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Rexroth IndraControl VSP 16.1 Rexroth IndraControl VSP 40.1

R911308264
Edition 03

Project Planning Manual



Title	Rexroth IndraControl VSP 16.1 Rexroth IndraControl VSP 40.1
Type of Documentation	Project Planning Manual
Document Typecode	DOK-SUPPL*-VSP*16/40**-PR03-EN-P
Internal File Reference	Document Number 120-2100-B369-03/EN
Purpose of Documentation	This documentation describes the operator terminals VSP 16.1 and VSP 40.1

Record of Revisions

Description	Release Date	Notes
120-2100-B369-01/EN	-	Not released in English
120-2100-B369-02/EN	04.2005	First English Edition
120-2100-B369-03/EN	04.2008	Second English Edition

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Published by Bosch Rexroth AG
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Dept. BRC/EAY2 (MePe)

Note This document has been printed on chlorine-free bleached paper.

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1 System Representation

1.1 Brief Description VSP 16.1 and VSP 40.1

The operator terminals VSP 16.1 and VSP 40.1 are PC-based machine operator terminals. Depending on the respective application or configuration they can also perform control functions. For extensions six PCI slots are provided.

Operator Terminals with Keypad

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

Operating 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.

1.2 Variants

Characteristic Features

The operator terminals are provided as different variants. They differ mainly in their display size, their touch screen capability, the kind of slots and the power supply.

VSP 16.1	DB	-	BK
VSP 40.89 cm customer-specific Bosch for design	-	AK	-
Display	12" TFT		
Touch screen	Yes		No
Keys	No		16 machine function keys
PC box	Type E with 6 PCI slots		
Supply voltage	230 V, alternatively 24 V		

Fig. 1-1: Distinguishing features VSP 16.1

VSP 40.1	DE	-	BI
VSP 40.1 in customer-specific Bosch for design	-	AL	-
Display	15" TFT		
Touch screen	Yes		No
Keys (keypad)	No		16 machine function keys
PC box	Type E with 6 PCI slots		
Supply voltage	230 V, alternatively 24 V		

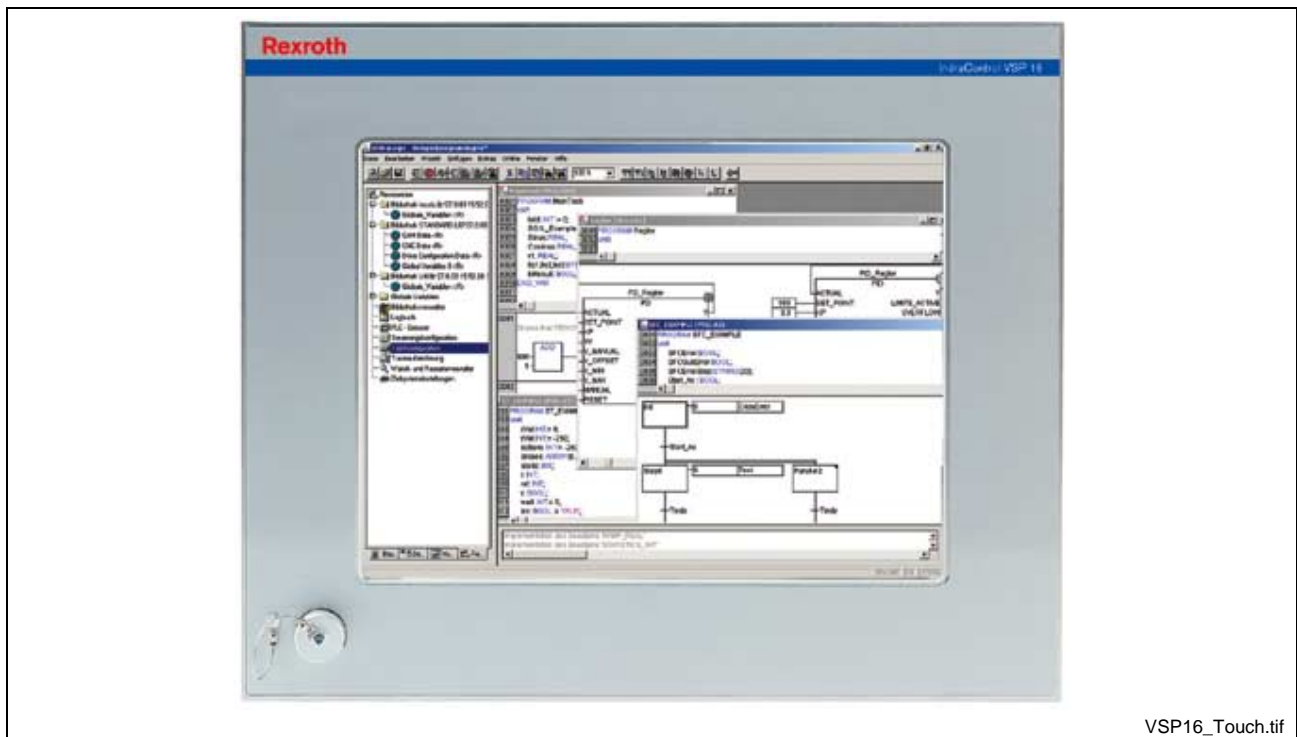
Fig. 1-2: Characteristic features VSP 40.1

Variants VSP 16.1

VSP 16.1 with Touch Screen

There are two front variants of the VSP 16.1 devices with touch screen. In addition to the standard variant VSP 16.1DB with an USB connection at the bottom left corner (Fig. 1-3), there is a second customer-specific device variant "Bosch" – VSP 16.1AK – having a slightly larger front panel than variant VSP 16.1DP without USB connection.

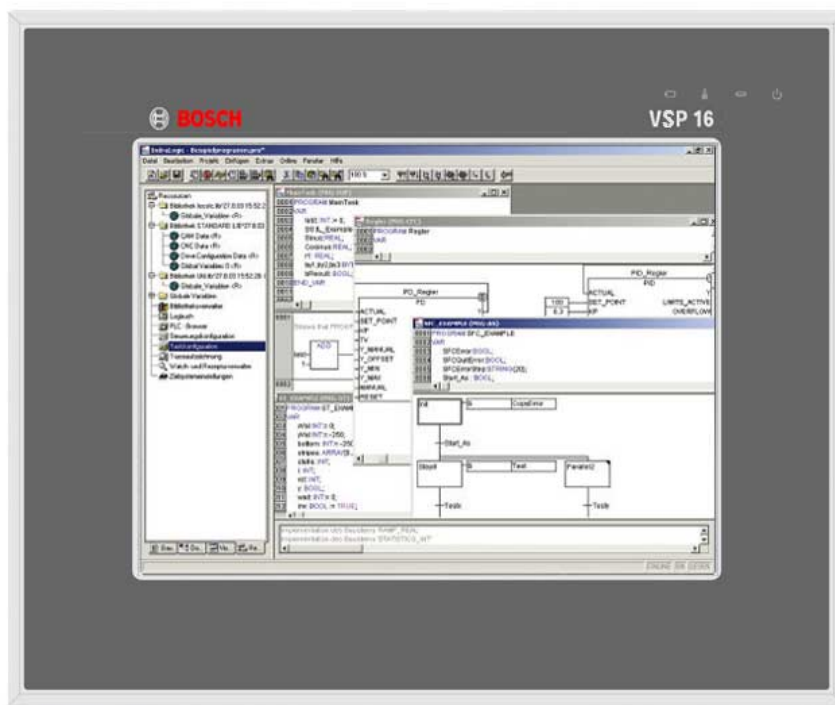
VSP 16.1DB



VSP16_Touch.tif

Fig. 1-3: Standard variant VSP 16.1DB with touch screen

VSP 16.1 AK



VSP16_1_AK_Touch.bmp

Fig. 1-4: VSP16.1 AK with touch screen

VSP 16.1 with Keypad and 16 M-keys



VSP16_Tasten.tif

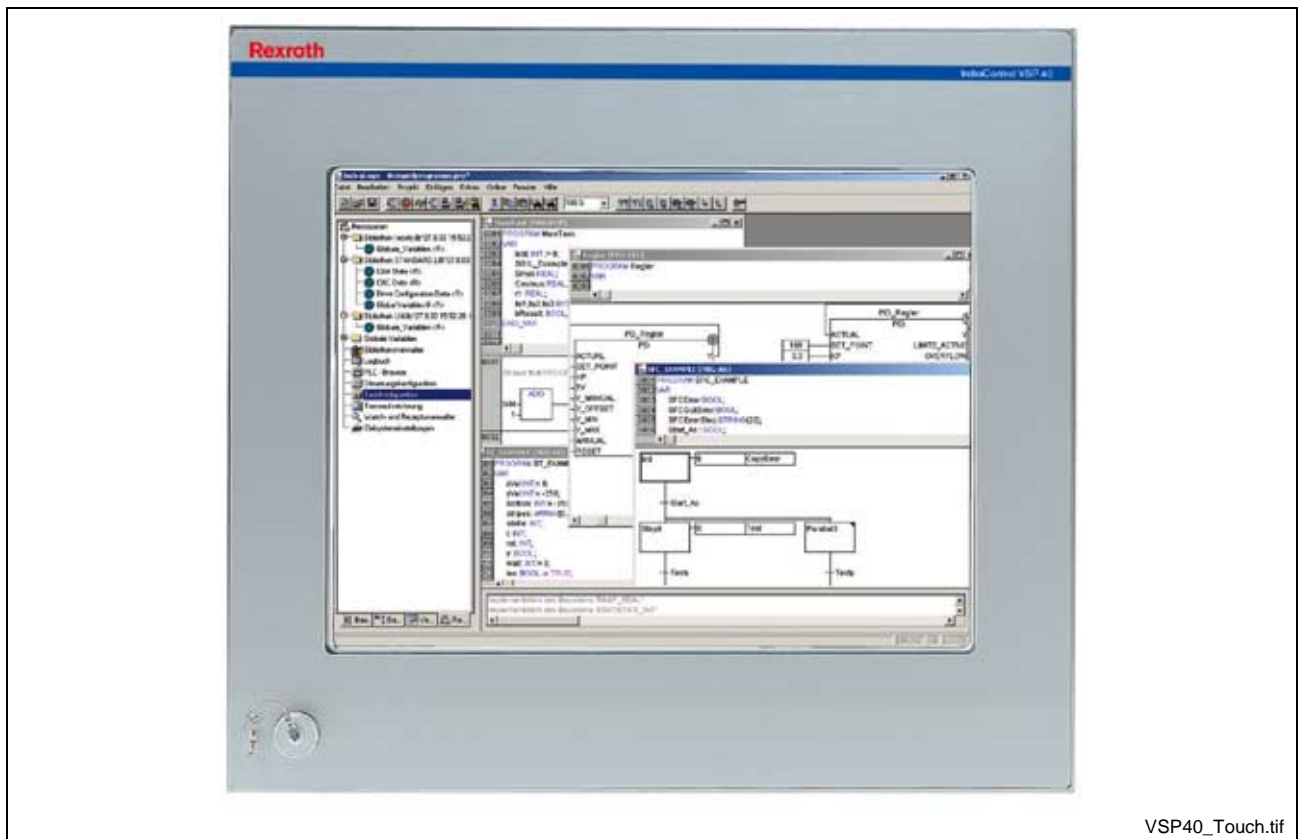
Fig. 1-5: Standard variant VSP 16.1BK with keypad (machine function keys)

Variants VSP 40.1

VSP 40.1 with Touch Screen

There are two front variants of the VSP 40.1 with touch screen. In addition to the standard variant VSP 40.1DE with an USB connection at the bottom left corner (Fig. 1-6), there is a second customer-specific device variant "Bosch" – VSP 40.1AL – having a slightly larger front panel than variant VSP 16.1DP without USB connection.

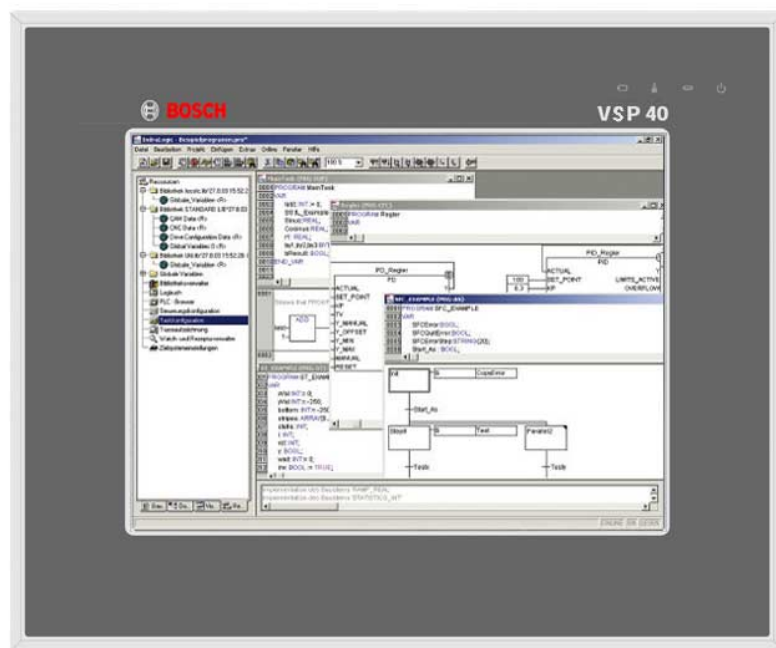
VSP 40.1DE



VSP40_Touch.tif

Fig. 1-6: Standard variant VSP 40.1DE with touch screen

VSP 40.1 AL



VSP40_1_AL_Touch.bmp

Fig. 1-7: Customer-specific device variant "Bosch" VSP 40.1AL with touch screen

VSP 40.1 with Keypad and 16 Machine Function Keys



VSP40_Tasten.tif

Fig. 1-8: Standard variant VSP 40.1BI with keypad (machine function keys)

1.3 Operating System

For license reasons VSP-type devices are only delivered with already installed operating system.

1.4 Commissioning

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

2 Important Directions for Use

2.1 Appropriate Use

Introduction

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

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

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

The devices VSP 16.1 and VSP 40.1 by Bosch Rexroth are PC-based machine operating and visualization terminals that can – depending on the application or configuration – also perform control functionalities .

Note: The operating terminals VSP 16.1 and VSP 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.

The operating terminals VSP 16.1 and VSP 40.1 have been developed for use in control tasks.

Typical areas of application of the operating terminals VSP 16.1 and VSP 40.1:

- Handling and assembly systems,
- Packaging and foodstuff machines,
- Printing and paper processing machines,
- Machine tools.

The operating terminals VSP 16.1 and VSP 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 operating terminals VSP 16.1 and VSP 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".

The operating terminals VSP 16.1 and VSP 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.



WARNING

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

3.2 Explanations

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

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
 DANGER	Death or severe bodily harm will occur.
 WARNING	Death or severe bodily harm may occur.
 CAUTION	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.



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

	VSP 16.1DB	VSP 16.2AK	VSP 16.1BK
Display	12" TFT, 800 x 600 pixels 256,000 colors		
Operation	Touch screen operation		Keyboard
Surface – front panel	Color: RAL 7035 light gray	Graphite gray (Bosch design)	Color: RAL 7035 light gray
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529		
Interface	USB connection, cover: degree of protection IP 65	No USB connection	USB connection, cover: degree of protection IP 65

Fig. 4-1: Technical data: front VSP 16.1

	VSP 40.1DB	VSP 40.1AK	VSP 40.1BK
Display	15" TFT, 1024 x 768 pixels 256,000 colors		
Operation	Touch screen operation		Keyboard
Surface – front panel	Color: RAL 7035 light gray	Graphite gray (Bosch design)	Color: RAL 7035 light gray
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529		
Interface	USB connection, cover: degree of protection IP 65	No USB connection	USB connection, cover: degree of protection IP 65

Fig. 4-2: Technical data: front VSP 40.1

4.2 PC Box

PC box	Type E
Processor	Celeron with minimum 2 GHz and integrated graphic controller with maximum 8 MB video memory
Random access memory (RAM)	512 MB / 1024 MB
Hard disk	Min. 20 GB
Optional drives	CD ROM or DVD/CD RW
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 serial standard interface RS232 (9-pin, D-Sub) ¹ •
Slots	6 x PCI
Voltage supply	90...264 VAC, alternatively 19...32 VDC
Max. power consumption	330 W (for 230 VAC), alternatively 380 W (for 19 VDC)
Degree of protection	PC box: IP 00

Fig. 4-3: Technical data: PC box

¹ This interface is used for the optionally available external UPS and is then no longer available to connect other devices.

4.3 Power Supply Unit 115 V / 230 V

Nominal input voltage:	115 VAC / 230 VAC			
Input voltage range:	90 ... 264 VAC			
Input current:	2.5 A for nominal voltage 230 VAC 5.0 A for nominal voltage 115 VAC			
Inrush current:	100 A for 264 VAC			
Output voltages:	Current		Tolerances	
	Min.	Max.		
	+3.3 V	0,5 A	20 A	+/- 5 %
	+5 V	0,5 A	25 A	+/- 5 %
	+12 V	1,0 A	17 A	+/- 5 %
	−12 V	0 A	0.8 A	+/-10 %
	+5 V SB	0 A	2.0 A	+/- 5 %
Max. output power:	250 W*			
Efficiency (under full load):	0.73 for 115 VAC, 0.76 for 230 VAC			

*) Note: During specifying the maximum output currents please observe that the currents separately considered are the maximum possible currents of the respective output voltage. However, it is not possible to create the maximum current from all output voltages, as the maximum total output power (= 250 W) must not be exceeded. In addition, the maximum power at +3.3 V together with +5 V must not exceed 150 W or 33 A.

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

4.4 Power Supply Unit 24 V

Nominal input voltage:	24 VDC			
Input voltage range:	19 ... 32 VDC			
Input current:	20 A for 19 VDC			
Inrush current:	5 A			
Output voltages:	Current		Tolerances	
	Min.	Max.		
	+3.3 V	0 A	15 A	+2.93 V ... +3.40 V
	+5 V	2 A	30 A	+4.80 V ... +5.20 V
	+12 V	0.1 A	15 A	+11.4 V ... +12.6 V
	-12 V	0 A	2.0 A	- 11.4 V ... -12.6 V
	-5 V	0 A	2.0 A	- 4.75 V ... -5.25 V
	+5 V SB	0 A	1.2 A	+4.75 V ... +5.25 V
Max. output power:	300 W*			
Efficiency (under full load):	> 0,65			

*) Note: During specifying the maximum output currents please observe that the currents separately considered are the maximum possible currents of the respective output voltage. However, it is not possible to create the maximum current from all output voltages, as the maximum total output power (= 300 W) must not be exceeded. In addition, the maximum power at +3.3 V together with +5 V must not exceed 150 W.

