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

Rexroth Bosch Group

Rexroth IndraControl VEP / VEH

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Project Planning Manual

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Purpose of Documentation This documentation describes the embedded terminals IndraControl VEP 30.1, VEP 40.1, VEP 50.1 and VEH 30.1.

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Contents

1 System Presentation

1.1 Brief Description of the IndraControl VEP / VEH Devices

The embedded terminals IndraControl VEP / VEH are PC-based machine operator terminals. Depending on the respective application or configuration they can also perform control functionalities. Depending on its type the IndraControl VEP devices are provided with up to two PC104 slots for plug-in cards. All VEP devices are suitable for the food industry.

IndraControl VEP

The embedded terminals are provided as different variants. Principally, they differ in their display seize.

	VEP 30.1CC
Display	8.4" TFT
Touch screen	Yes
Keys	No

Fig. 1-1: IndraControl VEP 30.1- Front panel

	VEP 40.1CE
Display	12.1" TFT
Touch screen	Yes
Keys	No

Fig. 1-2: IndraControl VEP 40.1 – Front panel

	VEP 50.1CH
Display	15" TFT
Touch screen	Yes
Keys	No

Fig. 1-3: IndraControl VEP 50.1 – Front panel

All IndraControl VEP devices are equipped with an identical PC-Box.

PC box	
PC104 slots	2 Depending on the device type one or two slots are equipped
Power supply	24 V DC
Short-time UPS	Integrated charging circuit and buffer capacitor board

Fig. 1-4: PC box of the VEP-devices

IndraControl VEH

VEH 30.1	
Display	8.4" TFT
Touch screen	Yes
Keys	Yes

Fig. 1-5: IndraControl VEH 30.1

Embedded Terminals with Keypad

The keypad consists of a chemical resistant polyester foil with embossed keys.

Embedded Terminals with Touch Screen

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

Front Panel of the IndraControl VEP 30.1

VEP 30.1CC with Touch Screen

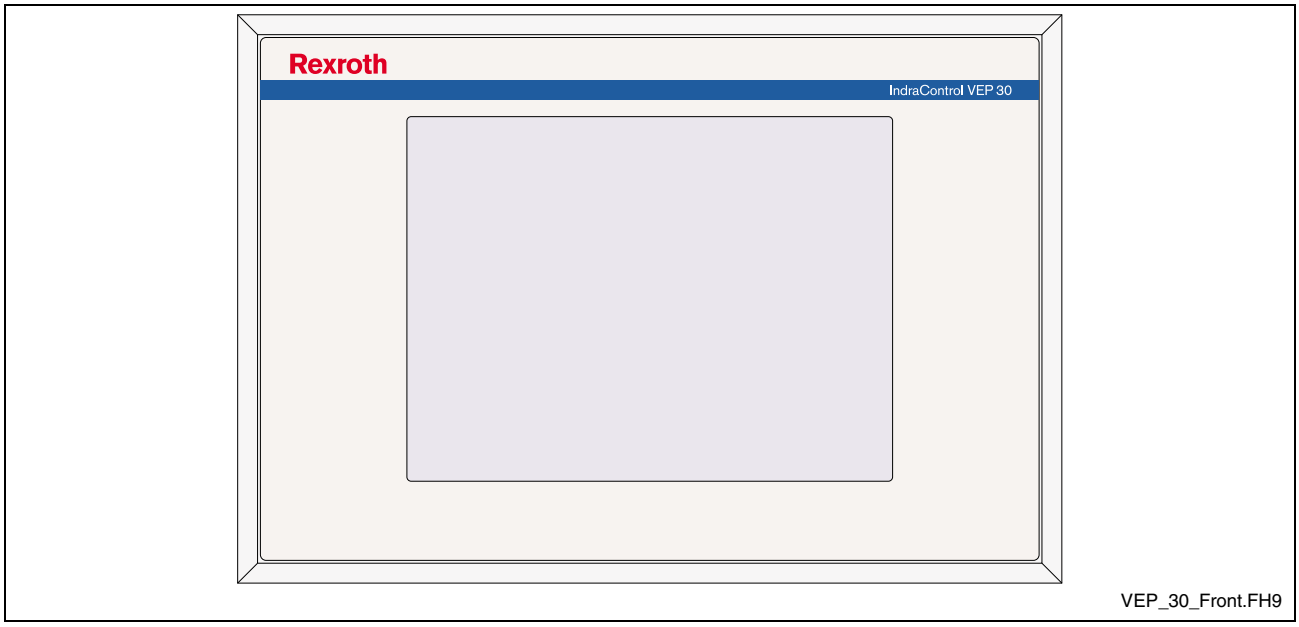


Fig. 1-6: VEP 30.1CC – Front panel

Front Panel of the IndraControl VEP 40.1

VEP 40.1CE with Touch Screen

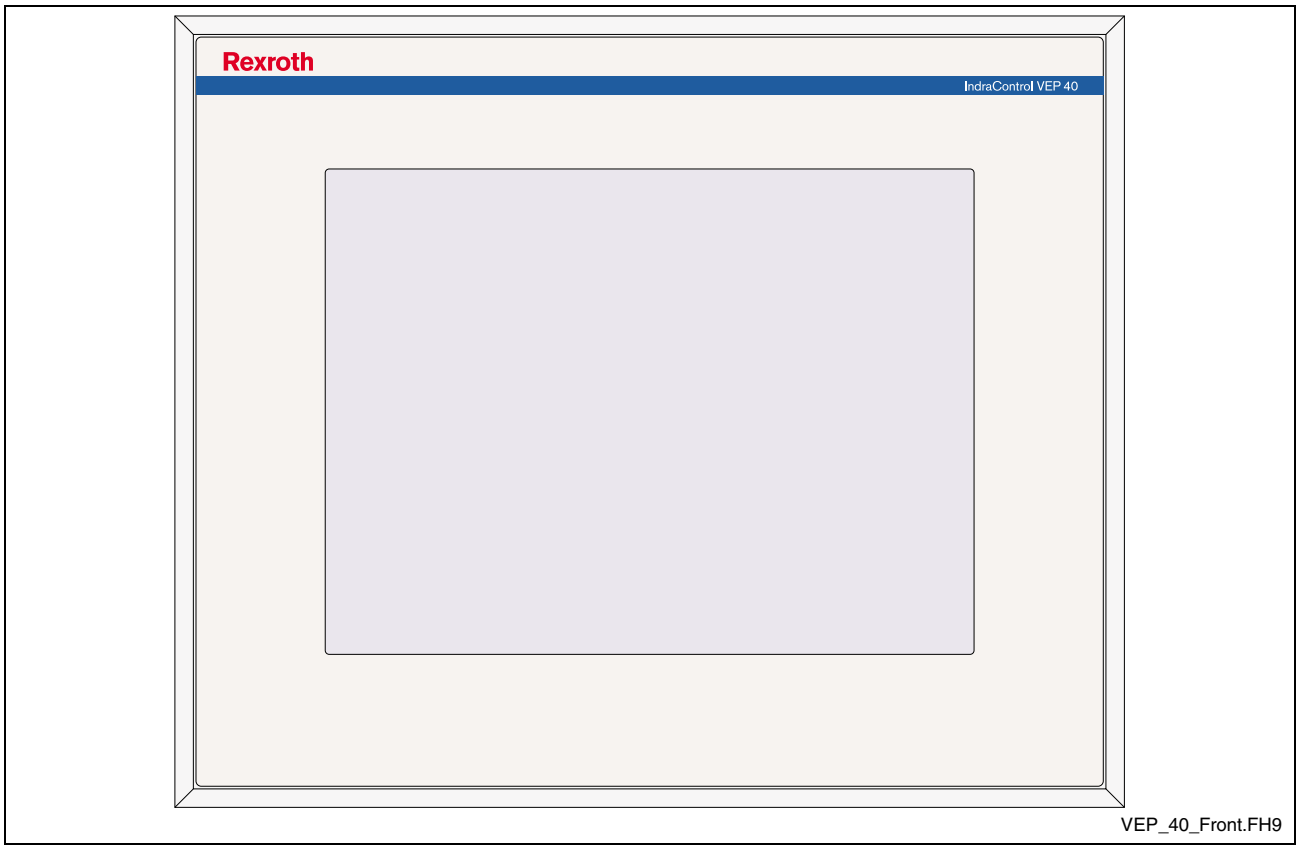


Fig. 1-7: VEP 40.1CE – Front panel

Front Panel of the IndraControl VEP 50.1

VEP 50.1CH with Touch Screen

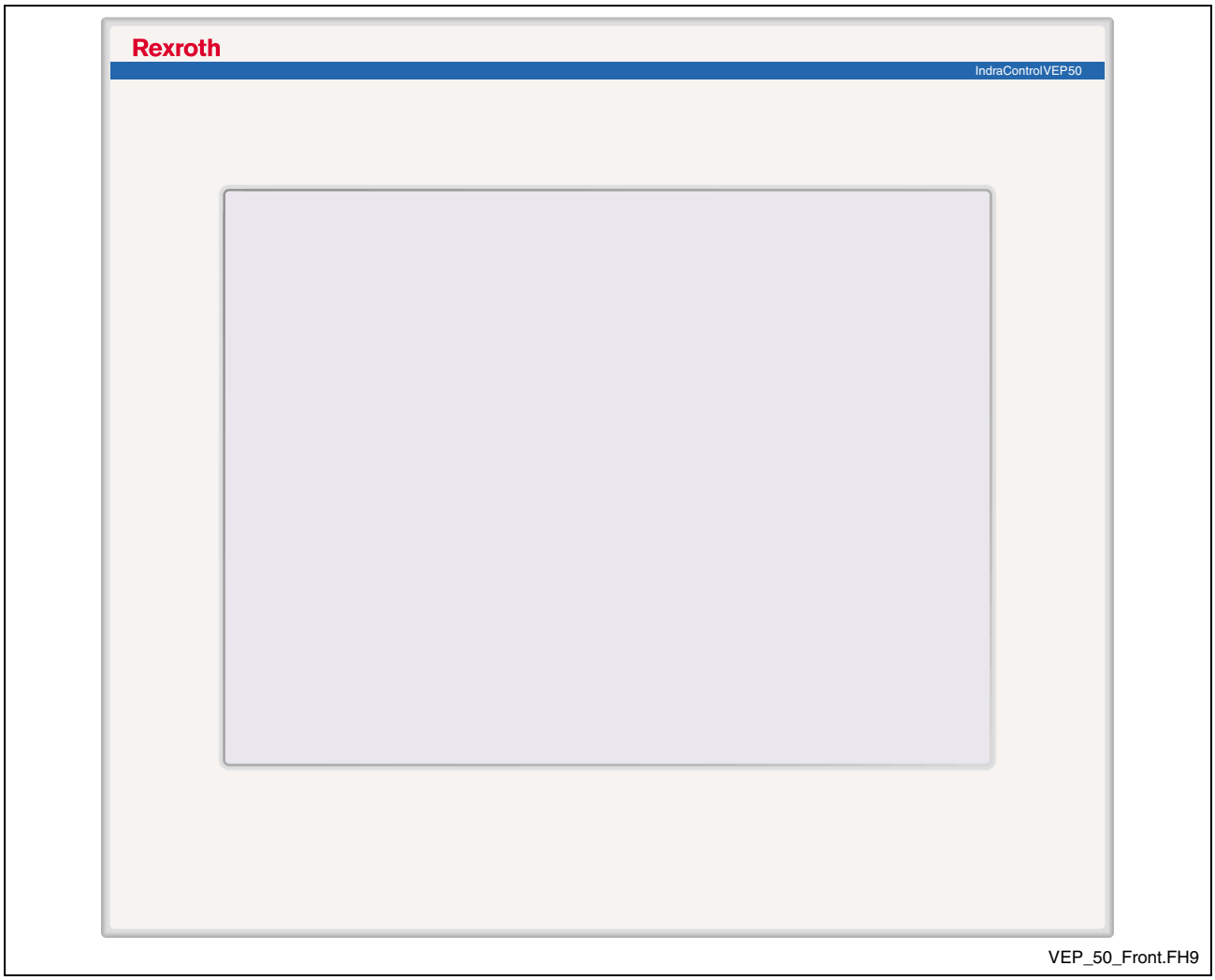


Fig. 1-8: VEP 50.1CH – Front panel

Front Panel of the IndraControl VEH 30.1

VEH 30.1 with Touch Screen and Keypad

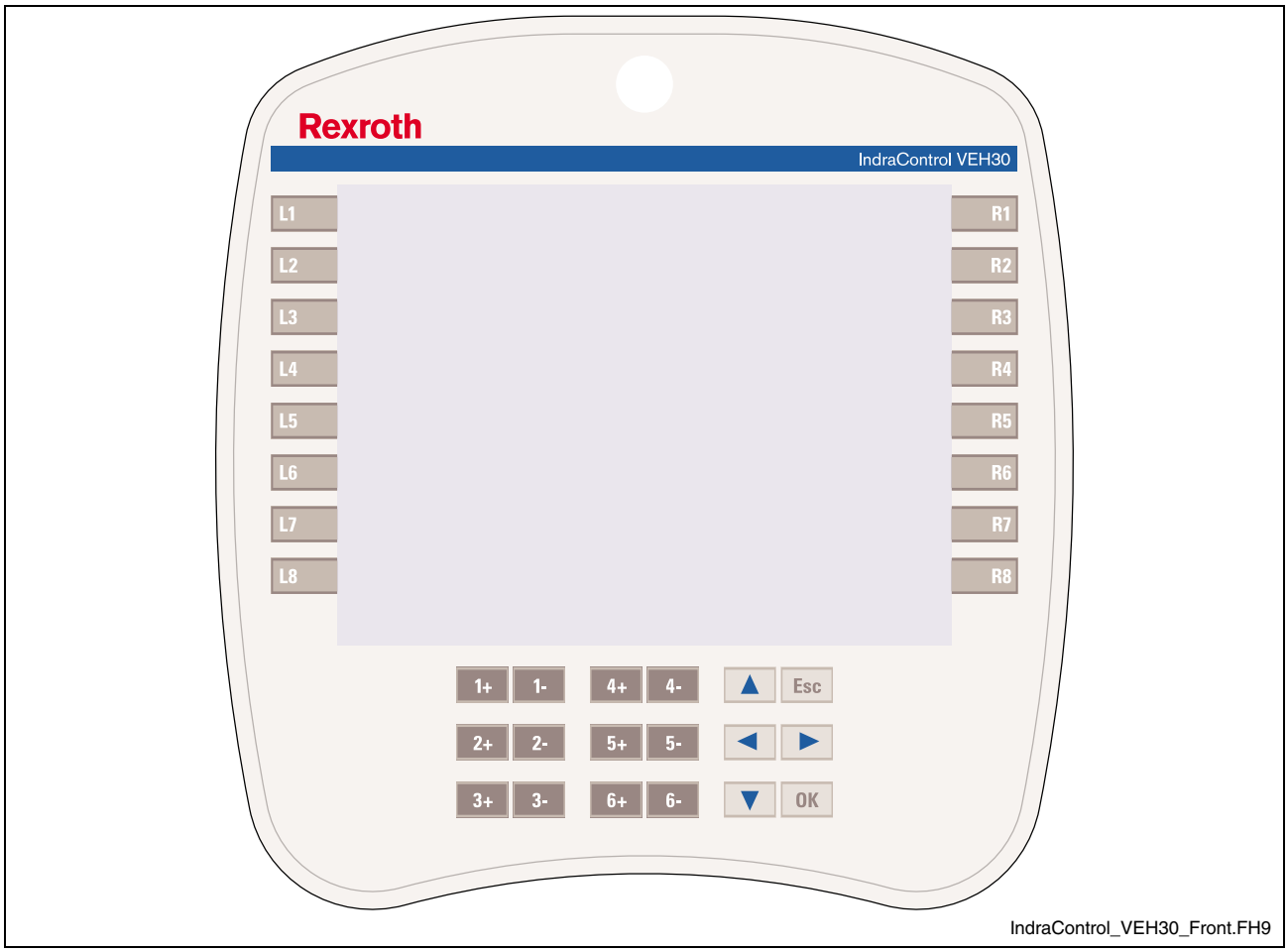
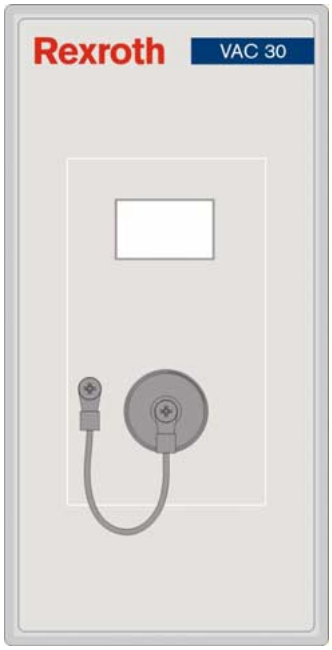


