Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth Bosch Group

Rexroth IndraControl VAU 01.1S

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Project Planning Manual

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Purpose of Documentation This documentation describes the uninterruptible power supply VAU 01.1S.

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Contents

1 System Presentation

1.1 Brief Description of the UPS

In case of voltage breakdown of the power supply (+24 VDC) the UPS (**U**ninterruptible **P**ower **S**upply) provides the connected device with voltage until a timer in the UPS expires. The timer can be set via a rotary switch (S1) on the front in steps of a minute from 0 to 3 minutes. The UPS is able to provide the connected device with 24 V / 10 A for max. 3 minutes. The communication between UPS and connected device occurs via a serial interface (XCOM1). The UPS consists of the following components:

- enclosed metal housing
- rechargeable battery integrated in the device
- display and operating components arranged on the front panel
- integrated burst and surge protection for the connected device

Note: Bosch Rexroth delivers also a 240 V version of the UPS for different IPCs. These UPS devices are not described in this document, but in the documentation of the respective IPC.

Fig. 1-1: View of the UPS

1.2 Software

The communication between UPS and connected PC occurs via a serial interface (XCOM1). For this, the UPS software has to be installed on the connected device (VPP 21 or DC version of the VSxxx). The installation is described in the documentation of the PC (see chapter 1.3).

1.3 Related Documentation

The UPS is optionally available with the VPP 21 and the DC variants of the VSxxx described in the following documentations:

No.	Title	Identification
/1/	Rexroth IndraControl VPP 21.1	DOK-SUPPL*-VPP*21.1***-PR..-EN-P
/2/	Rexroth IndraControl VSP 16.1/40.1	DOK-SUPPL*-VSP*16/40**-PR..-EN-P
/3/	Rexroth IndraControl VSB 40.1	DOK-SUPPL*-VSB*40.1***-PR..-EN-P

Fig. 1-2: Related documentations

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

Note: The UPS 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 UPS 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 UPS 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 UPS may not be used, if

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

3 Safety Instructions for Electric Drives and Controls

3.1 Introduction

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

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

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

WARNING

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

3.2 Explanations

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

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
 **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. If this is not the case, they are excluded.
  The following areas of use and application, for example, include safety features and applications: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications in which electrical devices with vital functions can be electromagnetically disturbed, mining, food processing, control of protection equipment (also in a machine).
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.
  The machine and installation manufacturer must
  - make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
  - make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.
- Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

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

3.5 Protection Against Contact with Electrical Parts

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 thirty (30) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.

⇒ Never touch the electrical connection points of a component while power is turned on.

⇒ Install the covers and guards provided with the equipment properly before switching the equipment on. Prevent contact with live parts at any time.

⇒ A residual-current-operated protective device (RCD) must not be used on electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.

⇒ Electrical components with exposed live parts and uncovered high voltage terminals must be installed in a protective housing, for example, in a control cabinet.

To be observed with electrical drive and filter components:

DANGER

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

⇒ Connect the electrical equipment, the housings of all electrical units and motors permanently with the safety conductor at the ground points before power is switched on. Look at the connection diagram. This is even necessary for brief tests.

⇒ Connect the safety conductor of the electrical equipment always permanently and firmly to the supply mains. Leakage current exceeds 3.5 mA in normal operation.

⇒ Use a copper conductor with at least 10 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.

DANGER

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

⇒ Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation. Unintended machine motion is possible if monitoring devices are disabled, bypassed or not activated.

⇒ Pay attention to unintended machine motion or other malfunction in any mode of operation.

⇒ Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:

- use safety fences
- use safety guards
- use protective coverings
- install light curtains or light barriers

⇒ Fences and coverings must be strong enough to resist maximum possible momentum, especially if there is a possibility of loose parts flying off.

⇒ Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the machine if the emergency stop is not working.

⇒ Isolate the drive power connection by means of an emergency stop circuit or use a starting lockout to prevent unintentional start.

⇒ Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone. Safe standstill can be achieved by switching off the power supply contactor or by safe mechanical locking of moving parts.

⇒ Secure vertical axes against falling or dropping after switching off the motor power by, for example:

- mechanically securing the vertical axes
- adding an external braking/ arrester/ clamping mechanism
- ensuring sufficient equilibration of the vertical axes

The standard equipment motor brake or an external brake controlled directly by the drive controller are not sufficient to guarantee personal safety!

⇒ Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:

- maintenance and repair work
- cleaning of equipment
- long periods of discontinued equipment use

⇒ Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such equipment cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.

3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

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

WARNING

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

⇒ Persons with heart pacemakers, hearing aids and metal implants are not permitted to enter the following areas:

- Areas in which electrical equipment and parts are mounted, being operated or started up.
- Areas in which parts of motors with permanent magnets are being stored, operated, repaired or mounted.

⇒ If it is necessary for a person with a heart pacemaker to enter such an area, then a doctor must be consulted prior to doing so. Heart pacemakers that are already implanted or will be implanted in the future, have a considerable variation in their electrical noise immunity. Therefore there are no rules with general validity.

⇒ Persons with hearing aids, metal implants or metal pieces must consult a doctor before they enter the areas described above. Otherwise, health hazards will occur.

3.9 Protection Against Contact with Hot Parts

CAUTION

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

⇒ Do not touch housing surfaces near sources of heat! Danger of burns!

⇒ After switching the equipment off, wait at least ten (10) minutes to allow it to cool down before touching it.

⇒ Do not touch hot parts of the equipment, such as housings with integrated heat sinks and resistors. Danger of burns!

3.10 Protection During Handling and Mounting

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

CAUTION

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

⇒ Observe general installation and safety instructions with regard to handling and mounting.

⇒ Use appropriate mounting and transport equipment.

⇒ Take precautions to avoid pinching and crushing.

⇒ Use only appropriate tools. If specified by the product documentation, special tools must be used.

⇒ Use lifting devices and tools correctly and safely.

⇒ For safe protection wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.

⇒ Never stand under suspended loads.

⇒ Clean up liquids from the floor immediately to prevent slipping.

3.11 Battery Safety

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

CAUTION

Risk of injury by incorrect handling!

⇒ Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and cauterization).

⇒ Never charge non-chargeable batteries (danger of leakage and explosion).

⇒ Never throw batteries into a fire.

⇒ Do not dismantle batteries.

⇒ Do not damage electrical components installed in the equipment.

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

3.12 Protection Against Pressurized Systems

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

CAUTION

Danger of injury by incorrect handling of pressurized systems !

⇒ Do not attempt to disassemble, to open or to cut a pressurized system (danger of explosion).

⇒ Observe the operation instructions of the respective manufacturer.

⇒ Before disassembling pressurized systems, release pressure and drain off the fluid or gas.

⇒ Use suitable protective clothing (for example safety glasses, safety shoes and safety gloves)

⇒ Remove any fluid that has leaked out onto the floor immediately.

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

4 Technical Data

4.1 Degree of Protection and Weight

Degree of protection	IP 20
Weight	3.5 kg

Fig. 4-1: Degree of protection and weight

4.2 Input and Output Voltage

Input voltage	
Nominal input voltage	24 VDC
Input voltage range	24 VDC +20 %, -15 %
Noise and surge immunity	Umax = 35 V (for t < 100 ms)
Current consumption for U_N	Max. 12 A (2 A to load the rechargeable battery)
Line-side fuse	None
Reverse voltage protection	Yes
Voltage rise of the supply voltage when switching on	Max. 500 ms (0 V to U_N)
Voltage drop of the supply voltage when switching off	Max. 500 ms (U_N to 0V)
Switch-on threshold	15.5 V ±5 %
Switch-off threshold	20.2 V ±5 %
Maximum power consumption	240 W [1]

Fig. 4-2: Input voltage

Output voltage	
Nominal output voltage	24 VDC
Output voltage range	24 VDC +20 %, -15 %
Current output for U_N	Max. 10 A
Switching time	< 1 ms
Bridging time	Max. 3 minutes for 240 W
Max. output power	240 W

Fig. 4-3: Output voltage

[1] The UPS requires a maximum of 240 W (24 V, 10 A) from the 24 VDC supply. Additionally, a maximum of 48 W (24 V, 2 A) to load the rechargeable battery are required.