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

4.5 Ambient Conditions

	In operation	Storage / Transport
Maximum ambient temperature <u>Exception:</u> 230 V – UPS (see chapter 8.3)	+5 °C... +45 °C +0 °C ... +40 °C	-20 °C to +60 °C +0 °C ... +40 °C
Max. temperature gradient	Temperature change up to 3°C per minute	Not defined
Relative humidity	Climatic class 3K3 according to EN 60721, condensation not permissible.	Climatic class 3K3 according to EN 60721, condensation not permissible.
Air pressure	Up to 2 000 m above MSL according to DIN 60204	
Mechanical strength	Max. vibration: Frequency range: 10...150 Hz Excursion: 0.025 mm for 10 ... 57 Hz Acceleration: 0.25 g for 57 ... 150 Hz According to EN 60068-2-6	Max. shock: 5 g according to DIN IEC 68-2-27, function not disturbed

Fig. 4-6: Ambient conditions

4.6 Used Standards

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

Standard	Meaning
EN 60 204-1	Electrical equipment of machines
EN 50 081-2	Basic technical standard, noise immunity (industrial environment)
EN 50 082-2	Basic technical standard, emitted interference (industrial environment)
EN 60 742	Transformer for 24 V power supply unit, protective separation
EN 60 950	Overvoltage category II
EN 61 131	Requirements regarding 24V outputs
EN 61 131-2	Requirements on 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
EN 60068-2-27	Shock

Fig. 4-7: Used standards

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

UL/CSA certification

The devices of the VSP family are basically certified according to

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

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

Note: To guarantee an UL/CSA-compliant operation, the following conditions have to be fulfilled:

- Use insulated copper wires suitable for at least 60/75 °C.
- Use Class 1 wire only or equivalent.

Note: The UL/CSA marking is only valid for the device in its delivery status. After modifying the device, e.g. after plugging additional extension cards, the UL compliance must be checked.

4.7 Wear Parts

Wear parts without warranty

The **backlight** has a limited service life. After 50 000 hours, the brightness reduces by 50 %.

CMOS battery: 5 to 7 years

- The **hard disk** is an electromechanical 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:

3.5" hard disk		
Operating hours / month		Max. 720
Input/output cycles / month		Min. 10 and max. 833
Operating conditions	Temperature	< 60 °C
	Rel. humidity	< 90 %
	Height	< 3000 m
	Accesses	50 % of the operating hours
Storage conditions	Temperature	< 70 °C
	Rel. humidity	< 95 %
	Duration	< 3 months

Fig. 4-8: Typical operating and storage conditions of the hard disk

The operation out of this typical conditions is permissible, whereby, however, the service life of the hard disk may reduce. However, the ambient conditions specified for the overall device in chapter 4.5 have to be absolutely kept. Different values apply for hard disks of some devices with special design.

- **Fans** are mechanic wear components, whose service life is extremely temperature-dependent. For the fan integrated in the housing, the following service life is specified by the manufacturer:

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

Fig. 4-9: Service life of the fan

4.8 Compatibility Check

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

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

Therefore, test new lubricants, cleaning agents, etc. for compatibility with our housings / our housing materials before using the particular material concerned.

5 Dimensions

5.1 Housing Dimensions

VDP 16.1 Housing Dimensions

Independent of the design of the VSP 16.1 standard variants with M-Keys or touch screen the front panel width is 350 mm and the height is 290 mm.

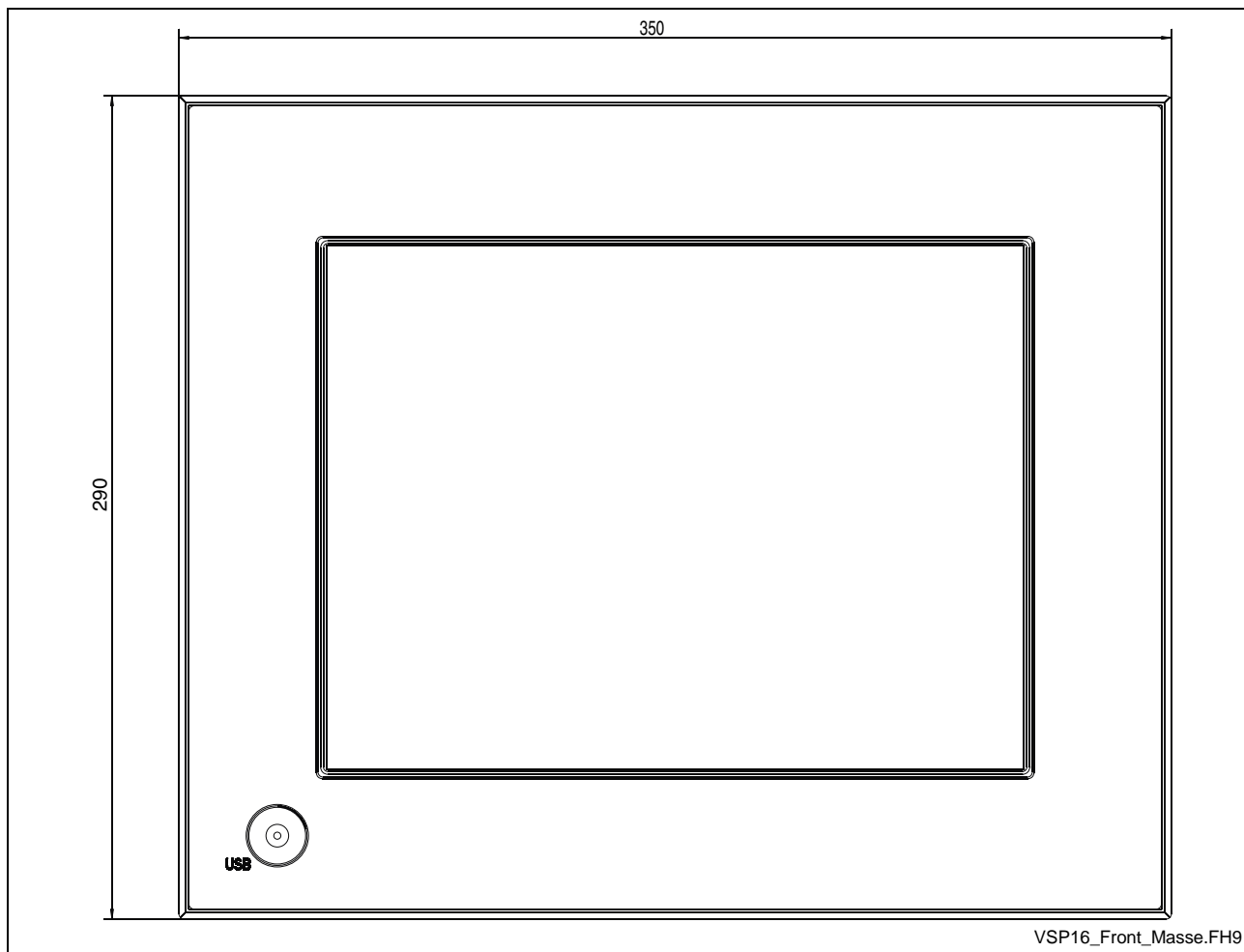


Fig. 5-1: Dimension – Front panel VSP 16.1DB The front panel of the VSP 16.1BK with machine function keys has the same dimensions..

The front panel width of the VSP 16.1AK is 360 mm and the height is 300 mm. It has no USB connection.

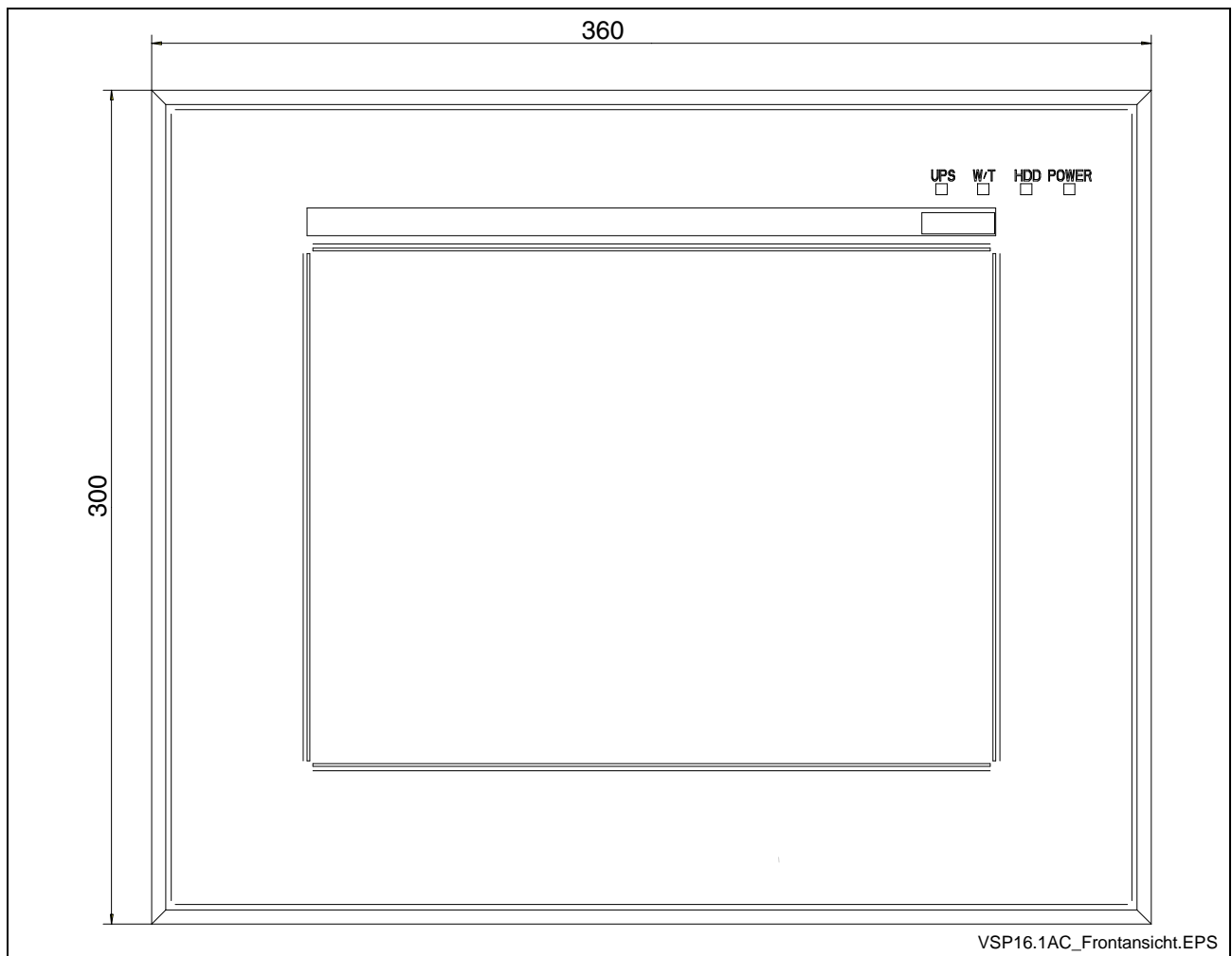


Fig. 5-2: Dimensions, front panel of the VDP 16.2AK

The installation depth is the same for all variants of the VSP 16.1 and is illustrated in the figure mentioned below:

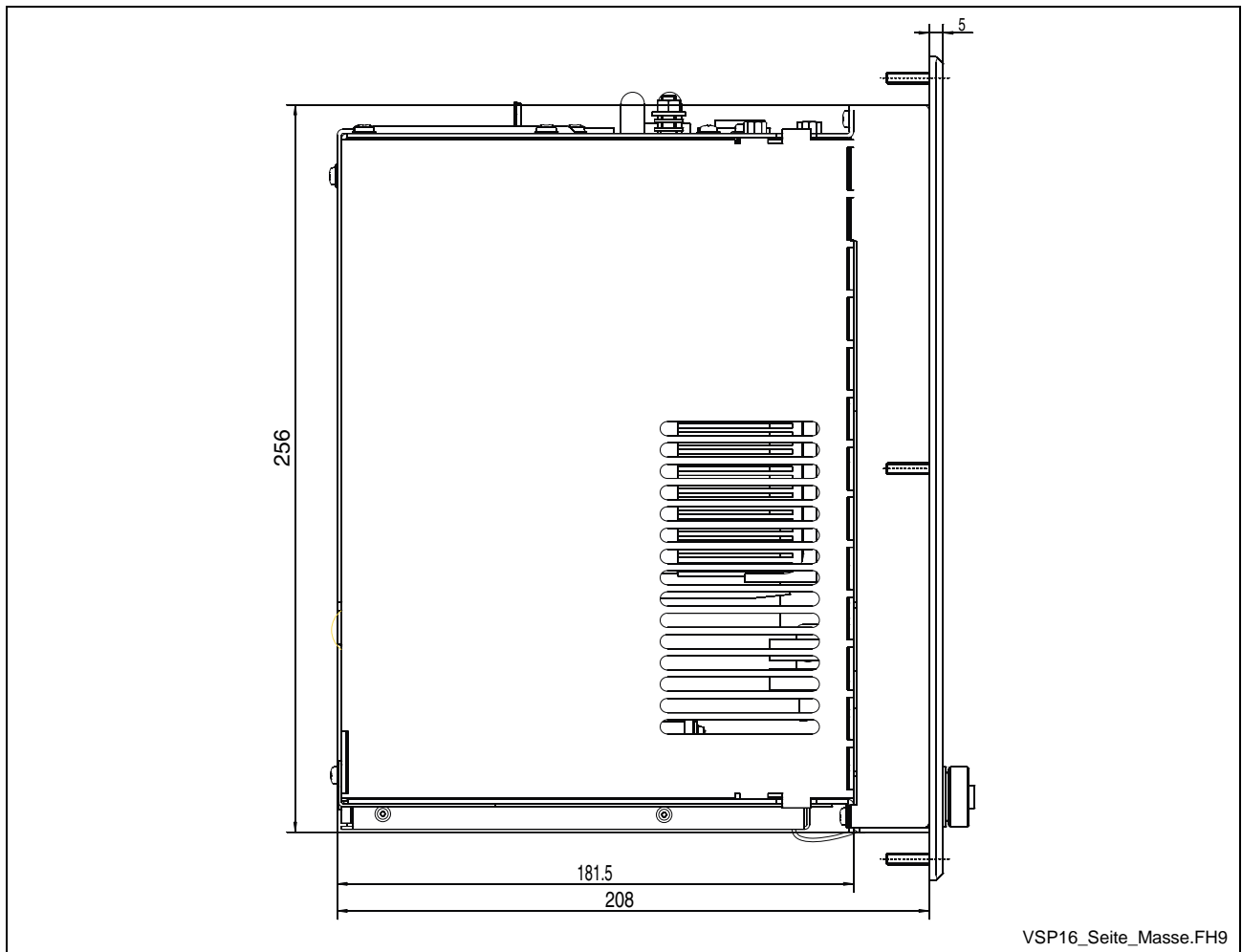


Fig. 5-3: Side view VSP 16.1

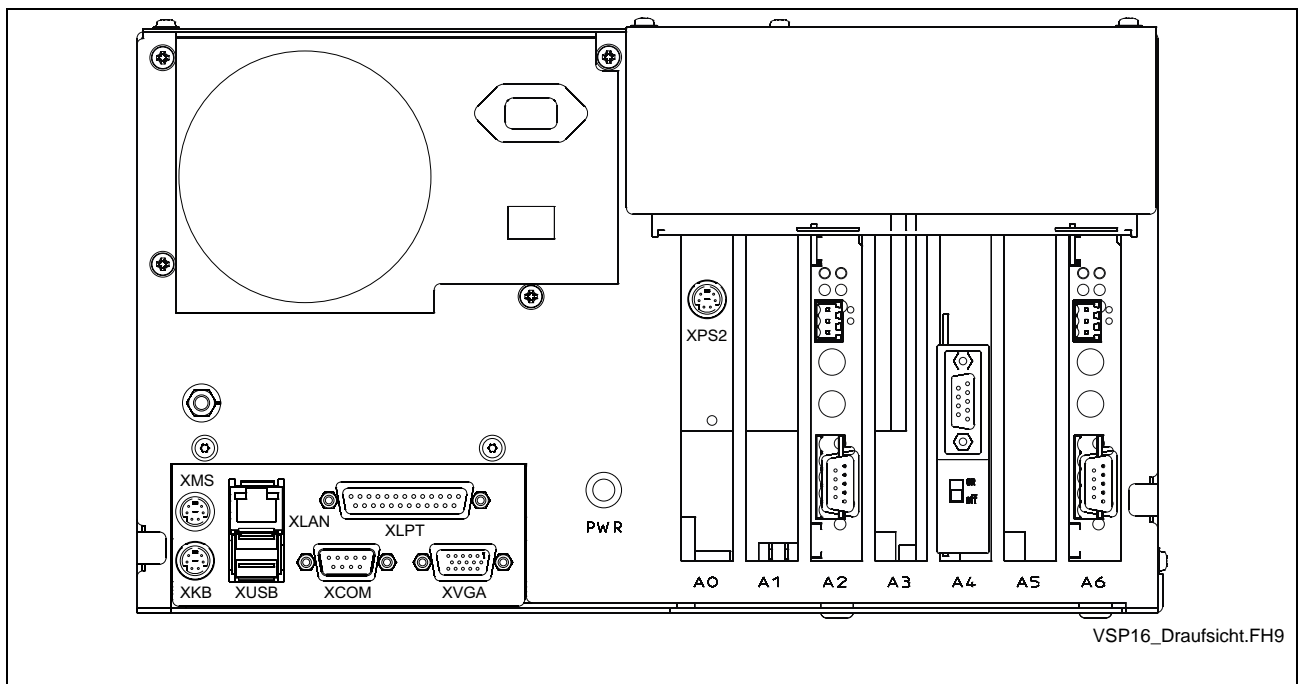


Fig. 5-4: Top view of the VSP 16.1

VDP 40.1 Housing Dimensions

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

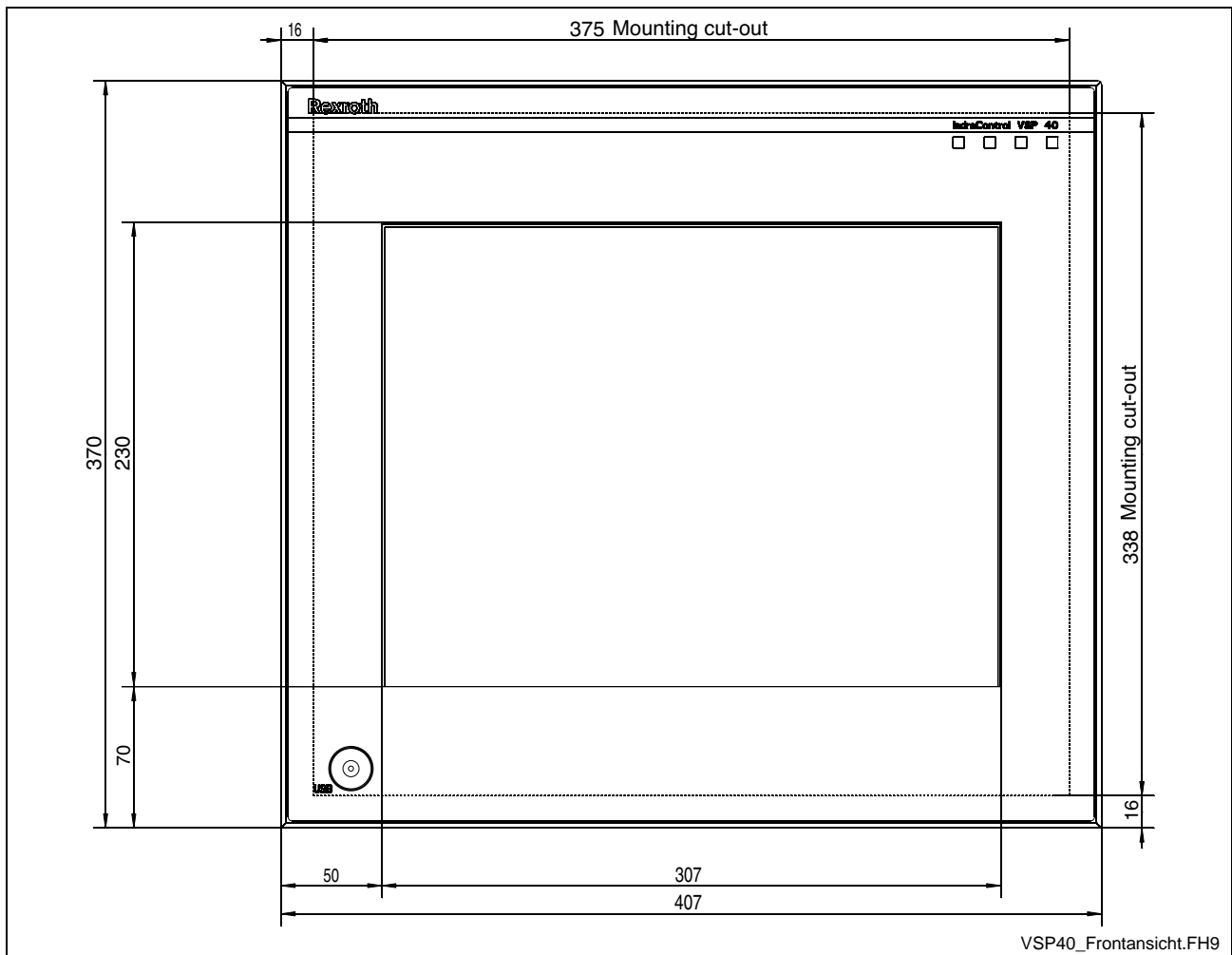


Fig. 5-5: Dimensions – Front panel VSP 40.1DE
The front panel of the VSP 40.1BI with machine function keys has the same dimensions..

The front panel width of the VSP 40.1AL is 417 mm and the height is 380 mm. It has no USB connection.

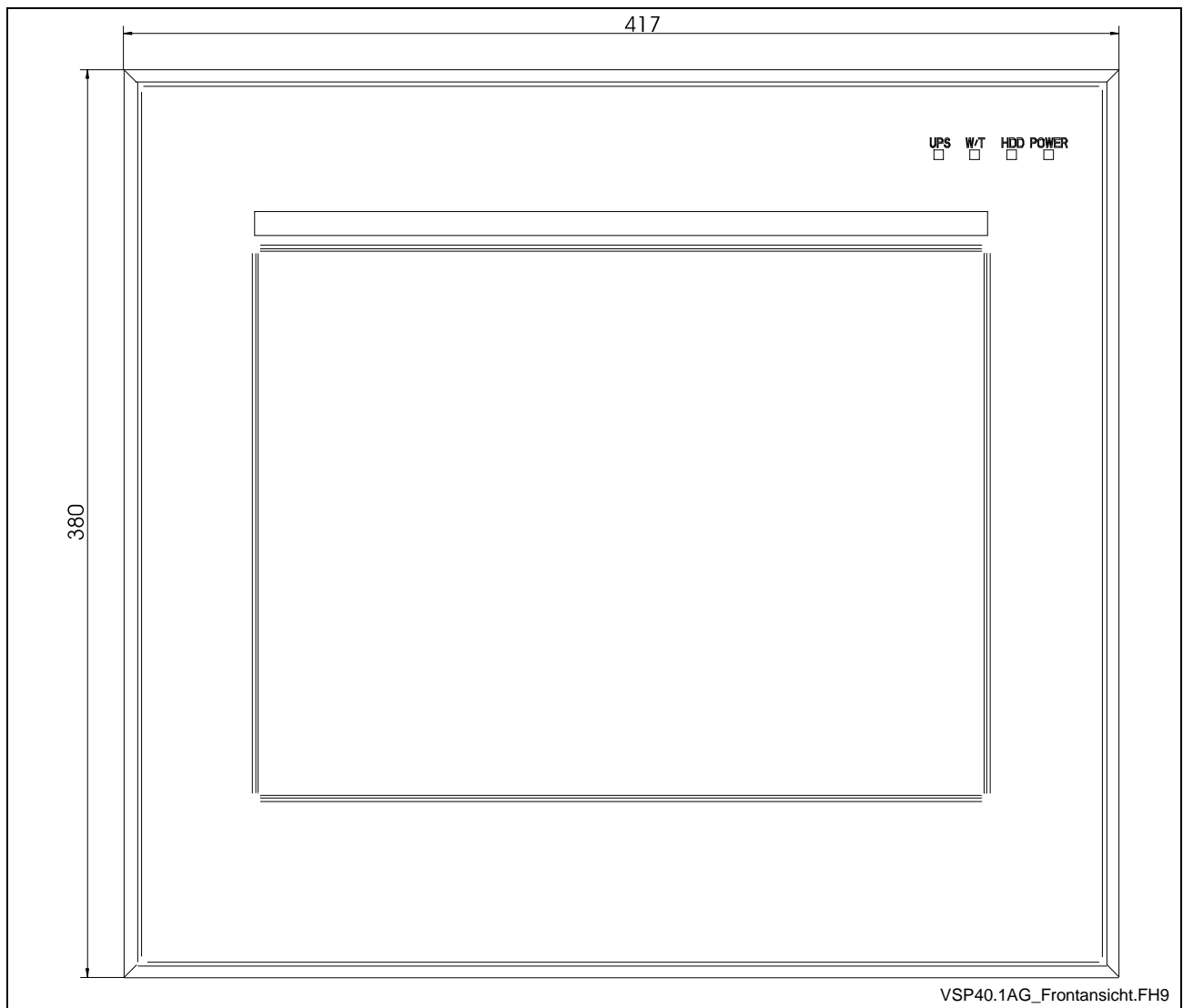


Fig. 5-6: Dimensions, front panel of the VDP 40.1AL

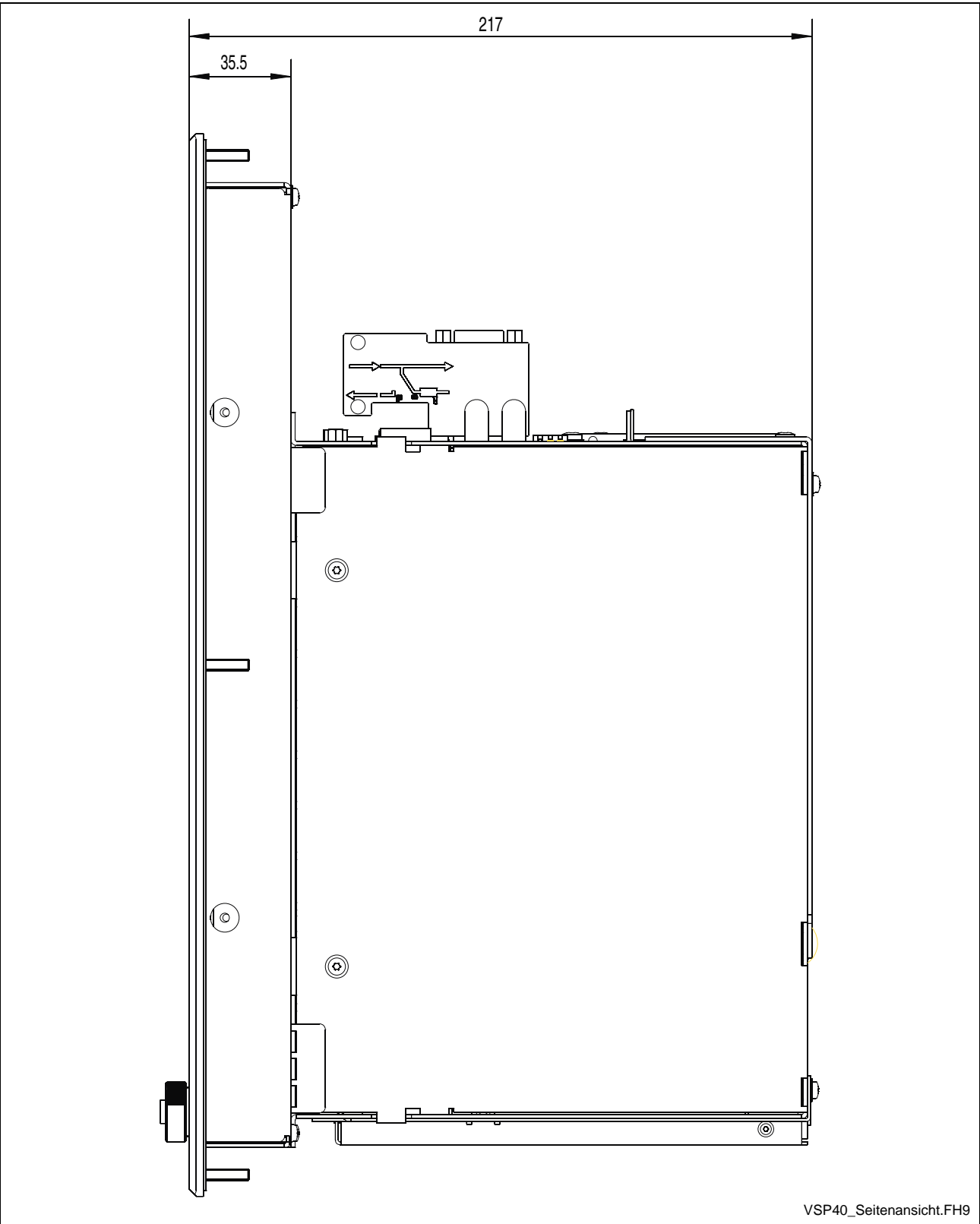


Fig. 5-7: Side view of the VSP 40.1

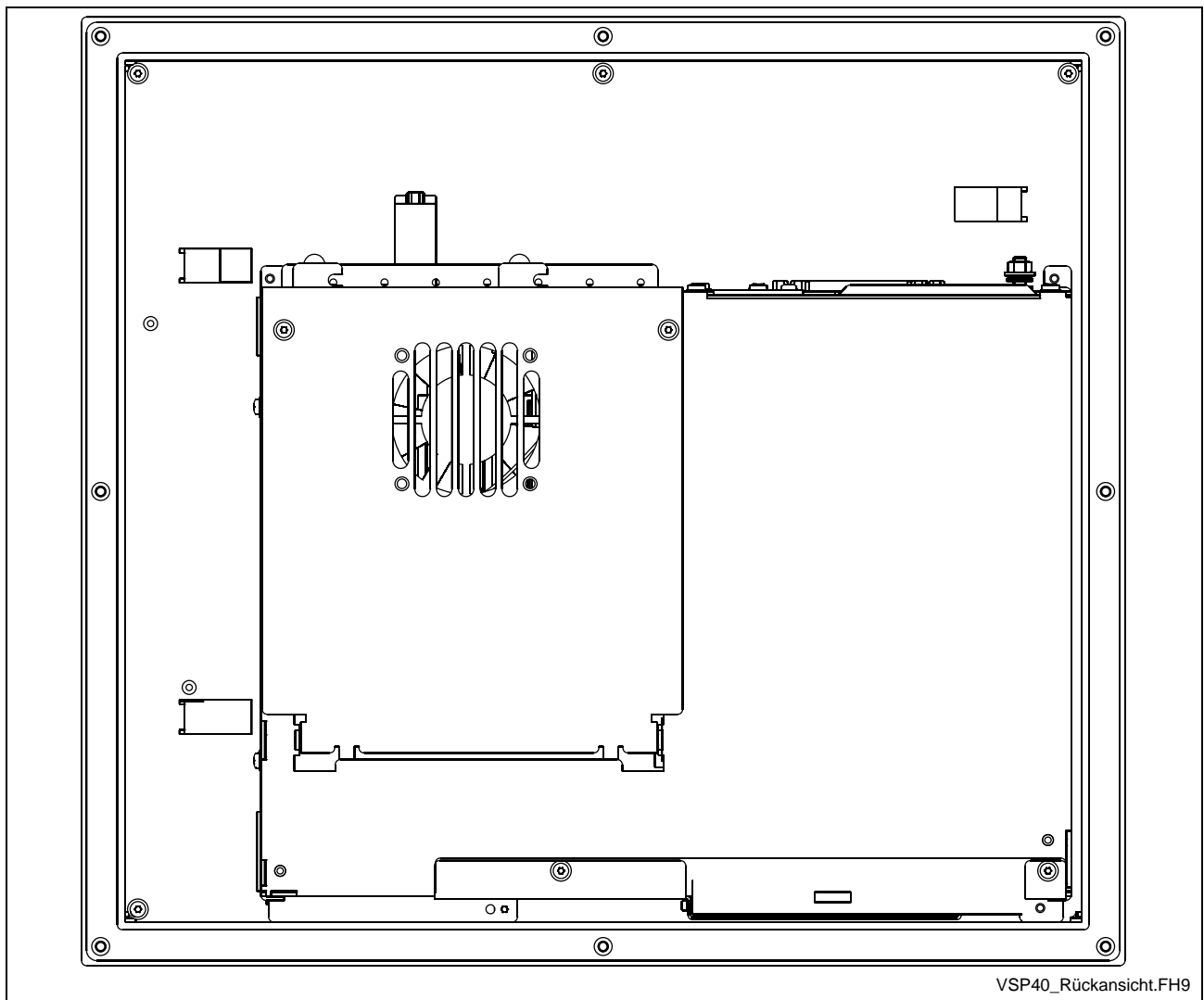


Fig. 5-8: Rear view of the VSP 40.1BI and VSP 40.1DE

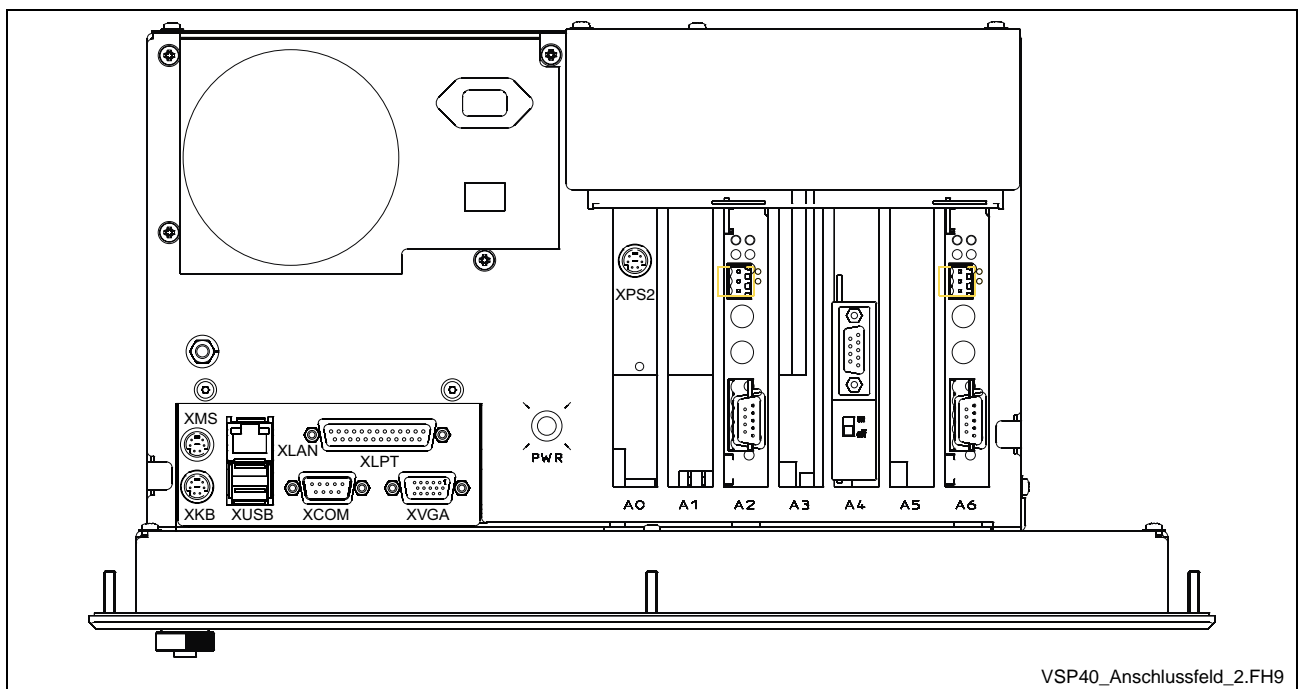


Fig. 5-9: Top view on the VSP 40.1

5.2 Installation

Installation Notes

- When installing the operator terminal observe to ensure an ergonomic operation. Additionally, ensure that all moving machine components can be seen by 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).
- The LED displays on the front panel have to be visible.
- Provide a sufficient clearance of 50 mm (on all sides) for cooling and cable routing behind the device.
- Lay all connecting cables in loops and use strain reliefs for all cables.
- Keep as much distance as possible to noise sources.