Fig. 1-9: VEH 30.1 – Front panel

IndraControl VAC 30.1 – Front View

VAC 30.1

The VAC 30.1 can be used to connect and wire the IndraControl VEH 30.1.



VAC30Front.FH9

Fig. 1-10: VAC 30.1 – Front view

1.2 Operating System

For license reasons IndraControl VEP/VEH-type devices are only delivered with already installed operating system. For further information on the operating system please refer to chapter "Software".

1.3 Commissioning

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

2 Important Directions for Use

2.1 Appropriate Use

Introduction

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

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

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

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

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

Areas of Use and Application

The embedded terminals IndraControl VEP /VEH are PC-based machine terminals, that can – depending on the application or configuration – also perform control functionalities.

Note: The embedded terminals IndraControl VEP / VEH 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 embedded terminals IndraControl VEP / VEH have been developed for use in control tasks.

Typical areas of application of the IndraControl VEP / VEH devices:

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

IndraControl VEP / VEH-type devices 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 embedded terminals IndraControl VEP / VEH 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 keypads may not be used, if

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

3 Safety Instructions for Electric Drives and Controls

3.1 Introduction

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

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

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

WARNING

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

3.2 Explanations

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

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

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

3.3 Hazards by Improper Use

DANGER

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

DANGER

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

WARNING

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

WARNING

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

CAUTION

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

CAUTION

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

CAUTION

Risk of injury due to incorrect handling of batteries!

3.4 General Information

- Bosch Rexroth AG is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before starting up the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.
- Only persons who are trained and qualified for the use and operation of the equipment may work on this equipment or within its proximity.
  - The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the equipment as well as an understanding of all warnings and precautionary measures noted in these instructions.
  - Furthermore, they must be trained, instructed and qualified to switch electrical circuits and equipment on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.
- Only use spare parts and accessories approved by the manufacturer.
- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The equipment is designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Use only safety features and applications that are clearly and explicitly approved in the Project Planning Manual.
  For example, the following areas of use are not permitted: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications sensitive to high frequency, mining, food processing, control of protection equipment (also in a machine).
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.
  The machine and installation manufacturer must
  - make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
  - make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.
- Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

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

3.5 Protection Against Contact with Electrical Parts

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

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

DANGER

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

⇒ Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain or repair this equipment.

⇒ Follow general construction and safety regulations when working on high voltage installations.

⇒ Before switching on power the ground wire must be permanently connected to all electrical units according to the connection diagram.

⇒ Do not operate electrical equipment at any time, even for brief measurements or tests, if the ground wire is not permanently connected to the points of the components provided for this purpose.

⇒ Before working with electrical parts with voltage higher than 50 V, the equipment must be disconnected from the mains voltage or power supply. Make sure the equipment cannot be switched on again unintended.

⇒ The following should be observed with electrical drive and filter components:

⇒ Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.

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

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

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

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

To be observed with electrical drive and filter components:

DANGER

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

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

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

⇒ Use a copper conductor with at least 10 mm² cross section over its entire course for this safety conductor connection!

⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. Otherwise, high voltages can occur on the housing that lead to electric shock.

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

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

WARNING

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

⇒ Only connect equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) to all terminals and clamps with voltages of 0 to 50 Volts.

⇒ Only electrical circuits may be connected which are safely isolated against high voltage circuits. Safe isolation is achieved, for example, with an isolating transformer, an opto-electronic coupler or when battery-operated.

3.7 Protection Against Dangerous Movements

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

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

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

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

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.

Notes

4 Technical Data

4.1 Front Panel

IndraControl VEP 30.1

	VEP 30.1CC
Display	8.4"-TFT, 800 x 600 pixels 262,144 colors
Operation	Touch screen
Surface – Front panel	Color: RAL 7035 light gray
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529

Fig. 4-1: Technical data, front panel of the IndraControl VEP 30.1

IndraControl VEP 40.1

	VEP 40.1CE
Display	12.1"-TFT, 800 x 600 pixels 262,144 colors
Operation	Touch screen
Surface – Front panel	Color: RAL 7035 light gray
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529

Fig. 4-2: Technical data, front panel of the IndraControl VEP 40.1

IndraControl VEP 50.1

	VEP 50.1CH
Display	15“-TFT, 1024x768 pixels 262,144 colors
Operation	Touch screen
Surface – Front panel	Color: RAL 7035 light gray
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529

Fig. 4-3: Technical data, front panel of the IndraControl VEP 50.1

IndraControl VEH 30.1

	VEH 30.1
Display	8.4"-TFT, 800 x 600 pixels 262,144 colors
Operation	Touch and key operation with 34 keys
Surface – Front panel	Color: RAL 7035 light gray
Degree of protection	Front panel IP 65 according to DIN 40 050, IEC 529

Fig. 4-4: Technical data, front panel of the IndraControl VEH 30.1

4.2 PC-Box of the IndraControl VEP Devices

PC box	
Processor	NS-Geode 300 MHz and integrated graphic controller with 4 MB shared memory
Main memory	64 MB / 128 MB
Compact Flash card (internal / external)	64 MB / 64 MB or 128 MB
Interfaces available in all variants	• 1 x external VGA connection (15-pin, HD-Sub) • 2 x USB connection (type A) • 2 x Ethernet connection (RJ 45, 10/100 Base-T) • 1 x keyboard/mouse connection (PS/2) • 1 x serial standard interface RS232 (9-pin, D-Sub)
Interfaces optional	Depending on the used PC104 cards
Slots	As an option 2 PC104 slots
Degree of protection	PC box IP 20
Power supply	24 VDC
Max. power consumption for maximum configuration	60 W

Fig. 4-5: Technical data: PC Box of the IndraControl VEP

4.3 IndraControl VEH

Processor	NS-Geode 300 MHz and integrated graphic controller with 4 MB shared memory
Main memory	128 MB
Compact Flash card	128 MB
Interfaces	• 1 x Ethernet connection (RJ 45, 10/100 Base-T)
Further connections	• STOP pushbutton • Enabling device
Degree of protection	IP 65
Power supply	24 VDC
Max. power consumption for maximum configuration	14 W

Fig. 4-6: Technical data: IndraControl VEH

4.4 Technical Data of the IndraControl VEP Power Supply Unit 24 V

Nominal input voltage:	24 VDC	
Input voltage range:	24 VDC (+19 V to +30 V)	
Noise and surge immunity:	Umax = 35 V (for t < 100 ms)	
Max. input current:	2.1 A	
Max. inrush current:	7 A / 6 ms	
Output voltages: +5 V +12 V	Current (max.) 5 A 1.8 A	Tolerance (incl. residual ripple) +/-3 % +/-4 %
Max. output power:	43 W	
Efficiency:	85%	

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

4.5 Technical Data of the IndraControl VEH Power Supply Unit 24 V

Nominal input voltage:	24 VDC	
Input voltage range:	24 VDC (+19 V to +30 V)	
Noise and surge immunity:	Umax = 35 V (for t < 100 ms)	
Max. input current:	0.7 A for nominal voltage 24 V	
Max. inrush current:	3 A for nominal voltage 24 V	
Output voltages: +5 V +12 V	Current (max.) 2.33 A 0.3 A	Tolerance (incl. residual ripple) +/-5 % +/-5 %
Max. output power:	13.5 W	
Efficiency:	80 %	

Fig. 4-8: Technical data of the IndraControl VEH power supply unit 24 V

4.6 Ambient Conditions

IndraControl VEP

	In operation	Storage/Transport
Max. surrounding air temperature	+5 ... +45 °C Under certain conditions it is necessary to use a fan available as accessories. These conditions are still to define.	-20 °C to +60 °C
Max. temperature gradient	Temporal temperature changes up to 3 °C per minute	Not defined
Relative humidity	Climatic class 3K3 according to EN 60721, condensation not allowed.	Climatic class 3K3 according to EN 60721, condensation not allowed.
Air pressure	Up to 2,000 m above MSL according to DIN 60204	
Mechanical strength	Max. vibration: Frequency range: 10...150 Hz Excursion: 0.075 mm at 10 ... 57 Hz Acceleration: 1 g at 57...150 Hz According to EN 60068-2-6	Max. shock: 15 g according to DIN IEC 68-2-27, no disturbance of the function

Fig. 4-9: IndraControl VEP: ambient conditions

IndraControl VEH

	In operation	Storage/Transport
Max. surrounding air temperature	+5... +40 °C	-20 °C to +60 °C
Max. temperature gradient	Temporal temperature changes up to 3 °C per minute	Not defined
Relative humidity	Climatic class 3K3 according to EN 60721, condensation not allowed.	Climatic class 3K3 according to EN 60721, condensation not allowed.
Air pressure	Up to 2,000 m above MSL according to DIN 60204	
Mechanical strength	Max. vibration: Frequency range: 10...150 Hz Excursion: 3.5 mm at 5...9 Hz Acceleration: 1 g at 57...150 Hz According to EN 60068-2-6	Max. shock: 15 g peak value, 11 ms duration according to DIN EN 60068-2-27 3 shocks in each of the three axes arranged horizontally to each other, in both directions (a total of 18 shocks)

Fig. 4-10: IndraControl VEH 30.1: ambient conditions

4.7 Weights

VEP 30	Approx. 2.2 kg
VEP 40	Approx. 3.8 kg
VEP 50	Approx. 4.5 kg
VEH 30	Approx. 2.6 kg

Fig. 4-11: IndraControl VEP / VEH: weights

4.8 Used Standards

The system components of the embedded terminals IndraControl VEP / VEH correspond to the following standards:

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

Fig. 4-12: Used standards

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

UL/CSA Certification

The devices of the IndraControl VEP / VEH family are basically certificated according to

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

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

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

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

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

4.9 Wear Parts

Wear parts without warranty

- The service life of the backlight is limited to a certain number of operating hours. After this time the backlight will produce only 50 % of its original brightness. This time differs for the used displays:

  Manufacturer's specifications for the service life of the displays:

  8.4" (VEP + VEH): Typ. 20,000 hours

  - 12.1" (only VEP) : Typ. 40,000 hours
  - 15": (only VEP) Typ. 30,000 hours
- CMOS battery: at least 5 years (VEP only). To exchange this battery, please contact the Bosch Rexroth Service.
- Capacitor pack of the short-time UPS (only VEP): The number of charging cycles of the capacitor pack and thus, its service life is dependent on the surrounding air temperature, in which the capacitor pack is used. Surrounding air temperature is defined as the temperature, in which the embedded terminal or the capacitor pack is situated, e.g. the internal temperature of the control cabinet or in a operator panel housing.

Surrounding air temperature	Service life	Maintenance interval
45 °C	48.000 h	5 years at continuous operation

Fig. 4-13: Capacitor pack

If you don't exactly know the conditions, Bosch Rexroth recommends to exchange the capacitor pack every 5 years.

4.10 Compatibility Test

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

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

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

5 Dimensions

5.1 Housing Dimensions

Housing Dimensions of the IndraControl VEP 30.1CC

The front panel width of the VEP 30.1CC is 296 mm and the height is 200 mm.

