte Germany Centre</p> <p>Bosch Rexroth AG Regionalzentrum Mitte Waldecker Straße 13 64546 Mörfelden-Walldorf</p> <p>Tel.: +49 (0) 61 05 702-3 Fax: +49 (0) 61 05 702-444</p>	<p>Vertriebsgebiet Ost Germany East</p> <p>Bosch Rexroth AG Beckerstraße 31 09120 Chemnitz</p> <p>Tel.: +49 (0)371 35 55-0 Fax: +49 (0)371 35 55-333</p>	<p>Vertriebsgebiet Ost Germany East</p> <p>Bosch Rexroth AG Regionalzentrum Ost Walter-Köhn-Str. 4d 04356 Leipzig</p> <p>Tel.: +49 (0)341 25 61-0 Fax: +49 (0)341 25 61-111</p>

Europa (West) - Europe (West)

vom Ausland: (0) nach Landeskennziffer weglassen, **Italien:** 0 nach Landeskennziffer mitwählen
from abroad: don't dial (0) after country code, **Italy:** dial 0 after country code

Austria - Österreich Bosch Rexroth GmbH Electric Drives & Controls Stachegasse 13 1120 Wien Tel.: +43 (0)1 985 25 40 Fax: +43 (0)1 985 25 40-93	Austria – Österreich Bosch Rexroth GmbH Electric Drives & Controls Industriepark 18 4061 Pasching Tel.: +43 (0)7221 605-0 Fax: +43 (0)7221 605-21	Belgium - Belgien Bosch Rexroth AG Electric Drives & Controls Industrielaan 8 1740 Ternat Tel.: +32 (0)2 5830719 - service: +32 (0)2 5830717 Fax: +32 (0)2 5830731 service@boschrexroth.be	Denmark - Dänemark BEC A/S Zinkvej 6 8900 Randers Tel.: +45 (0)87 11 90 60 Fax: +45 (0)87 11 90 61
Great Britain – Großbritannien Bosch Rexroth Ltd. Electric Drives & Controls Broadway Lane, South Cerney Cirencester, Glos GL7 5UH Tel.: +44 (0)1285 863000 Fax: +44 (0)1285 863030 sales@boschrexroth.co.uk service@boschrexroth.co.uk	Finland - Finnland Bosch Rexroth Oy Electric Drives & Controls Ansatie 6 017 40 Vantaa Tel.: +358 (0)9 84 91-11 Fax: +358 (0)9 84 91-13 60	France - Frankreich Bosch Rexroth SAS Electric Drives & Controls Avenue de la Trentaine (BP. 74) 77503 Chelles Cedex Tel.: +33 (0)164 72-70 00 Fax: +33 (0)164 72-63 00 Hotline: +33 (0)608 33 43 28	France - Frankreich Bosch Rexroth SAS Electric Drives & Controls ZI de Thibaud, 20 bd. Thibaud (BP. 1751) 31084 Toulouse Tel.: +33 (0)5 61 43 61 87 Fax: +33 (0)5 61 43 94 12
