

# Rexroth IndraControl VEP xx.5 Embedded Terminals

**R911337775**  
Edition 03

## Operating Instructions



## Record of Revision

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## Editorial Department

Development automation systems control hardware HP (KaWa/PiGe)

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# 1 About this Documentation

## Overview – target groups and product phases

The activities, product phases and target groups that refer to the present documentation are marked in red color in the following figure.

Example: In the product phase "Mounting (assembly/installation)", the "mechanic/electrician" can execute the activity "install" using this documentation.

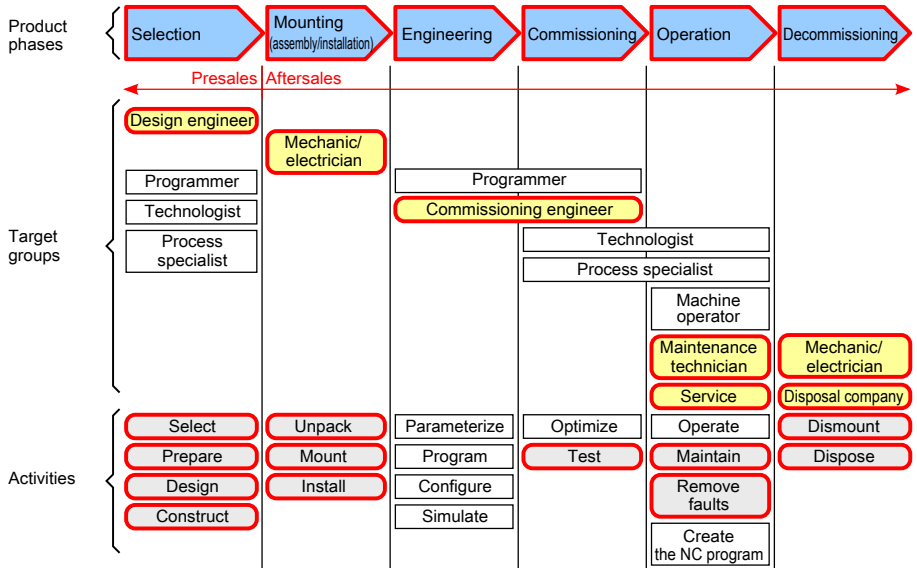


Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

### Purpose

This document instructs the technical staff of the machine manufacturer on how to perform the mechanic and electrical installation in a safe way and on how to commission the Embedded Terminal.

Required qualifications: Individual who is able to assess the tasks assigned and identify possible safety risks owing to qualification in the subject, knowledge and experience. The individual should also be familiar with the standards and regulations.

### Scope

This document is valid for all variants, whose type designation code starts with "VEP30.5...", "VEP40.5..." or "VEP50.5...".

The type designation code specifications are located on the type plate of the device (see also [chapter 2.1 "Product Identification" on page 2](#)).

## Further documents

Title	Part number and document type
Rexroth IndraControl VAP 01 Power Supply Unit	<a href="#">R911339612</a> Operating Instructions
Rexroth IndraControl V Devices Operating Systems	<a href="#">R911343901</a> Project Planning Manual

**Tab. 1-1:** Required and supplementing documentation

## Customer feedback

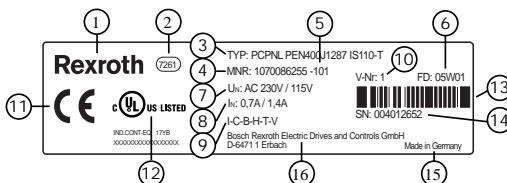
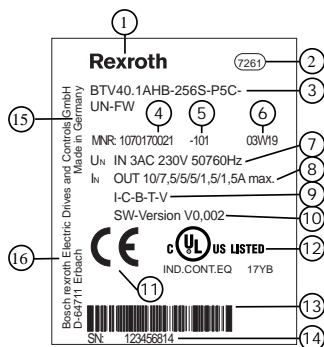
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# 2 Product Identification and Scope of Delivery

## 2.1 Product Identification

### 2.1.1 Type Plate on the Device

The type plate is located on the rear panel.



- 1 Logotype
- 2 Division or plant number
- 3 Type code (type designation code)
- 4 Part number
- 5 State of revision
- 6 Date of manufacture (yyWww)
- 7 Nominal voltage
- 8 Nominal current

- 9 Test marking
- 10 Version number
- 11 CE mark
- 12 Underwriters Laboratories Inc. mark
- 13 Serial number as barcode
- 14 Serial number
- 15 Designation of origin



16 Company address

**Fig. 2-1:** Type plates, example

### 2.1.2 Electronic Type Plate

The device is provided with an electronic type plate. The following data is stored on the electronic type plate:

- Operating hours counter
- Serial number of the device
- Index of the device
- Parts number of the device
- Type designation code of the device

The contents of the electronic type plate can be displayed via the Rexroth CE Settings. For a detailed description of the "Rexroth CE Settings", please refer to the project planning manual "Rexroth IndraControl V Devices Operating Systems" (see [tab. 1-1 "Required and supplementing documentation" on page 2](#)).

## 2.2 Scope of Delivery

- Embedded Terminal VEP xx.5
- Mounting kit
- Safety instructions
- Device passport

**Additional scope of delivery for the VEP30.5DPN... device**

- Cable grommets

# 3 Using the Safety Instructions

## 3.1 Safety Instructions – Structure

The safety instructions are structured as follows:

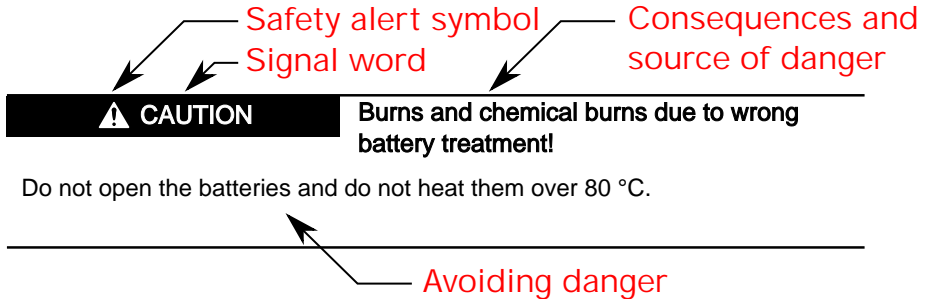


Fig. 3-1: Safety instructions – Structure

### 3.2 Explaining Signal Words and Safety Alert Symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6-2006).

The signal word is meant to draw the reader's attention to the safety instruction and signifies the degree of danger.

The safety alert symbol (a triangle with an exclamation point), which precedes the signal words danger, warning and caution is used to alert the reader to personal injury hazards.

#### **DANGER**

In case of non-compliance with this safety instruction, death or serious injury **will** occur.

#### **WARNING**

In case of non-compliance with this safety instruction, death or serious injury **can** occur.

#### **CAUTION**

In case of non-compliance with this safety instruction, minor or moderate injury could occur.

#### **NOTICE**

In case of non-compliance with this safety instruction, property damage could occur.

### 3.3 Symbols Used

Notes are displayed as follows:



This is a note.

---

Tips are displayed as follows:



This is a tip.

---

## 4 Intended Use

The Bosch Rexroth Embedded Terminals are PC based machine operator terminals. Depending on the respective configuration they can also perform control functions. The products are designed for use in industrial environments.

### **NOTICE**

**Danger of destruction of the device if not expressly stated accessories, mounting parts and other components, cables, lines, software and firmware are used.**

The Embedded Terminals may be used only as intended and with the accessories, mounting parts, and other components specified in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same is valid for cables and lines.

Operation must only be carried out with the hardware component configurations and combinations that are expressly specified and with the software and firmware indicated and specified in the respective documentation and functional descriptions.

---

Areas of application of the Embedded Terminals are:

- Handling systems and assembly systems
- Food processing machinery and packaging machines
- Printing machines and paper converting machines
- Machine tools
- Wood processing machines

The Embedded Terminals may only be operated under the mounting and installation conditions, the position, and the ambient conditions (temperature, degree of protection, humidity, EMC etc.) specified in this documentation.

## 5 Spare Parts, Accessories, and Wear Parts

### 5.1 Storage Media

Ordering code	Part number	Description
CFM01.1-08G0-N-LBA-NN-NW	R911173621	8 GB Compact Flash card for Win 7 firmware
CFM01.1-04G0-N-LBA-NN-NW	R911171809	4 GB Compact Flash card for XP Embedded firmware

**Tab. 5-1:** Storage media for the Embedded Terminals

### 5.2 External 24 V Power Supply Unit

Ordering code	Part number	Description
VAP01.1H-W23-024-010-NN	R911171065	External 24 V power supply unit for the IndraControl V devices

**Tab. 5-2:** External 24 V power supply unit for the operator display

### 5.3 Lithium Battery

Ordering code	Part number	Description
CAP01.1-B2	R911170806	3 V lithium battery

**Tab. 5-3:** 3 V lithium battery

### 5.4 Wear Parts

Wear parts are not subject to any warranty.