Mounting Cut-Out



Loss of degree of protection IP 65!

The front panels of the VSP 16.1 and VSP 40.1 devices correspond to degree of protection IP 65. To ensure that this degree of protection also remains preserved in the mounted status, you have to take appropriate measures:

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

For mounting the operator terminal proceed as follows:

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

Mounting Dimensions of the VSP 16.1

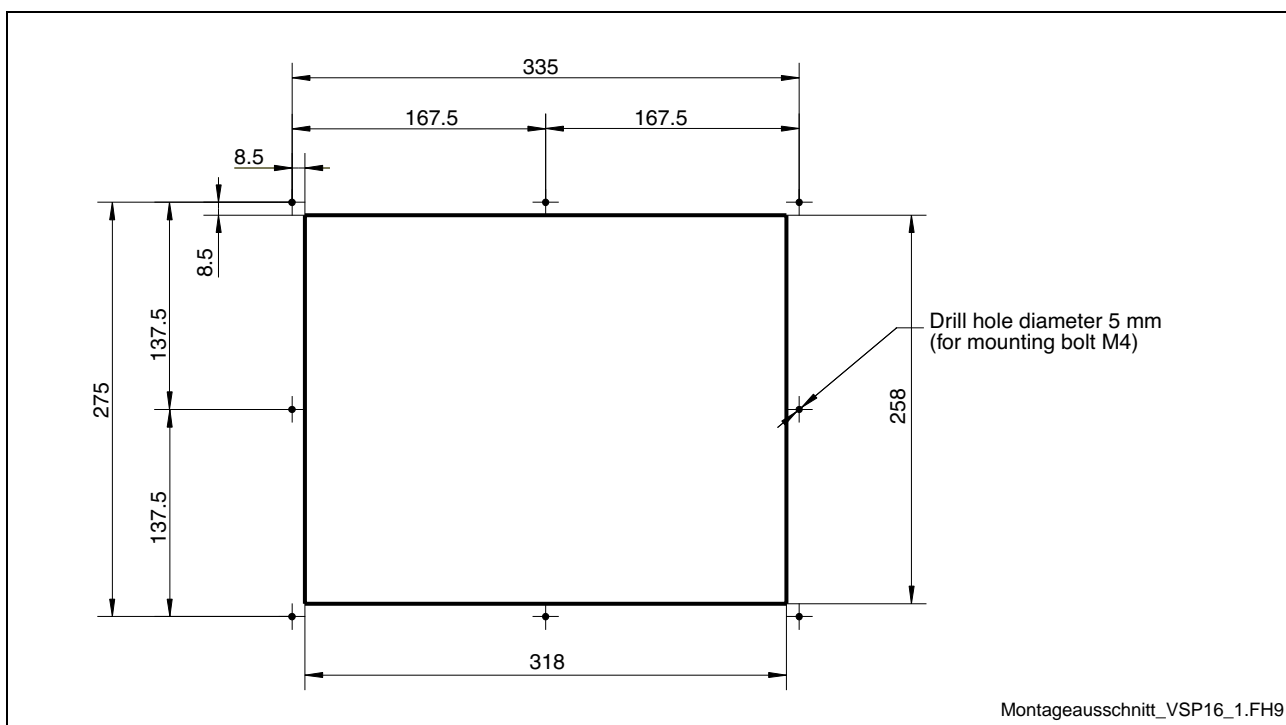


Fig. 5-10: Mounting cut-out for the VSP 16.1

Mounting Dimensions of the VSP 40.1

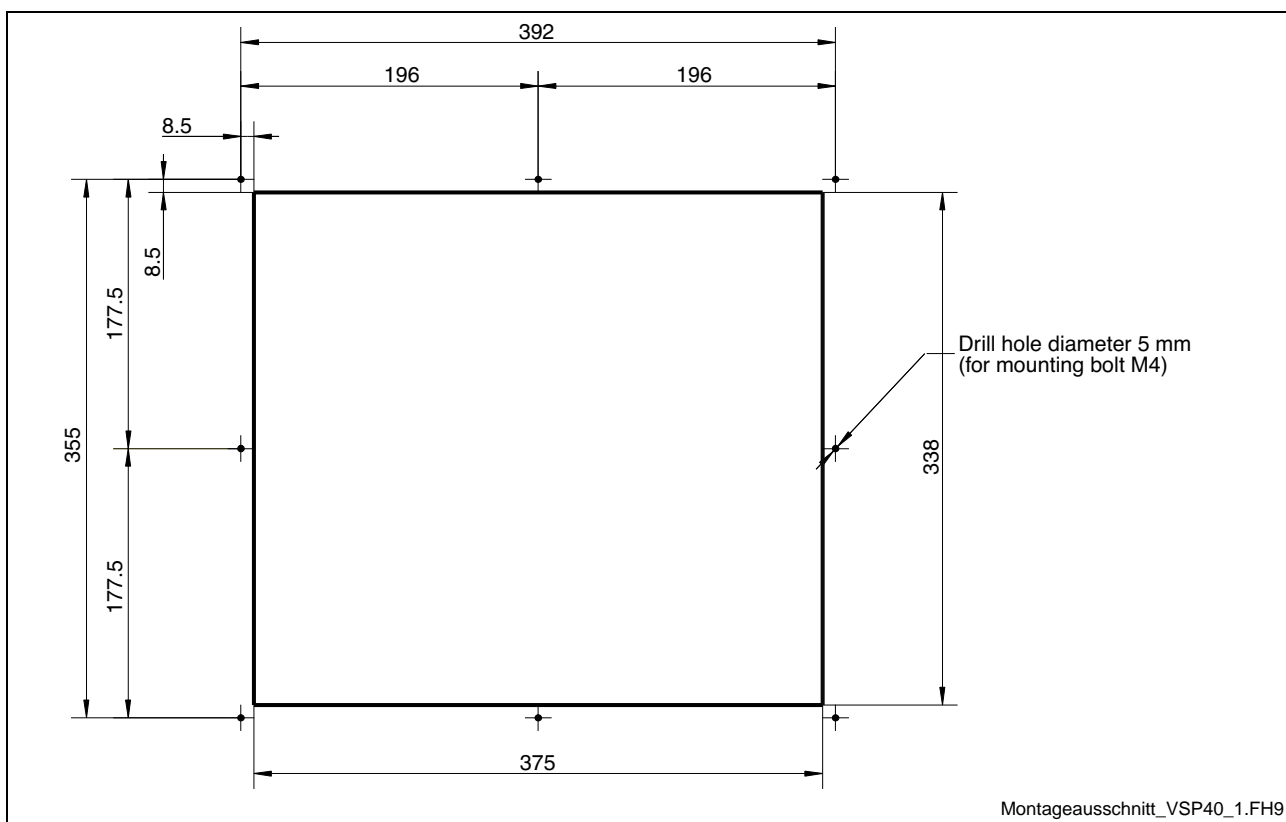


Fig. 5-11: Mounting cut-out for the VSP 40.1

Notes

6 Display and Operating Components

6.1 Operating Display

The operating display is situated in the upper right part of the front panel.


Symbol	Display	Meaning	Measure
	Green	Normal mode	-
	Off	No supply voltage 230/115 VAC or 24 VDC	Check supply voltage at the power supply unit!

Fig. 6-1: Operating display on the front panel

6.2 Keypad

System Requirements

To operate the keypad, an English or US keyboard driver is required. Therefore, do not change the delivery settings.

Position of the Keys



Fig. 6-2: VSP – position of the keys

Function and Operating Keys

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

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

Use of an External Keyboard

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

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

Fig. 6-3: Key combinations for the keys of the VSP 16.1BK and VSP 40.1BI

M-Keys

Eight M-Keys (machine function keys) are allocated at the right and the left side of the display (see Fig. 6-2). The keys on the right side of the display are labeled with R1 to R8, the keys on the left side of the display with L1 to L8.

Addressing of the M-Keys

The status of the M-keys can be retrieved in several ways:

- Pressed M-keys are transmitted as PS/2 signals to the PC.
- They can be transferred to a soft control installed on the PC via the serial interface COM3.
- M-Key information can be provided for another system via an optionally available PROFIBUS DP plug-in assembly.

Request M-keys via PS/2 The following key codes are output:

Key combinations for the keys of the VSP 16.1BK and VSP 40.1BI	Corresponding key to the standard keyboard
M-keys, left <div>L1</div> to <div>L8</div>	CTRL + ALT + SHIFT LEFT + X ASCII block X: 1 ... 8 (not NUM block)
M-keys, right <div>R1</div> to <div>R8</div>	CTRL + ALT + SHIFT RIGHT + X ASCII block X: 1 ... 8 (not NUM block)

Fig. 6-4: Key combinations for the keys of the VSP 16.1BK and VSP 40.1BI

Output of the M-Keys via PROFIBUS DP

The M-Keys are output at the optionally provided Profibus DP plug-in assembly as output bits of a Profibus DP slave, so that they can be read by a connected Profibus DP master as inputs. The corresponding GSD file is stored in folder C:\SUPPORT\PROFIBUS.

Pressed M-keys have the value "1"; The keys are not pressed have the value "0".

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

Fig. 6-5: Assignment of the M-Keys at the Profibus DP

6.3 Touch Screen

In the variants VSP 16.1DB, VSP 16.1AK as well as VDP 40.1DE and VDP 40.1AL a touch screen is used allowing the operation of the application software via the touch-sensitive surface of the displays.

Settings can be modified via setup programs (see chapter "Touch Screen Software" on page 9-1).

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

Notes

7 PC Box

7.1 View on the Connector Panel

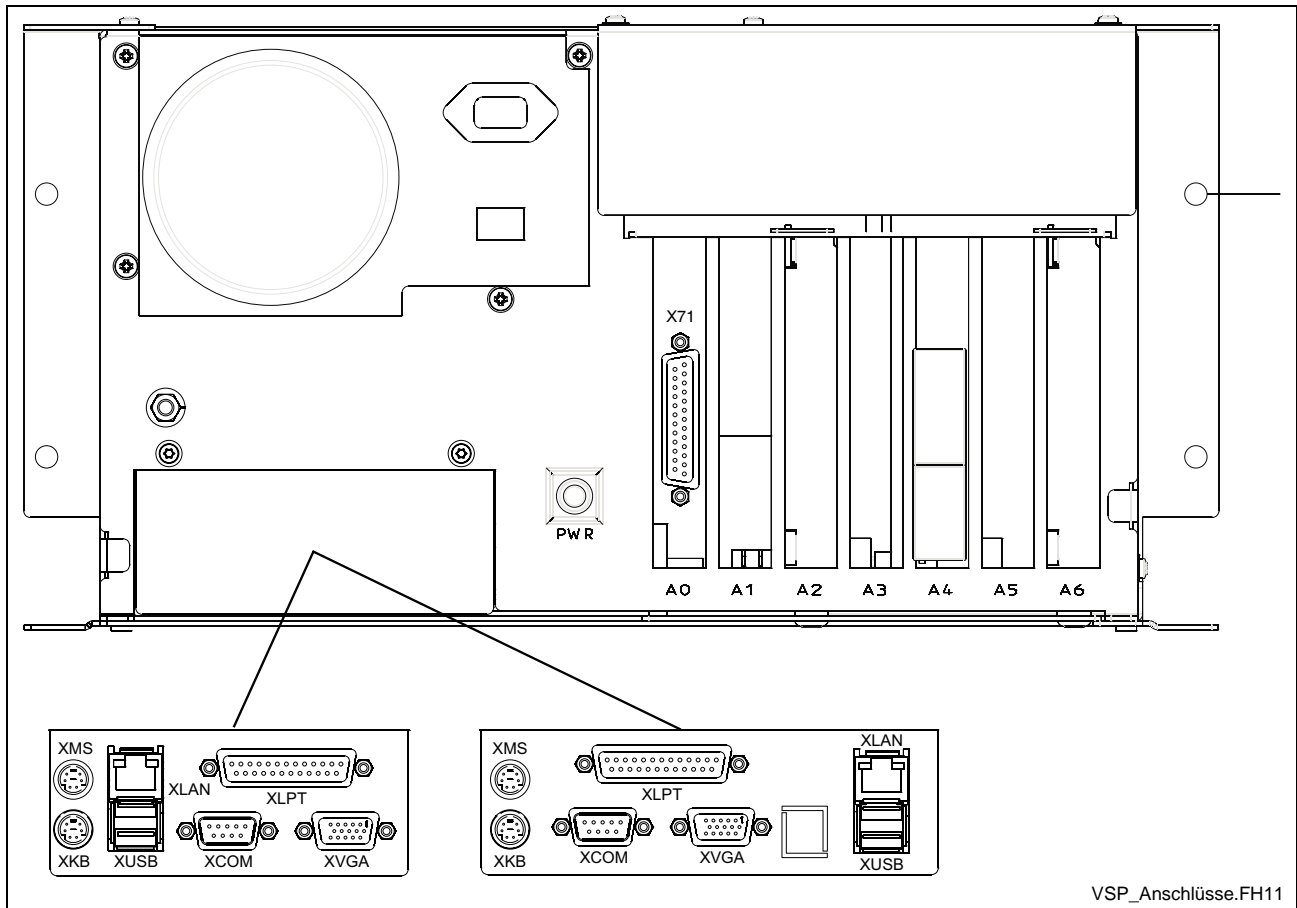


Fig. 7-1: Typical connector panel of the VSP 16.1 devices and the VSP 40.1 (the assignment of the connections depends on the variants)

7.2 Interfaces

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

Overview

Connection point:	Des. on the housing	Connection type	Connector type (integrated)	Mating connector or cable (from outside)
o	XCOM	Serial interface: RS232 (UART 16550), not assigned	D-Sub male connector, 9-pin	D-Sub female connector, 9-pin
o	XLPT	Parallel interface: supports standard SPP-, EPP-, ECP-mode	D-Sub female connector, 25-pin	D-Sub male connector, 25-pin (e. g. printer cable)
o	XUSB	2 USB interfaces	USB female connector, 4-pin, type A	USB male connector, 4-pin
f		USB interface	USB female connector, 4-pin, cap in degree of protection IP 65	USB male connector, 4-pin
o	XLAN	Network connection: Ethernet 10Base T / 100Base X	RJ45 female connector, 8-pin	RJ45 connector (twisted pair, 8-core)
o	XVGA	VGA connection of an external CRT monitor	VGA HD female connector, 15-pin	VGA HD male connector, 15-pin
o or A0	XKB or XPS2	PS/2 keyboard	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 male connector, 6-pin
o	XMS	PS/2 mouse	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 male connector, 6-pin
o		PC power supply: 24 VDC (only for VSP 16.1AK and VSP 40.1AL)	Screw terminal	
o		PC power supply: 230/115 VAC (not for VSP 16.1AK and VSP 40.1AL)	AC male connector	AC female connector

Connection point:

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

Fig. 7-2: Connector types VSP 16.1 / VSP 40.1

Serial Interface XCOM

XCOM: A serial standard interface is provided at connection XCOM.
Serial interface

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

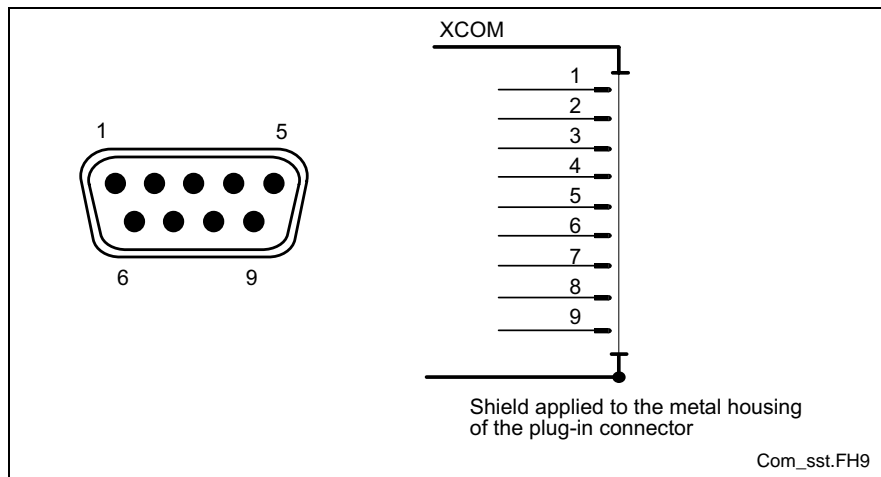


Fig. 7-3: Serial interface XCOM

Note: Depending on the design, the UPS available as accessory this interface might be needed for the communication with the UPS.

Settings of the Serial Interface

Control Panel To find out settings of the transfer parameters for the serial interfaces, please refer to the description of the installed operating system (for Windows under Settings/Control Panel, ...").

BIOS The standard BIOS setting of COM (Serial Port A) is **AUTO** (automatic parameter assignment). Apply the following settings if the parameter should be assigned directly:

- COM = 3F8H

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

Parallel Interface XLPT

XLPT – Parallel Interface for
Printer, Scanner, etc.