4.3 Ambient Conditions

	In operation	Storage/Transport
Surrounding air temperature	+5 ... +45 °C	-20 °C to +60 °C
Max. temperature gradient	Temporal temperature changes up to 3 °C per minute	Temporal temperature changes up to 3 °C per minute
Relative humidity	Climatic class 3K3 according to EN 60721, non-condensing. Max. 80 % humidity for 25 °C	Climatic class 3K3 according to EN 60721, non-condensing. Max. 80 % humidity for 25 °C
Air pressure	Up to 2,000 m above MSL according to DIN 60204	Up to 3,000 m above MSL according to DIN 60204
Mechanical strength	Max. vibration: Frequency range: 10...150 Hz Excursion: 0.075 mm at 10...57 Hz Acceleration: 1 g at 57..0.150 Hz Test duration for each axis: 10 frequency cycles Frequency sweep rate: 1 octave/min According to EN 60068-2-6, test Fc	Max. shock: 15 g according to EN 60 068-2-27, no disturbance of the function
Degree of pollution	2	2

Fig. 4-4: Ambient conditions

4.4 Used Standards

The UPS complies with the following standards:

Standard	Meaning
EN 60 204-1	Electrical equipment of machines
EN 61 131-2	PLC product standard
EN 60 529	Degrees of protection (incl. housings and installation compartments)
EN 60 068-2	Vibration, free fall and shock

Fig. 4-5: Used standards

Note: Concerning delivered UPS devices all CE requirements are fulfilled.

UL/CSA Certification

The series devices of the UPS are optionally available for the VPP 21 and the DC versions of the VSP xx, VSB 40 and basically certificated according to

- **UL508** (Industrial Control Equipment) and
- **C22.2 No. 142-M1987** (CSA)

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

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

- Use 60/75 °C copper wire only.

Note: The UL/CSA marking is only valid for the device in its delivery status. After having modified the device the UL compliancy has to be verified.

4.5 Wear Parts

Wear Parts without Warranty

- The service life of the rechargeable battery is approx. 10 years at +25 °C and is reduced by half with each 10 °C temperature rise.
- If you want to place the UPS in storage, please consider chapter "Storage" on page 7-6.

4.6 Rechargeable Battery

The installed Bleigel battery bridges the voltage breakdown of the supply voltage for a max. of 3 minutes.

The rechargeable battery is checked with the help a monitoring circuit controlled by the connected PC. If the voltage falls below a minimum value, the red LED "Batt. low" at the front panel is switched on. In this case it is not possible to bridge a voltage breakdown. If this LED is still lit within 5 hours after switching on the UPS, you should immediately initiate that the rechargeable battery is changed. For further information please contact the Bosch Rexroth Service.

The service life of the rechargeable battery depends on the number of charging cycles and the surrounding air temperature, in which it is used. Surrounding air temperature is defined as the temperature, in which the UPS is situated, e. g. the internal temperature of the control cabinet.

The following table can be used as guideline:

Surrounding air temperature	Maintenance interval
+25 °C	10 years
+35 °C	5 years
+45 °C	2.5 years

Fig. 4-6: Maintenance interval

The following table specifies the recommended values for the number of discharges possible without loading the battery again:

	Number of discharges at +25 °C without reloading for a discharge time of			
Output power	1 minute	2 minutes	3 minutes	4 minutes
60 W	39	19	13	9
75 W	31	15	10	7
120 W	19	9	6	4
240 W	9	4	3	2

Fig. 4-7: Number of discharges

The charging time depends on the power output during previous discharges according to the following table:

	Loading time at + 25 °C in minutes according to a discharging time of			
Output power	1 minute	2 minutes	3 minutes	4 minutes
60 W	4	7	10	14
75 W	5	9	13	17
120 W	7	14	20	27
240 W	14	27	40	53

Fig. 4-8: Loading times

4.7 Compatibility Test

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

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

For that reason, 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

The UPS has the following dimensions:

Width	123 mm
Height	145 mm
Depth	128 mm

Fig. 5-1: Dimensions

5.2 Installation

Installation Notes

- The UPS is provided for top-hat rail mounting.

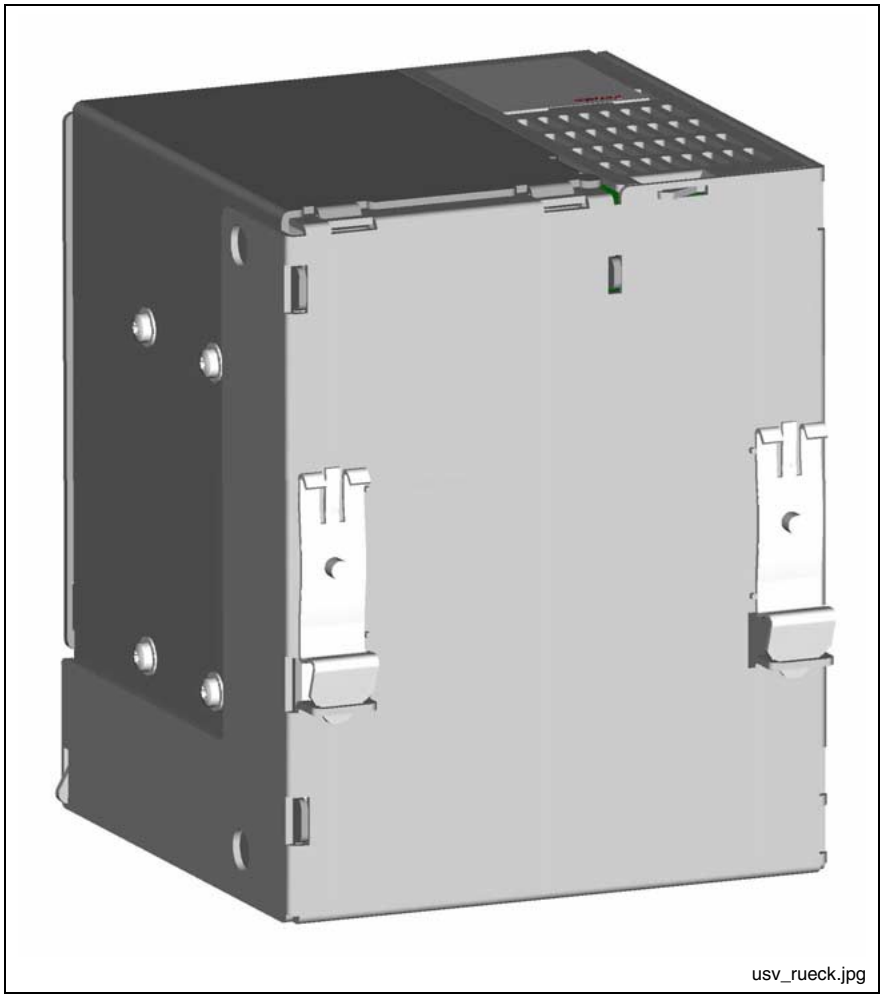


Fig. 5-2: Top-hat rail mounting

- Avoid mounting locations exposed to direct sunlight.
- Provide a sufficient minimum clearance of 50 mm to the bottom side and 80 mm to the top side.
- The 80 mm include the clearance for the battery exchange.

- Lay all connecting cables in loops. Provide the cables with strain reliefs.
- Keep a suitably large distance from sources of interference.

Mounting

Only top-hat rails made of TH35-7.5 and TH35-15 steel according to EN60715 are permitted.

Determine the distance of the fixing bores according to EN60715-Appendix B.

On both sides of the UPS end clamps, e. g. Clipfix 35 have to be mounted on the top-hat rail to prevent lateral moving of the UPS during vibration.

Unfixed cables are not permitted. An appropriate fixing (e. g. installation in a cable cable) and a strain relief of the cables is required.

6 Interfaces, Display and Operating Components

6.1 Connector Panel

The terminals for the voltage connection, the voltage output and the serial interface as well as the display and operating components are arranged on the connector panel.

Fig. 6-1: Connector panel

Connection Overview

Des. on the housing	Type of connection	Type of connector (integrated)	Mating connector or cable (from outside)
X1S1	24 VDC voltage supply	Phoenix male connector terminal, PC4/2-G-7,62, 2-pin	Phoenix female connector terminal, PC4/2-St-/,62, 2-pin
X1S2	24 VDC output voltage	Phoenix male connector terminal, PC4/2-G-7,62, 2-pin	Phoenix female connector terminal, PC4/2-St-/,62, 2-pin
XCOM1	Serial interface RS232 (special assignment, see chapter 6.3)	D-Sub female connector, 9-pin	D-Sub male connector, 9-pin

Fig. 6-2: Interfaces

Note: The mating connectors are included in the scope of delivery.