#### Display

The service life of the display is limited. After the service life has been exceeded, the readability is reduced.

Service life: 50,000 hours (typically)

#### 3 V lithium battery

The service life of the lithium battery is approx. five years.

To replace the battery of further Embedded Terminals (degree of protection IP 20), use the battery specified in [chapter 5.3 "Lithium Battery" on page 6](#). Replace the battery as described in this section.

## 6 Ambient Conditions

	In operation	Transport	Storage
Max. ambient temperature	+5 °C to +45 °C	-20 °C to +60 °C	
Max. temperature gradient	Temporal temperature changes up to 3 K per minute		
Humidity	Min. relative humidity: 5 % Max. relative humidity: 85 % Min. absolute humidity: 1 g/m <sup>3</sup> Max. absolute humidity: 25 g/m <sup>3</sup> Condensation not allowed Corresponds to climatic class 3K3 acc. to EN 60721-3-3	Min. relative humidity: 5 % Max. relative humidity: 75 % Min. absolute humidity: 1 g/m <sup>3</sup> Max. absolute humidity: 25 g/m <sup>3</sup> Condensation not allowed Corresponds to climatic class 2K2 acc. to EN 60721-3-2	Min. relative humidity: 5 % Max. relative humidity: 85 % Min. absolute humidity: 1 g/m <sup>3</sup> Max. absolute humidity: 25 g/m <sup>3</sup> Condensation not allowed Corresponds to climatic class 1K2 acc. to EN 60721-3-1
Air pressure	Up to 2,000 m above sea level acc. to EN 61131-2	Up to 3000 m above sea level acc. to EN 61131-2	
Mechanical strength	Max. vibration: Frequency range: 10 Hz to 150 Hz Excursion: 0.075 mm for 10 Hz to 57 Hz Acceleration: 1 g for 57 Hz to 150 Hz acc. to EN 600068-2-6	Max. shock: 15 g 11 ms acc. to EN 60068-2-27, no disturbance of the function	
Contamination level	2		
Overvoltage category	2	-	

**Tab. 6-1:** Ambient Conditions



The surrounding air must be free from acids, alkaline solutions, corrosive agents, salts, dust, metal vapors, and other electrically conductive contaminants in high concentrations.

Housings and installation compartments must at least comply with degree of protection IP 54 according to DIN VDE 0470-1.

## 7 Technical Data

### 7.1 Front Panel of the Embedded Terminals

Display VEP 30.5... (VEP30.5DPN-2GONE-A3D- NNN- <b>CG</b> -FW)	213 mm TFT (8.4"), 800 x 600 pixels, 262144 colors
Display VEP 40.5...	304 mm TFT (12.1"), 800 x 600 pixels, 262144 colors
Display VEP 50.5...	381 mm TFT (15"), 1024 × 768 pixels, 262144 colors
Operation	<ul style="list-style-type: none"> <li>● Touch screen operation or touch screen and key operation (VEP 40.5..., VEP 50.5...)</li> <li>● Touch operation, operating elements and EMERGENCY STOP (VEP 30.5 DPN device)</li> </ul>
Color of the surface – front panel	Rexroth design: RAL 7035 light gray Bosch design: RAL 7046 telegray
Degree of protection, front panel	IP 65 acc. to DIN 40 050, IEC 529 Front type 1 according to NEMA (UL) USB connection on the front panel IP 65 (not on all variants)
Degree of protection, overall device	IP 20 IP 54 (VEP30.5DPN-2GONE-A3D-NNN- <b>CG</b> -FW)

**Tab. 7-1:** Embedded Terminals, technical data



Surfaces, colors and their structure may diverge from each other slightly. Also the height and shape of the embossing may diverge from each other.



In some cases the touch screen surface may camber due to high air humidity or high temperatures. This does not impair the function of the touch screen. Blistering is no cause for a complaint.



The installed displays comply with class 2 according to ISO 13406-2. Pixel errors in the specified range are no cause for a complaint.

### 7.2 Further Technical Data of the Embedded Terminals

	Advanced <sup>1</sup>	Basic <sup>2</sup>
Processor, processor performance	Intel ATOM processor, N455, 1.6 GHz	Intel ATOM processor, N455, 1.6 GHz
Working memory (RAM)	2 GB	

	Advanced <sup>1</sup>	Basic <sup>2</sup>
Voltage supply	DC 24 V (use a 24 V power supply unit according to DIN EN 60742, classification VDE 0551, for example the power supply unit VAP01.1H-W23-024-010-NN, part number R911171065)	
Input voltage range	DC 24 V (+19 V to +30 V)	
Emitted interference and surge immunity	$U_{\max} = 35 \text{ V}$ (for $t < 100 \text{ ms}$ )	
Max. input current	1.5 A for DC 24 V	
Max. inrush current	7 A, 6 ms	
Max. power consumption for maximum configuration	36 W	

<sup>1</sup> The interface of the "Advanced" variant is designated as "2E-NN" (identification "2E").

<sup>2</sup> The interface of the "Basic" variant is designated as "ET-NN" (identification "NE").

**Tab. 7-2:** Technical data of the Embedded Terminals VEP xx.5

### 7.3 Weight

VEP 40.5 (touch screen)	Approx. 3.8 kg
VEP 50.5 (touch screen)	Approx. 5.4 kg
VEP 40.5 (touch screen, keys)	Approx. 3.9 kg
VEP 50.5 (touch screen, keys)	Approx. 5.5 kg
VEP 30.5 (touch screen, operating elements, EMERGENCY STOP)	Approx. 3.4 kg

**Tab. 7-3:** Embedded Terminals, weight

### 7.4 EMERGENCY STOP Pushbutton (for the VEP30.5DPN... Device)

Manufacturer	RAFI
Manufacturer designation	RAFIX 22 FS; EMERGENCY STOP pushbutton

Operating voltage AC/DC	42 V
Operating current AC/DC	100 mA
Max. switching capacity	250 mW
B10d value RAFX 22 FS	<p>Electrics:</p> <p>B10d = 5,000,000 (according to the manufacturer)</p> <p>Assumption: B10d = 5 x B10</p> <p>Exclusion of failure at &lt; 6050 switching cycles</p> <p>Mechanics:</p> <p>B10d = 250,000 (according to the manufacturer)</p> <p>Assumption: B10d = 5 x B10</p> <p>Exclusion of failure at &lt; 6050 switching cycles</p>

**Tab. 7-4:** Technical data, EMERGENCY STOP pushbutton  
For information on the standards, please refer to [chapter 8 "Standards"](#) on [page 10](#).

## 8 Standards

### 8.1 Used Standards

Standard	Meaning
EN 61000-6-4	Generic standards - emission standard (industrial environments)
EN 61000-6-2	Generic standards – noise immunity (industrial environments)
EN 61558-2-6	Transformer for 24 V power supply unit, protective separation
EN 61131 -2	24 V current supply requirements
ISO 13850	Safety of machinery, emergency stop - principles for design
EN 60664 -1	Overvoltage category II
EN 60529	Degrees of protection (including housings and installation compartments)
EN 60068-2-6	Vibration test
EN 60068-2-27	Shock test
EN 60721-3-1 to 3	Classification of ambient conditions
UL 508	Industrial Control Equipment

**Tab. 8-1:** Used Standards

#### EMERGENCY STOP pushbutton, standards

The EMERGENCY STOP pushbutton is disclosed by the manufacturer as safety component according to machinery directive 2006/42/EC (annex V-10, emergency stop devices). The compliance with the directive is proven by adherence to the following European standards:



- IEC 60204-1 (safety of machinery - electrical equipment of machines)
- IEC 60947-5-1/5 (requirements for control circuit devices, requirements for emergency stop devices)
- ISO 13850 (safety of machinery - emergency stop - principles for design)

Technical data and B10d value of the EMERGENCY STOP pushbutton are specified in [chapter 7.4 "EMERGENCY STOP Pushbutton \(for the VEP30.5DPN... Device\)"](#) on page 9.

## 8.2 CE Marking

### 8.2.1 Declaration of Conformity



The electronic products that are described in the present instructions, comply with the requirements and the target of the following EU directive and with the following harmonized European standards:

EMC Directive 2004/108/EC

The electronic products described in the present instructions are intended for use in industrial environments and comply with the following requirements:

Standard	Title	Edition
DIN EN 61000-6-4 (VDE 0839-6-4)	Electromagnetic Compatibility (EMC) Part: 6-4: Generic standards – emission standard for industrial environments (IEC 61000-6-4:2006)	September 2007
DIN EN 61000-6-2 (VDE 0839-6-2)	Electromagnetic Compatibility (EMC) Part: 6-2: Generic standards – noise immunity for industrial environments (IEC 61000-6-2:2005)	March 2006

**Tab. 8-2:** Standards for electromagnetic compatibility (EMC)



**Non-compliance with CE conformity due to modifications to the device.**

The CE marking is only valid for the device in its delivery status. After having modified the device, the CE conformity is to be verified.