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

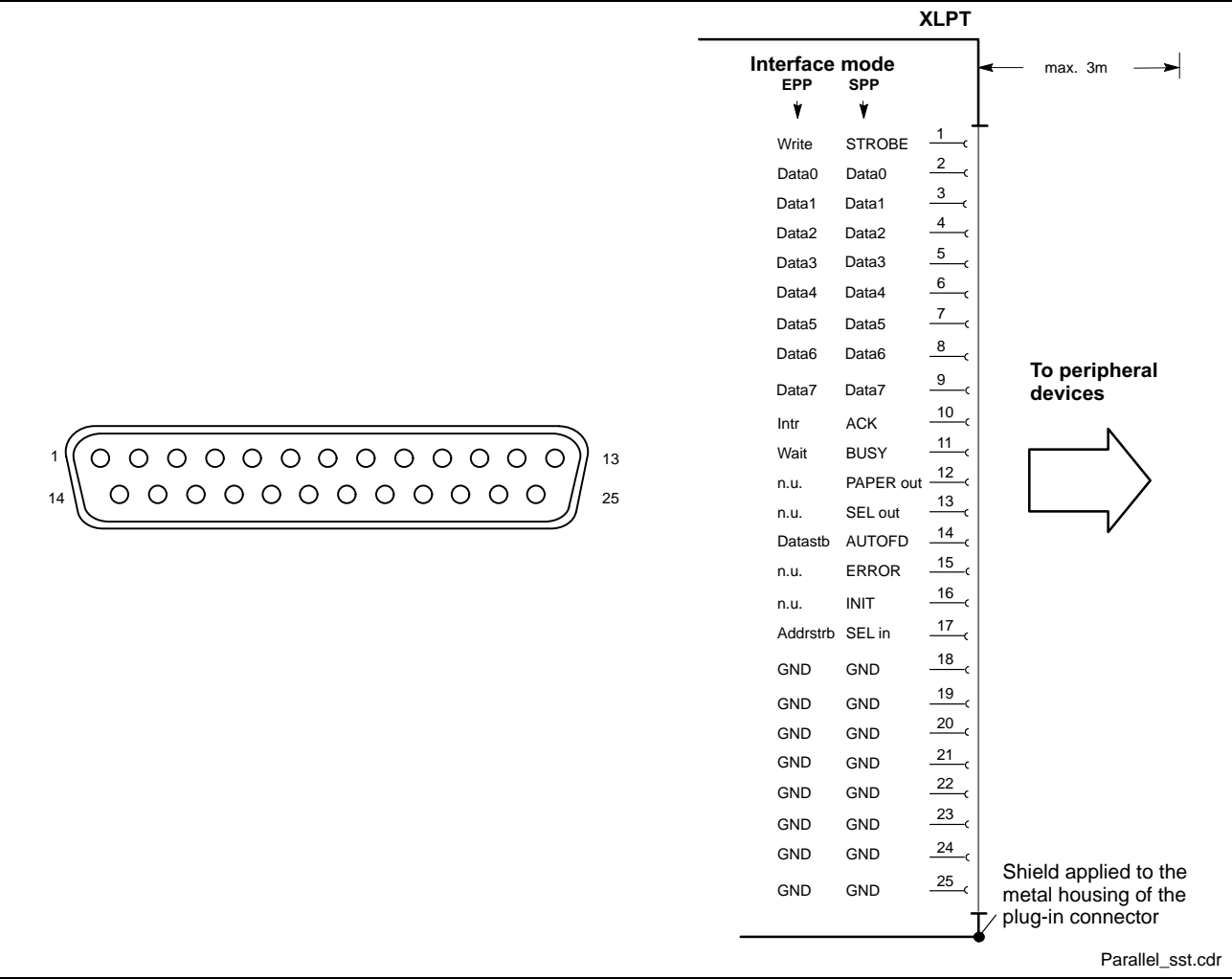


Fig. 7-4: XLPT interface

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

USB Interfaces XUSB

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

The devices feature two USB interfaces on the connector panel (XUSB) and one on the front panel (partially not for devices with customer-specific design). These interfaces are compatible to USB 1.1 and USB 2.0.

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.

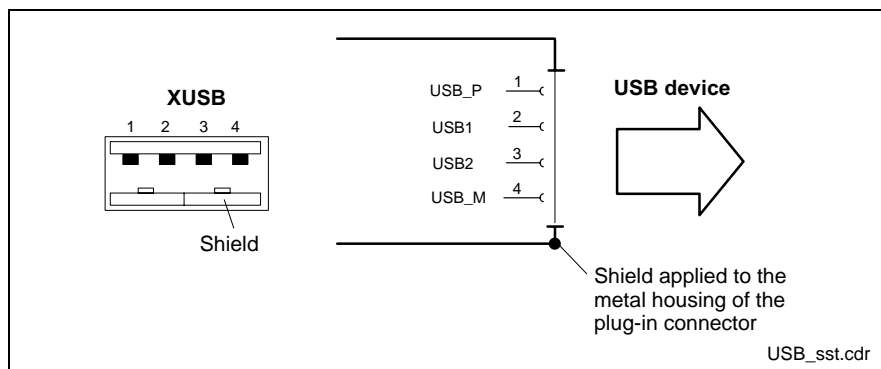


Fig. 7-5: USB Interfaces

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

Ethernet Interface XLAN

XLAN – Network Connection The operator terminal can be connected with an Ethernet network via an Ethernet interface XLAN.

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

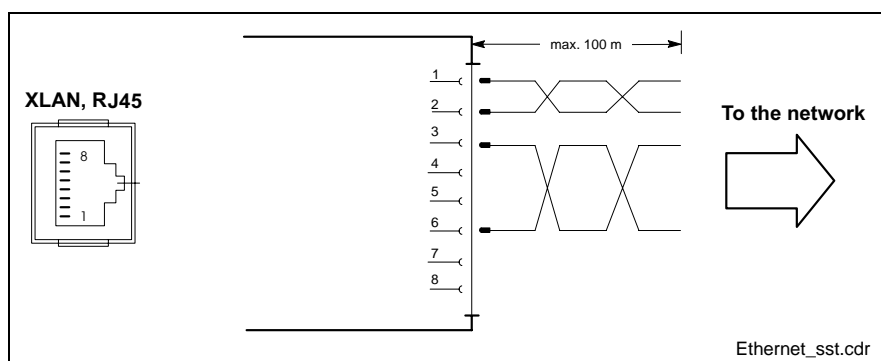


Fig. 7-6: Ethernet interface XLAN

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

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

VGA Interface XVGA

XVGA – Connection for an External Monitor

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

- Video RAM: 8 MB max.

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

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

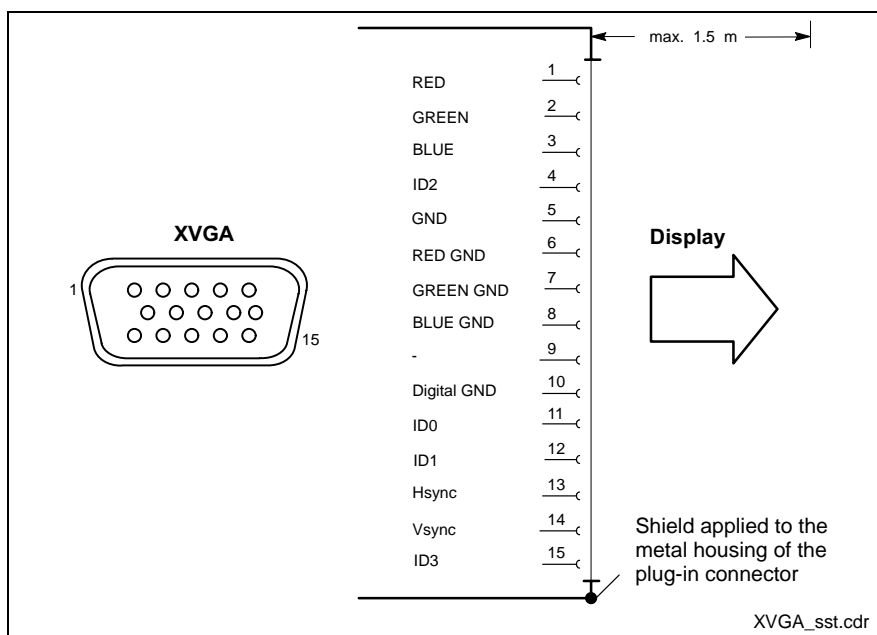


Fig. 7-7: VGA interface



CAUTION!

Setting incorrect resolutions and colors may destroy your monitor!

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

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

Activation of the External Monitor

You can select, if the internal display, the external monitor or both are addressed:

1. Select "Intel(R) Extreme Graphics" in the task bar.

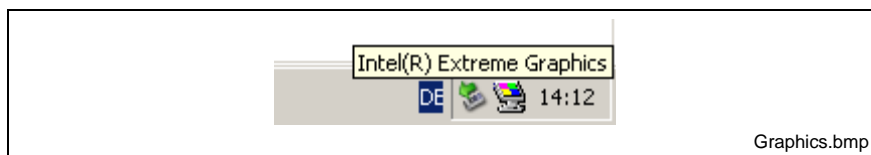


Fig. 7-8: Intel Extreme Graphics

2. Chose "Graphics Options" -> "Graphics Properties".

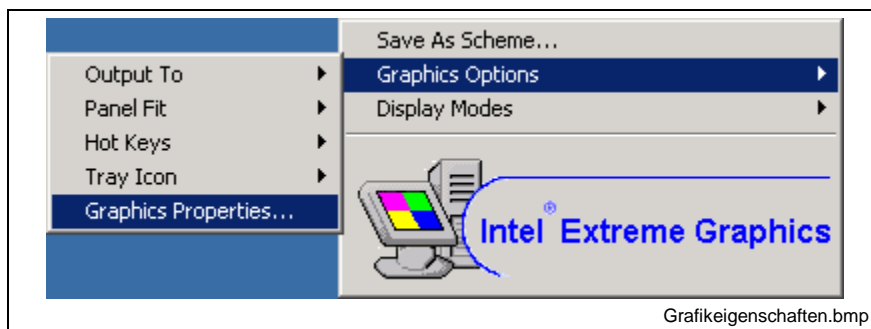


Fig. 7-9: Graphics Properties

3. If you select the "Devices" tab, the "Properties of Intel(R) ..." window opens.

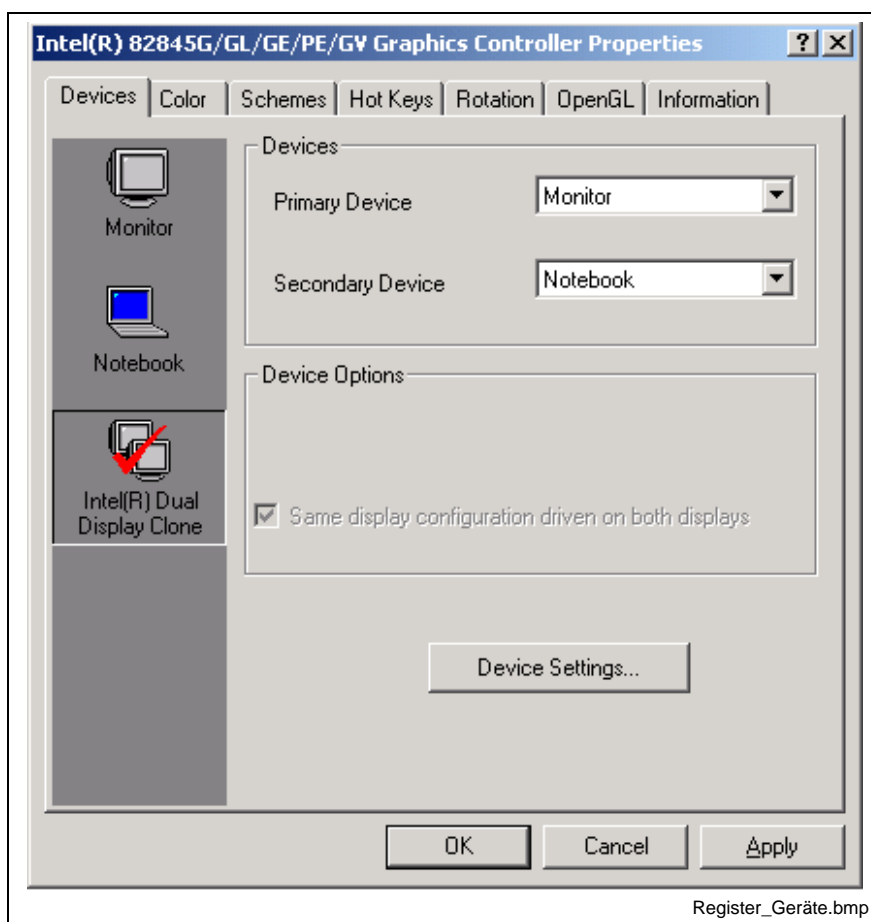


Fig. 7-10: "Devices"

4. If an external monitor is connected, you can select on the left side by clicking on the corresponding icons, if you want to address only the external monitor (select "Monitor"), only the internal VGA screen (select "Notebook") or both screens (select "Intel(R) Dual Display Clone").

5. After confirming using <OK>, another window opens where the selection is to be reconfirmed by pressing <OK>. Otherwise, the monitor selection is not applied.



Fig. 7-11: Confirm Desktop Change

Keyboard Interface XKB/XPS2

XKB or XPS2 –
PS/2 Mini DIN
Keyboard Interface

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

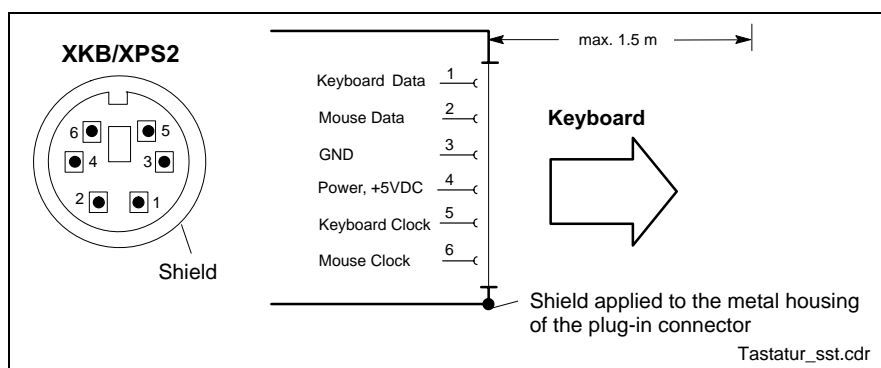


Fig. 7-12: Keyboard interface

The external keyboard has to be connected at XPS2 on the A0 slot:



**Wrongly connected keyboard
may cause malfunctions!**

⇒ No keyboard may be connected to the XKB connection.

Mouse Interface XMS

XMS – PS/2 Mouse Interface

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

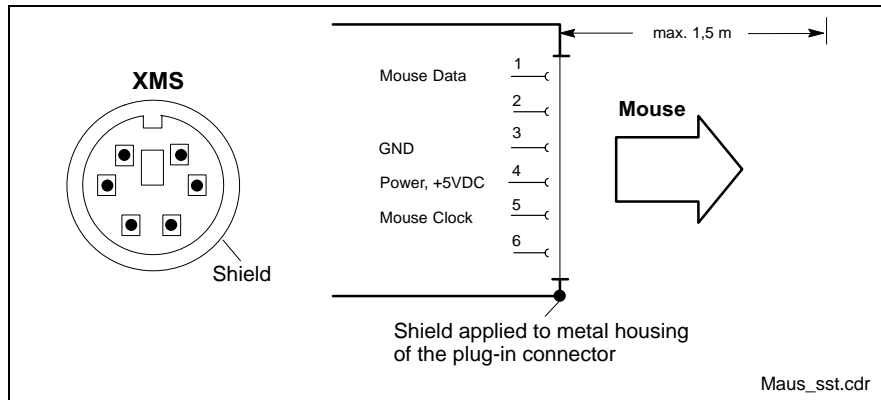


Fig. 7-13: Mouse interface XMS

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

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

PC Power Supply

24 VDC Power Supply

This screw connection is used for device variants for 24 VDC. All internally required voltages are generated from the 24 VDC supply.

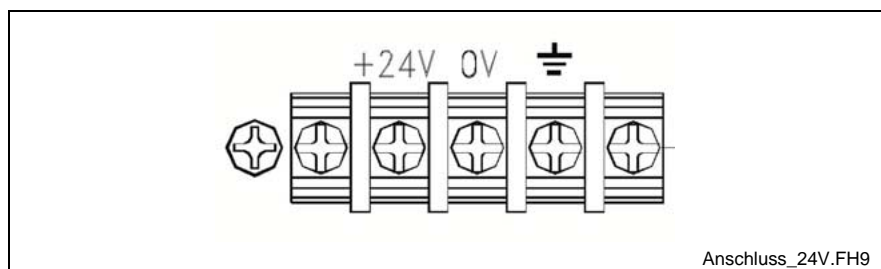


Fig. 7-14: Connection terminal for the 24 VDC supply

Note: Only copper wire is to be used to connect these terminals. Tighten the screws of the screw terminals with a torque of 0.4 Nm (1.81 kg in).

Parameters	Value
Input voltage U_N	24 VDC ; (19 ... 32 VDV)
Residual ripple for U_N	See Fig. 7-17
Power consumption for 19 VDC	20 A max.
Overload protection	Deactivation with automatic restart
Short-circuit protection	Deactivation with automatic restart

Fig. 7-15: 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!

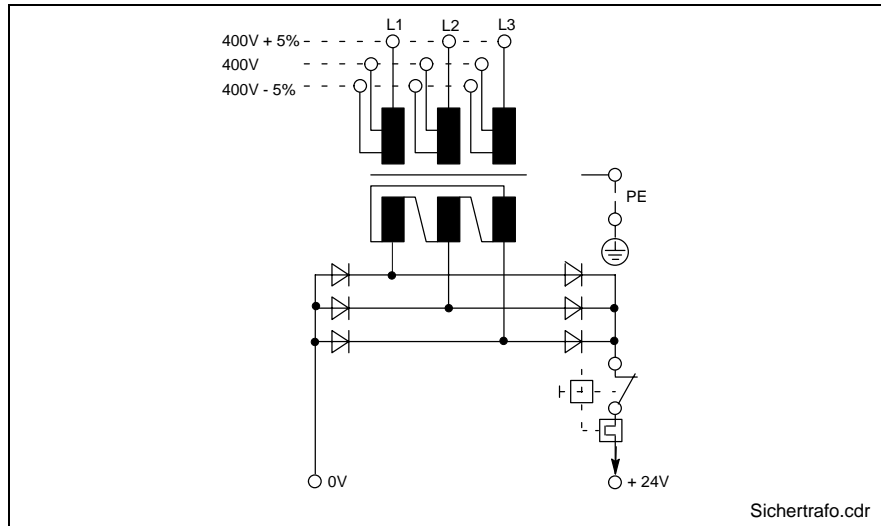


Fig. 7-16: Safety transformer according to EN 60742

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.