6.2 Voltage Connection

The supply voltage 24 V is connected at the X1S1 interface, the output voltage 24 V is provided at the X1S2 interface.

Note: Use only copper wire to connect these terminals. Tighten the screws of the screw terminals with a torque of 0,6 Nm (5,5 lb in).

Wiring the Power Connection

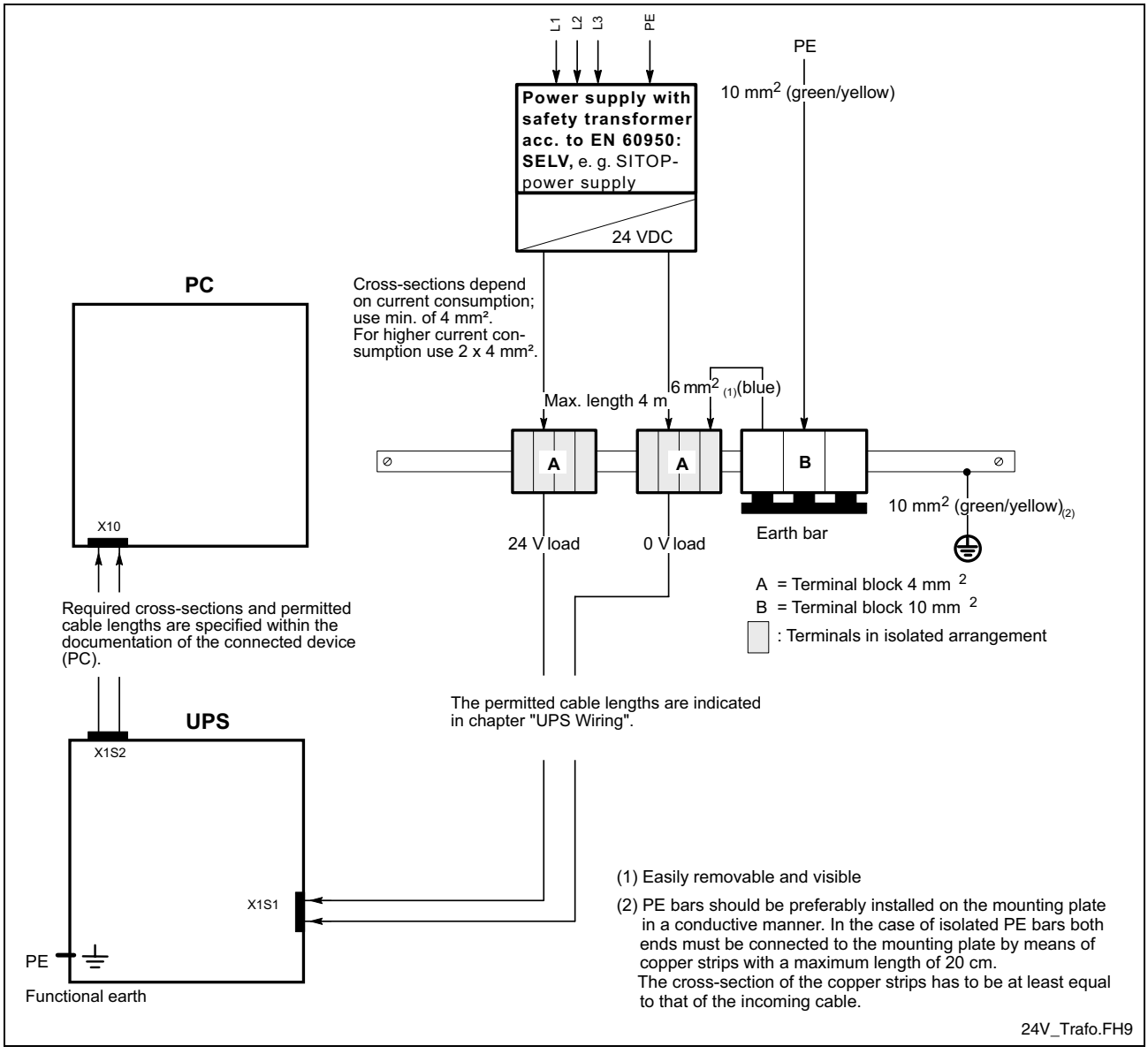
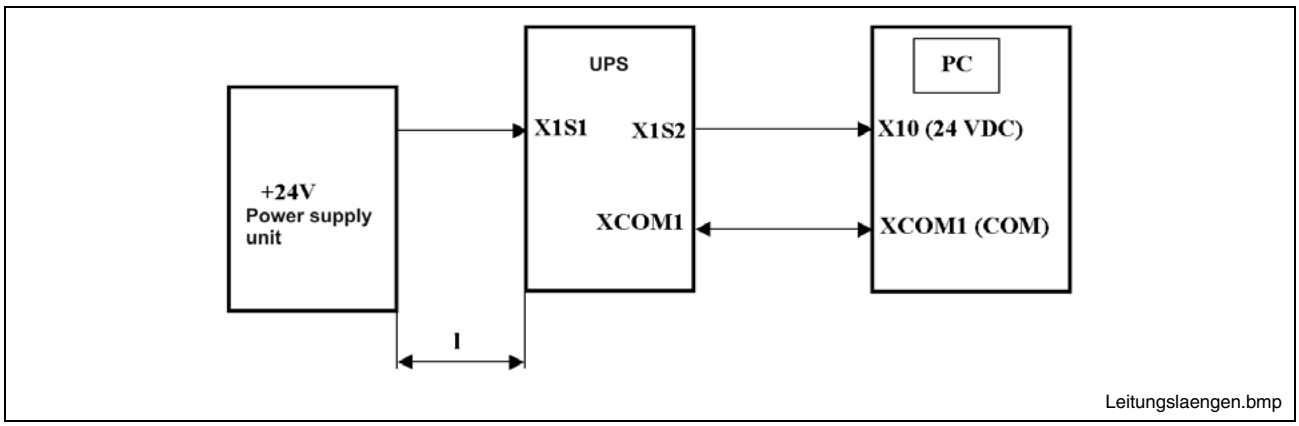


Fig. 6-3: Wiring the power connection 24 VDC and the UPS

UPS Wiring, Cable Lengths and Cable Cross-Sections



Cable length l	Cable cross-sections in mm^2 (AWG) in relation to the output power in the amount of			
	60W	75W	120W	240W
1 m – 5 m	1.00 (AWG17)	1.00 (AWG17)	1.00 (AWG17)	2.5 (AWG13)
6 m	1.00 (AWG17)	1.00 (AWG17)	1.50 (AWG15)	2.5 (AWG13)
7 m	1.00 (AWG17)	1.50 (AWG15)	2.50 (AWG13)	2.5 (AWG13)
8 m	1.50 (AWG15)	1.50 (AWG15)	2.50 (AWG13)	4.00 (AWG11)
9 m	1.50 (AWG15)	2.50 (AWG13)	2.50 (AWG13)	4.00 (AWG11)
10 m	2.50 (AWG13)	2.50 (AWG13)	2.50 (AWG13)	4.00 (AWG11)

Fig. 6-4: Required cable cross-sections for the 24 VDC voltage supply in relation to cable length and output power

6.3 Serial Interface XCOM1

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

The electrical properties of the XCOM interface correspond to the properties of the standard COM interface. However, the signals have another meaning (see Fig. 6-7 and Fig. 6-8).