France – Frankreich Bosch Rexroth SAS Electric Drives & Controls 91, Bd. Irène Joliot-Curie 69634 Vénissieux – Cedex Tel.: +33 (0)4 78 78 53 65 Fax: +33 (0)4 78 78 53 62	Italy - Italien Bosch Rexroth S.p.A. Via G. Di Vittorio, 1 20063 Cernusco S/N.MI Hotline: +39 02 92 365 563 Tel.: +39 02 92 365 1 Service: +39 02 92 365 326 Fax: +39 02 92 365 500 Service: +39 02 92 365 503	Italy - Italien Bosch Rexroth S.p.A. Via Paolo Veronesi, 250 10148 Torino Tel.: +39 011 224 88 11 Fax: +39 011 224 88 30	Italy - Italien Bosch Rexroth S.p.A. Via Mascia, 1 80053 Castellamare di Stabia NA Tel.: +39 081 8 71 57 00 Fax: +39 081 8 71 68 85
Italy - Italien Bosch Rexroth S.p.A. Via del Progresso, 16 (Zona Ind.) 35020 Padova Tel.: +39 049 8 70 13 70 Fax: +39 049 8 70 13 77	Italy - Italien Bosch Rexroth S.p.A. Via Isonzo, 61 40033 Casalecchio di Reno (Bo) Tel.: +39 051 29 86 430 Fax: +39 051 29 86 490	Netherlands - Niederlande/Holland Bosch Rexroth Services B.V. Technical Services Kruisbroeksestraat 1 (P.O. Box 32) 5281 RV Boxtel Tel.: +31 (0) 411 65 16 40 +31 (0) 411 65 17 27 Fax: +31 (0) 411 67 78 14 +31 (0) 411 68 28 60 services@boschrexroth.nl	Netherlands – Niederlande/Holland Bosch Rexroth B.V. Kruisbroeksestraat 1 (P.O. Box 32) 5281 RV Boxtel Tel.: +31 (0) 411 65 19 51 Fax: +31 (0) 411 65 14 83 www.boschrexroth.nl
Norway - Norwegen Bosch Rexroth AS Electric Drives & Controls Berghagan 1 or: Box 3007 1405 Ski-Langhus 1402 Ski Tel.: +47 (0)64 86 41 00 Fax: +47 (0)64 86 90 62 Hotline: +47 (0)64 86 94 82 jul.ruud@rexroth.no	Spain - Spanien Bosch Rexroth S.A. Electric Drives & Controls Centro Industrial Santiga Obradors s/n 08130 Santa Perpetua de Mogoda Barcelona Tel.: +34 9 37 47 94 00 Fax: +34 9 37 47 94 01	Spain – Spanien Goimendi S.A. Electric Drives & Controls Parque Empresarial Zuatzu C/ Francisco Grandmontagne no.2 20018 San Sebastian Tel.: +34 9 43 31 84 21 - service: +34 9 43 31 84 56 Fax: +34 9 43 31 84 27 - service: +34 9 43 31 84 60 sat.indramat@goimendi.es	Sweden - Schweden Bosch Rexroth AB Electric Drives & Controls - Varuvägen 7 (Service: Konsumentvägen 4, Älfsjö) 125 81 Stockholm Tel.: +46 (0)8 727 92 00 Fax: +46 (0)8 647 32 77
Sweden - Schweden Bosch Rexroth AB Electric Drives & Controls Ekvändan 7 254 67 Helsingborg Tel.: +46 (0) 42 38 88 -50 Fax: +46 (0) 42 38 88 -74	Switzerland West - Schweiz West Bosch Rexroth Suisse SA Electric Drives & Controls Rue du village 1 1020 Renens Tel.: +41 (0)21 632 84 20 Fax: +41 (0)21 632 84 21	Switzerland East - Schweiz Ost Bosch Rexroth Schweiz AG Electric Drives & Controls Hemrietstrasse 2 8863 Buttikon Tel.: +41 (0) 55 46 46 111 Fax: +41 (0) 55 46 46 222	