Ask your representative for the Declaration of Conformity.

## 8.3 UL/CSA Certified



The devices are certified according to

- **UL508** (Industrial Control Equipment) and

- **C22.2 No. 142-M1987 (CSA)**

UL file no. E210730

However, there can be combinations or extension stages with limited or missing certification. Thus, verify the registration according to the UL marking on the device.



**Loss of UL/CSA conformity due to modifications to the device.**

The UL- and CSA- marking is only valid for the device in its delivery status. After having modified the device the UL and CSA compliance is to be verified.

## 9 Interfaces

### 9.1 Overview

Designation at the housing	Connection type	Basic devices	Advanced devices
XCF1, XCF2	Slot for Compact Flash card XCF1 Primary Master XCF2 Primary Slave	2 x Compact Flash card	2 x Compact Flash card
XETH1, X7E1, X7E2	Network connection: Ethernet 10 Base T or 100 Base X	1 x RJ45 (XETH1)	2 x RJ45 (X7E1, X7E2)
XUSB	USB interfaces, USB 1 and USB 2	2 x USB (type A)	2 x USB (type A)
X1S	DC 24 V voltage supply	Connector strip, SL pin spacing 3.5 mm, 3-pin	Connector strip, BL pin spacing 3.5 mm, 5-pin
XCOM <sup>1)</sup>	Serial interface	1 x D-Sub, 9-pin	No

<sup>1)</sup> Not available on all devices

**Tab. 9-1:** Embedded Terminals, interfaces

## 9.2 Connector Panels

### Connector Panel of the Advanced devices

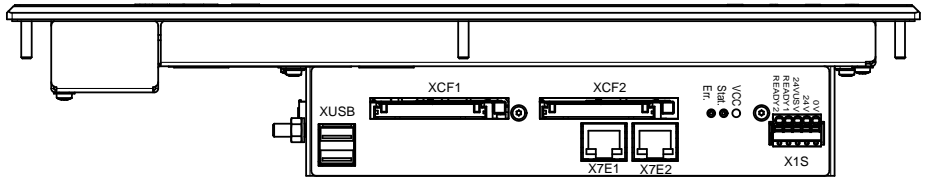


Fig. 9-1: Connector panel of the Advanced devices (sample illustration)

### Connector panel of the Basic devices

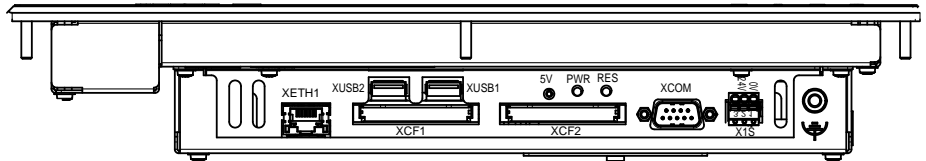


Fig. 9-2: Connector panel of the Basic devices

### Connector panel of the VEP30.5DPN... devices

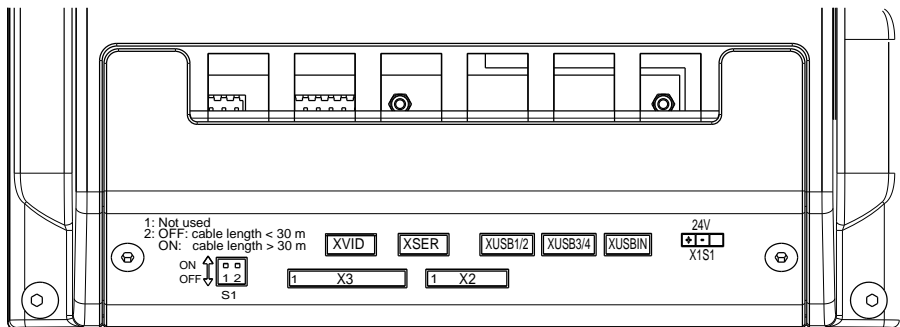


Fig. 9-3: Connector panel of the VEP30.5DPN... devices

## 9.3 Serial Interface XCOM

D-Sub male connector, 9-pin	
Type	RS232
Cable length	Max. 15 m

D-Sub male connector, 9-pin	
Cable type	Shielded, cross-section min. 0.14 mm <sup>2</sup>
Transmission rate	Max. 115200 bits/s

**Tab. 9-2:** Serial interface XCOM1

The "XCOM" interface is only available on the "Basic" devices.

## 9.4 USB Interfaces XUSB



**USB devices (e. g. keyboard) switch off if the power consumption is exceeded.**

The max. power consumption of one USB connector must not exceed 500 mA.

If the maximum power consumption is exceeded, a message displays that the USB devices are disabled. The USB devices are enabled as soon as the power consumption of one USB connector is below 500 mA.



**Not all USB devices are recognized.**

The operating system does not support all USB devices. Devices that require a special USB driver, which is not integrated in the system, cannot be operated at the USB interfaces.

## 9.5 Ethernet Interfaces X7E1, X7E2, and XETH1

	Basic	Advanced
Connector type	RJ45, female connector, 8-pin	RJ45, female connector, 8-pin
Cable length	Max. 100 m	Max. 100 m
Number	1 x	2 x
Max. data transmission rate	10/100 MBit and 1 GBit	10/100 MBit and 1 GBit
Connector designation	XETH1	X7E1, X7E2

**Tab. 9-3:** Ethernet network connection

### Ethernet interface – status and diagnostic displays

#### LED link

- On: Connection to network is available
- Off: No connection
- Flashing: Communication is running

#### LED status

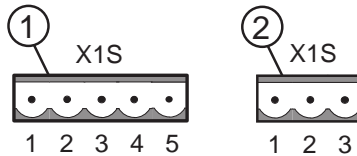
- On: Communication is running
- Off: No communication

## LED Speed

- Off: 10 MB
- Green: 100 MB
- Yellow: 1 GB

## 9.6 DC 24 V Voltage Supply X1S

Cables up to a max. conductor cross-section of 1.5 mm<sup>2</sup> can be connected to the connection terminal (male connector strip SL pin spacing 3.5 mm).



- ① 5-pin connection terminal for VEP xx.5 Advanced devices  
 ② 3-pin connection terminal for VEP xx.5 Basic devices

Fig. 9-4: Voltage supply connector X1S

	X1S, 5-pin (Advanced devices)		X1S, 3-pin (Basic devices)	
Pin	Function	Description	Function	Description
1	0 V	0 V voltage supply	0 V	0 V voltage supply
2	24 V	24 V voltage supply	24 V	24 V voltage supply
3	24 V UPS	24 V UPS to connect an external UPS	Not assigned	–
4	RDY1	Ready contact 1	–	–
5	RDY2	Ready contact 2	–	–

Tab. 9-4: Pin assignment of the voltage supply connector X1S

### NOTICE

Destruction of screw terminals, insufficient contact and loss of UL/CSA certification if no copper wire is used and/or wrong tightening torque.

For terminal connectors use copper wire only. Tighten the screws of the screw terminals with a torque of 2.25 lb in (0.25 Nm).

---

**NOTICE**

**Destruction of the Embedded Terminal caused by polarity reversal when the 0 V load is simultaneously grounded.**

Polarity reversal of the X1S connector might destruct the operator terminal, if there is no additional external protection (fire hazard). The reason for this is the grounding of the 0 V in the operator terminal and simultaneously to that the grounding of the 0 V load (PELV).

---

**NOTICE**

**Damage to the Embedded Terminal caused by polarity reversal and too high input voltages.**

The Embedded Terminals are designed reverse voltage protected. Polarity reversal of the 24 V voltage supply at the X1S connector does not damage the device. Overvoltage more than 36 V and more than 500 ms damages components in the power supply area of the device.

---

## 9.7 Slot for Compact Flash Card XCF1 and XCF2

The Embedded Terminals feature two slots for Compact Flash cards ("XCF1" and "XCF2"). The slots are designed for Compact Flash cards type A and type B. The Compact Flash card, which contains the operating system, is contained in the scope of delivery. Further cards can be ordered (see [chapter 5.1 "Storage Media" on page 6](#)).

If only one Compact Flash card is used in a device, this Compact Flash card has to be plugged in the "XCF1" slot (Master).

---

**NOTICE**

**Reduced performance and damage to files or file system if different or non-released Compact Flash cards are used.**

Use released Compact Flash cards only. Use similar and released Compact Flash cards only if two Compact Flash cards are required in one device.