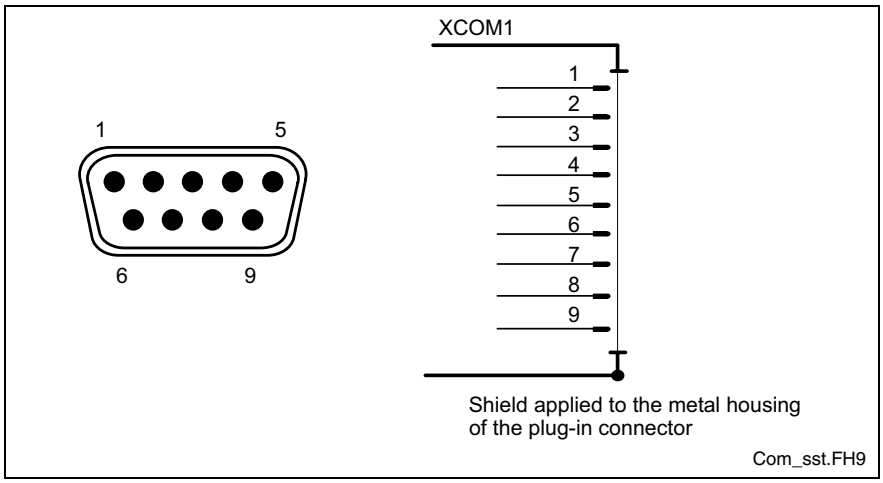


Fig. 6-5: Assignment of the serial interface XCOM1

XCOM1 – Serial Interface

D-Sub male connector, 9-pin	
Type:	RS232
Cable length:	Max. 20 m
Cable type:	Shielded, cross section min. 0.08 mm^2 (AWG28) Part no.: 1070089307 (3 m)

Fig. 6-6: Serial interface XCOM1

Pin	Name	Function	Remarks
4	DTR	Start battery test	Battery test is initiated
5	GND		Electrically isolated to 24V GND
6	DSR	Discharge battery	Signaling that battery is completely discharged
7	RTS	PC OK	Power supply unit of the connected PCs ok and UPS software ready for operation
8	CTS	Message UPS operation to the PC	UPS operation initiated

Fig. 6-7: Pin assignment XCOM1

Note: The basic function of the UPS is also guaranteed without a connection to a PC. The battery test is not possible.

Description of the COM Interface

CTS / UPS → PC	UPS operation initiated	HIGH LEVEL (+5 V)	The CTS signal indicates after a time delay of 5 s that the UPS operation was initiated. Requirement: The input voltage of the UPS is fallen below +20 V. See also description of rotary switch S1.
	No UPS operation	LOW LEVEL (-5 V)	
DSR / UPS → PC	Battery OK	HIGH LEVEL (+5 V)	The DSR signal indicates, if the battery is charged or discharged. If the battery is discharged or defective, the red LED "Battery Low" is triggered. If the battery is not plugged in, the DSR signal indicates battery error, only if the battery test (DTR signal) is active at the same time. The reason for this is, that only during the battery test the charging process of the battery is interrupted and therefore no voltage is applied to the battery connector.
	Battery defective or discharged	LOW LEVEL (-5 V)	
RTS / PC → UPS	PC OK	HIGH LEVEL (+5 V)	The RTS signal indicates to the UPS, if the PC has booted. It is also indicated, if: the PC is supplied with voltage via the UPS, the COM interface is connected to the PC, the PC has booted. If the RTS signal has HIGH LEVEL (+5 V), the green "LED VCC_PC_OK" is triggered. Additional functions: If the RTS signal is set to LOW LEVEL, the battery test is prevented. If the RTS signal is set to LOW LEVEL, a connection between the input signal DTR and the output signal DSR is established and at the same time the signal level is inverted. This serves to verify, if the COM interface is plugged in.
	PC not OK	LOW LEVEL (-5 V)	
DTR / PC → UPS	Stop battery test	HIGH LEVEL (+5 V)	The DTR signal starts the battery test. For this, the RTS signal must additionally have HIGH LEVEL. Independent of the signal level of the DTR signal, a timer within the UPS switches off the internal test load of 500 mA after max. 10 sec, if beforehand the battery test has been started.
	Start battery test	LOW LEVEL (-5 V)	

Fig. 6-8: Description of the COM interface signals

6.4 Operating and Error Indication

To indicate device states 5 LEDs are arranged at the front panel of the UPS.

Start the measures specified in the following table, if one of the succeeding LEDs indicates an error or a note.

LED	Designation	Display	Meaning	Measure
1	24V IN	LED green	Normal mode	-
		LED OFF	24 V DC missing	Check the connection cable of the supply voltage applied to the X1S2.
2	UPS OK	LED green	Normal mode	-
		LED OFF	Internal voltages missing	Check the two SMD fuses (see Fig. 6-10). T2,5A with UL certification
3	PC OK	LED green	Normal mode	
		LED OFF	Serial interface cable (UPS – PC) is not plugged in or defective.	Check interface cable.
			Connected PC power supply unit has no supply voltage or has not started	Check the PC cable connected to the X1S2.
			UPS software has not started or is not installed.	Check the connected PC
4	Batt. charg.	LED green	Battery is charged	Guaranteed UPS bridging time cannot be kept
		LED OFF or flashing	Battery is charged	UPS is ready for operation
5	Batt. low	LED red (over 500 ms)	Battery is discharged or not connected (LED is triggered by the UPS software of the PC via the serial interface XCOM1)	Keep the UPS switched on, so that the battery can be loaded (max. 5h). If the LED is still flashing after this time, check and/or change the battery.
		LED red (500 ms after switch-on)	Battery is not plugged in or defective or the deep discharge threshold of 18 V has been reached (display independent of the UPS software)	Verify, if the battery is connected with the printed circuit board. Keep the UPS switched on, so that the battery can be loaded (max. 5h). If the LED is still flashing after this time, check and/or change the battery.
		LED OFF	Normal mode	

Fig. 6-9: Description of the LEDs

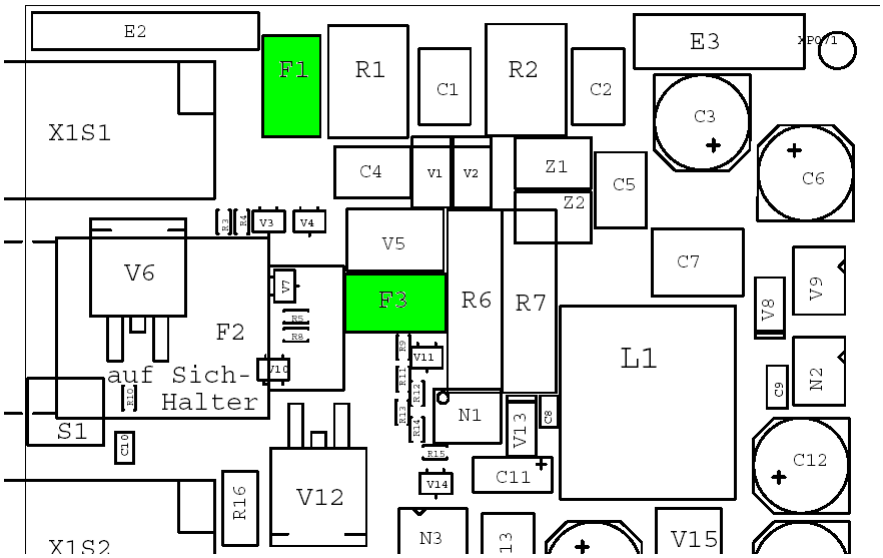


Fig. 6-10: Position of the two SMD fuses

DANGER

Risk to damage the UPS due to short-circuits!

⇒ Disconnect the UPS from the power supply (24 V), before you open the device to check or change a fuse!

⇒ Also disconnect the external batteries, before you open the UPS.

CAUTION

Risk to damage the UPS by electrostatic discharges!

⇒ When you check or change the fuse, comply with all ESD-protection measures during replacing a fuse! Avoid electrostatic discharges!

6.5 Rotary Switch S1

With the rotary switch you can set different UPS times. By using the switch positions from 0 to 3 it is possible to change the UPS time in steps of 1 minute. The UPS time is the time period in which the connected device is provided with output voltage of the UPS after the switch off of the input voltage.