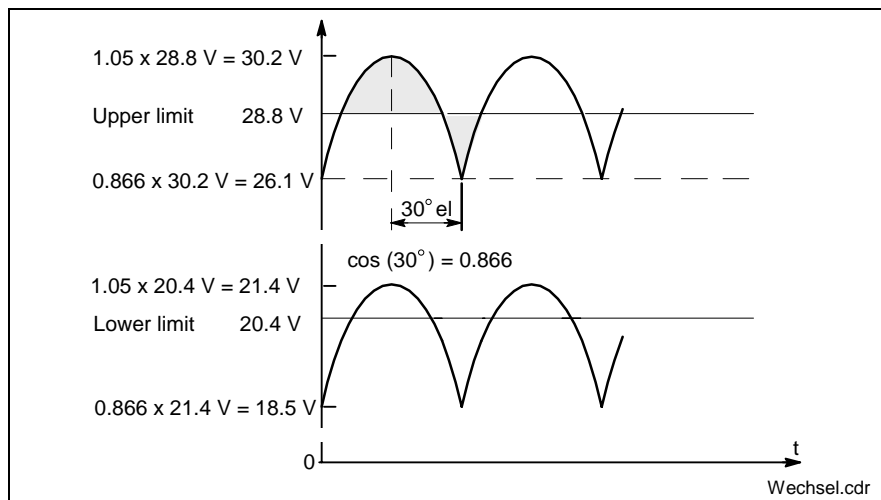


Fig. 7-17: Illustration of the limit values for the 24 VDC voltage

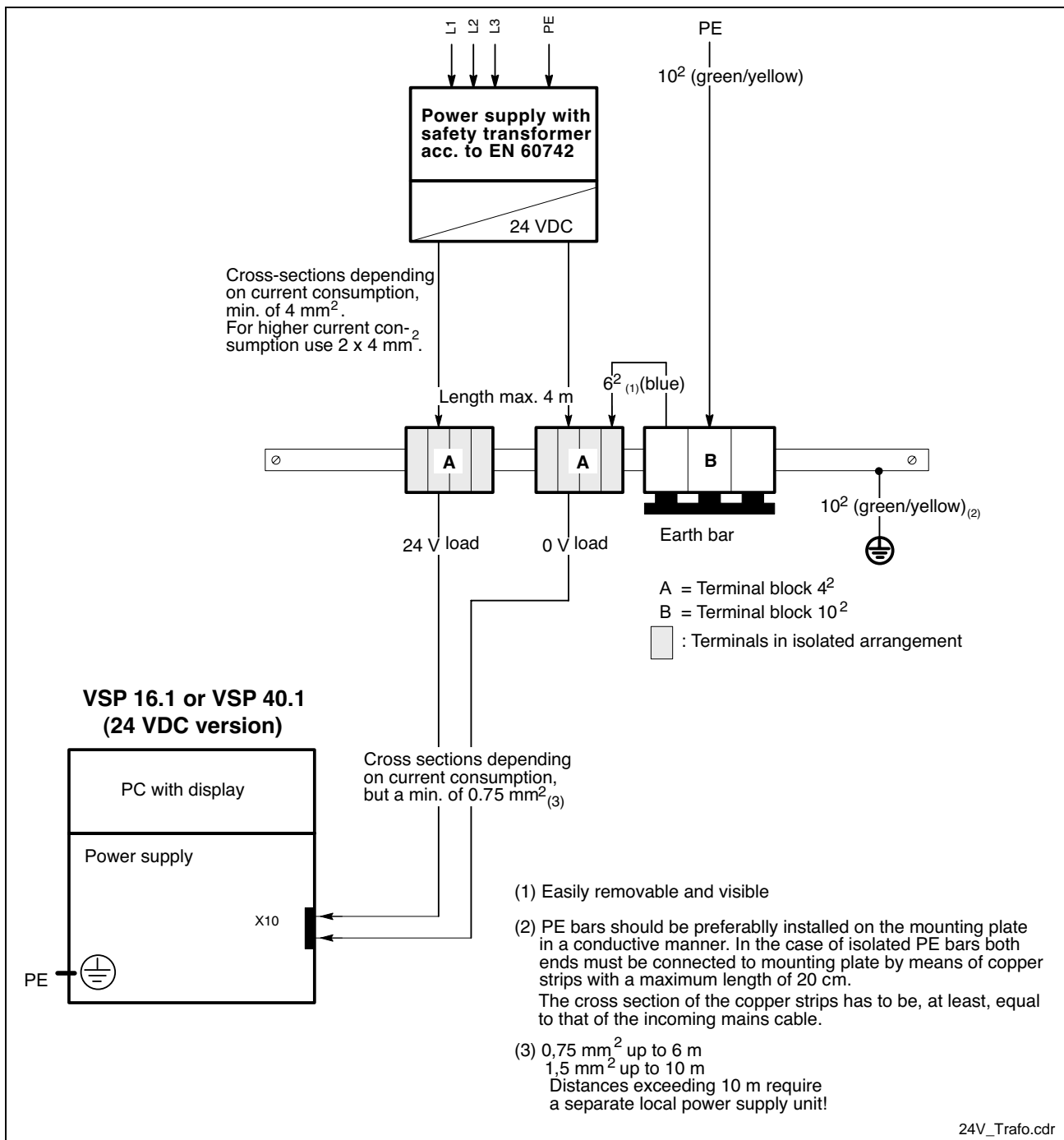



Fig. 7-18: Wiring of the power connection 24 VDC and the operator terminal

115/230 VAC Power Supply

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



CAUTION

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

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

The 230/115 VAC connection occurs via a 3-pin inlet connector for AC connectors on the connector panel. The maximum cable cross section for the connected cables is 1.5 mm².

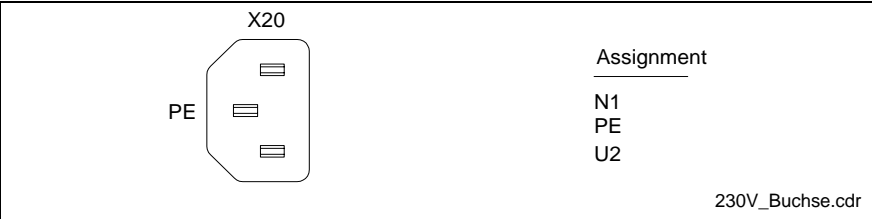


Fig. 7-19: Pin assignment of the 230/115 VAC connection X20

Parameters	Value
Rated voltage	90 VAC ... 264 VAC auto range
Power consumption for U _N = 230 VAC	2.5 A
Power consumption for U _N = 115 VAC	5 A
Inrush current for 264 VAC	100 A
Overload protection	As of 135 %, deactivation
Short-circuit protection	At all outputs, deactivation

Fig. 7-20: Technical data 230/115 VAC connection

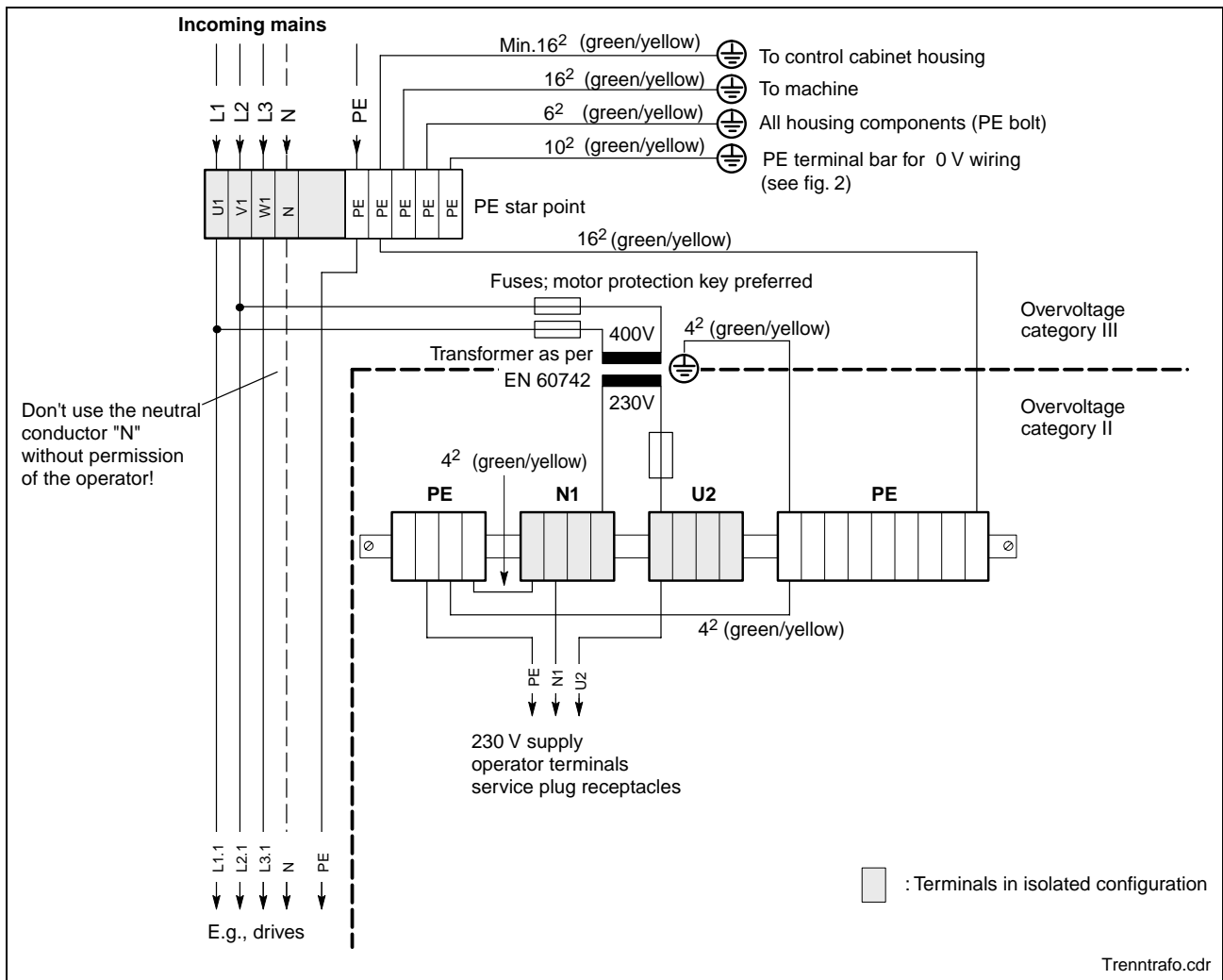


Fig. 7-21: Voltage connection 230 VAC via isolating transformer

7.3 Optional Serial Interfaces

According to the configuration, serial interfaces are available for the extension cards A5 and A6 on the slots.

The interfaces have different pin assignments and signal assignments. Before using the interfaces, identify type or pin assignment. See configuration sticker on the device (CFG-VSN01E1-xx-xx-xx-xx-xx-xx)

CFG-VSN01E1-NN-NN-NN-NN-NN-S3 Serial Interface RS232

XCOM4 on Slot for Extension Card A6

Pin	Assignment
1	DCD (Data Carrier Detect)
2	RX (Receive Data)
3	TX (Transmit Data)
4	DTR (Data Terminal Ready)
5	Signal Ground
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)

Fig. 7-22: Pin assignment RS232, D-sub male connector, 9-pin

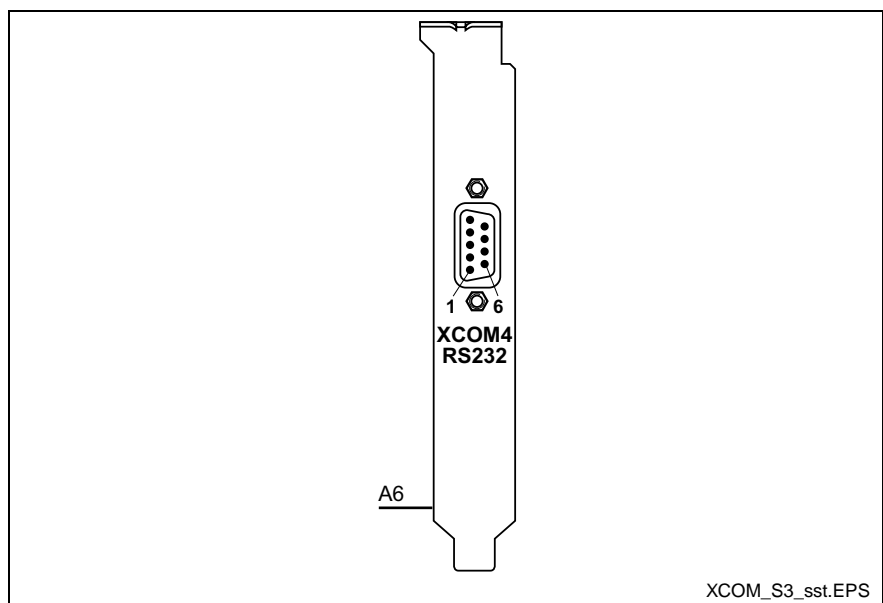


Fig. 7-23: Serial interface adapter XCOM4 on slot for extension card A6

CFG-VSN01E1-NN-NN-NN-NN-S3-S3

Serial Interface RS232

XCOM3 on Slot for Extension Card A5

Pin	Assignment
1	DCD (Data Carrier Detect)
2	RX (Receive Data)
3	TX (Transmit Data)
4	DTR (Data Terminal Ready)
5	Signal Ground
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)

Fig. 7-24: Pin assignment RS232, D-sub male connector, 9-pin

XCOM4 on Slot for Extension Card A6

Pin	Assignment
1	DCD (Data Carrier Detect)
2	RX (Receive Data)
3	TX (Transmit Data)
4	DTR (Data Terminal Ready)
5	Signal Ground
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)

Fig. 7-25: Pin assignment RS232, D-sub male connector, 9-pin

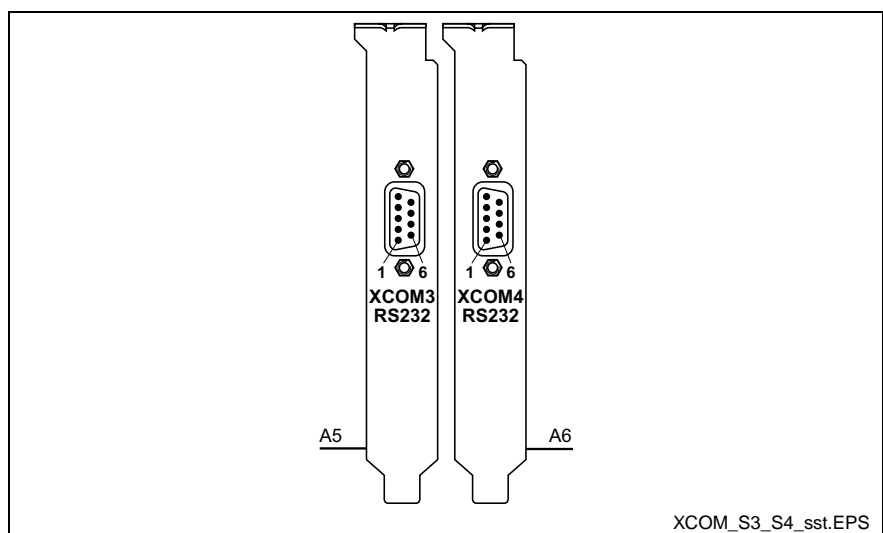


Fig. 7-26: Serial interface adapters XCOM3 and XCOM4 on the slots for the extension cards A5 and A6

CFG-VSN01E1-NN-NN-NN-NN-S2

Serial Interfaces RS232 and RS422

XCOM4 on Slot for Extension Card A6

Pin	Assignment
1	DCD (Data Carrier Detect)
2	RX (Receive Data)
3	TX (Transmit Data)
4	DTR (Data Terminal Ready)
5	Signal Ground
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)

Fig. 7-27: Pin assignment RS232, D-sub male connector, 9-pin

XCOM4 on Slot for Extension Card A6

Pin	Assignment
1	TXD- (Transmit Data-)
2	TXD+ (Transmit Data+)
3	RXD- (Receive Data-)
4	RXD+ (Receive Data+)
5	Ground

Fig. 7-28: Pin assignment RS 422, D-sub male connector, 9-pin

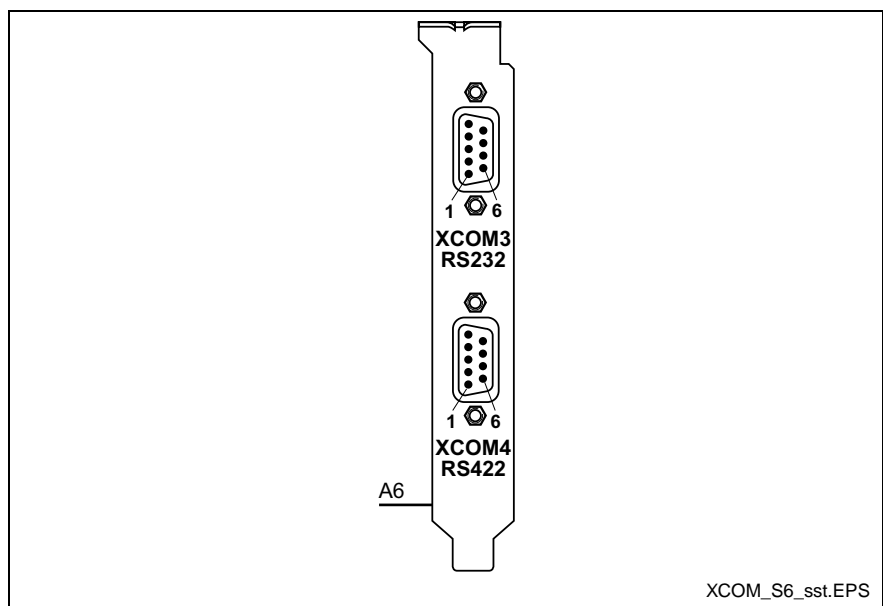


Fig. 7-29: Serial interface adapters XCOM3 and XCOM4 on slot for extension card A6

Note: There is no uniform and standard pin assignment for RS422. When connecting RS422 devices, the pinout in the documentation is to be considered.