---

**NOTICE**

**Data loss and uncontrolled machine movements by removing the Compact Flash card if voltage is applied.**

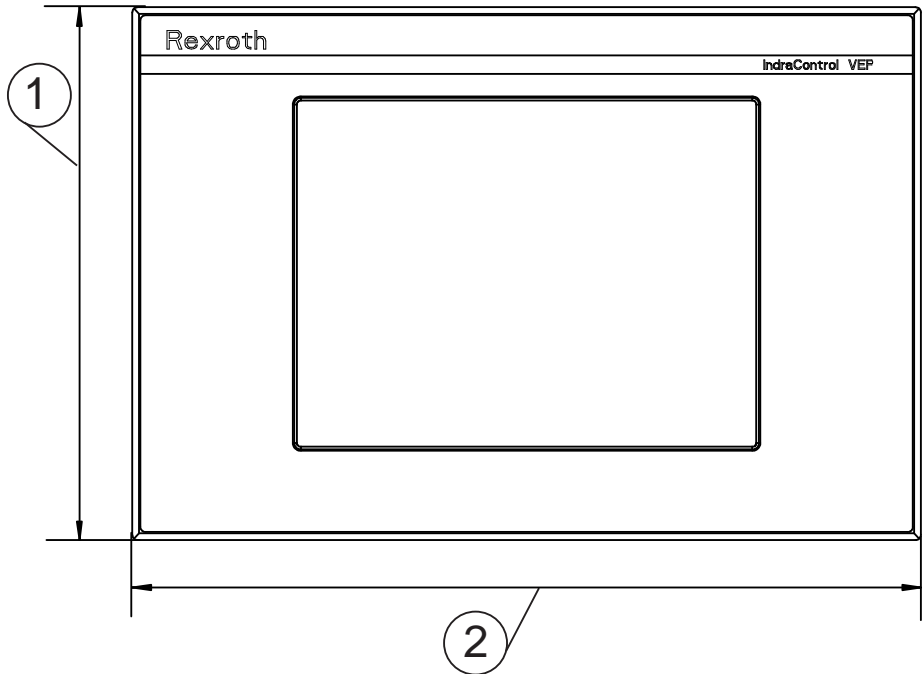
Before inserting or removing the Compact Flash card, switch off the device!

---

## 10 Assembly, Disassembly and Electrical Installation

### 10.1 Housing Dimensions

#### 10.1.1 Overview Housing Dimensions



①, ② see the following table

**Fig. 10-1:** Overview: Embedded Terminals, front view

Device	Height (mm)	Width (mm)
VEP 40.5...	290	350
VEP 50.5...	370	407
VEP 30.5DPN...	280	246

**Tab. 10-1:** Housing dimensions: Front panel of the Embedded Terminals

### 10.1.2 Overview Housing Dimensions - Top View

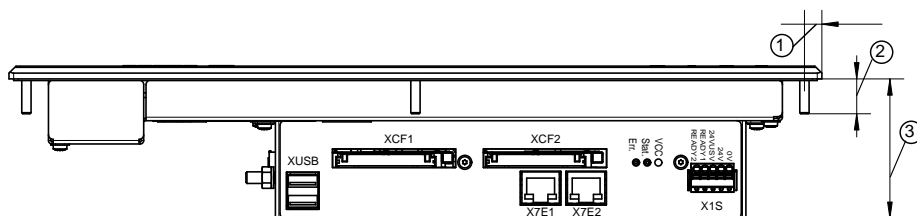


Fig. 10-2: Overview: Embedded Terminal, top view (sample illustration)

	Display size	(mm)	(mm)	(mm)
VEP40.5APN-2G0NE-A3D-NNN-NN-FW	12"	5	20	51
VEP40.5APN-2G02E-A3D-NNN-NN-FW				60
VEP40.5EIN-2G02E-A3D-NNN-NN-FW				60
VEP40.5DBN-2G02E-A3D-NNN-NN-FW				60
VEP40.5DBN-2G0NE-A3D-NNN-NN-FW				51
VEP50.5AQN-2G0NE-A3D-NNN-NN-FW	15"	5	20	53
VEP50.5AQN-2G02E-A3D-NNN-NN-FW				62
VEP50.5DFN-2G02E-A3D-NNN-NN-FW				65
VEP30.5DPN-2G0NE-A3D-NNN-NN-FW	8,4"	5	20	55

Tab. 10-2: Housing dimensions: Embedded Terminal, top view (sample illustration)

## 10.2 Installing the Embedded Terminals - Installation Notes

- Avoid installation locations that are exposed to direct UV light or sunlight, as the screen readability is reduced and additional heat development can occur.
- Install the Embedded Terminal in a manner ensuring easy access to the connector panel (top side)
- Provide a sufficient space of 50 mm (on all sides of the device) for sufficient cooling and cable routing
- Use strain reliefs for all cables
- Keep as much distance as possible to noise sources

### Additional note for Installing the VEP30.5DPN Embedded Terminal

- For maintaining the degree of protection IP 54, use only cable grommets that fit to the cable cross-sections for cable bushing, see also the following table



Cable grommet description (Mounting/luting)	Cable diameter
QT4	4-5 mm
QT5	5-6 mm
QT6	6-7 mm
QT7	7-8 mm
QT8	8-9 mm
QT11	11-12 mm
QT12	12-13 mm
QTB	Blind grommet

Tab. 10-3: Cable diameter and corresponding cable grommet

## 10.3 Installing the Embedded Terminals VEP 40.5, VEP 50.5

### 10.3.1 Mounting Cut-Out

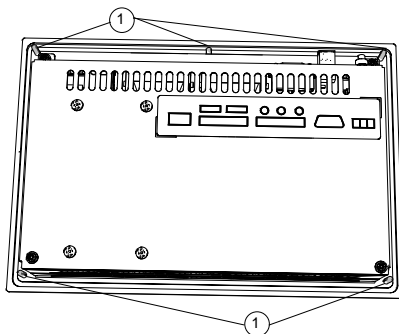
#### **NOTICE**

Damage to the front panel or to the touch screen and the IP degree of protection is not kept due to incorrect installation.

- Install the devices without mechanical stress
- Provide a sufficiently sized mounting cut-out
- Provide an even mounting surface
- Ensure that no objects are squeezed

To create a mounting cut-out and to install the Embedded Terminal proceed as follows:

1. Create a mounting cut-out with the corresponding number of holes, diameter 5 mm, according to the figures "Mounting Dimensions" on the following pages (see [chapter 10.3.2 "Mounting Dimensions VEP 40.5..."](#) on page 21 and [chapter 10.3.3 "Mounting Dimensions VEP 50.5..."](#) on page 22).
2. Insert the Embedded Terminal from the front into the cut-out and insert the mounting bolts M4 into the drilled holes.
3. Fasten the Embedded Terminal by screwing the nuts at the rear side of the mounting bolts.



① Mounting bolt

Fig. 10-3: Rear view: Position of the mounting bolts (sample illustration)

### **NOTICE**

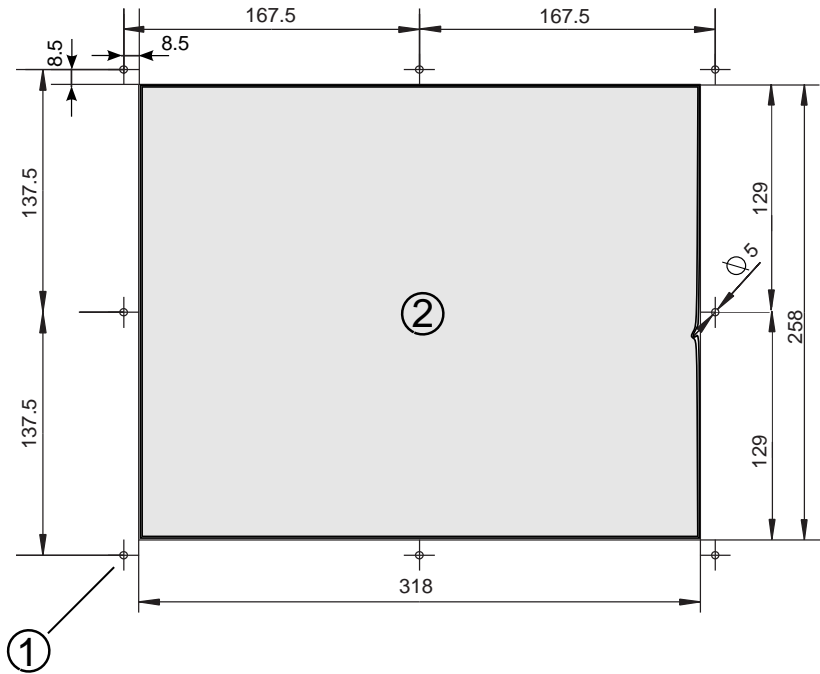
Damage of the mechanics caused by wrong tightening torque.

Tighten the screws with a torque specified in the following tables.