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<p>Poland – Polen</p> <p>Bosch Rexroth Sp.zo.o. Biuro Poznan ul. Dabrowskiego 81/85 60-529 Poznan Tel.: +48 061 847 64 62 /-63 Fax: +48 061 847 64 02</p>	<p>Romania - Rumänien</p> <p>East Electric S.R.L. Bdul Basarabia no.250, sector 3 73429 Bucuresti Tel./Fax.: +40 (0)21 255 35 07 +40 (0)21 255 77 13 Fax: +40 (0)21 725 61 21 eastel@rdsnet.ro</p>	<p>Romania - Rumänien</p> <p>Bosch Rexroth Sp.zo.o. Str. Drobety nr. 4-10, app. 14 70258 Bucuresti, Sector 2 Tel.: +40 (0)1 210 48 25 +40 (0)1 210 29 50 Fax: +40 (0)1 210 29 52</p>	<p>Russia - Russland</p> <p>Bosch Rexroth OOO Wjatskaja ul. 27/15 127015 Moskau Tel.: +7-095-785 74 78 +7-095 785 74 79 Fax: +7 095 785 74 77 laura.kanina@boschrexroth.ru</p>
<p>Russia - Russland</p> <p>ELMIS 10, Internationalnaya 246640 Gomel, Belarus Tel.: +375/ 232 53 42 70 +375/ 232 53 21 69 Fax: +375/ 232 53 37 69 elmis_ltd@yahoo.com</p>	<p>Turkey - Türkei</p> <p>Bosch Rexroth Otomasyon San & Tic. A..S. Fevzi Cakmak Cad No. 3 34295 Sefaköy - Istanbul Tel.: +90 212 413 34-00 Fax: +90 212 413 34-17</p>	<p>Slowenia - Slowenien</p> <p>DOMEL Otoki 21 64 228 Zelezniki Tel.: +386 5 5117 152 Fax: +386 5 5117 225 brane.ozebek@domel.si</p>	

Africa, Asia, Australia – incl. Pacific Rim

<p>Australia - Australien</p> <p>AIMS - Australian Industrial Machinery Services Pty. Ltd. 28 Westside Drive Laverton North Vic 3026 Melbourne</p> <p>Tel.: +61 3 93 14 3321 Fax: +61 3 93 14 3329 Hotlines: +61 3 93 14 3321 +61 4 19 369 195 enquires@aimservices.com.au</p>	<p>Australia - Australien</p> <p>Bosch Rexroth Pty. Ltd. No. 7, Endeavour Way Braeside Victoria, 31 95 Melbourne</p> <p>Tel.: +61 3 95 80 39 33 Fax: +61 3 95 80 17 33 mel@rexroth.com.au</p>	<p>China</p> <p>Shanghai Bosch Rexroth Hydraulics & Automation Ltd. Waigaoqiao, Free Trade Zone No.122, Fu Te Dong Yi Road Shanghai 200131 - P.R.China</p> <p>Tel.: +86 21 58 66 30 30 Fax: +86 21 58 66 55 23 richard.yang_sh@boschrexroth.com.cn gf.zhu_sh@boschrexroth.com.cn</p>	<p>China</p> <p>Shanghai Bosch Rexroth Hydraulics & Automation Ltd. 4/f, Marine Tower No.1, Pudong Avenue Shanghai 200120 - P.R.China</p> <p>Tel.: +86 21 68 86 15 88 Fax: +86 21 58 40 65 77</p>
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<p>Indonesia - Indonesien</p> <p>PT. Bosch Rexroth Building # 202, Cilandak Commercial Estate Jl. Cilandak KKO, Jakarta 12560</p> <p>Tel.: +62 21 7891169 (5 lines) Fax: +62 21 7891170 - 71 rudyy.karimun@boschrexroth.co.id</p>	<p>Japan</p> <p>Bosch Rexroth Automation Corp. Service Center Japan Yutakagaoka 1810, Meito-ku, NAGOYA 465-0035, Japan</p> <p>Tel.: +81 52 777 88 41 +81 52 777 88 53 +81 52 777 88 79 Fax: +81 52 777 89 01</p>	<p>Japan</p> <p>Bosch Rexroth Automation Corp. Electric Drives & Controls 2F, I.R. Building Nakamachidai 4-26-44, Tsuzuki-ku YOKOHAMA 224-0041, Japan</p> <p>Tel.: +81 45 942 72 10 Fax: +81 45 942 03 41</p>	<p>Korea</p> <p>Bosch Rexroth-Korea Ltd. Electric Drives and Controls Bongwoo Bldg. 7FL, 31-7, 1Ga Jangchoong-dong, Jung-gu Seoul, 100-391</p> <p>Tel.: +82 234 061 813 Fax: +82 222 641 295</p>
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<p>Taiwan</p> <p>Bosch Rexroth Co., Ltd. Taichung Branch 1F., No. 29, Fu-Ann 5th Street, Xi-Tun Area, Taichung City Taiwan, R.O.C.</p> <p>Tel.: +886 - 4 -23580400 Fax: +886 - 4 -23580402 charlie.chen@boschrexroth.com.tw jim.lin@boschrexroth.com.tw david.lai@boschrexroth.com.tw</p>	<p>Thailand</p> <p>NC Advance Technology Co. Ltd. 59/76 Moo 9 Ramintra road 34 Tharang, Bangkhen, Bangkok 10230</p> <p>Tel.: +66 2 943 70 62 +66 2 943 71 21 Fax: +66 2 509 23 62 Hotline +66 1 984 61 52 sonkawin@hotmail.com</p>		