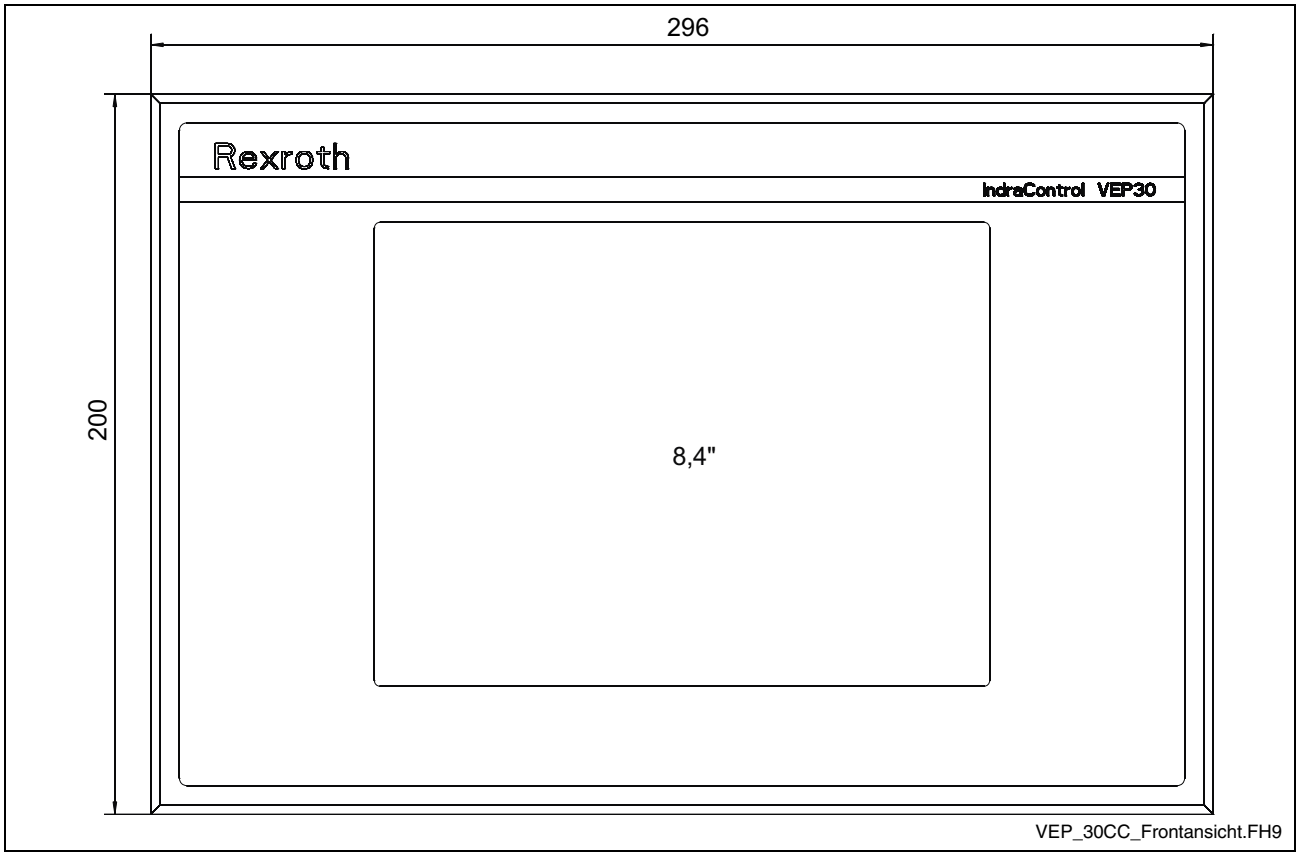


Fig. 5-1: VEP 30.1CC – Front panel

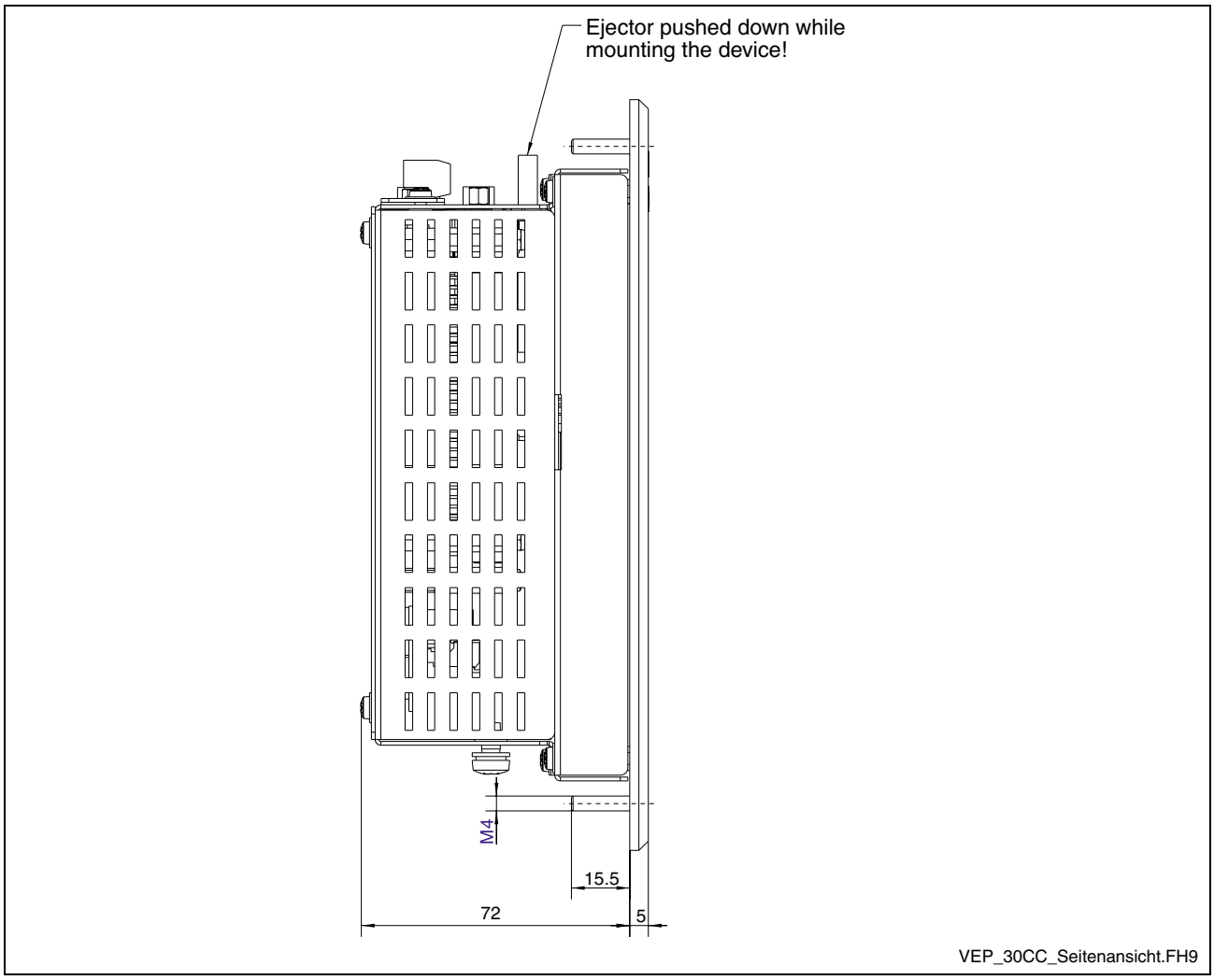


Fig. 5-2: VEP 30.1CC – Side view

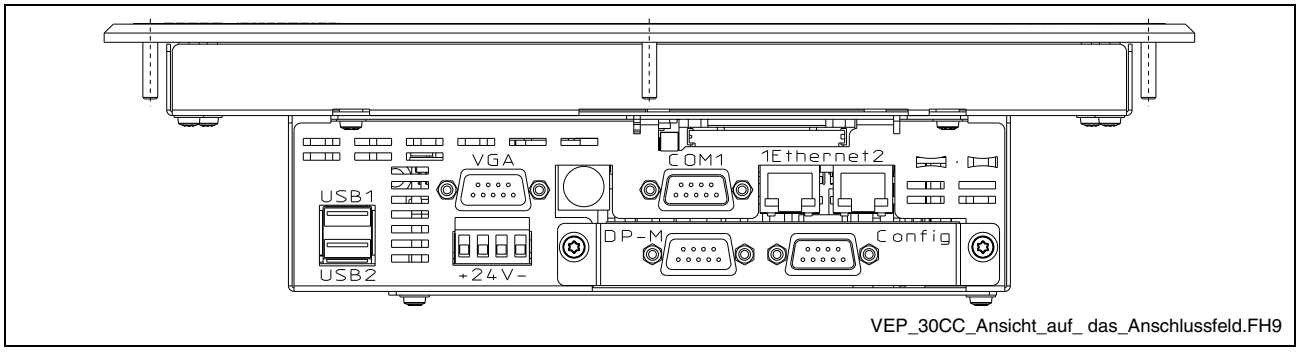


Fig. 5-3: VEP 30.1CC – Top view

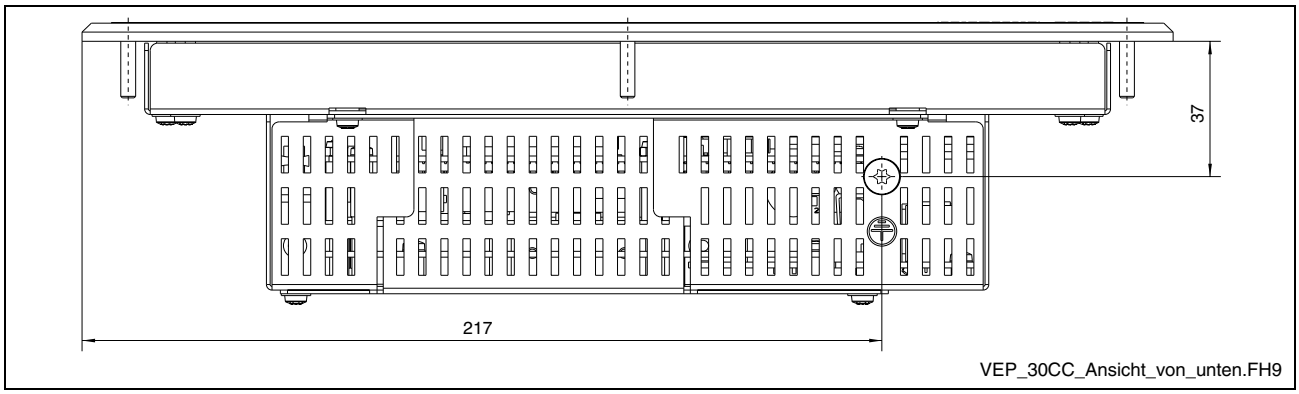


Fig. 5-4: VEP 30.1CC – Bottom view

Housing Dimensions of the IndraControl VEH 30.1

The width of the VEP 30.1 is 270 mm and the height is 290.54 mm.