Threads	Mounting torques
M2.5	0.4 Nm
M3	0.7 Nm
M4	1.4 Nm
M5	2.8 Nm

Tab. 10-4: Tightening torques

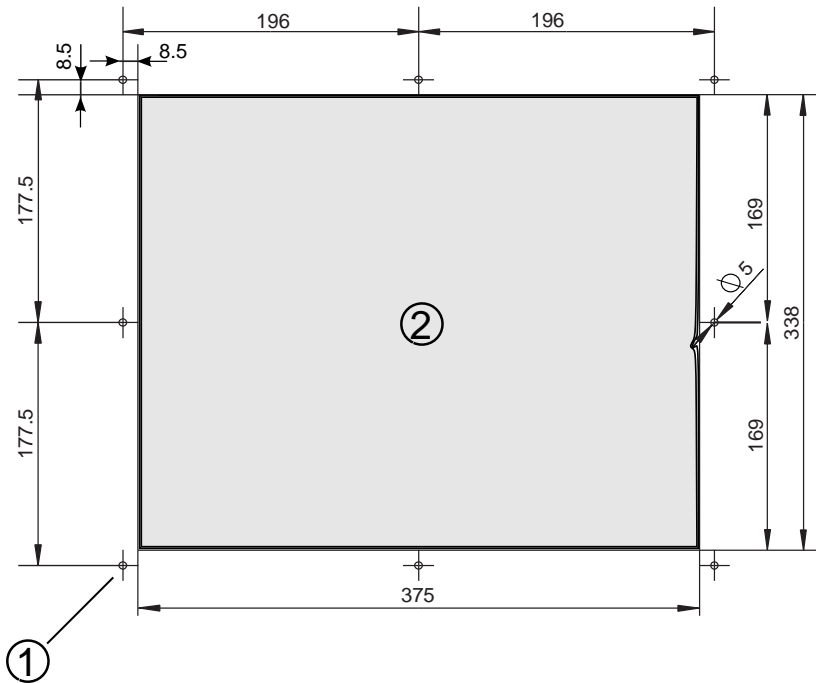
## 10.3.2 Mounting Dimensions VEP 40.5...



- ① Drilled hole for the mounting bolts, bore diameter 5 mm
- ② Mounting cut-out

Fig. 10-4: Mounting dimensions of the VEP 40.5 in millimetres

### 10.3.3 Mounting Dimensions VEP 50.5...



① Drilled hole for the mounting bolts, bore diameter 5 mm

② Mounting cut-out

Fig. 10-5: Mounting dimensions of the VEP 50.5 (in millimetres)

## 10.4 Installing the Embedded Terminals VEP 30.5DPN...

### 10.4.1 Mounting the VEP 30.5DPN...

#### **NOTICE**

Loss of IP degree of protection due to wrong size or wrong mounting of the cable grommet.

Use a cable grommet fitting to the cable diameter. Mount the cable grommet properly.

**NOTICE**

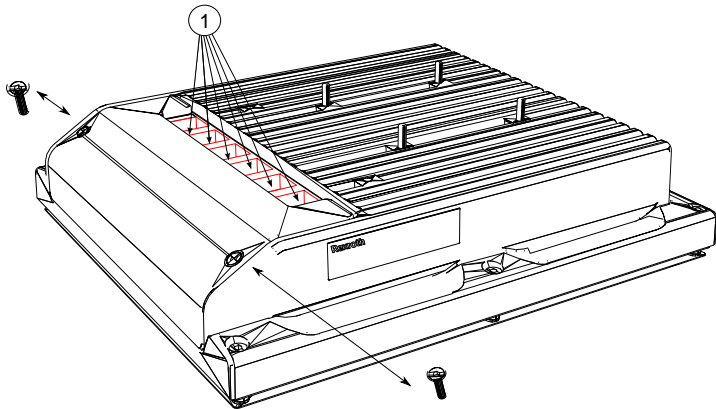
Loss of IP degree of protection due to damaged or wrongly mounted or not sufficiently fastened covers.

The sealing of the cover must not be damaged. Mount the cover properly. Tighten the screws with the correct torque (see [tab. 10-4 "Tightening torques"](#) on [page 20](#)).

The connectors are located under the housing cover.

### Dismounting the cover

1. Dismount the cover by loosening the screws (see the following figure).



① Openings for cable grommets

**Fig. 10-6:** Dismounting the cover

### Using the cable grommet

1. Select the corresponding cable grommet from the table (see [tab. 10-3 "Cable diameter and corresponding cable grommet"](#) on [page 19](#)).

The cable grommets and the connector for connecting the keypad are in the delivered accessories kit.

2. Lay the cable grommet around the cable.
3. Plug the cable grommet into the housing.
4. Provide the cables, which are lead through a cable grommet, with a strain relief.

### Using a blind grommet

1. Cover not used openings with a blind grommet.

## Fastening the cover

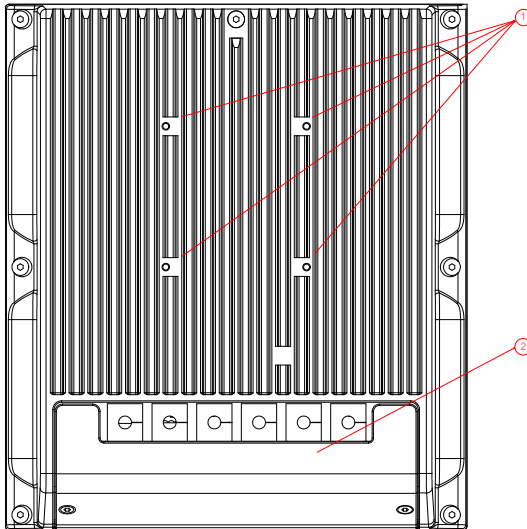
1. Check that the seal of the cover is not damaged.
2. Position the cover properly and fasten the screws with the corresponding torque (see also [tab. 10-4 "Tightening torques" on page 20](#)).

### 10.4.2 Mounting to a Standardized VESA Bracket on a VEP 30.5DPN...



Do observe the minimum bending radius of the used cables.

Use appropriate cable material (sufficient bending and torsional strength).



- ① VESA attachment with four M4 threaded bolts (75 mm × 75 mm)
- ② Cable bushings, appropriate for ready-made cables

**Fig. 10-7:** Position of VESA fastening screws and cable bushings

### 10.4.3 VESA Bracket for VEP 30.5DPN...

The operator terminals can be attached to a standardized VESA bracket, which is offered by different manufacturers.

## 10.5 Electrical Wiring

### 10.5.1 General Information

---

**⚠ DANGER****Danger of death without protective separation!**

The DC 24 V input voltage must comply with the requirements of the "Protective separation"!

Plug and unplug the connector only if there is no voltage!

---

**NOTICE****Malfunctions due to insufficient shielding!**

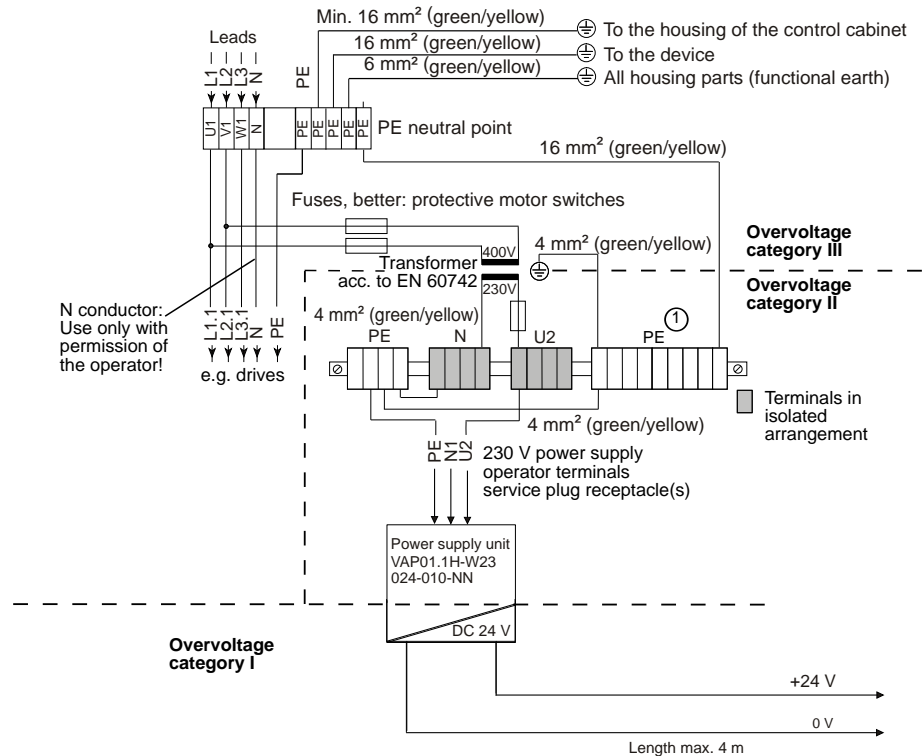
Use only shielded cables and metallic, conductive connector or coupling housings with large-area shield support.

---

Interfering AC voltage components such as the ones resulting from an uncontrolled three-phase bridge circuit without smoothing and with a ripple factor (see DIN 40110/10.75, section 1.2) of 5 % are allowed.