Nordamerika – North America

USA Headquarters - Hauptniederlassung Bosch Rexroth Corporation Electric Drives & Controls 5150 Prairie Stone Parkway Hoffman Estates, IL 60192-3707 Tel.: +1 847 6 45 36 00 Fax: +1 847 6 45 62 01 servicebrc@boschrexroth-us.com repairbrc@boschrexroth-us.com	USA Central Region - Mitte Bosch Rexroth Corporation Electric Drives & Controls Central Region Technical Center 1701 Harmon Road Auburn Hills, MI 48326 Tel.: +1 248 3 93 33 30 Fax: +1 248 3 93 29 06	USA Southeast Region - Südwest Bosch Rexroth Corporation Electric Drives & Controls Southeastern Technical Center 3625 Swiftwater Park Drive Suwanee, Georgia 30124 Tel.: +1 770 9 32 32 00 Fax: +1 770 9 32 19 03	USA SERVICE-HOTLINE - 7 days x 24hrs - +1-800-REX-ROTH +1 800 739 7684
USA East Region – Ost Bosch Rexroth Corporation Electric Drives & Controls Charlotte Regional Sales Office 14001 South Lakes Drive Charlotte, North Carolina 28273 Tel.: +1 704 5 83 97 62 +1 704 5 83 14 86	USA Northeast Region – Nordost Bosch Rexroth Corporation Electric Drives & Controls Northeastern Technical Center 99 Rainbow Road East Granby, Connecticut 06026 Tel.: +1 860 8 44 83 77 Fax: +1 860 8 44 85 95	USA West Region – West Bosch Rexroth Corporation 7901 Stoneridge Drive, Suite 220 Pleasant Hill, California 94588 Tel.: +1 925 227 10 84 Fax: +1 925 227 10 81	
Canada East - Kanada Ost Bosch Rexroth Canada Corporation Burlington Division 3426 Mainway Drive Burlington, Ontario Canada L7M 1A8 Tel.: +1 905 335 5511 Fax: +1 905 335 4184 Hotline: +1 905 335 5511 michael.moro@boschrexroth.ca	Canada West - Kanada West Bosch Rexroth Canada Corporation 5345 Goring St. Burnaby, British Columbia Canada V7J 1R1 Tel.: +1 604 205 5777 Fax: +1 604 205 6944 Hotline: +1 604 205 5777 david.gunby@boschrexroth.ca	Mexico Bosch Rexroth Mexico S.A. de C.V. Calle Neptuno 72 Unidad Ind. Vallejo 07700 Mexico, D.F. Tel.: +52 55 57 54 17 11 Fax: +52 55 57 54 50 73 mariofelipe.hernandez@boschrexroth.com.mx	Mexico Bosch Rexroth S.A. de C.V. Calle Argentina No 3913 Fracc. las Torres 64930 Monterrey, N.L. Tel.: +52 81 83 65 22 53 +52 81 83 65 89 11 +52 81 83 49 80 91 Fax: +52 81 83 65 52 80 mario.quiroga@boschrexroth.com.mx

Südamerika – South America

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Columbia - Kolumbien Refflutec de Colombia Ltda. Calle 37 No. 22-31 Santafé de Bogotá, D.C. Colombia Tel.: +57 1 368 82 67 +57 1 368 02 59 Fax: +57 1 268 97 37 reflutec@neutel.com.co reflutec@007mundo.com			

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