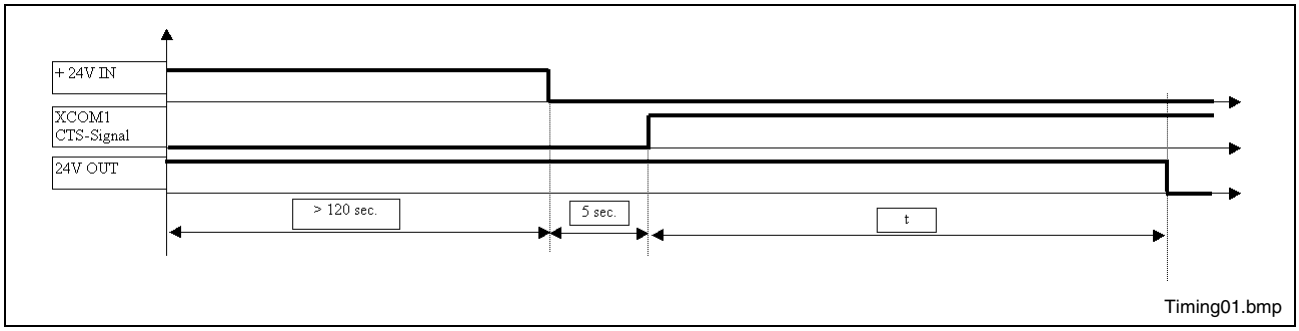
Fig. 6-11: Position of rotary switch S1

Switch position	UPS operation for	Remarks
0	5 seconds	
1	1 minute	
2	2 minutes	
3	3 minutes	
4	5 seconds	See note below
5	1 minute	See note below
6	2 minutes	See note below
7	3 minutes	See note below

Fig. 6-12: Switch position

Note: Additionally, the UPS is provided with a timer, which prevents that the UPS operation is signaled to the connected device and initiated during the first 120 seconds after switching on the UPS. This ensures, that a voltage breakdown in the initialization phase of the connected PC does not cause a switch off of the PC power supply. This time is switched off with switch position 4 to 7.

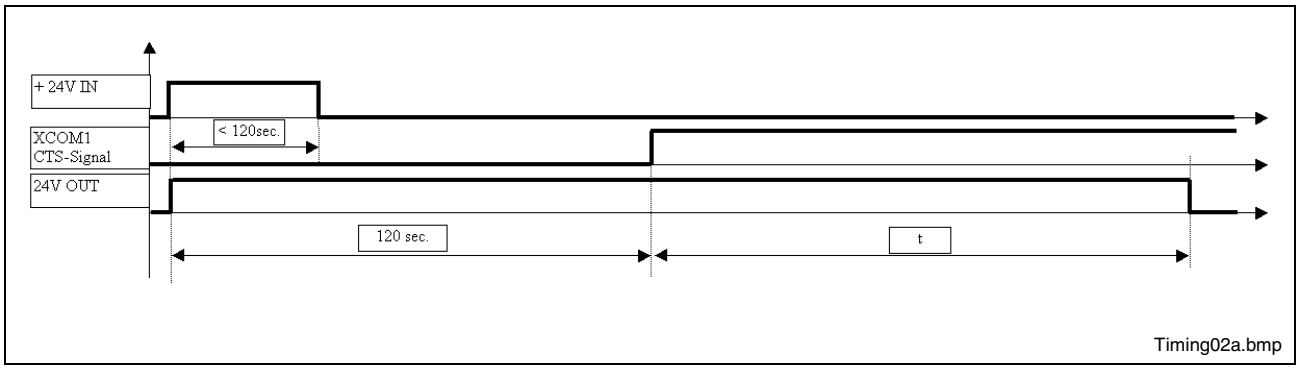
Timing in Relation to the Position of Rotary Switch S1



Timing01.bmp

Switch position S1	Time t
0	5 sec
1	1 min
2	2 min
3	3 min
4	5 sec
5	1 min
6	2 min
7	3 min

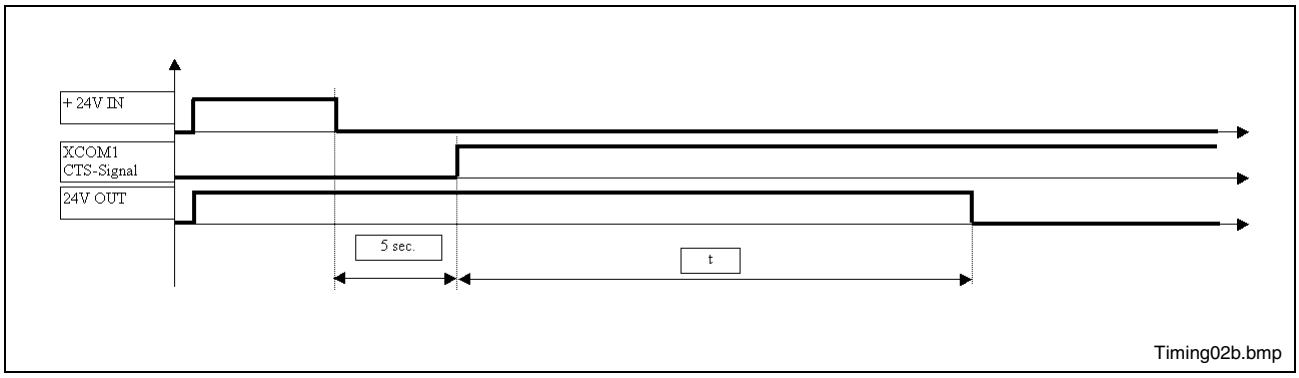
Fig. 6-13: Switching off the UPS after an inrush time > 120 sec



Timing02a.bmp

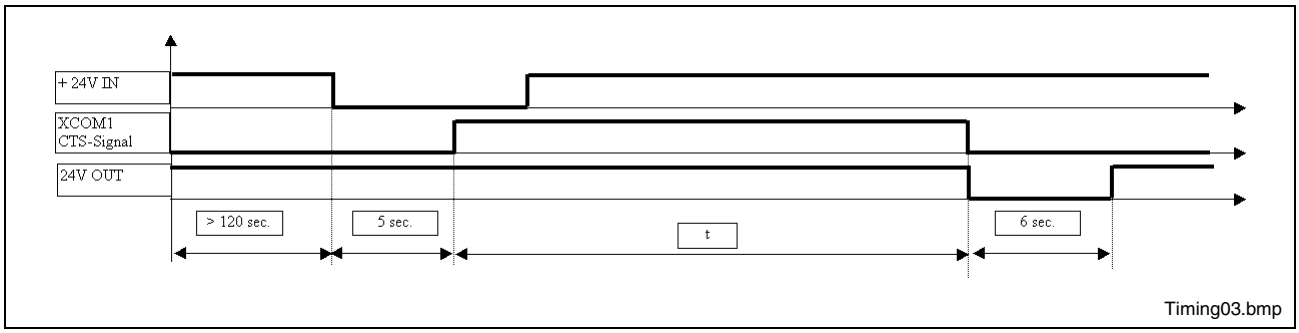
Switch position S1	Time t
0	5 sec
1	1 min
2	2 min
3	3 min

Fig. 6-14: Switching off the UPS after an inrush time < 120 sec for switch positions 0 to 3



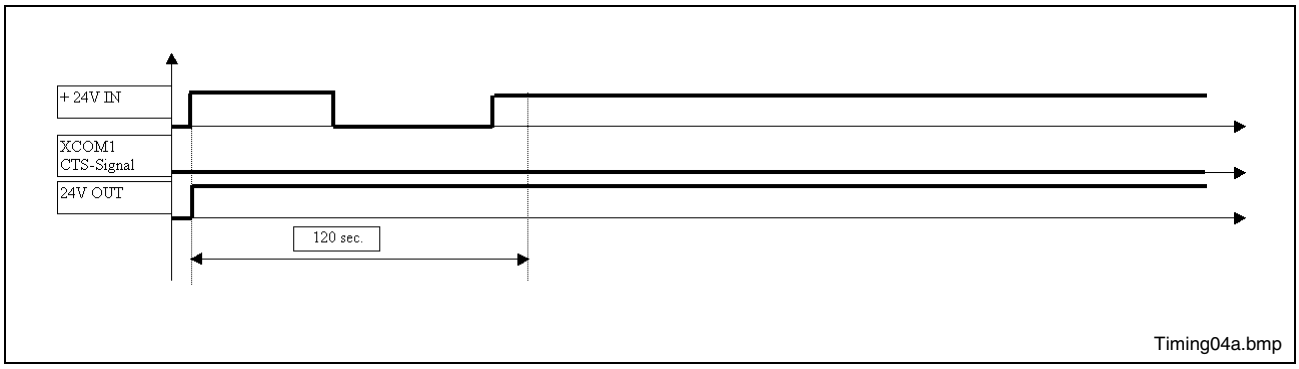
Switch position S1	Time t
4	5 sec
5	1 min
6	2 min
7	3 min

Fig. 6-15: Switching off the UPS after an inrush time < 120 sec for switch positions 4 to 7