That results in the greatest absolute value of 30.2 V as upper voltage limit. The lowest absolute value of 18.5 V is the lower voltage limit.

Wiring 230 V



① PE bars are to be installed preferably on the mounting plate. In case of isolated PE bars, connect both ends to the mounting plate by means of copper strips with a maximum length of 20 cm. The cross-section of the copper strips has to be at least equal to that of the incoming mains cable.

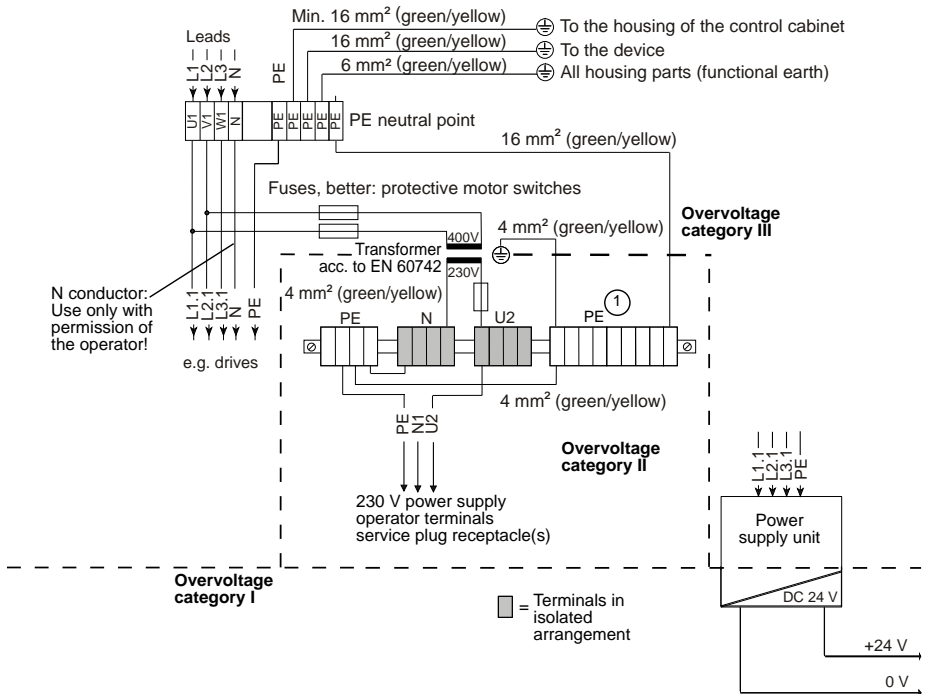
Fig. 10-8: Wiring 230 V

**⚠ DANGER** Danger of death by high electrical voltage.

- Connect power supply units, which generate protective extra-low voltage (PELV) (24 V), only to supply voltages for which the power supply units are designed. Comply with the overvoltage categories, see fig. 10-8 "Wiring 230 V" on page 26
- Do not apply the supply voltage to the protective extra-low voltage (PELV)



## Wiring 400 V



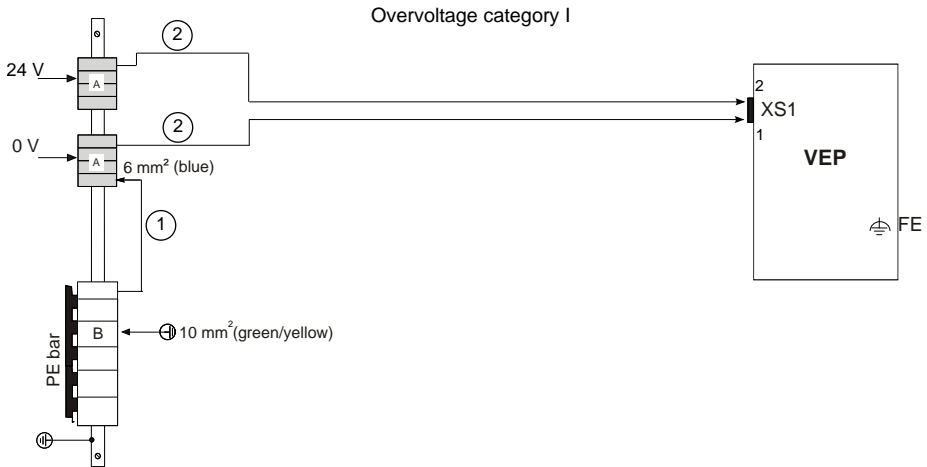
- ① PE bars are to be installed preferably on the mounting plate. In case of isolated PE bars, connect both ends to the mounting plate by means of copper strips with a maximum length of 20 cm. The cross-section of the copper strips has to be at least equal to that of the incoming mains cable.

Fig. 10-9: Wiring 400 V

**⚠ DANGER****Danger of death by high electrical voltage.**

- Connect power supply units, which generate protective extra-low voltage (PELV) (24 V), only to supply voltages for which the power supply units are designed. Comply with the overvoltage categories, see [fig. 10-9 "Wiring 400 V" on page 27](#)
- Do not apply the supply voltage to the protective extra-low voltage (PELV)

## 24V-DC Wiring



- ① Easy to remove and visible
- ② Cable length between 24 V power supply unit and VEP max. 6 m at a minimum cross-section of 0.75 mm<sup>2</sup>. Cable length between 24 V power supply unit and VEP max. 10 m at a minimum cross-section of 1.5 mm<sup>2</sup>.

- A** Isolated terminal block
- B** Non-isolated terminal block
- FE** Functional earth ground

**Fig. 10-10:** Wiring the Embedded Terminal

## 11 Commissioning

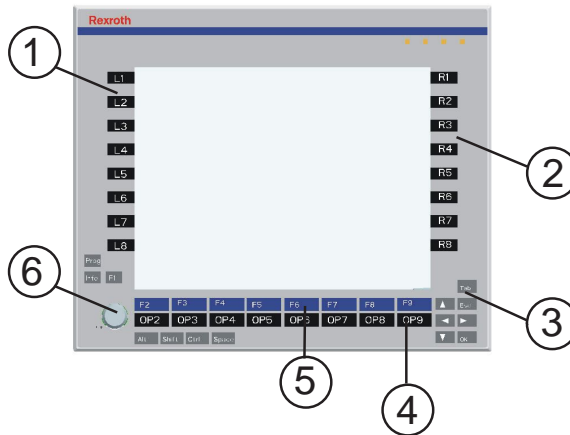
The product can be used directly, no configuration is required.

To commission the device, proceed as follows:

During the first commissioning, the configuration applications "touch calibration" and the "Rexroth Settings" start automatically. They are described in the project planning manual "Rexroth IndraControl V Devices Operating Systems" (see [tab. 1-1 "Required and supplementing documentation" on page 2](#)). For just delivered devices these settings are already done ex works.

## 12 Device Description

### 12.1 General Information



- ① Machine function keys (M-keys), L1 to L8
- ② Machine function keys (M-keys), R1 to R8
- ③ Navigation keys
- ④ Operating keys, OP2 to OP9
- ⑤ Function keys, F2 to F9
- ⑥ USB interface (not available on all devices)

**Fig. 12-1:** Front panel of the VEP xx devices (sample illustration, here: VEP xx.5 with touchscreen and machine function keys, Rexroth design)

#### USB interface on the front panel



The USB interface on the front panel is **not** available on all devices.

The USB interface complies with USB standard 2.0. The USB interface is sealed with a cap with the degree of protection IP 65. The cap is connected with the device. Screw on the cap again as soon as the USB interface is not used anymore.

### 12.2 Variants

The VEP xx.5 devices are available as "Basic" and "Advanced" variants. The devices differ in the type designation code as follows:

		Interface designation in the type designation code	Abbreviation in the type designation code
Basic	1 x Ethernet	ET-NN	NE
Advanced	2 x Ethernet	2E-NN	2E

**Tab. 12-1:** "Basic" and "Advanced" devices in the type designation code  
The VEP xx.5 Embedded Terminals are provided as different variants. The devices differ in the display size and in the different design of the housing. There are different PC boxes depending on device type and application.