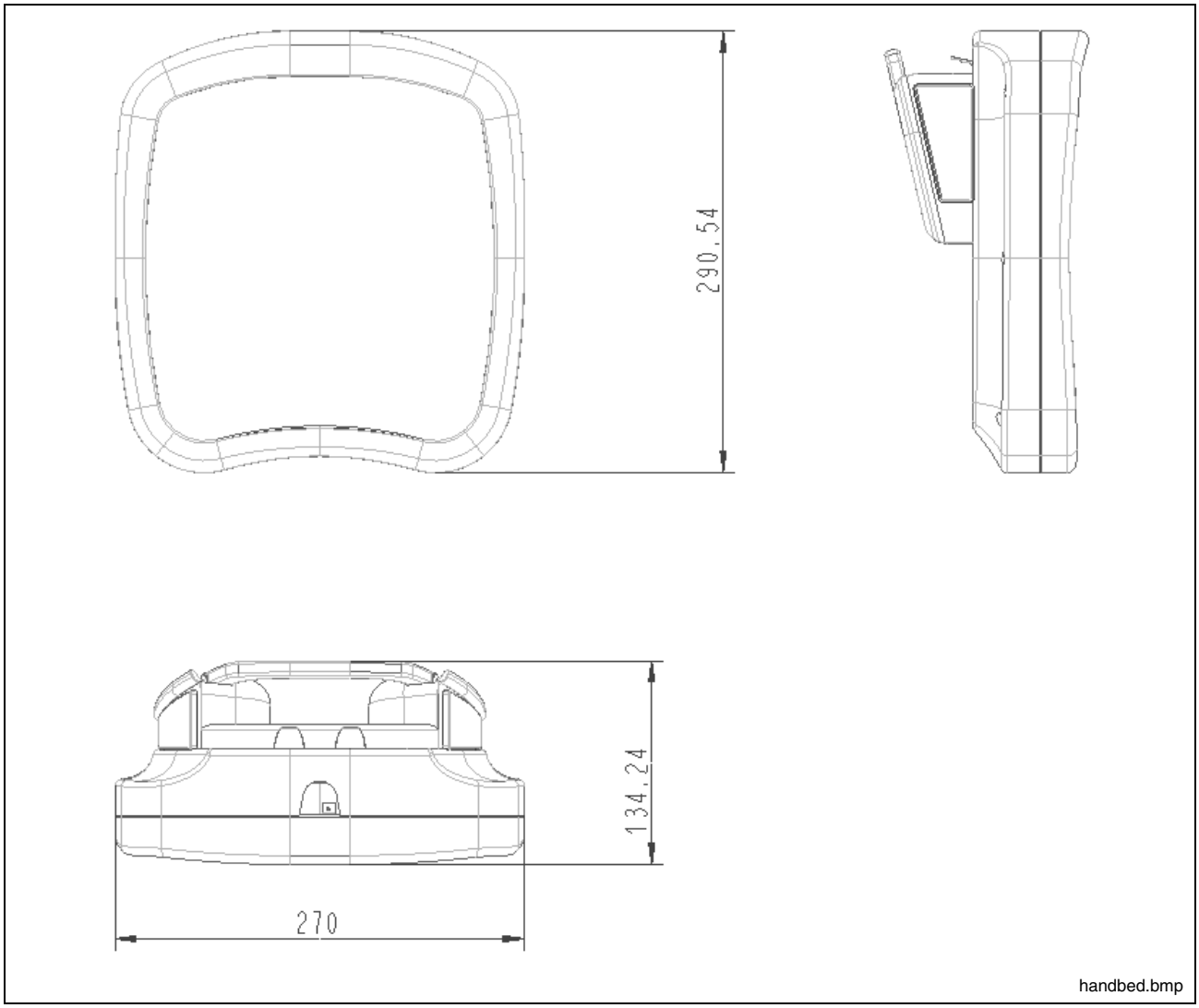


Fig. 5-5: VEH 30.1 – Front view

Housing and Mounting Dimensions of the IndraControl VAC 30.1

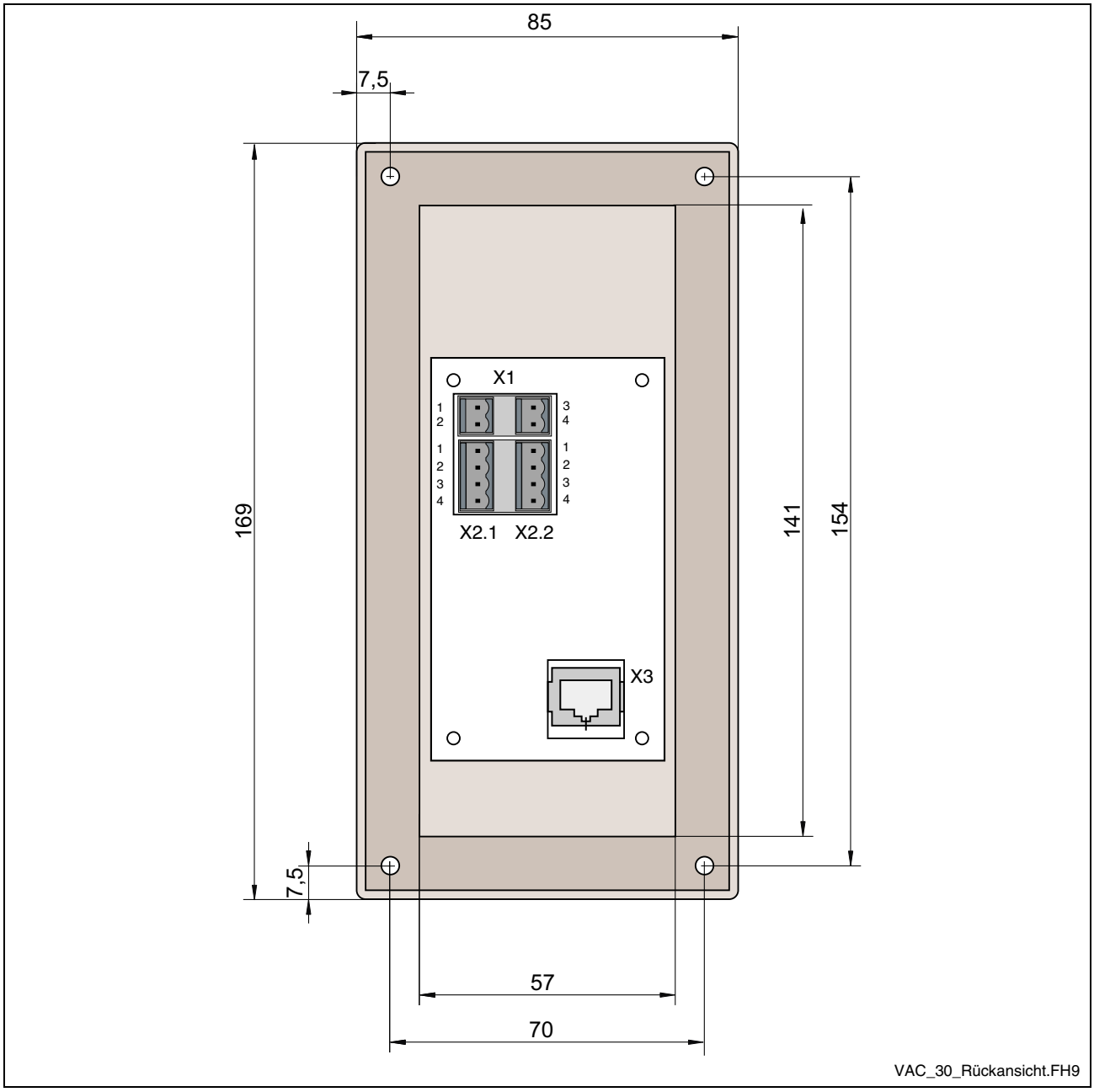


Fig. 5-6: Housing and mounting dimensions: IndraControl VAC 30.1

Dimensions of the Wall Holder for VEH 30.1 Devices

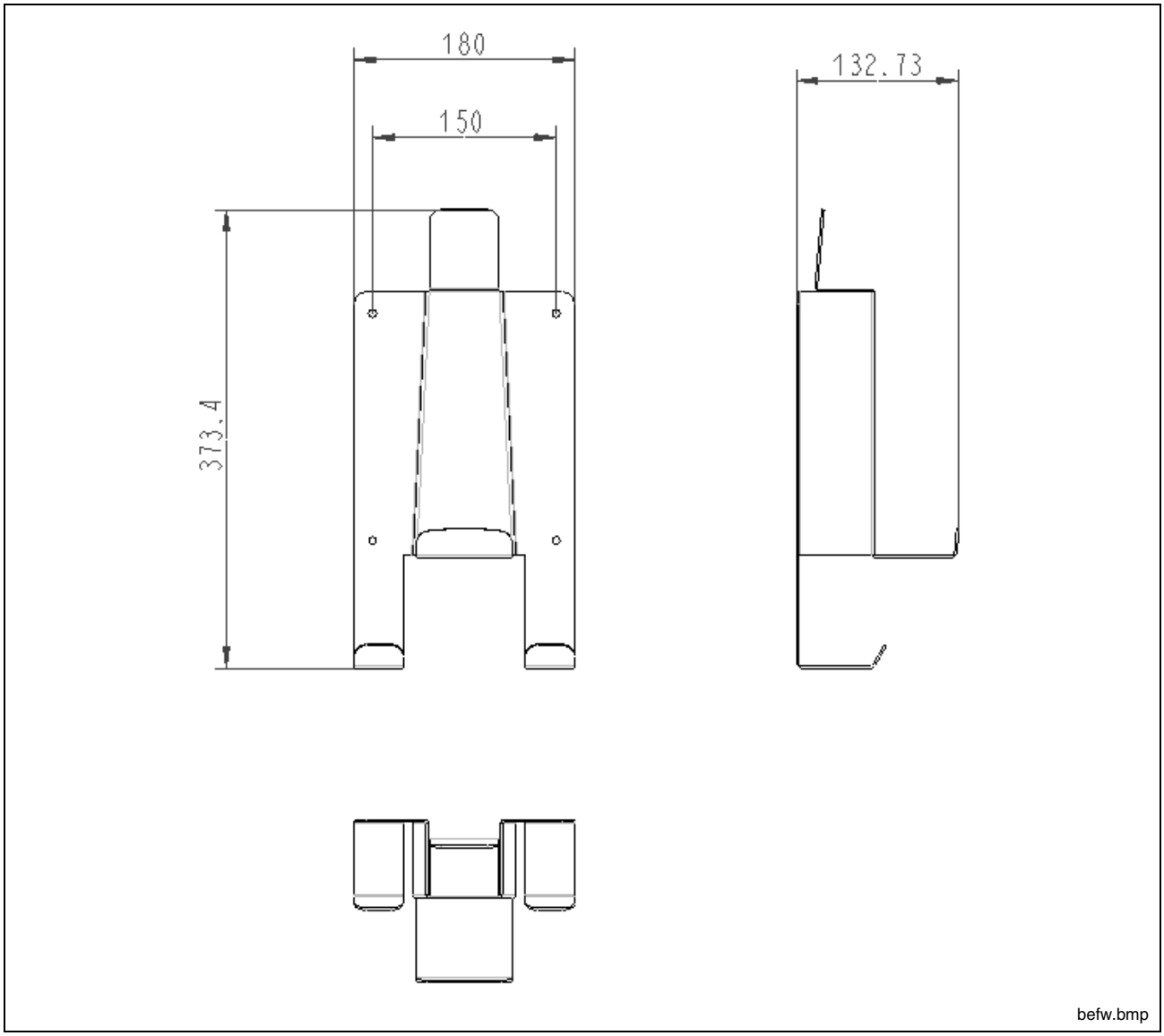


Fig. 5-7: Dimensions of the wall holder for VEH 30.1 devices

Housing Dimensions of the IndraControl VEP 40.1CE

The front panel width of the VEP 40.1CE is 350 mm and the height is 290 mm.