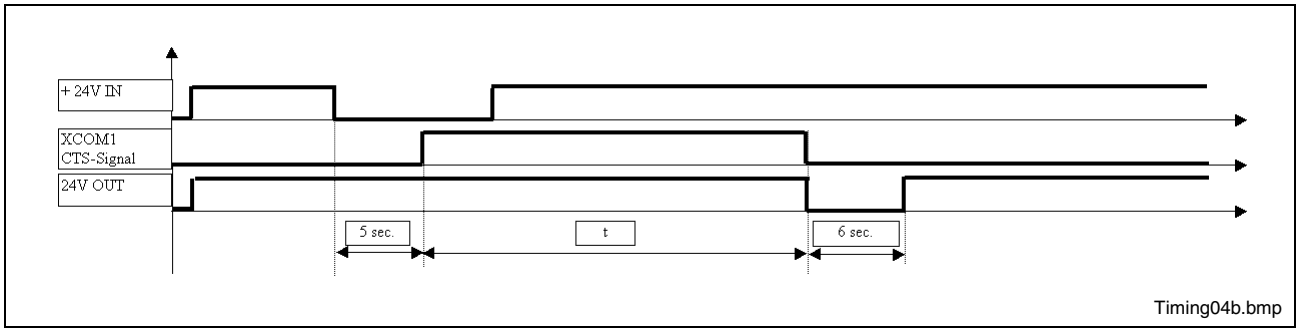
Switch position S1	Time t
0	5 sec
1	1 min
2	2 min
3	3 min
4	5 sec
5	1 min
6	2 min
7	3 min

Fig. 6-16: Activation of the supply voltage during UPS operation



Switch position S1	Time t
0	5 sec
1	1 min
2	2 min
3	3 min

Fig. 6-17: Activation, deactivation and reactivation for switch positions 0 to 3



Switch position S1	Time t
4	5 sec
5	1 min
6	2 min
7	3 min

Fig. 6-18: Activation, deactivation and reactivation for switch positions 4 to 7

7 Maintenance and Installation

7.1 General Information

The UPS is maintenance-free. A few parts are subject to wear and must be replaced after a certain number of operating hours.

CAUTION

Maintenance work in the device is only permissible by skilled staff!

⇒ If hardware and/or software components have to be exchanged, please contact the Bosch Rexroth Service or ensure that only skilled staff changes the respective components.

Maintenance

Include the following measure in your maintenance schedule:

- At least once a year, check all plug and terminal connections for proper tightness and damage. Verify that lines and cables are not broken or squeezed. Replace damaged parts immediately.

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

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

If you decide that the rechargeable battery should be exchanged by your own skilled staff, consider the following instructions:

DANGER

Fire or explosion hazard by use of wrong rechargeable battery types!

⇒ Replace the rechargeable battery only by a battery type permitted by Bosch Rexroth.

DANGER

Risk of injury through improper treatment of the rechargeable battery!

The rechargeable battery in this device can cause fire or chemical burn, if it is treated in the wrong way.

⇒ The rechargeable battery must not be charged, opened, heated over 80 °C and burn.

Note: The rechargeable battery is designed for the use under normal temperature conditions. The temperatures to be expected must not exceed values of 60 °C.

Note: The rechargeable battery must not be connected in series with a power source, as this would increase the forward current through the cells to an impermissible value.

DANGER

Fire, explosion or burns due to wrong battery treatment!

⇒ The rechargeable battery must not be charged, opened, heated over 80 °C and burn.

1. Shut down the PC.
2. Disconnect the power supply of the UPS.
3. Open the cover by loosening screw M5 at the UPS.

Fig. 7-1: Loosen screw (1) to open the UPS (1).

4. The rechargeable battery is attached at the cover. For this reason, open the cover carefully and loosen the connector, with which the rechargeable battery is connected. For this, loosen the locking of the connector by pressing the release of the plug at the plug housing (see Fig. 7-3). If the cover is swiveled out, it can be separated from the housing.

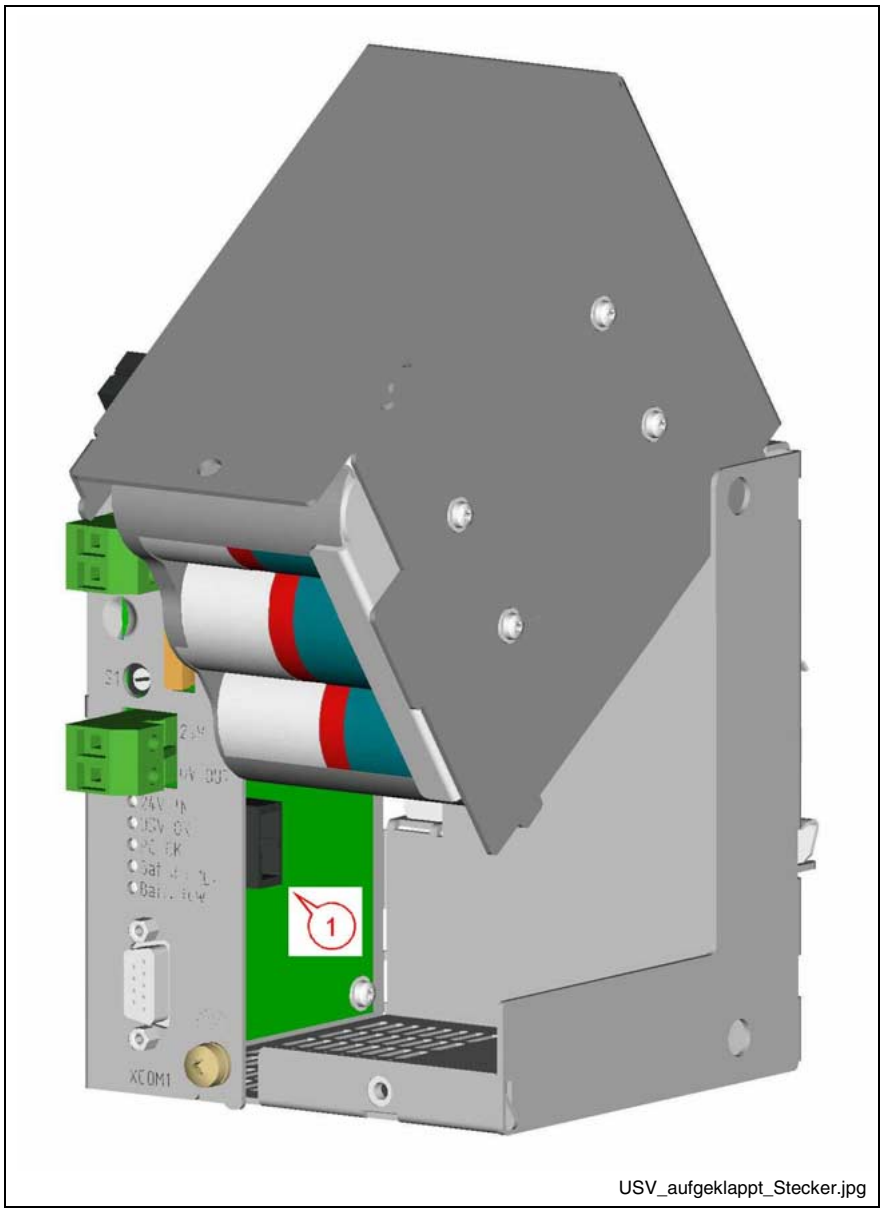


Fig. 7-2: Swivel out the cover, unlock and unplug the connector (1).