		Ordering Information									
		VEP30.5DPN-2GONE-A3D-NNN-NN-FW	VEP40.5APN-2GONE-A3D-NNN-NN-FW R911172932	VEP40.5APN-2G02E-A3D-NNN-NN-FW R911172934	VEP40.5EIN-2G02E-A3D-NNN-NN-FW R911172936	VEP40.5DBN-2G02E-A3D-NNN-NN-FW R911173050	VEP40.5DBN-2G02N-A3D-NNN-NN-FW R911173150	VEP60.5AQN-2GONE-A3D-NNN-NN-FW R911172933	VEP60.5AQN-2G02E-A3D-NNN-NN-FW R911172935	VEP60.5DFN-2G02E-A3D-NNN-NN-FW R911172937	
Enclosure rating		IP 54	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	
PC box (VISU)	Basic	X	X	-	-	-	X	X	-	-	
	Advanced	-	-	X	X	X	-	-	X	X	
Processor	N455, 1.6 GHz	X	X	X	X	X	X	X	X	X	
Display size	213 mm (8.4")	X	-	-	-	-	-	-	-	-	
	304 mm (12")	-	X	X	X	X	X	-	-	-	
	381 mm (15")	-	-	-	-	-	-	X	X	X	
Front type	Touch, Rexroth design	-	-	-	-	-	-	-	X	X	
	Touch and keys, Rexroth design	X	-	-	X	-	-	-	-	X	
	Touch, Bosch design	-	X	X	-	-	-	X	X	-	
	EMERGENCY STOP	X	-	-	-	-	-	-	-	-	
	USB	X	-	-	X	X	X	-	-	X	

**Tab. 12-2:** VEPxx.5 variants

## 12.3 Display and Operating Components

### 12.3.1 Operating and Error Display

In the upper part of the front panel, there are four LEDs to indicate device states and errors. Depending on the variant the front panel features either labeled LEDs or illuminated symbols. The meaning of the display elements and actions in the event of failures are listed in the following table.

Symbol or LED	Display	Meaning	Measure
Von	LED green on	Normal operation	-
	LED green off	No supply voltage DC 24 V	Check the supply voltage at the power supply unit!

Symbol or LED	Display	Meaning	Measure
HDD	LED yellow	Hard disk access	–
Temp	LED off	Normal operation	–
	LED flashes red	Temperature exceeds the specified temperature range	Reduce surrounding air temperature! Connect fan, if required

**Tab. 12-3:** LEDs for operating and error display on the front panel

### **NOTICE**

**Destruction of keys due to operation with pointed objects.**

Operate the keys only with your fingers.

## 12.3.2 Display Resolution

The resolution is set at delivery, depending on the device, and is not to be changed by the user.

## 12.3.3 Light-Emitting Diodes (LEDs) on the PC Box

Next to the XS1 voltage supply connector, there are three light-emitting diodes (LEDs) on the PC box. The description of the individual LEDs is listed in the following table.

LED	Color	Function
H1	Green	Supply voltage is OK
H2 <sup>1)</sup>	Yellow	Application-dependent
H3 <sup>1)</sup>	Red	Application-dependent

<sup>1)</sup> "H2" and "H3" LEDs are only available for "Advanced" variants

**Tab. 12-4:** LEDs on the PC box  
H2 and H3 LEDs can be activated by the respective application.

## 12.4 Touchscreen

Short touches of the touch screen are taken as "left mouse click". To do a "right mouse click" the touch screen is to be touched on the corresponding position for approx. 2 seconds.

---

**NOTICE**

Damage to front panel or to touch screen due to operation with inadequate objects (e.g. a screwdriver).

Operate the touch screen only with your fingers or with a special touch pen (parts number 1070923266) for touch screens.

If the touch screen is operated with gloves, ensure that the gloves are free from hard particles like glass fragments or chips.

---

---

**NOTICE**

Damage to front panel or to touch screen due to too high pressure.

Avoid high pressure when operating the touch screen.

---

## 12.5 VEP 30.5DPN IP 54 Device

### 12.5.1 General Information

The VEP 30.5DPN device has the IP 54 degree of protection. Additionally, the device features three keys and an emergency stop button, which are not connected electrically to the device.

### 12.5.2 Housing and Housing Lid

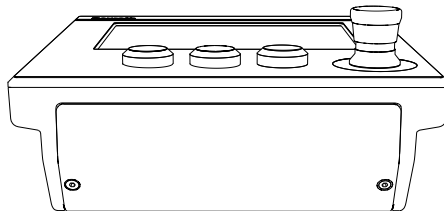


Fig. 12-2: Housing and housing lid

### 12.5.3 Keypad

The VEP 30.5DPN features a start, stop and EMERGENCY STOP pushbutton.



Fig. 12-3: Keypad

### 12.5.4 Keypad Connection Scheme

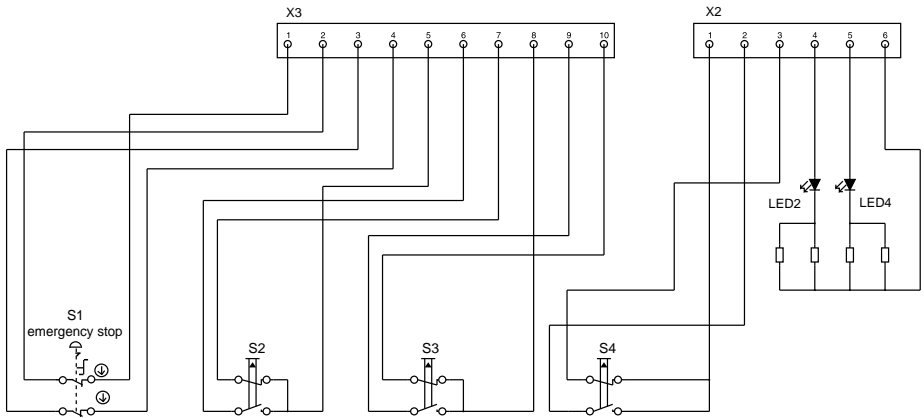


Fig. 12-4: Connection Scheme of the Keypad



The maximum load for each contact must not exceed 500 mA.

**⚠ WARNING**

**Death or serious injury caused by wrong handling!**

- The EMERGENCY STOP pushbutton can be used as operating element in an EMERGENCY STOP circuit
- The EMERGENCY STOP circuit has to be designed by the machine manufacturer
- Only qualified persons may connect the EMERGENCY STOP button and check it afterwards
- The connection has to be performed according to the connection scheme [fig. 12-4 "Connection Scheme of the Keypad"](#) on page 33
- The max. load current is 500 mA

For further information on the EMERGENCY STOP pushbutton, please refer to [chapter 7.4 "EMERGENCY STOP Pushbutton \(for the VEP30.5DPN... Device\)"](#) on page 9 and [chapter 8 "Standards"](#) on page 10.

### 12.5.5 Pin Assignment of the Keypad

Pin	Function
1	S1 (EMERGENCY STOP) N/C contact 1
2	S1 (EMERGENCY STOP) N/C contact 1
3	S1 (EMERGENCY STOP) N/C contact 2
4	S1 (EMERGENCY STOP) N/C contact 2
5	S2 (white key) N/O contact / N/C contact
6	S2 (white key) N/O contact
7	S2 (white key) N/C contact
8	S3 (black key) N/O contact / N/C contact
9	S3 (black key) N/O contact
10	S3 (black key) N/C contact

**Tab. 12-5:** Pin assignment keypad, connector X3

Pin	Function
1	S4 (blue key) N/O contact / N/C contact
2	S4 (blue key) N/O contact
3	S4 (blue key) N/C contact
4	LED2 in S2 (white key) +24V



Pin	Function
5	LED4 in S4 (blue key) +24 V
6	LED2/LED4 -0V

Tab. 12-6: Pin assignment keypad, connector X2

## NOTICE

Destruction of screw terminals, insufficient contact and loss of UL/CSA certification if no copper wire is used and/or wrong tightening torque.

For terminal connectors use copper wire only. Tighten the screws of the screw terminals with a torque of 2.25 lb in (0.25 Nm).

### Connector X2, X3

The X2 and X3 connectors are located behind the housing cover (see the following figure).

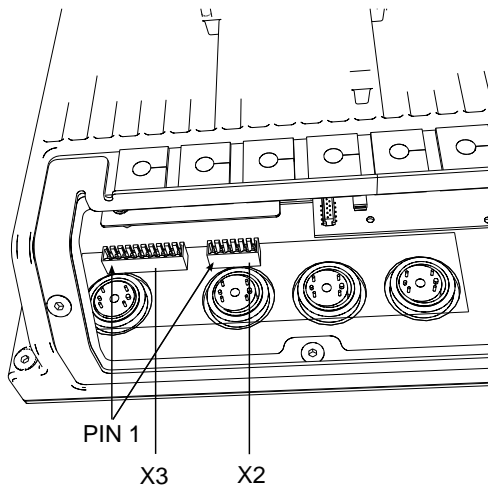


Fig. 12-5: Position of X2, X3 Connectors

## 13 Error Causes and Error Elimination

Error	Measures for error elimination
Reduced performance	Ensure that the utilization of the Compact Flash cards does not exceed 70%
Reduced performance and damage to files or file system	Use released Compact Flash cards only Use similar and released Compact Flash cards only if two Compact Flash cards are required in one device
The system freezes or a "bluescreen" appears. In some cases the file system or the Compact Flash card can be destroyed.  This can lead, among other things, to uncontrolled machine movements and data loss	Before inserting or removing the Compact Flash card, do switch off the device!

**Tab. 13-1:** Error causes and error elimination

For information on errors that are displayed via the LEDs, please refer to [chapter 9.5 "Ethernet Interfaces X7E1, X7E2, and XETH1"](#) on page 14 and [chapter 12.3.1 "Operating and Error Display"](#) on page 30.