Jumper Setting on Motherboard

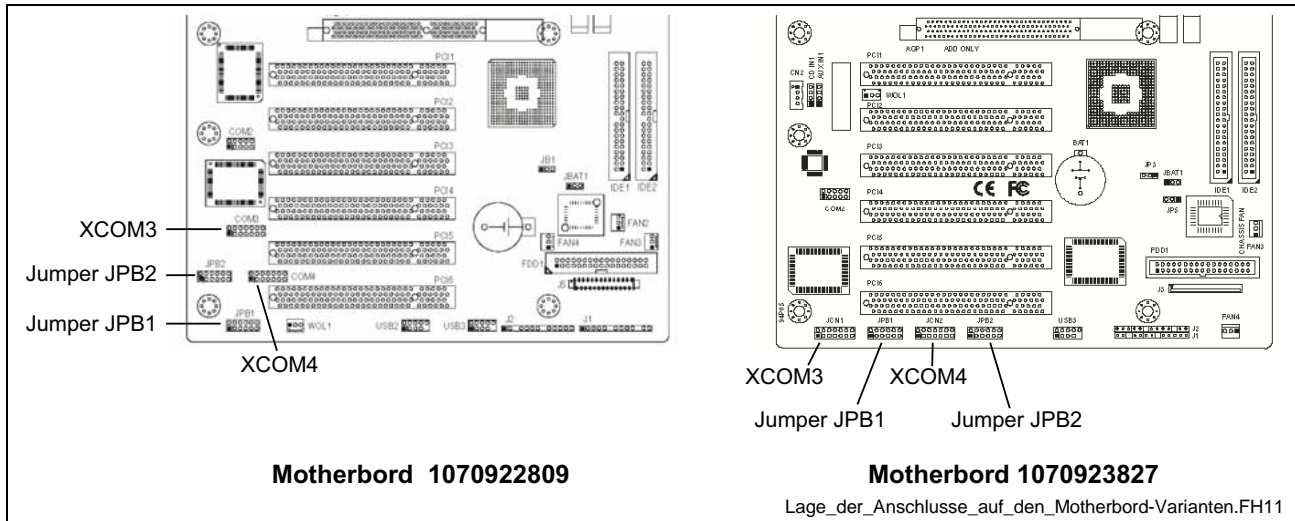


Fig. 7-30: Position of the connections and the jumper on the motherboard variants

XCOM3	Motherboard 1070922809 = Jumper JPB2 Motherboard 1070923827 = Jumper JPB1					
	1-2	3-4	5-6	7-8	9-10	11-12
RS232	OFF	OFF	OFF	OFF	OFF	ON

XCOM4	Motherboard 1070922809 = Jumper JPB1 Motherboard 1070923827 = Jumper JPB2					
	1-2	3-4	5-6	7-8	9-10	11-12
RS422	OFF ON (Term.)	OFF ON (Term.)	OFF	ON	ON	OFF

Jumper 1-2 ON = Termination 120 ohm between RXD+ and RXD-
 Jumper 2-3 ON = Termination 120 ohm between TXD+ and TXD-

Fig. 7-31: Jumper positions for termination settings

CFG-VSN01E1-NN-NN-NN-NN-S6

Serial Interfaces RS232 and RS422 (Rexroth Standard)

XCOM4 on Slot for Extension Card A6

Pin	Assignment
1	DCD (Data Carrier Detect)
2	RX (Receive Data)
3	TX (Transmit Data)
4	DTR (Data Terminal Ready)
5	Signal Ground
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)

Fig. 7-32: Pin assignment RS232, D-sub male connector, 9-pin

XCOM4 on Slot for Extension Card A6

Pin	Assignment
2	RXD- (Receive Data-)
3	TXD- (Transmit Data-)
5	Ground
7	RXD+ (Receive Data+)
8	TXD+ (Transmit Data+)

Fig. 7-33: Pin assignment RS422 (here the Rexroth standard assignment), D-sub connector, 9-pin

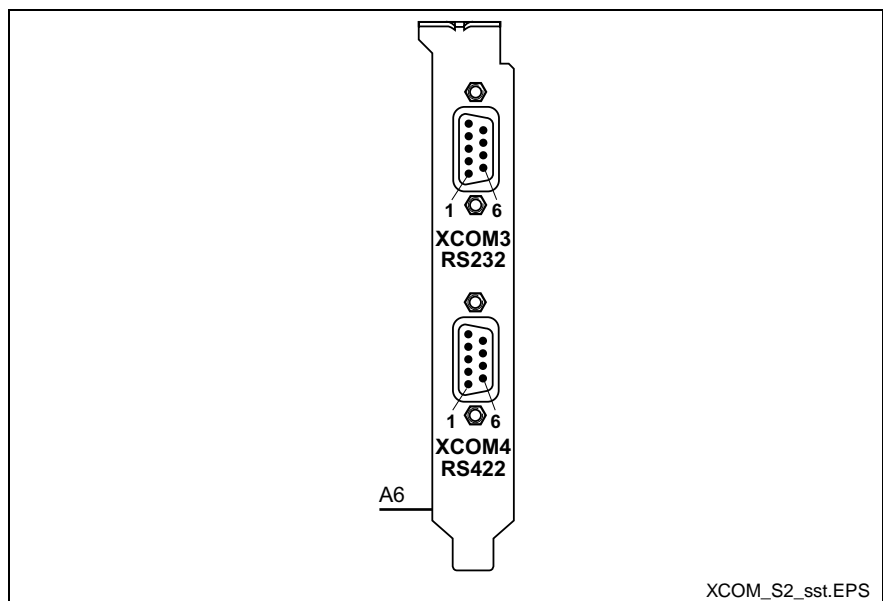


Fig. 7-34: Serial interface adapters XCOM3 and XCOM4 on slot for extension card A6

Note: There is no uniform and standard pin assignment for RS422. When connecting RS422 devices, the pinout in the documentation is always to be considered.

Jumper Setting on Motherboard

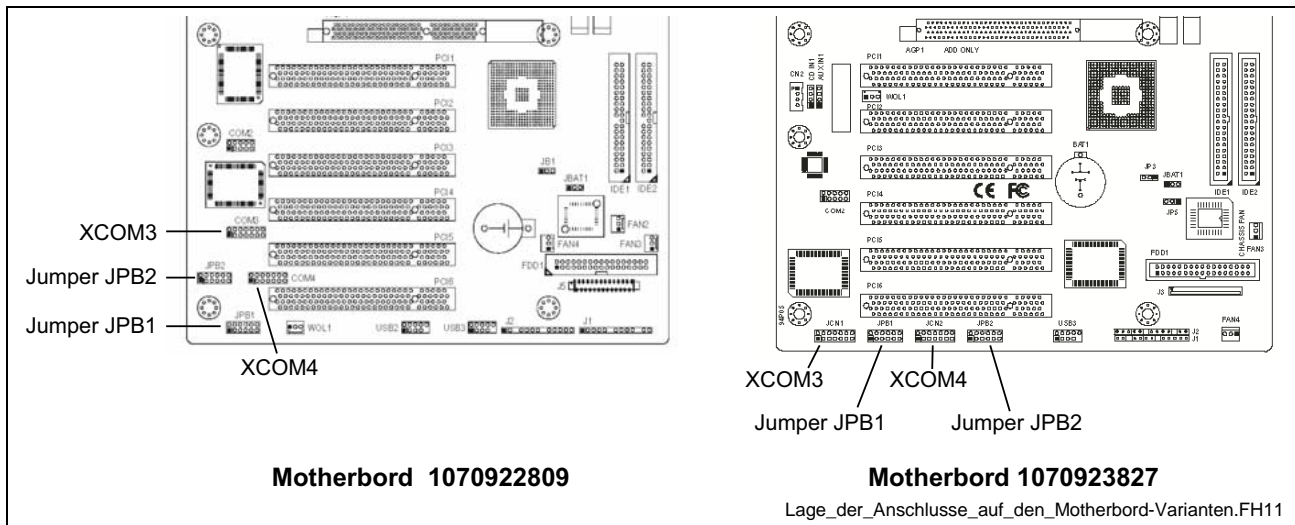


Fig. 7-35: Position of the connections and the jumper on the motherboard variants

XCOM3	Motherboard 1070922809 = Jumper JPB2 Motherboard 1070923827 = Jumper JPB1					
	1-2	3-4	5-6	7-8	9-10	11-12
RS232	OFF	OFF	OFF	OFF	OFF	ON

XCOM4	Motherboard 1070922809 = Jumper JPB1 Motherboard 1070923827 = Jumper JPB2					
	1-2	3-4	5-6	7-8	9-10	11-12
RS422	OFF ON (Term.)	OFF ON (Term.)	OFF	ON	ON	OFF

Jumper 1-2 ON = Termination 120 ohm between RXD+ and RXD-
 Jumper 2-3 ON = Termination 120 ohm between TXD+ and TXD-

Fig. 7-36: Jumper positions for termination settings

Notes

8 Maintenance and Installation

8.1 General Information

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

Maintenance Include the following measures in the maintenance schedule:

- The screen is to be cleaned at least once a week using an antistatic fabric or a cleansing agent containing alcohol.



CAUTION!

Dissolving the surface of the foil as well as the display cover by solvents!

⇒ No solvents (e.g. dilution) to be used!

-
- 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 fan at least once a year.



DANGER

Risk of injury through rotating fan impeller!

⇒ Do not touch the fan impeller with your hands or other objects.

-
- Ensure that the operator terminal is connected to a working uninterruptible power supply.

Note: The accessories of Bosch Rexroth include uninterruptible power supplies for the 230 V supply as well as for the 24 V supply (see chapter "Connection of the Uninterruptible Power Supply (UPS)" from page 8-2 onwards).

CMOS Battery

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

This lithium battery may not be changed by the user. The battery may only be exchanged by the Bosch Rexroth Service (see chapter 14 "Service and Support") or by personnel especially trained and authorized by the Service.

8.2 Connection of the Uninterruptible Power Supply (UPS)

The accessories of Bosch Rexroth include uninterruptible power supplies (UPS) for the 230 V supply as well as for the 24 V supply (see section "Uninterruptible Power Supply on page 11.5-2).

These USP devices bridge short voltage dips. Longer voltage dips cause and allow a normal shutdown of the operating system. Therefore, Bosch Rexroth recommends to use an UPS.

The uninterruptible power system is connected to the voltage supply line. Depending on the design, the UPS communicates with the VSP 16.1 / VSP 40.1 either via the XUSB interface or via the XCOM interface.

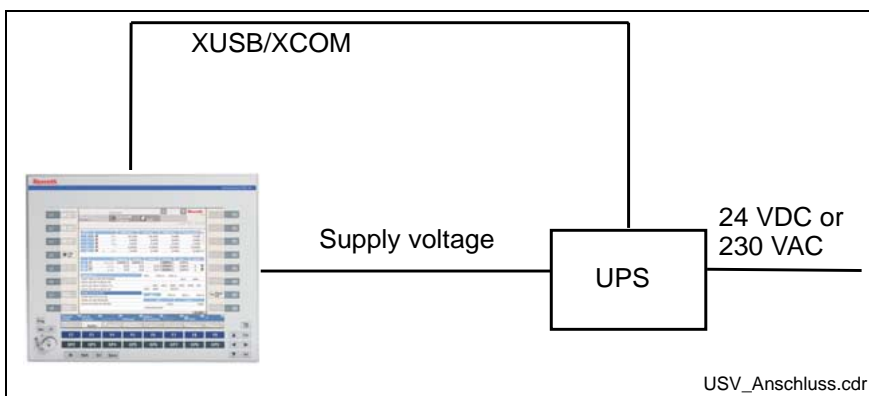


Fig. 8-1: Connection of the UPS

Mounting the UPS

The UPS for 24 V can directly be engaged on the top-hat rail (refer to the project planning manual of the UPS used). To mount the UPS for 230 V, a holder is available as accessories. This holder can be engaged in a top-hat rail or can be fastened to a rear panel with two M6 screws.

After mounting the holder, lift the angle bracket and insert the UPS. Now, close the angle bracket and fix it with the enclosed nut.

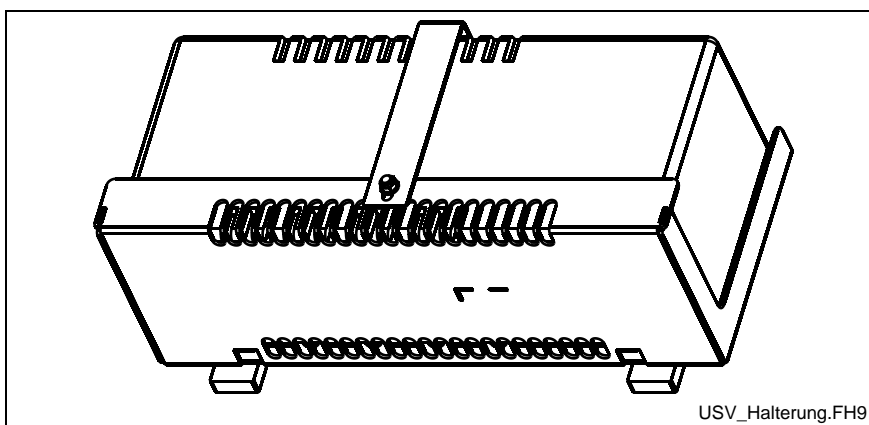


Fig. 8-2: Inserting the UPS into the holder

Dimensions of the UPS

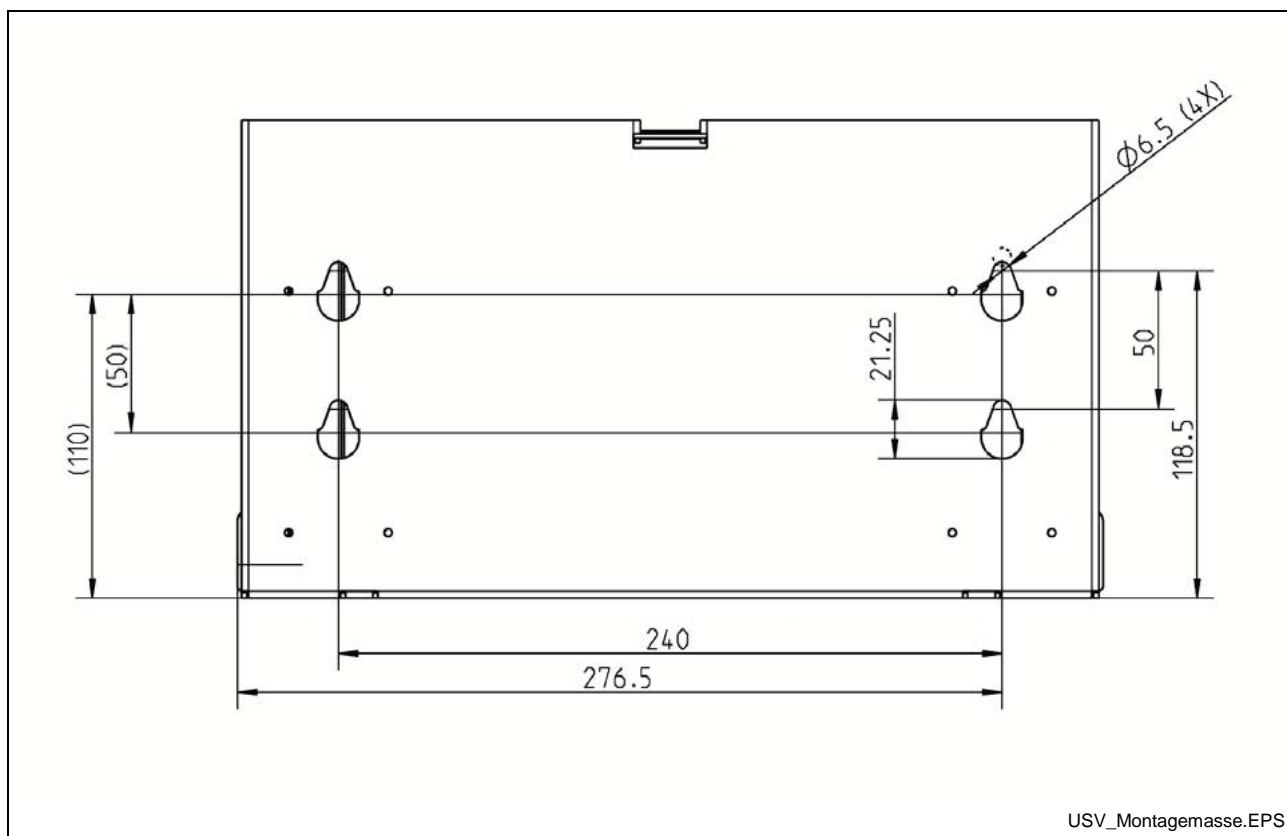


Fig. 8-3: Installation dimensions UPS holder

The depth of the UPS holder without top-hat rail adapter is 117.5 mm and with the top-hat rail adapter 127 mm.

8.3 Hard Disk

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



CAUTION!

Loss of data!

⇒ Backup 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 reinstallation of the operating system and application programs after a hard disk exchange, you should backup the well-working hard disk at regular intervals.