5. Remove cover with rechargeable battery from the housing.

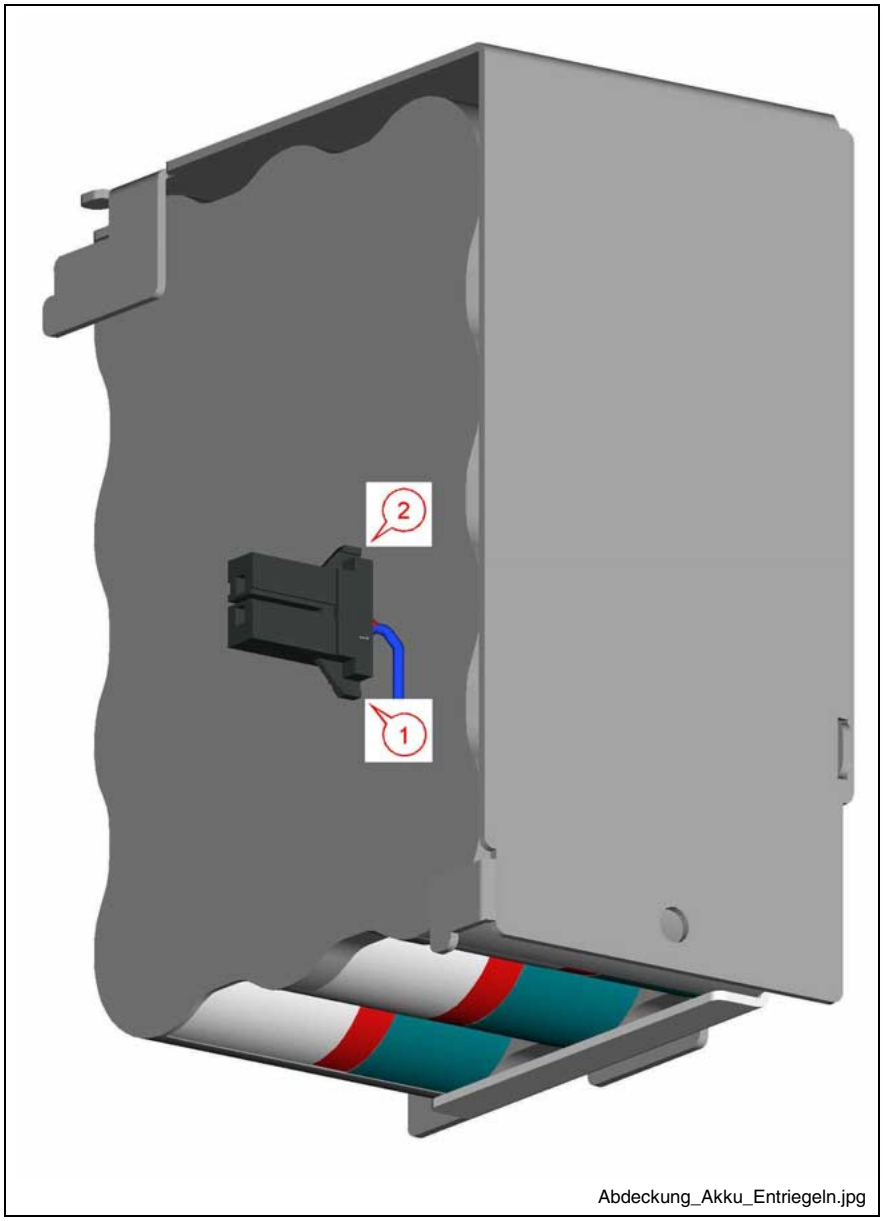


Fig. 7-3: To unlock the connector pinch it at position (1) and (2).

6. Remove the rechargeable battery from the cover by loosening the four M3 screws. Dispose the rechargeable battery immediately and properly and observe the notes given in this chapter.

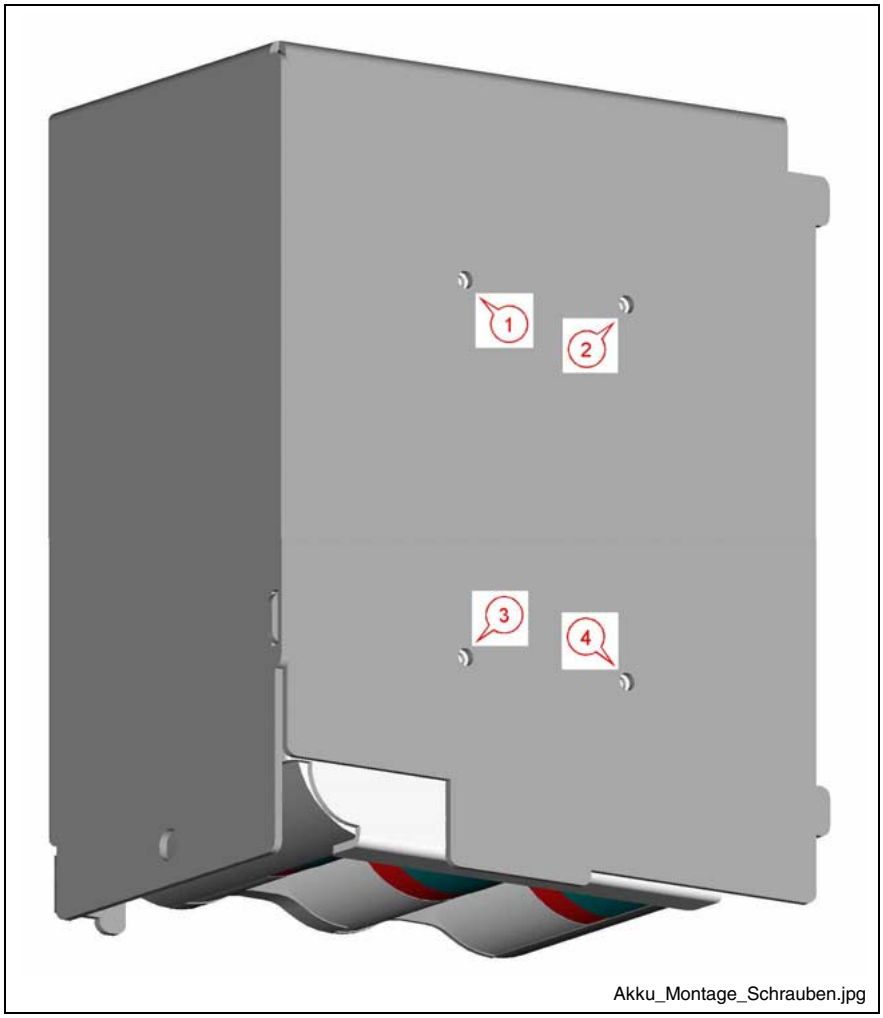


Fig. 7-4: Remove the screws (1) to (4) to remove the rechargeable battery.

7. Fix the new rechargeable battery. Installation position as illustrated in Fig. 7-3. Observe that you install only a rechargeable battery permitted by Bosch Rexroth. At present, this type is: AKKU24V/2,5Ah with the following Bosch Rexroth part number: 1070923287. For the screws (1) to (4) a torque of 0,7 Nm is required.
8. Plug in the connector.

DANGER

⇒ Ensure that the polarity of the rechargeable batteries is correct. In case of polarity reversal of the rechargeable battery fuse F1, a FKS flat fuse 20 A / 32 V (1070917667) is triggered.

Note: If the new rechargeable battery 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 2.5 Ah rechargeable battery is approximately 5 hours.

9. Close the cover and fix it with the original screw and washer assembly M5x10 Z4 with a torque of 2,8 Nm at the housing.

Caution: Use only screw and washer assemblies M5x10 Z4. A longer screw might damage the housing of the rechargeable battery.

Note: Dispose the used rechargeable battery immediately. Keep it away from children.

Testing the New Component

1. Switch on the supply voltage for the UPS again.
2. Observe the "Batt. Charg." LED on the front panel:
   - Batt. Charg. LED on: Battery is charged The lit or unlit LED indicates, if the rechargeable battery is charged or not. The darker the LED flashes, the higher is the charging status of the battery.

7.2 Storage

Recommended Value for the Storage Time

The storage time is two years for an average surrounding air temperature of +25 °C.

WARNING

Risk to damage the rechargeable battery by deep discharge

⇒ If the storage temperature is unclear or if the storage time has exceeded two years, check regularly the open-circuit voltage of the rechargeable battery as described in the following section!

Open-Circuit Voltage Check

To check the open-circuit voltage of the rechargeable battery, insert a voltmeter between the fusible wire of fuse F1 (see Fig. 6-10) and the 0 V connection of X1S1.

WARNING

Risk to damage the UPS by short-circuit

⇒ Don't cause a short-circuit during measuring the voltage, as a measurement at the fusible wire of the fuse might deactivate its function!

The open-circuit voltage of the rechargeable battery must not fall below +21 V, as otherwise the battery cells might be damaged.

For this reason, start the charging process of the rechargeable battery as of an open-circuit voltage of +22 V by connecting the UPS with the +24 V supply. Then, the charging process starts automatically.

8 Disposal and Environmental Protection

8.1 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
D-97816 Lohr am Main

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.

8.2 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.