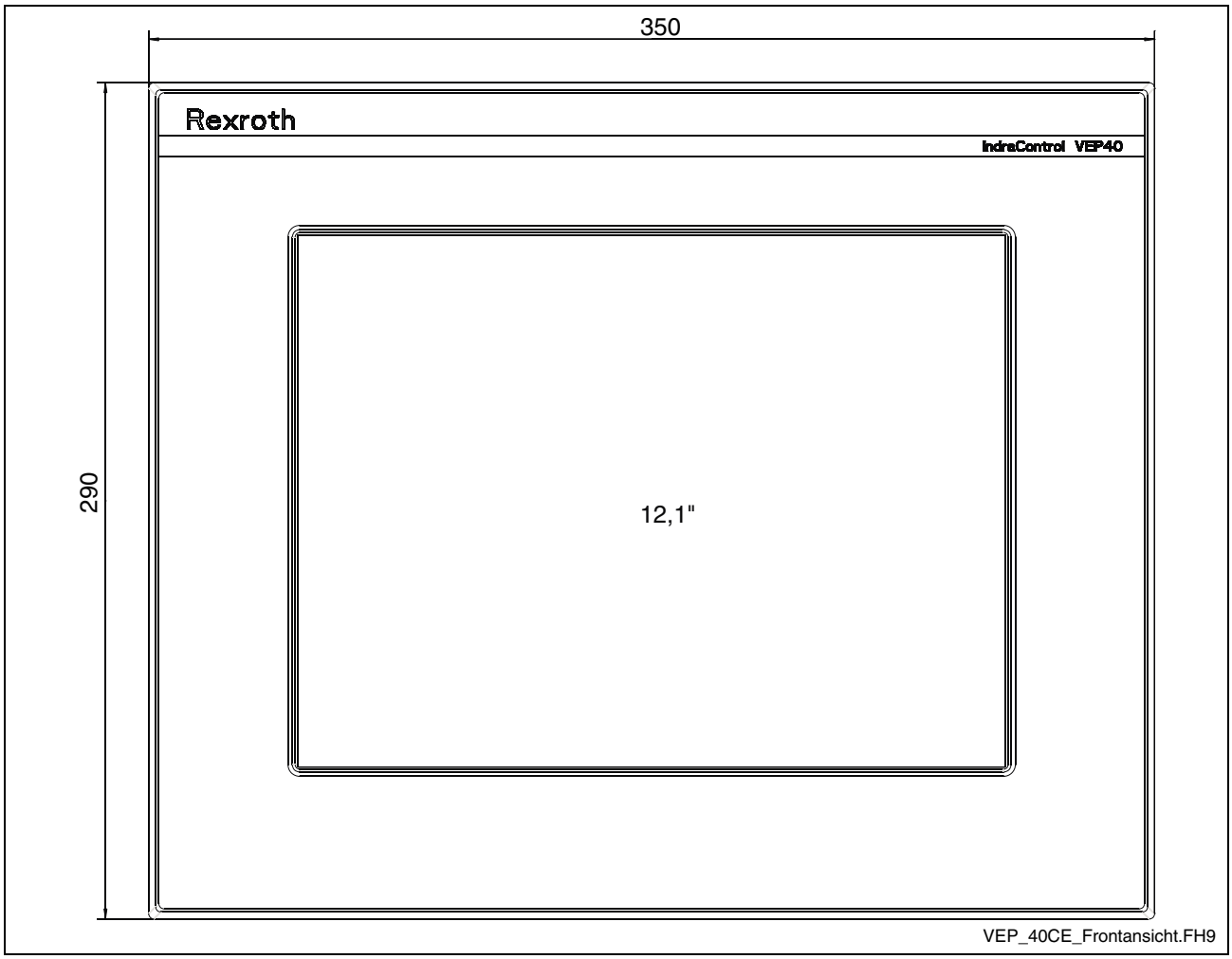


Fig. 5-8: VEP 40.1CE – Front panel

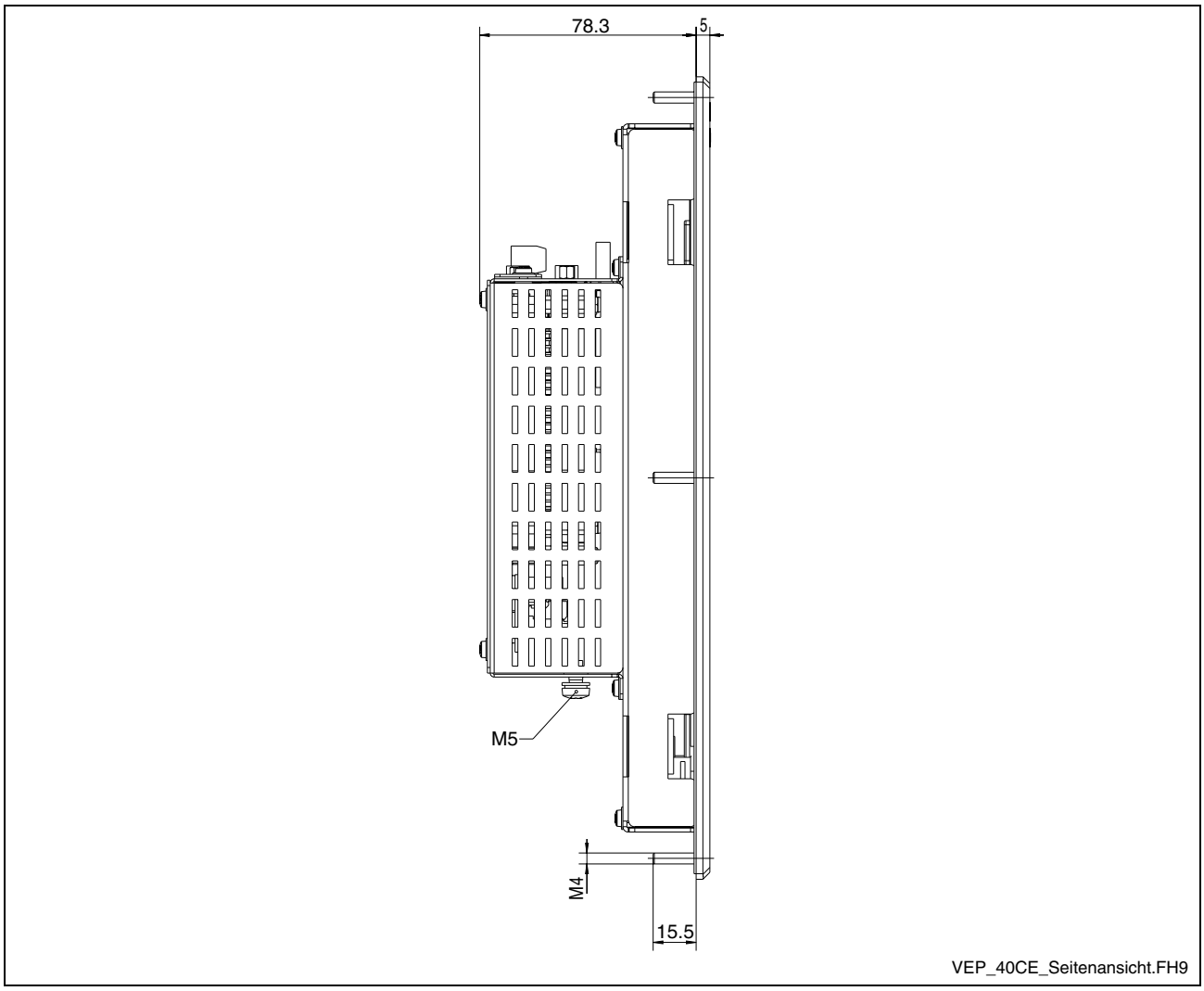


Fig. 5-9: VEP 40.1CE – Side view

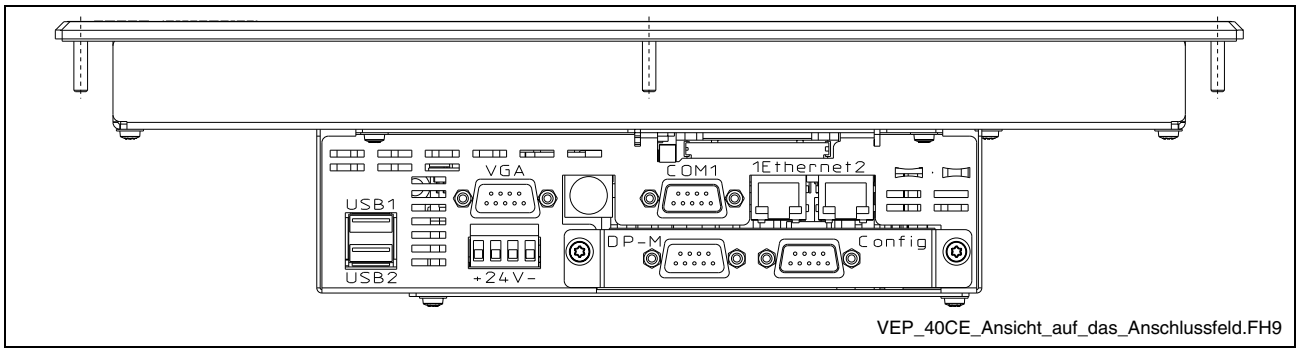


Fig. 5-10: VEP 40.1CE – Top view

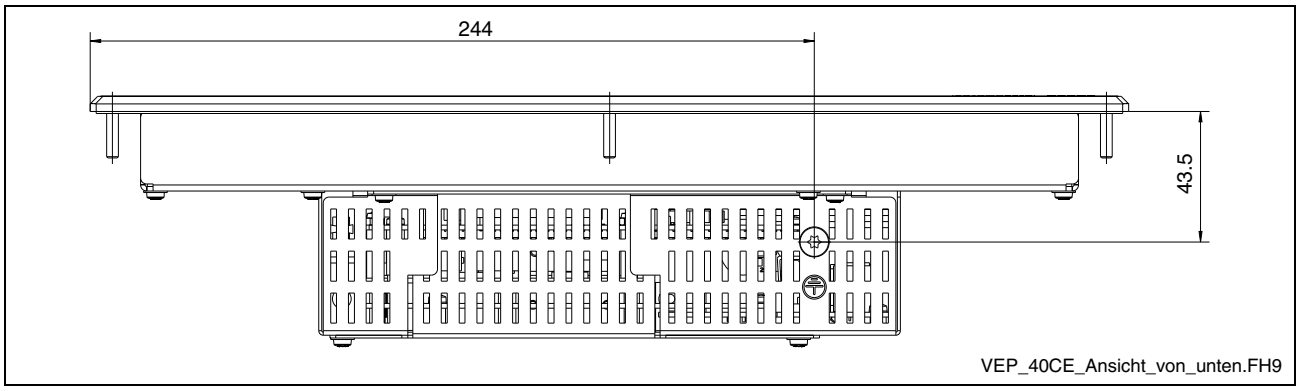


Fig. 5-11: VEP 40.1CE – Bottom view

Housing Dimensions of the IndraControl VEP 50.1CH

The front panel width of the VEP 50.1CH is 407 mm and the height is 370 mm.

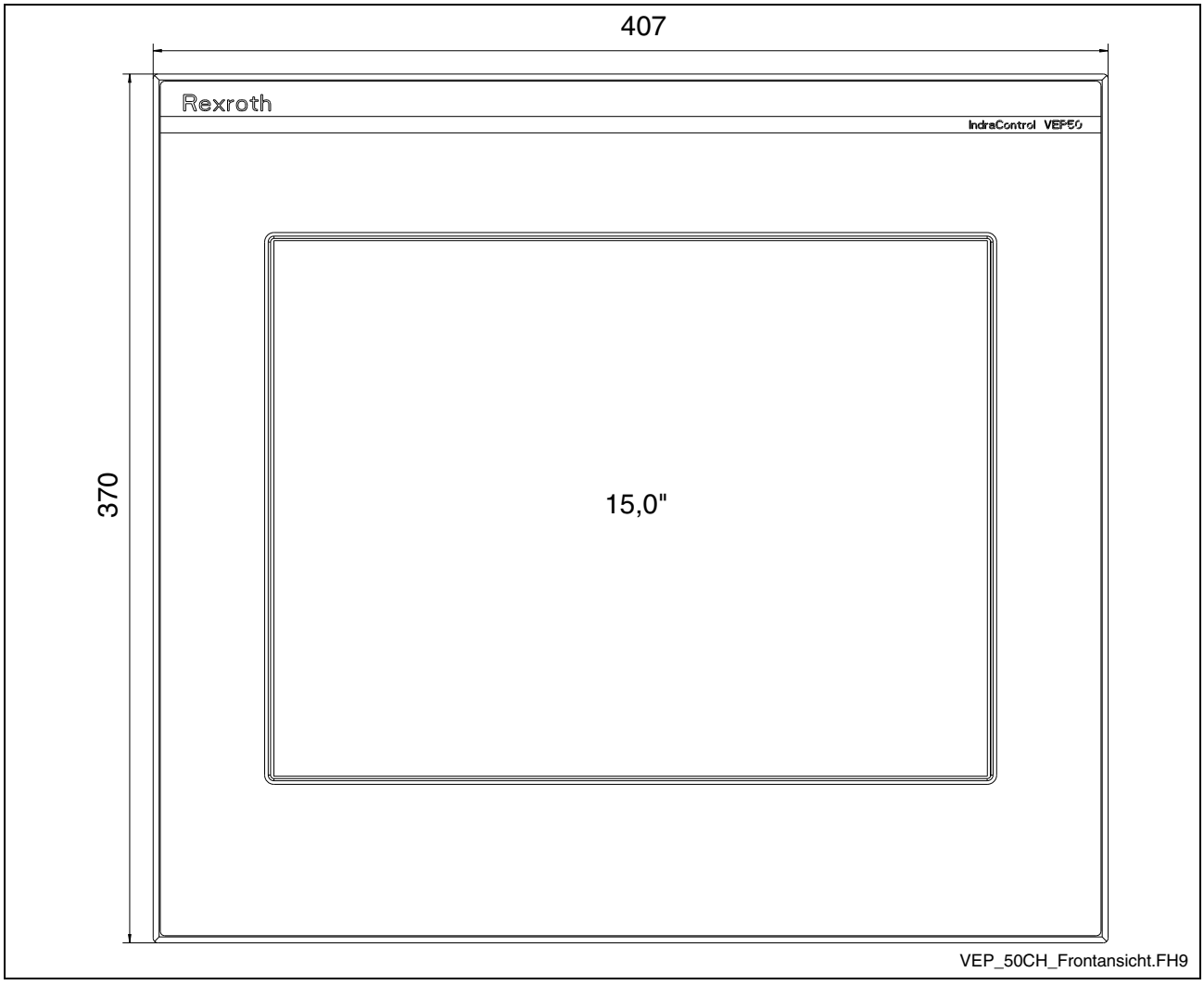


Fig. 5-12: VEP 50.1CH - Front panel

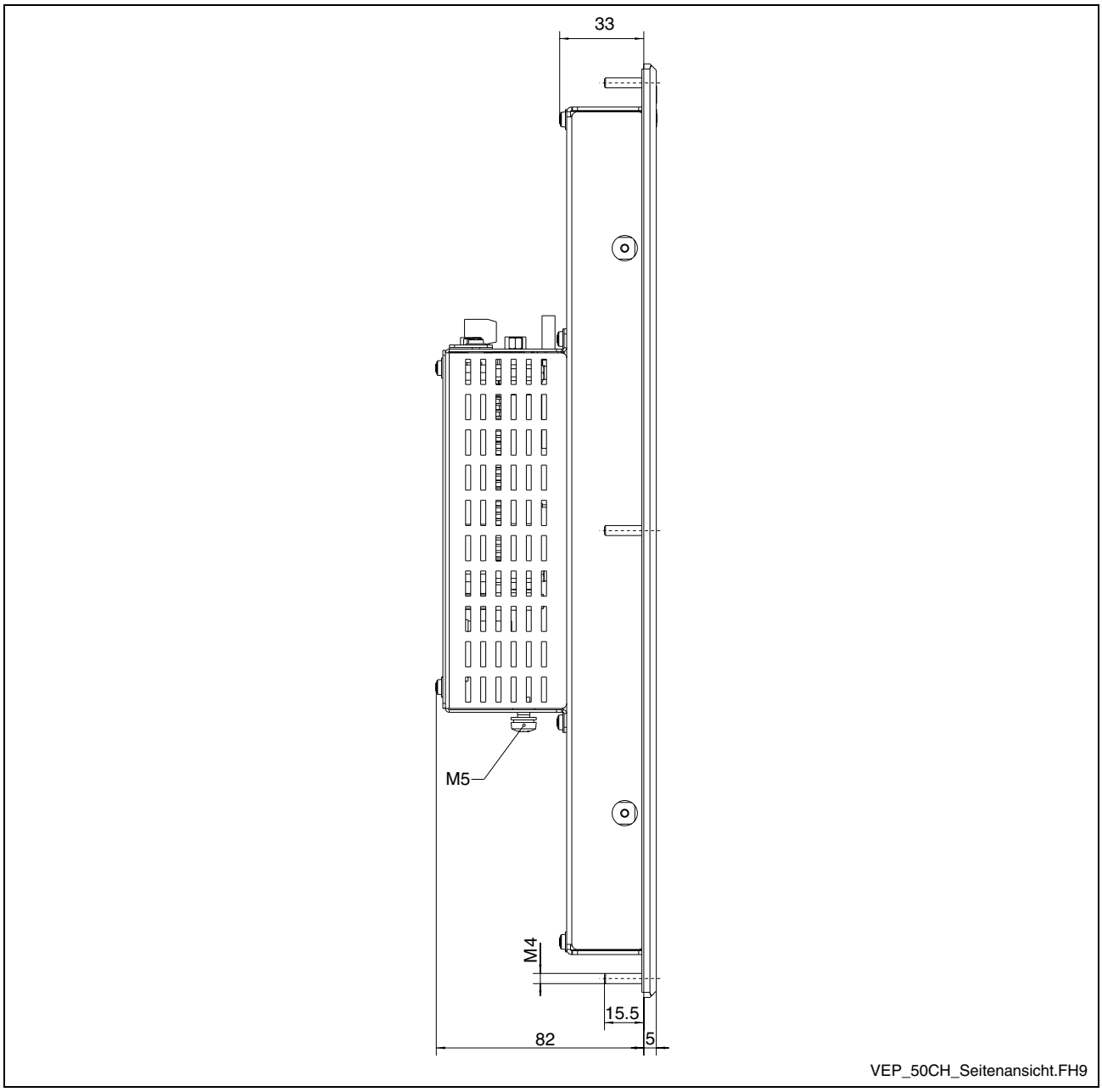


Fig. 5-13: VEP 50.1CH – Side view

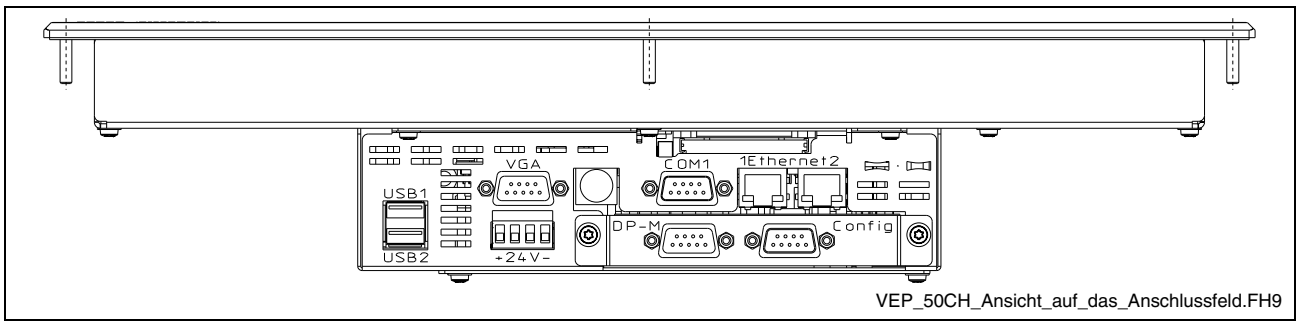


Fig. 5-14: VEP 50.1CH – Top view

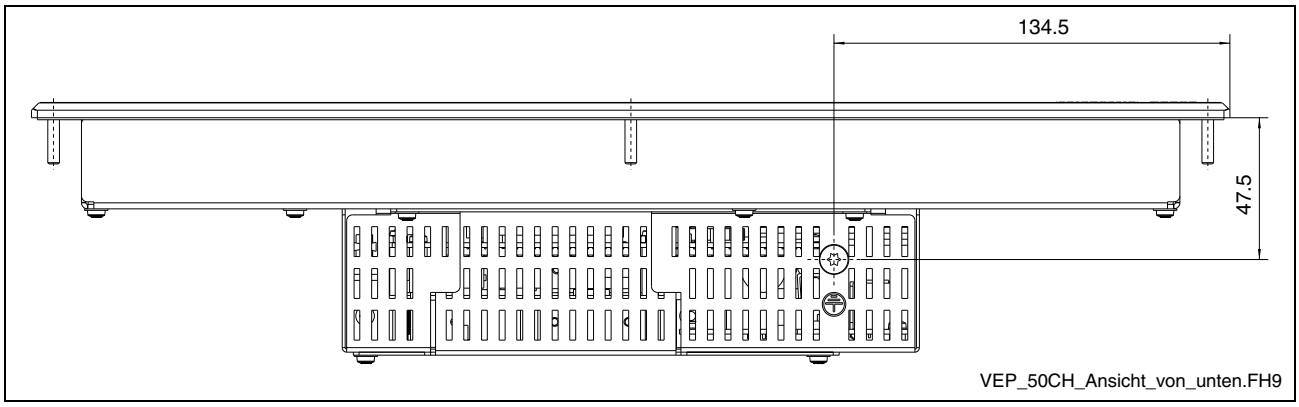


Fig. 5-15: VEP 50.1CH – Bottom view

Installation of a Second PC104 Card

Optionally, a second PC104 card can be equipped for future extensions. For this, a different housing cover is required increasing the installation depth by 11 mm.

Note: It is only allowed to use plug-in cards released by Bosch Rexroth.

5.2 Installation

Installation Notes

- When installing the embedded terminal observe to ensure an ergonomic operation. Additionally, ensure that all moving machine components are in sight of the operator.
- Avoid installation locations exposed to direct sunlight, as the screen readability is reduced and additional heat development can occur.
- Install the embedded terminal in a manner ensuring easy access to the connector panel (top side).
- Provide a sufficient minimum clearance of 50 mm for cooling and cable routing around the device.
- Lay all connecting cables in loops and use strain reliefs for all cables.
- Keep a suitably large distance from sources of interference.

Mounting Cut-Out

For mounting the embedded terminal proceed as follows:

1. Create a mounting cut-out with the corresponding number of holes, diameter 5 mm, according to the illustrations "Mounting dimensions" on the following page.
2. Insert the embedded terminal from the front into the cut-out. Then 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.