## 14 Maintenance

### 14.1 General Information

#### **WARNING**

**Danger of death due to electric shock while opening the housing!**

The LCD display in the Embedded Terminal is operated at high voltage, depending on the display type. Do not open the housing.

#### **NOTICE**

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

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

**NOTICE**

Dissolution of the foil surface as well as the seal by solvents or by high pressure cleaning devices!

- Do not use any solvents (e. g. diluents)!
- Do not use compressed air, steam jet and high pressure cleaning devices!

## 14.2 Cleaning



In order to avoid incorrect operation, clean the devices only when they are switched off.

- Clean the screen at least once a week using an antistatic fabric or a cleansing agent containing alcohol when the device is switched off. Avoid hard objects that may cause scratches

## 14.3 Display

A fading backlight causes a progressive deterioration of the readability of the LCD, so that a backlight replacement is required. For further information, please contact the Bosch Rexroth Service (see [chapter 17 "Service and Support" on page 41](#)).

## 14.4 Regular Maintenance Tasks

Include the following measures in the maintenance schedule:

- At least once a year, all plug and terminal connections of the components are to be checked regarding proper tightness and possible damage
- Make sure that cables are not broken or crushed.
- Replace damaged parts immediately.

## 14.5 Lithium Battery

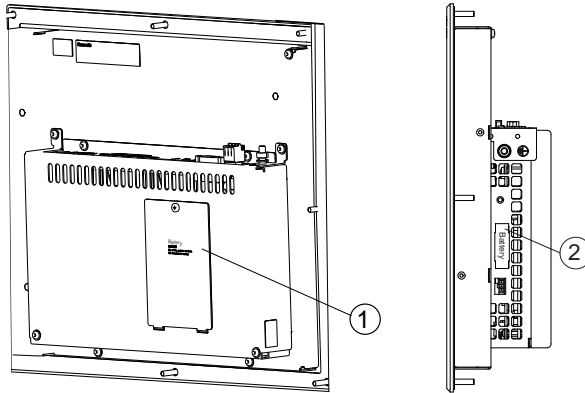
The devices are provided with a lithium battery to buffer the real-time clock in the BIOS. If this battery is empty or weak, the clock setting is lost in the BIOS.

**WARNING**

Batteries can cause fire, explosions or chemical burn.

Do not load, remove, destroy, burn or heat batteries over 100 °C. Dispose old batteries immediately and properly. Keep away from children!

## Position of the battery



- ① The battery case of the Basic devices is located on the rear panel
- ② The battery case of the Advanced devices is located on the side

Fig. 14-1: Overview: Position of the battery case (sample illustration)

## Battery exchange



Use the battery specified in [chapter 5.3 "Lithium Battery"](#) on [page 6](#) by Bosch Rexroth only.



Data loss if the device is switched off!

Ensure that the control remains switched on during battery exchange.

Proceed as follows to exchange the battery:

1. Open the battery case when the device is switched on (see figure [fig. 14-1 "Overview: Position of the battery case \(sample illustration\)"](#) on [page 38](#)).
2. To insert a new battery, pull the battery cover forward using the plastic strap attached thereon.
3. Using the strap, insert the new battery into the battery holder with the positive terminal, facing the rear side of the housing.
4. Engage the battery cover at the housing of the device.

# 15 Ordering Information

## 15.1 Accessories and Spare Parts

For ordering information on accessories and spare parts, please refer to [chapter 5 "Spare Parts, Accessories, and Wear Parts"](#) on [page 6](#).

## 15.2 Type Designation Code VEP xx

Abbrev. Column	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	2	1	2	3	4	5	6	7	8	9	0	3
Example:	V	E	P	4	0	4	A	P	N	-	1	G	0	N	N	-	A	2	D	-	4	G	0	-	N	N	-	F	W			
<b>Product</b>																																
VEP..... = VEP																																
<b>Line</b>																																
30..... = 30																																
40..... = 40																																
50..... = 50																																
<b>Design</b>																																
3..... = 3																																
4..... = 4																																
5..... = 5																																
<b>Front panel and display</b>																																
<b>Rexroth design</b>																																
8.4" touch screen..... = CC																																
8.4" touch screen with front USB..... = EF																																
8.4" touch screen with switching elements = DK																																
8.4" touch screen with front USB and switching elements..... = DP																																
8.4" touch screen with front USB and machine function keys..... = EK																																
12.1" touch screen..... = CE																																
12.1" touch screen with front USB..... = DB																																
12.1" touch screen with front USB and machine function keys..... = EI																																
12.1" with 16 machine function keys..... = BK																																
15" touch screen..... = CH																																
15" touch screen with front USB..... = DE																																
15" touch screen with front USB and machine function keys..... = DF																																
15" with 16 machine function keys..... = BI																																
<b>Customized design</b>																																
Bosch: 8.4" touch screen..... = A0																																
ATMO: 8.4" touch screen Easy Panel = FC																																
Bosch: 12.1" touch screen..... = AP																																
Bosch: 15" touch screen..... = AQ																																
<b>Additional option</b>																																
None..... = N																																
Short-time UPS..... = U																																
<b>RAM</b>																																
256 MB..... = 256																																
512 MB..... = 512																																
1 GB..... = 1G0																																
2 GB..... = 2G0																																

Fig. 15-1: Type designation code VEP xx (part 1)

Abbrev. Column →	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	2	0	1	2	3	4	5	6	7	8	9	0	3
Example:	V	E	P	4	0	.	4	A	P	N	-	1	G	0	N	N	-	A	2	D	-	4	G	0	-	N	N	-	F	W	0		
<b>Interface ①</b>																																	
Not equipped.....	= NN																																
P1-NN.....	= NA																																
DN-NN.....	= NB																																
P2-NN.....	= NC																																
N-33.....	= 3B																																
P2-33.....	= 3C																																
ET-NN.....	= NE																																
2E-NN.....	= 2E																																
<b>System configuration</b>																																	
Celeron M, min. 600 MHz.....	= MA																																
Celeron M, min. 1 GHz.....	= MB																																
Intel Atom, min. 1.1 GHz.....	= A2																																
Intel Atom N455, min. 1.66 GHz.....	= A3																																
<b>Supply voltage</b>																																	
DC 24 V.....	= D																																
<b>Compact Flash size</b>																																	
Without Compact Flash.....	= NN																																
e.g. 4 GB.....	= 4G0																																
<b>Other design ②</b>																																	
None.....	= NN																																
In the system housing.....	= CG																																
<b>Firmware and software</b>																																	
Denotes that firmware and software have to be ordered as separate subposition.....	= FW																																

**Note**

- ① Interface:  
 NN = Not equipped  
 33 = 2 x sercos III  
 DN = Devicenet - NETX  
 P1 = Profibus DP Master module  
 P2 = Profibus DP Master module NETX  
 ET = Ethernet  
 2E = 2 x Ethernet
- ② Other design:  
 "CG" is only available with front panel and display "DK", "DP" and "FC".

Fig. 15-2: Type designation code VEP xx (part 2)

## 16 Disposal

### 16.1 General Information

Dispose of the products according to the respective national standard.

### 16.2 Take-Back

Our products can be returned to our premises free of charge for disposal. However, the products must be free of impurities like oil, grease or other impurities.

Furthermore, the products returned for disposal must not contain any undue foreign material or foreign components.

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, Germany

## 16.3 Packaging

The packaging materials consist of cardboard, plastic material, wood or expanded polystyrene (EPS). The packaging materials can be recycled without any problem.

For ecological reasons, please refrain from returning the empty packages to Bosch Rexroth.

## 16.4 Batteries and Accumulators

Batteries and accumulators can be labelled with this symbol.



The symbol indicating "separate collection" for all batteries and accumulators is the crossed-out wheeled bin.

The end user within the EU is legally obligated to return used batteries. Outside the validity of the EU Directive 2006/66/EC keep the stipulated directives.

Used batteries can contain hazardous substances, which can harm the environment or the people's health when they are improperly stored or disposed of.

After use, the batteries or accumulators contained in Rexroth products have to be disposed of according to the country-specific collection system.

## 17 Service and Support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

### Service Germany

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Helpdesk & Hotline** under:

Phone: **+49 9352 40 5060**  
Fax: **+49 9352 18 4941**  
E-mail: [service.svc@boschrexroth.de](mailto:service.svc@boschrexroth.de)  
Internet: <http://www.boschrexroth.com>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

### **Service worldwide**

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

### **Preparing information**

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances resulting in the malfunction
- Type plate name of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your email address)



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## Notes

Bosch Rexroth AG  
Electric Drives and Controls  
P.O. Box 13 57  
97803 Lohr, Germany  
Bgm.-Dr.-Nebel-Str. 2  
97816 Lohr, Germany  
Tel. +49 9352 18 0  
Fax +49 9352 18 8400  
[www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics)



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