9 Ordering Information

9.1 Type Code

The UPS has the following features according to the type code illustrated below:

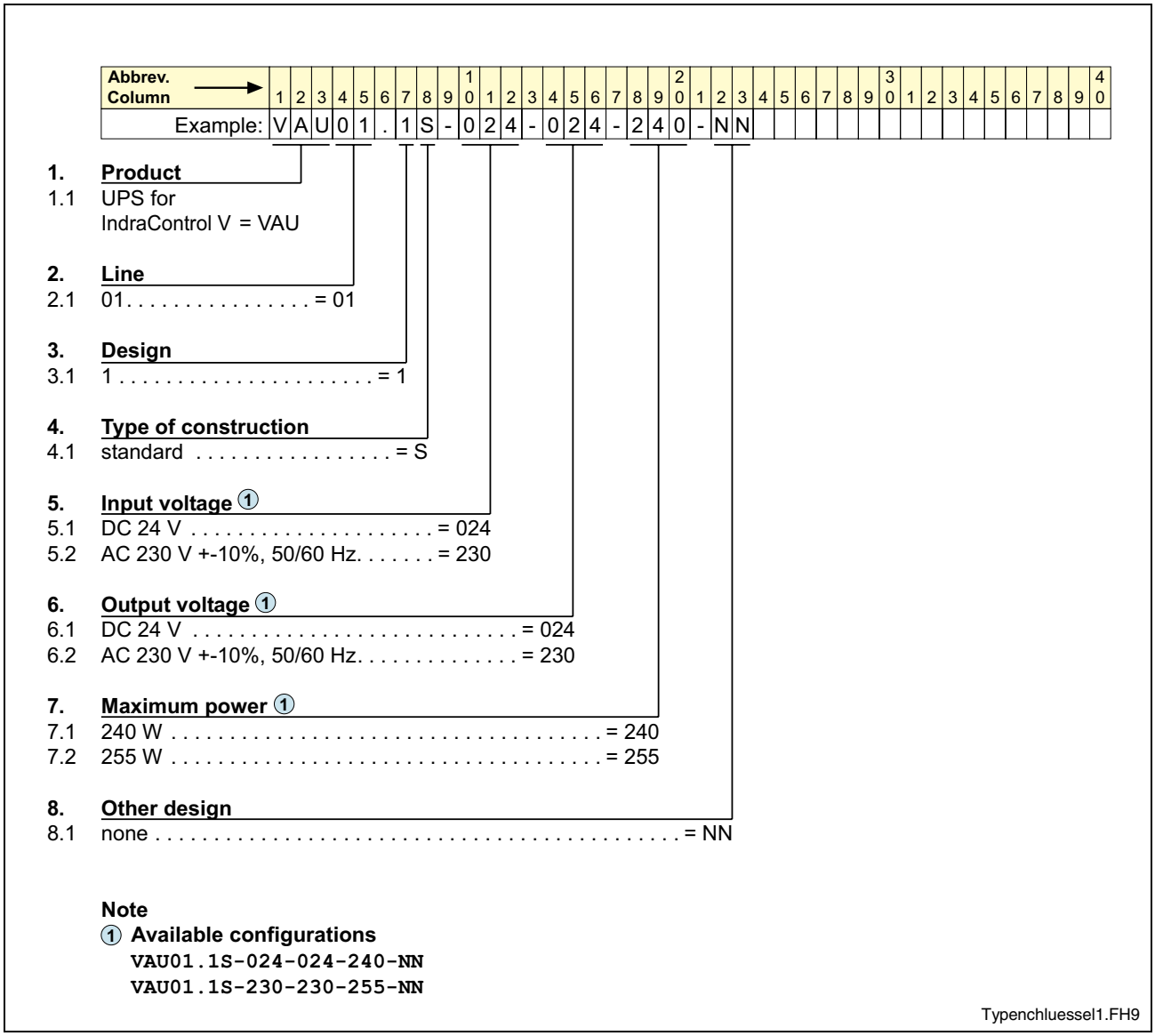


Fig. 9-1: Type code for the UPS

Note: This documentation describes only the 24 V variant of the UPS. The 240 V variant is offered in combination with the IPCs and is, thus, described in the documentation of the respective IPC.

10 List of Figures

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12 Service & Support

1.1 Helpdesk

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

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

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

1.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service Deutschland direkt ansprechbar unter

After helpdesk hours, contact the German service experts directly at

+49 (0) 171 333 88 26

oder - or **+49 (0) 172 660 04 06**

Hotline-Rufnummern anderer Länder entnehmen Sie bitte den Adressen in den jeweiligen Regionen.

Hotline numbers of other countries to be seen in the addresses of each region.

1.3 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 can find additional notes about service, repairs and training. The current addresses *) for our sales and service facilities locations around the world are on the following pages.

sales agencies
sales agencies providing service

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

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

1.4 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.

1.5 Kundenbetreuungsstellen - Sales & Service Facilities

Deutschland – Germany

vom Ausland: (0) nach Landeskennziffer weglassen!
from abroad: don't dial (0) after country code!

Vertriebsgebiet Mitte Germany Centre	SERVICE AUTOMATION	SERVICE AUTOMATION	SERVICE AUTOMATION
Bosch Rexroth Electrice Drives and Controls GmbH Bgm.-Dr.-Nebel-Str. 2 / Postf. 1357 97816 Lohr am Main / 97803 Lohr **Kompetenz-Zentrum Europa** Tel.: +49 (0)9352 40-0 Fax: +49 (0)9352 40-4885	CALL ENTRY CENTER Helpdesk MO – FR von 07:00 - 18:00 Uhr from 7 am – 6 pm **Tel. +49 (0) 9352 40 50 60** **Fax +49 (0) 9352 40 49 41** service.svc@boschrexroth.de	HOTLINE 24 / 7 / 365 **außerhalb der Helpdesk-Zeit** **out of helpdesk hours** **Tel.: +49 (0)172 660 04 06** oder / or **Tel.: +49 (0)171 333 88 26**	**ERSATZTEILE / SPARES** verlängerte Ansprechzeit - extended office time - ♦ nur an Werktagen - only on working days - ♦ von 07:00 - 18:00 Uhr - from 7 am - 6 pm - **Tel. +49 (0) 9352 40 42 22**
Vertriebsgebiet Süd Germany South	Vertriebsgebiet West Germany West	Gebiet Südwest Germany South-West	
Bosch Rexroth AG Landshuter Allee 8-10 80637 München Tel.: +49 (0)89 127 14-0 Fax: +49 (0)89 127 14-490	Bosch Rexroth AG Regionalzentrum West Borsigstrasse 15 40880 Ratingen Tel.: +49 (0)2102 409-0 Fax: +49 (0)2102 409-406 +49 (0)2102 409-430	Bosch Rexroth AG Service-Regionalzentrum Süd-West Siemensstr. 1 70736 Fellbach Tel.: +49 (0)711 51046–0 Fax: +49 (0)711 51046–248	
Vertriebsgebiet Nord Germany North	Vertriebsgebiet Mitte Germany Centre	Vertriebsgebiet Ost Germany East	Vertriebsgebiet Ost Germany East
Bosch Rexroth AG Walsroder Str. 93 30853 Langenhagen 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	Bosch Rexroth AG Regionalzentrum Mitte Waldecker Straße 13 64546 Mörfelden-Walldorf Tel.: +49 (0) 61 05 702-3 Fax: +49 (0) 61 05 702-444	Bosch Rexroth AG Beckerstraße 31 09120 Chemnitz Tel.: +49 (0)371 35 55-0 Fax: +49 (0)371 35 55-333	Bosch Rexroth AG Regionalzentrum Ost Walter-Köhn-Str. 4d 04356 Leipzig Tel.: +49 (0)341 25 61-0 Fax: +49 (0)341 25 61-111

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 40-1459

Austria – Österreich

Bosch Rexroth GmbH
Electric Drives & Controls
Industriepark 18
4061 Pasching
Tel.: +43 (0)7221 605-0
Fax: +43 (0)7221 605-1220

Belgium - Belgien

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Henri Genessestraat 1
1070 Bruxelles

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info@boschrexroth.be
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8900 Randers

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77503 Chelles Cedex
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Hotline: +33 (0)608 33 43 28

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69634 Vénissieux – Cedex
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France – Frankreich

Tightening & Press-fit:
Globe Techniques Nouvelles
143, Av. du Général de Gaulle
92252 La Garenne Colombes

Tel.: +33 (0)1 41 19 33 33

Italy - Italien

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