Mounting Dimensions of the IndraControl VEP 30.1CC

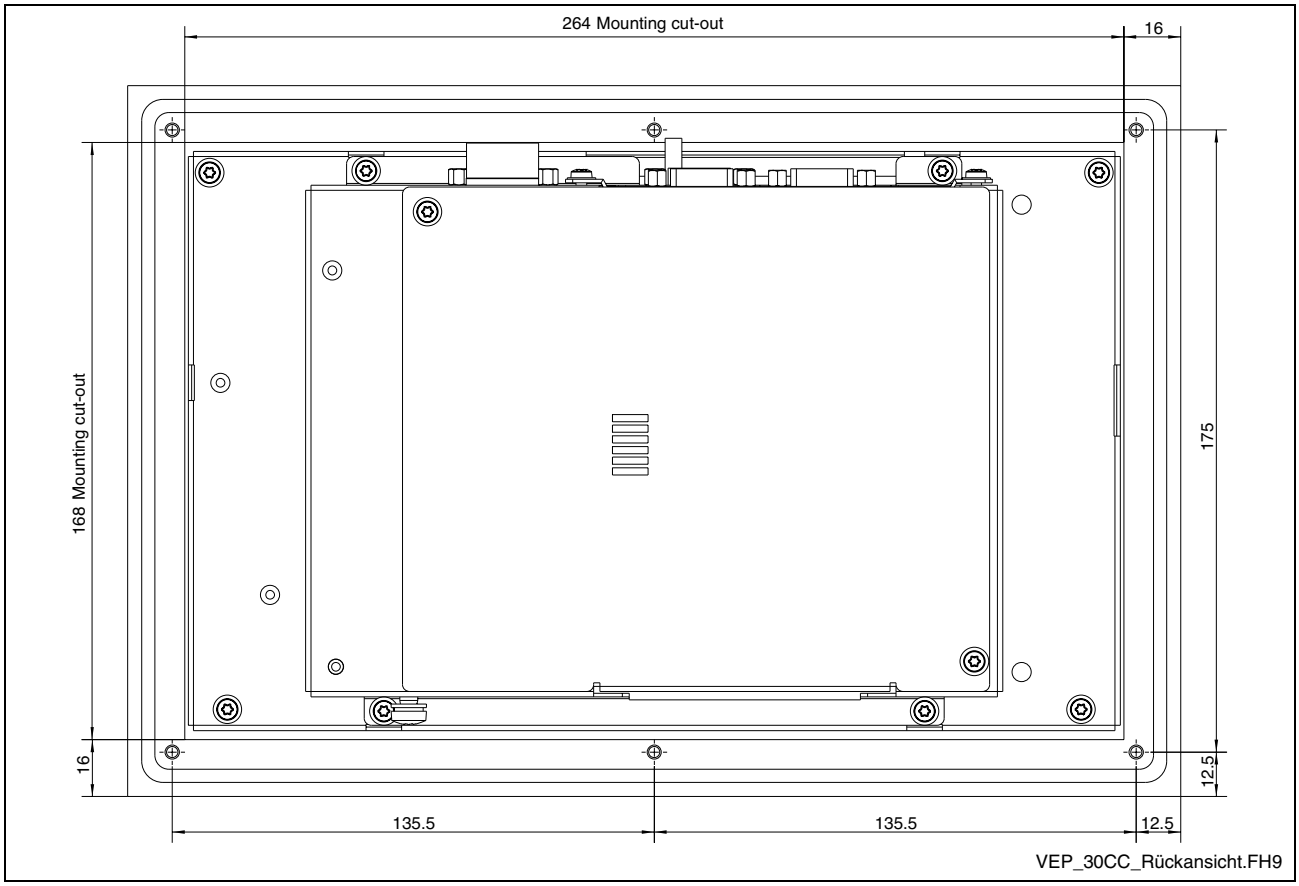


Fig. 5-16: Mounting dimensions of the IndraControl VEP 30.1CC

Mounting Dimensions of the IndraControl VEP 40.1CE

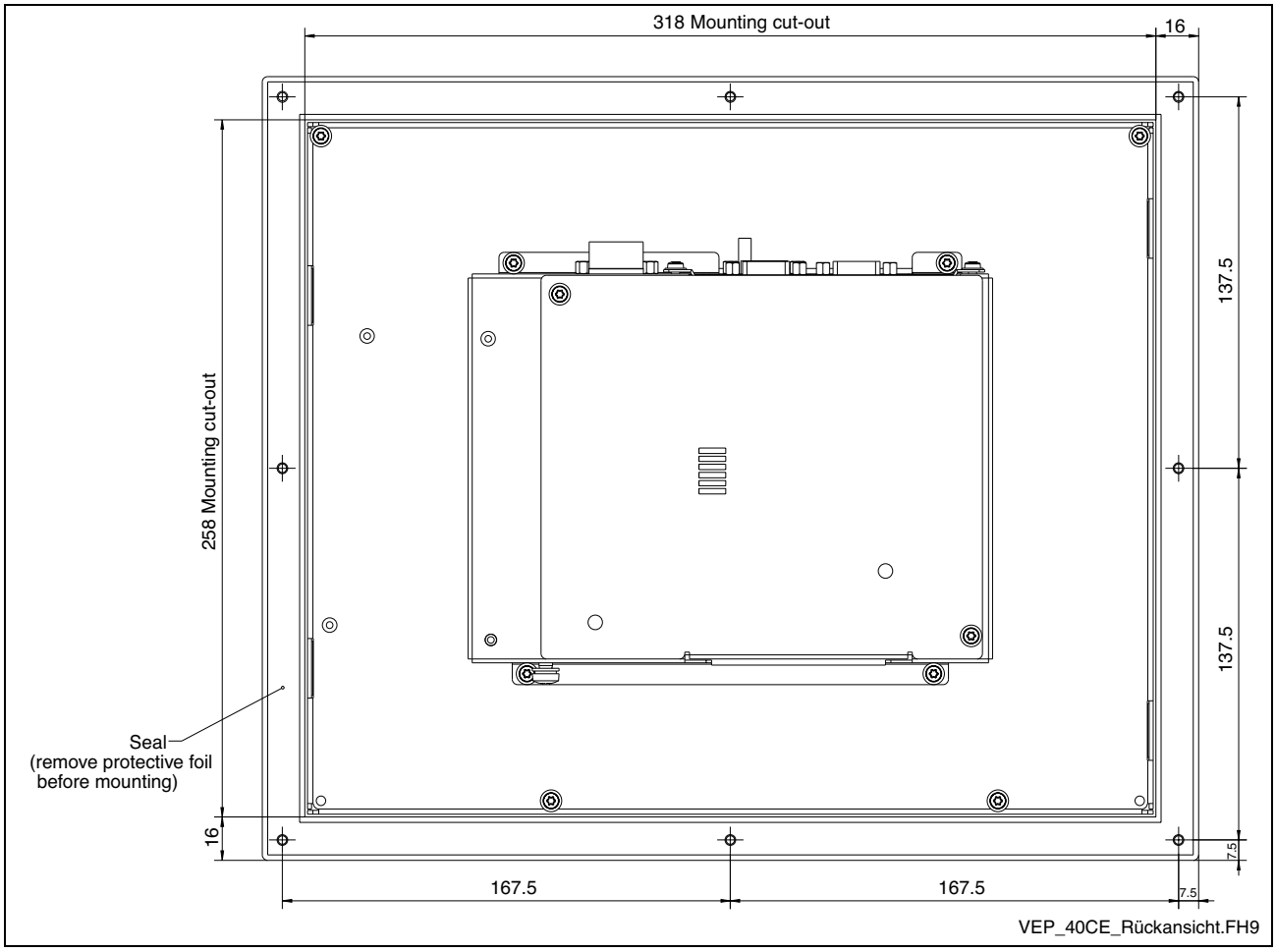


Fig. 5-17: Mounting dimensions of the IndraControl VEP 40.1CE

Mounting Dimensions of the IndraControl VEP 50.1CH

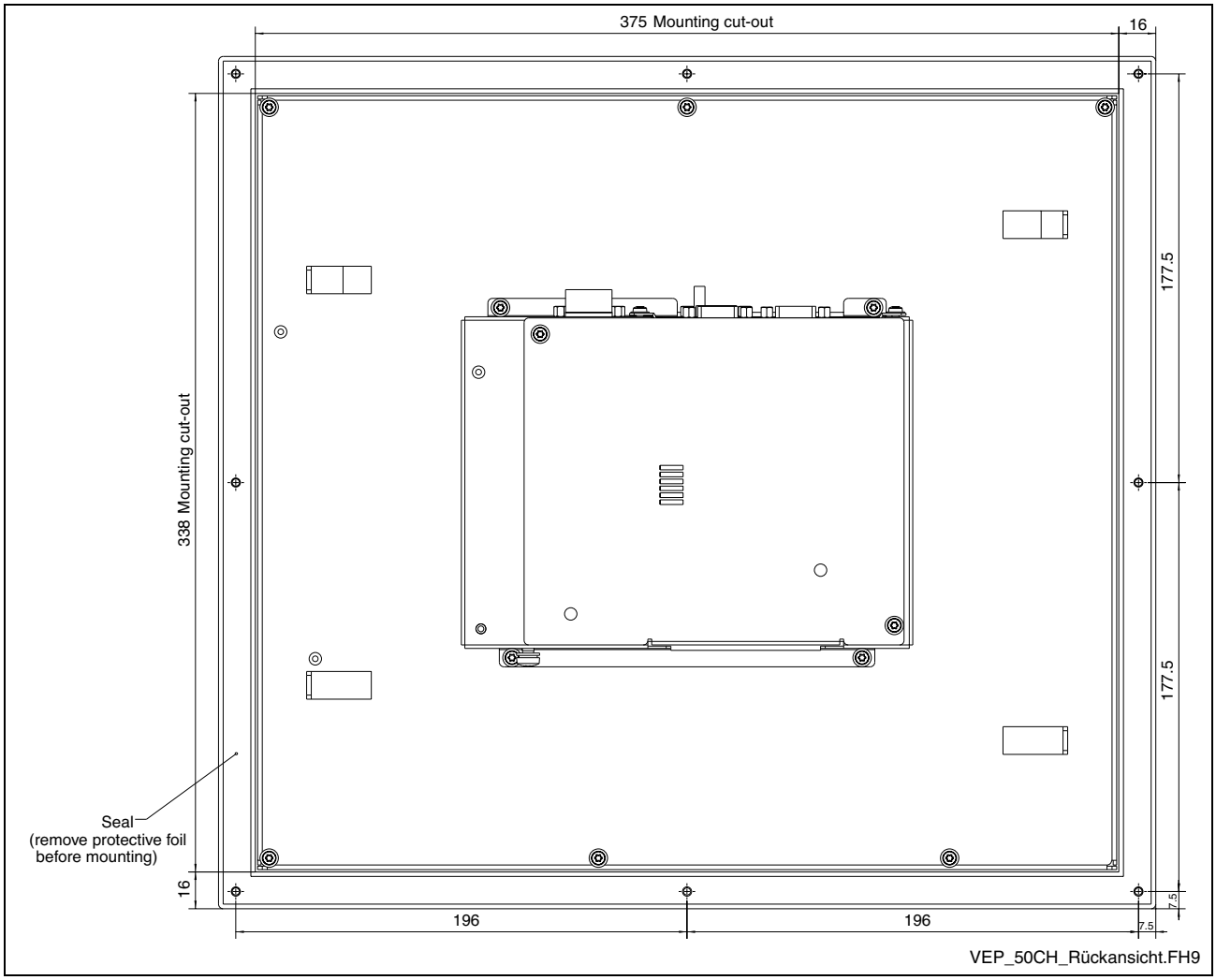


Fig. 5-18: Mounting dimensions of the IndraControl VEP 50.1CH

6 Display and Operating Components

6.1 Backlight Switch-Off

The backlight as background lighting of the display has a limited lifetime (see section 4.9, "Wear Parts").

To extend the service life of the LCD backlight, the flat screen display features a backlight dimming. This function "darkens" the display to half of its original brightness, if no operation of the embedded terminal has occurred for a certain period of time.

The length of the time interval can be set under Windows CE in the "Display Properties". You can call up the "Display properties" either by clicking with the right mouse button on the desktop or via Start – Settings – Control Panel – Display.

The default value is 5 minutes. Avoid longer waiting times than 5 minutes to ensure a longer service life of the backlight.

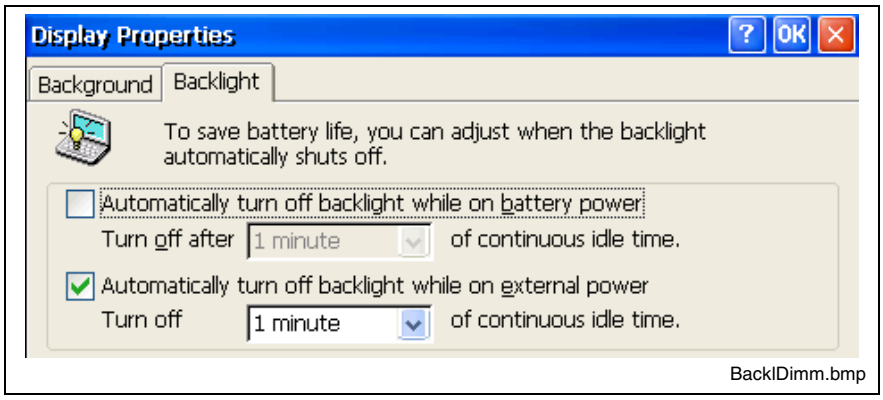


Fig. 6-1: Graphics properties – Backlight dimming

6.2 Operating Components of the IndraControl VEH 30.1

The VEH 30.1 provides a keypad with 34 keys.