Note: The hard disk to be inserted must already have an installed operating system, if no external boot medium 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. Shutdown the operating system.
3. Wait until the power supply unit switches off and then, switch off the supply voltage. If required, unplug all connectors.
4. Put the device on the display and protect it against scratching by using an appropriate mat.
5. Loosen the retaining screw of the hard disk's installation frame on the rear side of the operator terminal. The hard disk and (depending on the device design) the CD ROM drive are mounted on this plate:



Fig. 8-4: Fastening screws of the hard disk frame

6. Lift the hard disk frame:

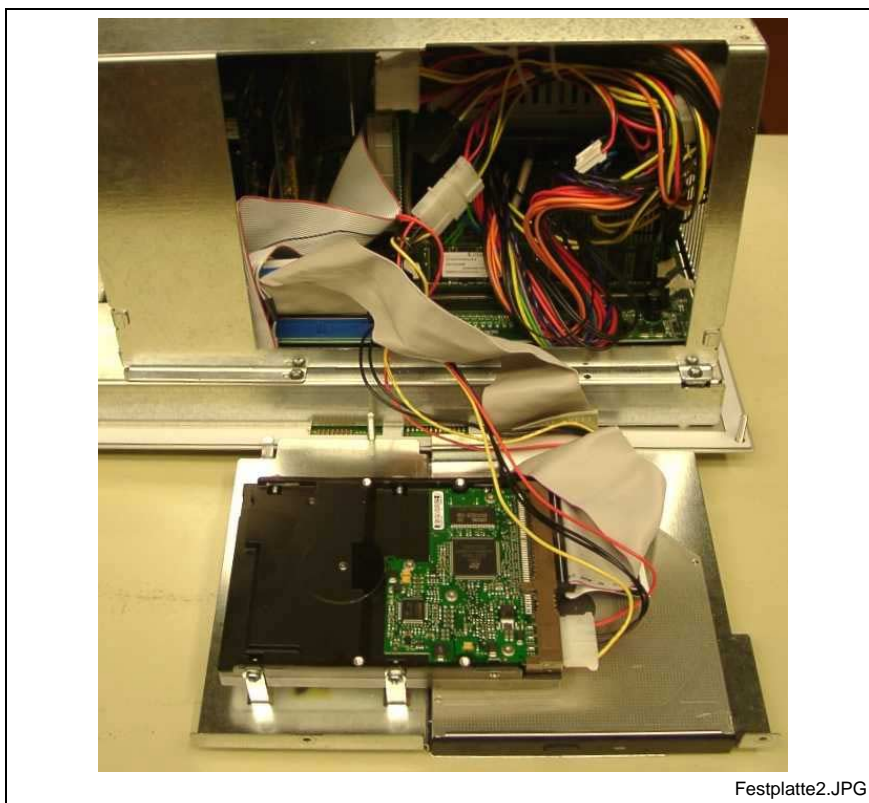


Fig. 8-5: Lifted hard disk frame

7. Now, you can loosen the required cables, remove the old hard disk and mount the new one.

Note: Check the cable connections leading to the hard disk for tightness.

8. After having re-connected the cables, put the hard disk frame into the housing by using the claws provided at its bottom. While closing the housing, observe not to squeeze any cables.
9. Fasten the hard disk frame with the two screws.
10. The new hard disk parameters are automatically recognized by the system. If the operating system does not boot automatically after switching on the VPB, interrupt the power supply for at least 10 seconds and restart.
11. After a regular booting of the PC, the user data as well as the operating system settings for the normal operating mode are to be restored.

Exchanging Hard Disk with Damper

In order to exchange the hard disk, remove the fastening screw of the hard disk installation frame on the back side of the VSP operating terminal (refer to Fig. 8-6). 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 and can be exchanged as whole unit.

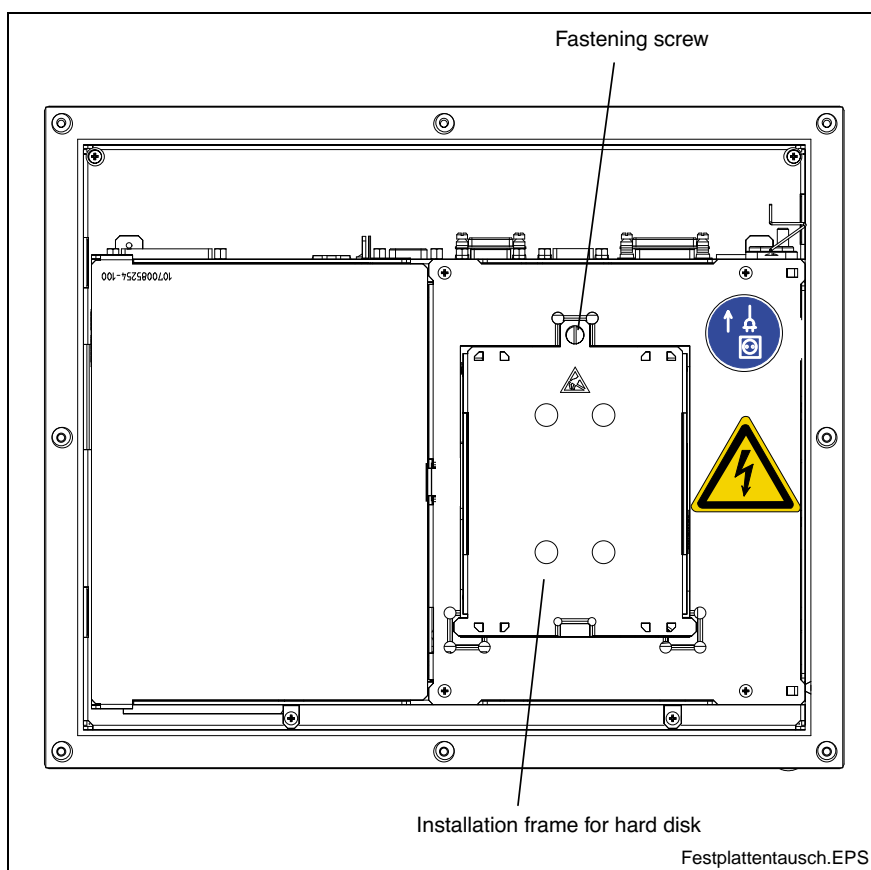


Fig. 8-6: Position of the hard disk's installation frame and the fastening screw

8.4 LCD Display (Backlight Exchange)

A fading backlight causes a progressive deterioration of the LCD display's readability, so that a backlight exchange will be necessary. For further information please contact the Bosch Rexroth Service (for this, see chapter 14 "Service & Support").

8.5 Extension Cards

To plug extension cards slots for the six PCI bus are available.



CAUTION!

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

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



CAUTION!

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

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

Inserting an Extension Card

1. Shutdown the operating system.
2. Wait until the power supply unit switches off and then, switch off the supply voltage. If required, unplug all connectors from the operator terminal.
3. Put the VSP 16.1 or the VSP 40.1 with the display on a protecting mat to avoid a scratching of the display.
4. Loosen and remove the two fastening screws of the cover:



Fig. 8-7: Installing the plug-in card: Loosening two screws

5. Lift up the cover with the fan.

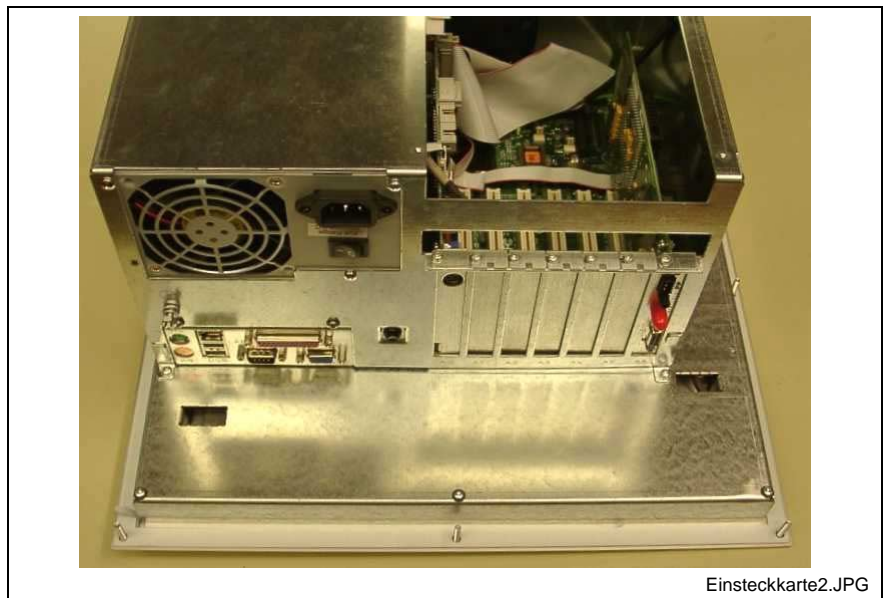


Fig. 8-8: Installing the plug-in card: Lift the top cover

6. Loosen the fastening screw of the corresponding slot plate and remove it:

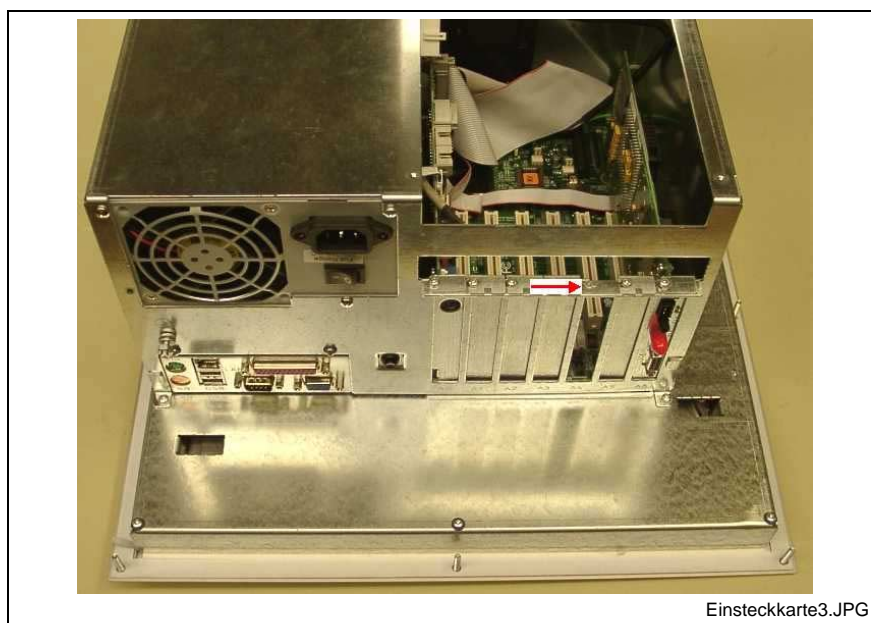


Fig. 8-9: Installing the plug-in card: Remove the slot plate

7. Insert the plug-in assembly from the top. Don't use force. The connections are to be inserted in the plug on the main board.
8. Fasten the plug-in assembly with the screw, with which the slot cover was fixed.
9. Close the top cover and fasten it with the two screws.

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 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 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 WindowsXP).

BIOS Settings

If the BIOS settings have to be changed, you will find the required information in the manual about the used motherboard delivered with the VSP and, if necessary, in the documents about the PCI card mounted by yourself.

9 Software

9.1 Operating System

The VSP devices are delivered with already installed operating system. Modifications in the operating system that are not carried out by an expert can cause failure or can damage the VSP.



CAUTION

Material damage due to exchange or update of a graphic device driver!

An improper exchange causes a failure of the image representation in the digital display.

⇒ Ask before modifying the graphic device driver at the Bosch Rexroth Service (see chapter 14, "Service and Support")!

9.2 Touch screen software

In the displays VSP 16.1AK, VSP 16.1DB, VSP 40.1AL and VSP 40.1DE a touch screen is integrated allowing the operation via the touch-sensitive surface of the display.

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

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



Fig. 9-1: UPDD setup programs for the touch screen

The following dialog windows appear for the different settings:

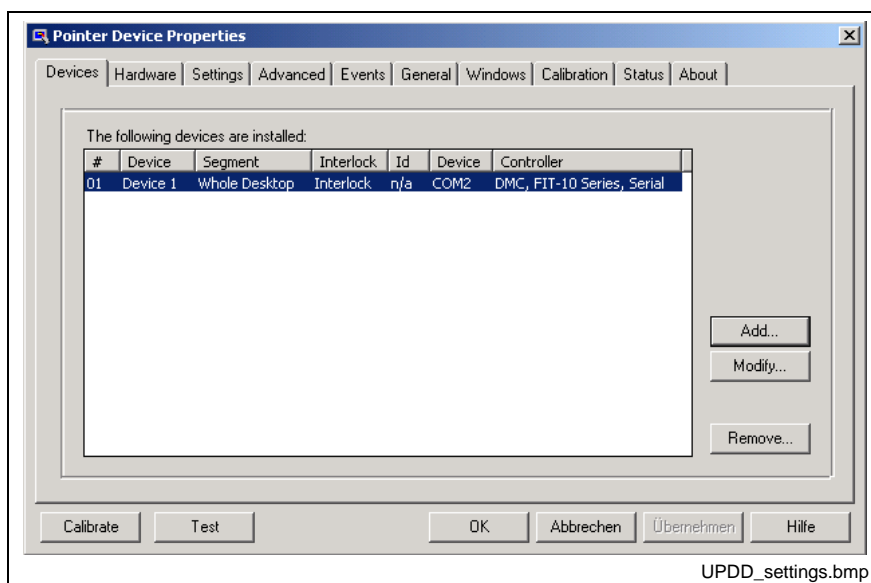


Fig. 9-2: Dialog window to set the touch screen

For more detailed information, please select the **Help** button on the respective tab.

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

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

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

9.3 UPS Software

The software required for the optionally available UPS (see chapter 8.3 "Connection of the Uninterruptible Power Supply" on page 8-2 and chapter 11.2 "Uninterruptible Power Supply" on page 11-5) is stored on the hard disk of the VSB 40.1. Before being able to use this software, you have to install it. Install this software using the installation software BRCVInstall saved on the desktop.

10 Disposal and Environmental Protection

10.1 Disposal

Products

Our products can be returned to us free of charge for disposal. However, it is a precondition that the products are free of oil, grease or other dirt.

Furthermore, the products returned for disposal must not contain any undue foreign matter or foreign component.

Please send the products free domicile to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Bürgermeister-Dr.-Nebel-Straße 2
97816 Lohr am Main, Germany

Packaging Materials

The packaging materials consist of cardboard, wood and polystyrene. These materials can be easily recycled. For ecological reasons, please refrain from returning the empty packages to us.

10.2 Environmental Protection

No Release of Hazardous Substances

Our products do not contain any hazardous substances, which may be released in the case of appropriate use. Accordingly, our products will normally not have any negative effect on the environment.

Materials Contained in the Products

Electronic Devices

Electronic devices mainly contain:

- steel
- aluminum
- copper
- synthetic materials
- electronic components and modules

Motors

Motors mainly contain:

- steel
- aluminum
- copper
- brass
- magnetic materials
- electronic components and modules

Recycling

Due to their high content of metal most of the product components can be recycled. In order to recycle the metal in the best possible way, the products must be disassembled into individual modules.

Metals contained in electric and electronic modules can also be recycled by means of special separation processes. The synthetic materials remaining after these processes can be thermally recycled.

If the products contain batteries or rechargeable batteries, these batteries are to be removed and disposed before they are recycled.

11 Ordering Information

11.1 Type Designation Code

The operating terminals VDP 16.1 and VDP 40.1 are available in different variants according to the following type designation codes.

VSP 16.1

[illegible]

- | | | |
|-------|---|-------|
| 1. | Product | |
| 1.1 | VSP | = VSP |
| 2. | Line | |
| 2.1 | 16. | = 16 |
| 3. | Design | |
| 3.1 | 1 | = 1 |
| 4. | Front panel and display | |
| 4.1 | Rexroth design | |
| 4.1.1 | 12", with 16 machine function keys (MTX) | = BK |
| 4.1.2 | 12", Touch-Screen (universal) | = DB |
| 4.2 | Customized design | |
| 4.2.1 | Bosch: 12", Touch-Screen (suitable for food industry) ... | = AK |
| 5. | PC-Box | |
| 5.1 | 6 slots, PCI | = E |
| 6. | Memory capacity (RAM) | |
| 6.1 | 512 MB | = 512 |
| 6.2 | 1024 MB | = 1G0 |
| 7. | Interface | |
| 7.1 | without special interface | = NN |
| 8. | System configuration | |
| 8.1 | Celeron, min. 2GHz. | = C1 |
| 9. | Supply voltage | |
| 9.1 | AC 115 to 230 V, 50 to 60 Hz. | = C |
| 9.2 | DC 24 V | = D |
| 10. | Hard disc (HD) | |
| 10.1 | 3.5", mind. 20 GB | = A |
| 10.2 | 2.5", mind. 20 GB, with vibration-resistant suspension. | = B |
| 11. | Disc drive | |
| 11.1 | without | = N |
| 11.2 | DVD-ROM. | = D |
| 11.3 | DVD±RRW | = E |
| 12. | Other design | |
| 12.1 | without | = NN |
| 13. | Firmware and software | |
| 13.1 | Denotes that firmware and software must be ordered as separate subposition = FV | |

Typenschlüssel_VSP16_1.FH9

Fig. 11-1: Type designation code of the VSP 16.1

VSP 40.1

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

<

Typenschlüssel_VSP40_1.FH9

Fig. 11-2: Type designation code of the VSP 40.1

11.2 Accessories

Connectors and Ready-Made Cables

Ordering designation	Part number	Description
B-AC STECKER NETZ 230V	1070912881	Mains connector 230 V, male inlet connector for non-heating apparatus, angular, for self-mounting
BKS-U-N-NTZKAB-IPCRHO-002,5-P	1070048937	Mains cable 230 V with female inlet connector for non-heating apparatus, angular, cable length 2.5 m

Fig. 11-3: Connectors and cables for VSP 16.1 and VSP 40.1

Uninterruptible Power Supply

Ordering designation	Part number	Description
VAU01.1S-024-024-240-NN	R911307090	UPS 24 VDC, 240 W
VAU01.1S-230-230-300-NN	R911170724	USV 230 VAC, 300 W
SUP-M02-VAU01.1S-230	R911170725	Holder for top-hat rail mounting of the USP 230 VAC
SUP-M03-VAU01.1S-230	R911170819	Holder for screw mounting of the USP 230 VAC

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14 Service and Support

14.1 Helpdesk

Our service helpdesk at our headquarters in Lohr, Germany, will assist you with all kinds of inquiries.

Contact us:

- By phone through the Service Call Entry Center
Monday to Friday: 7:00 am – 6:00 p.m. CET
+49 (0) 9352 40 50 60
- By fax
+49 (0) 9352 40 49 41
- By E-mail: service.svc@boschrexroth.de

14.2 Service Hotline

Out of helpdesk ours please contact our German service department directly:

+49 (0) 171 333 88 26

or

+49 (0) 172 660 04 06

Hotline numbers for other countries can be found in the addresses of each region on the Internet (see below).

14.3 Internet

Additional notes regarding service, maintenance and training, as well as the current addresses of our sales and service offices can be found on

<http://www.boschrexroth.com/>

Outside Germany please contact our sales/service office in your area first.

14.4 Helpful Information

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

- detailed description of the fault and the circumstances
- Information on the name plate of the affected products, especially type codes and serial numbers
- Your phone and fax numbers and E-mail address, so we can contact you in case of questions

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