Keypad

Position of the Keys

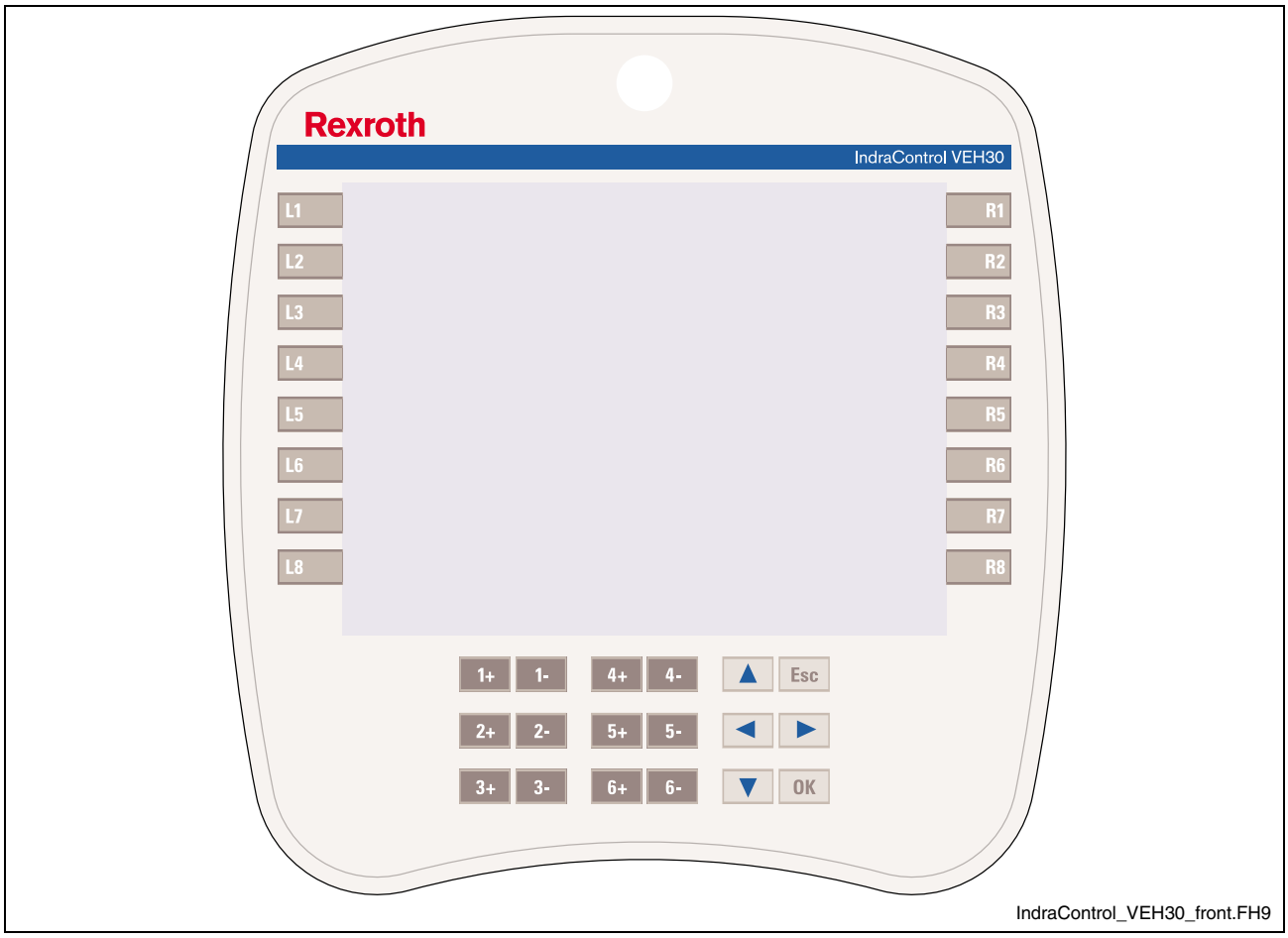


Fig. 6-2: Position of the keys

Operation keys L1-L8 and R1-R8

The assignment of the function and operating keys is fixed. The evaluation is specified by the respective application software.

Jog keys 1+ to 6+ and 1- to 6-

Key strokes of this keys are directly transmitted to the control.

Navigation keys

The navigation keys include the cursor keys as well as the ESC and the OK key.

Safety Operating Components

Enabling Device

The IndraControl VEH 30 provides a 2-circuit, 3-stage enabling device. The enabling can occur by the right or the left hand. The switching contacts are directly guided outwards via the connecting cables and can be contacted via the VAC 30. The position of the enabling devices is transmitted to the application software by an additional signal request.

STOP Pushbutton

A second safety operating component of the IndraControl VEH 30 is a 2-circuit STOP pushbutton. The switching contacts are also directly guided outwards via the connecting cables and can be contacted via the VAC 30.

Accessories

Additional Components

The following additional components are available:

Left side	Right side
Key switch or override switch	Handwheel

Fig. 6-3: Additional components of the VEH 30.1

Wall Holder

To mount the VEH 30 at the machine a wall holder is available.

6.3 Touch Screen

All variants are provided with a touch screen, that allows the operation of the application software via the touch-sensitive surface of the displays.

A short touch of the touch screen is taken as "left mouse click". To carry out a "right mouse click", the touch screen must be touched at the corresponding position for approx. 2 seconds.

7 Pin Assignments of the IndraControl VEP

7.1 Connector Panel without Special Interfaces

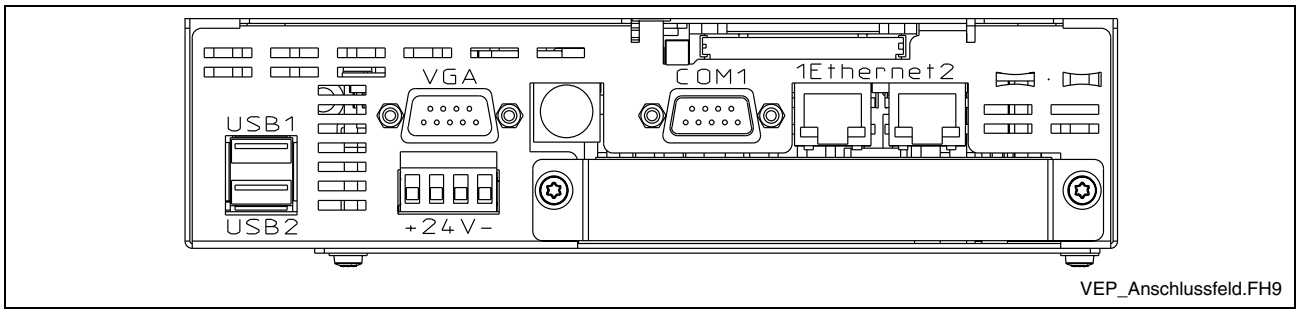


Fig. 7-1: Connector panel without special interfaces

7.2 Connector Panel with PROFIBUS DP Master

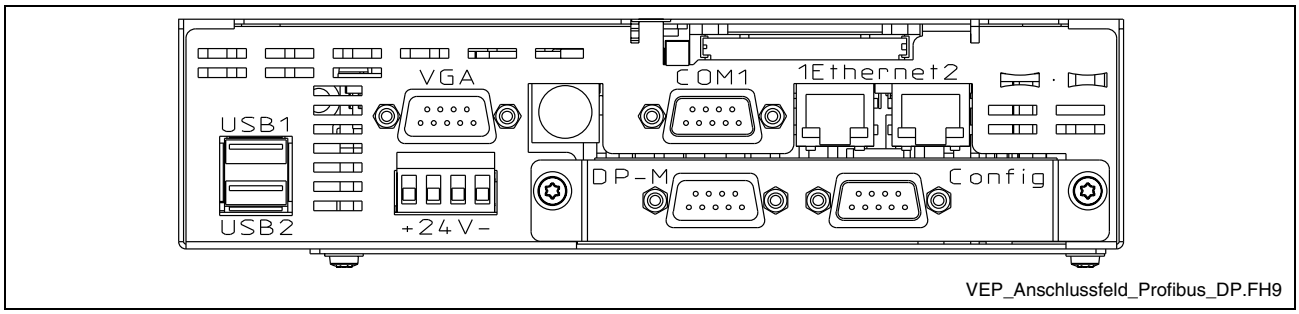


Fig. 7-2: Connector panel with PROFIBUS DP master

7.3 Connector Panel with PROFIBUS DP Master and Exemplarily Second PC104 Plug-In Card

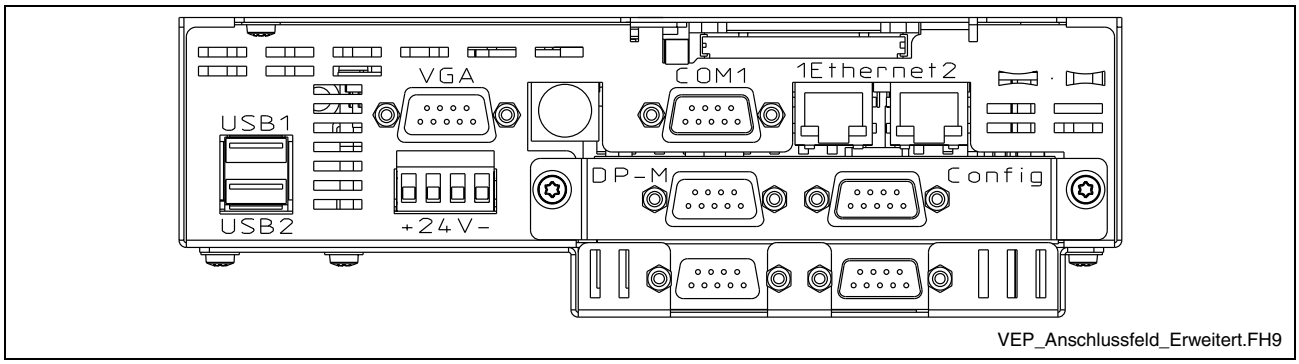


Fig. 7-3: Connector panel with PROFIBUS DP master and exemplarily second PC104 plug-in card

7.4 Interfaces of the IndraControl VEP

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

CAUTION

Malfunctions caused by insufficient shielding!

⇒ Use only shielded cables and metallic/conductive connector or coupling covers with large-area screen contact.

Overview

Des. on the housing	Type of connection	Type of connector (integrated)	Mating connector or cable (from outside)
-	PS/2 Keyboard/Mouse	Mini-DIN PS/2 female connector, 6-pin	Mini-DIN PS/2 male connector, 6-pin
Ethernet1 Ethernet2	Network connection: Ethernet 10Base T / 100Base X	RJ45 female connector, 8-pin	RJ45 connector (twisted pair, 8-core)
VGA	VGA connection of an external CRT monitor	VGA HD female connector, 15-pin	VGA HD male connector, 15-pin
COM1	Serial interfaces: RS232 (UART 16550 equivalent), not assigned	D-Sub male connector, 9-pin	D-Sub female connector, 9-pin
USB1, USB2	USB interfaces	USB female connector, type A, 4-pin	USB male connector, 4-pin
24 V	Power supply: 24 VDC)	Weidmüller male connector strip, SL 5.00 mm pin-spacing, 4-pin	Weidmüller female connector strip, SL 5.00 mm pin-spacing, 4-pin
Optional:			
DP-M	PROFIBUS DP master	D-Sub female connector, 9-pin	D-Sub male connector, IP 20, 9-pin
and			
Config	Configuration interface PROFIBUS	D-Sub male connector, 9-pin	D-Sub female connector, 9-pin

Fig. 7-4: Interfaces of the IndraControl VEP /30.1/40.1/50.1

Serial Interface COM1

Serial Interface COM1

D-Sub male connector, 9-pin	
Type:	RS232
Cable length:	Max. 15 m
Cable type:	Shielded, cross section min. 0.14 mm²
Transmission rate:	Max. 115200 bits/s
Handshake:	Hardware and software handshake (XON, XOFF)
Interrupt (IRQ):	4
I/O address:	(3F8H)
BIOS presettings:	Enabled

Fig. 7-5: Serial interface COM1

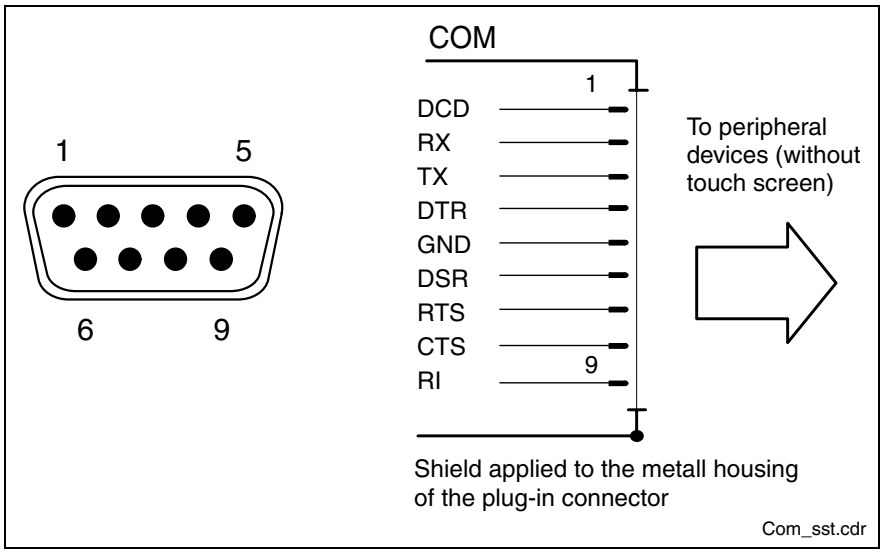


Fig. 7-6: Pin assignment COM1

USB Interfaces

USB Interfaces

The devices feature two USB interfaces (USB1 and USB2) according to the USB 1.1-specification.

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

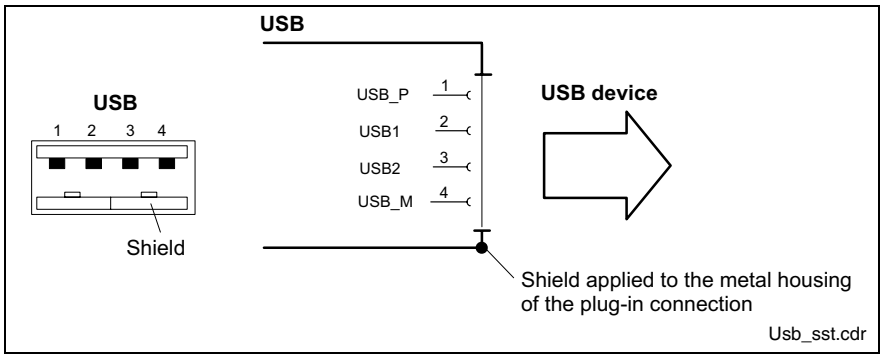


Fig. 7-7: USB interfaces

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

Fig. 7-8: Pin assignment of the USB interfaces

Ethernet Interfaces Ethernet1 and Ethernet2

Ethernet Interfaces

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

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

Fig. 7-9: Ethernet – Network connection

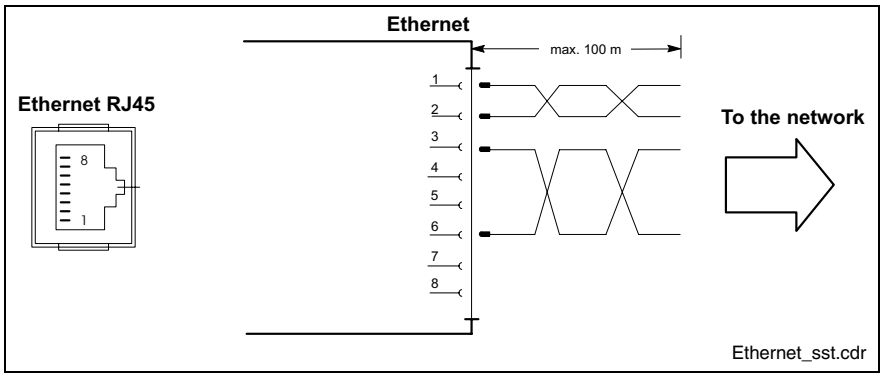


Fig. 7-10: Pin assignment of the Ethernet interface

The configuration of the Ethernet interfaces is described in chapter 10, "Software".

VGA Interface

VGA Connection of an External Monitor

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

- Video RAM: Max. 4 MB

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

HD female connector, 15-pin	
Cable length:	Max. 1.5 m
Cable type:	Shielded, cross section min. 0.14 mm²
Max. resolution:	1024 x 768 pixels

Fig. 7-11: VGA connection

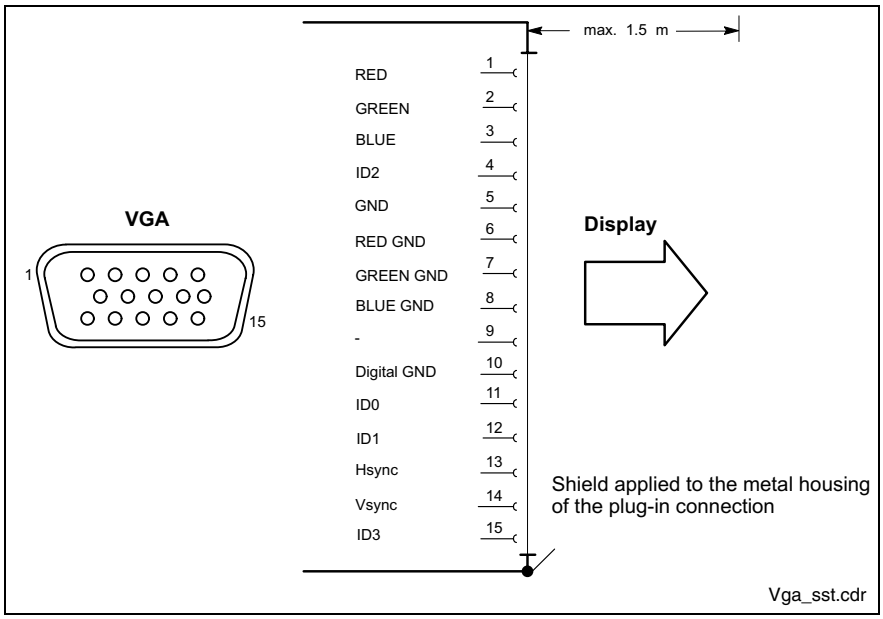


Fig. 7-12: Pin assignment of the VGA interface

Combined Keyboard/Mouse Interface

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

PS/2 Mini-DIN female connector, 6-pin	
Cable length:	Max. 1.5 m
Cable type:	Shielded, cross section min. 0.14 mm²

Fig. 7-13: Keyboard/mouse interface

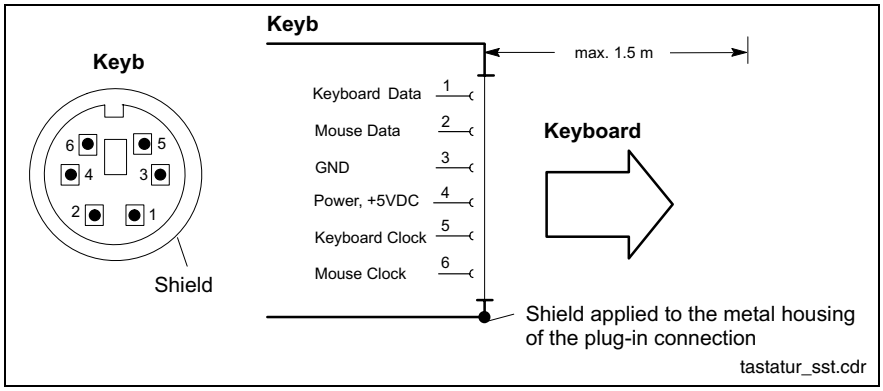


Fig. 7-14: Pin assignment of the keyboard/mouse interface

24 VDC Power Supply

X10 – 24-VDC Power Supply

All internally required voltages are generated with electrical isolation via a DC/DC converter. The connection is designed as male connector strip SL 5.08 mm pin-spacing, 4-pin. To this connector terminal, cables with a cross section of maximum 2.5 mm² can be connected.

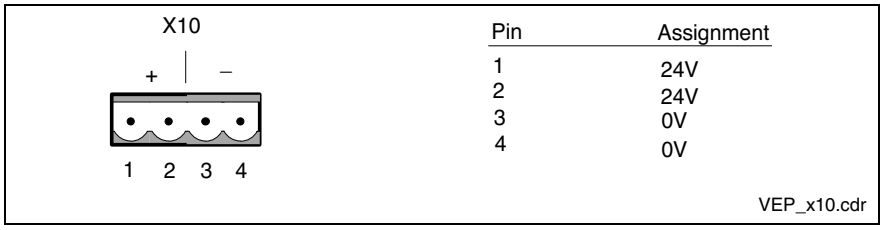


Fig. 7-15: Pin assignment of the 24 VDC connection X10

Parameters	Value
Rated voltage U_N	24 VDC; (+19V to +30V)
Residual ripple for U_N	See figure below
Noise and surge immunity	U_{max}= 35 V (for t < 100 ms)
Current consumption for U_N	Max. 2.5 A
Line-side fuse	4.0 A medium time-lag
Reverse voltage protection	Via isolating diode The line-side fuse is activated when polarity reversal occurs.

Fig. 7-16: Technical data of the 24 VDC connection

DANGER

Danger without protective separation!

⇒ The 24 VDC input voltage must comply with the requirements of the "Protective separation".

⇒ Plug and unplug the connector only in no-voltage condition!

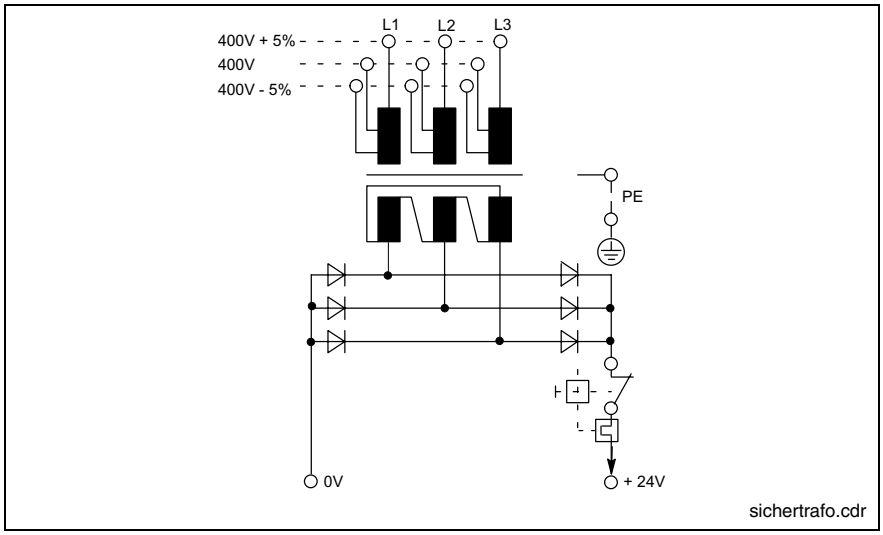


Fig. 7-17: Safety transformer according to EN 60742

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

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

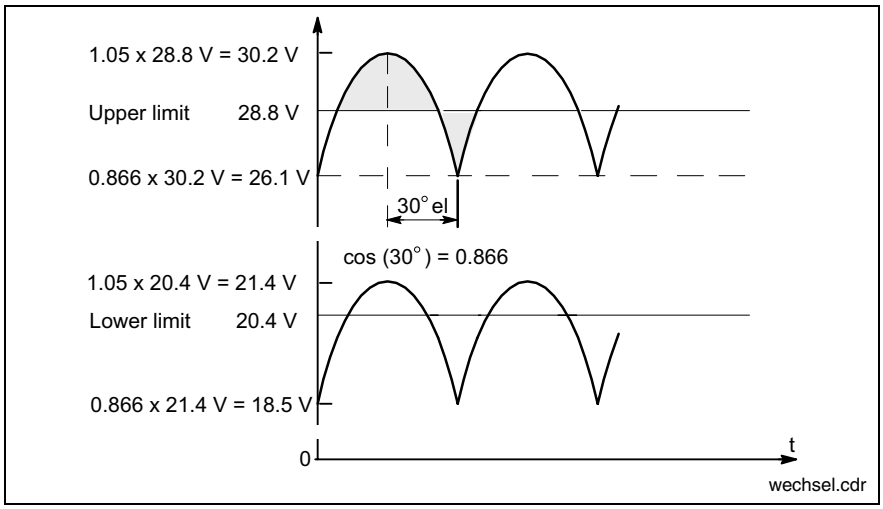


Fig. 7-18: Illustration of the limit values for the 24 VDC voltage

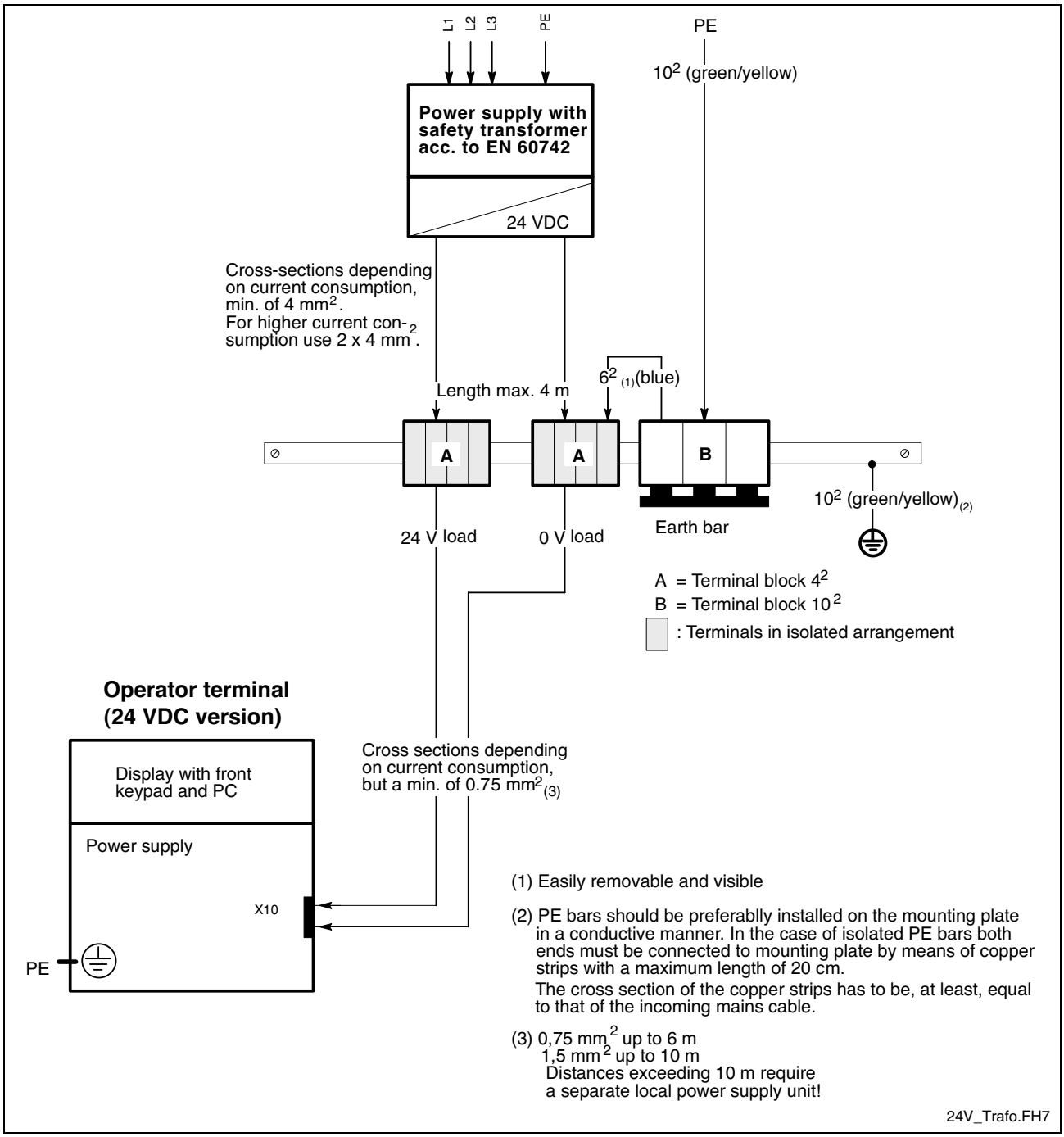


Fig. 7-19: Wiring of the power connection 24 VDC and the embedded terminal

PROFIBUS Master Interface DP-M

This interface is only provided for IndraControl VEP devices with PROFIBUS configuration.

PIN	Signal designation	PIN	Signal designation
1	RGND – Reference potential	2	NC
3	RxD/TxD-P – Transmit/receive	4	NC
5	DGND – Reference potential	6	VP – Supply voltage plus
7	NC	8	RxD/TxD-N – Transmit/receive
9	NC		

Fig. 7-20: Pin assignment of the PROFIBUS master interface

PROFIBUS Diagnostic Interface Config

PIN	Signal designation	PIN	Signal designation
1	NC	2	RxD – Receive Data
3	TxD – Transmit Data	4	DTR – Data Terminal Ready
5	GND – Signal ground	6	NC
7	RTS – Ready To Send	8	CTS – Clear To Send
9	NC		

Fig. 7-21: Pin assignment of the diagnostic interface RS232C

Technical Data PROFIBUS Master Interface

Interface data	
Communication interface:	PROFIBUS DP, max. 12 Mbauds, isolated
Diagnostic interface:	RS 232C, 9600 bauds

Fig. 7-22: Technical data PROFIBUS master interface

Status and Diagnostic Indicators PROFIBUS Master

The status and diagnostic indicators of the PROFIBUS master card are situated in special housing cut-outs on the rear side of the IndraControl VEP devices.

When it is switched on, the PROFIBUS master card performs a self-test. After the initialization phase of this test (2-3 seconds), the two LEDs ERR and STA turn dark and the yellow RDY LED lights, if the test is completed successfully. If not, the RDY LED starts flashing and the processing of the program is stopped. The further meanings of the display during the initialization phase are listed below.

RDY	LED yellow	**Rea**d**y**
	On:	DPM01 or DPS01 ready for operation
	Flashes cyclically	Bootstrap loader active
	Flashes irregularly	Hardware or system error
	Off:	Hardware defect
RUN	LED green	**RUN** (communication)
	On:	Communication running
	Flashes cyclically:	Ready for communication
	Flashes irregularly:	Improper configuration
	Off:	No communication
ERR	LED red	**Err**or (error)
	On:	Communication interface error
	Off:	Communication interface OK
STA	LED yellow	**Sta**tus
	On:	Data exchange with slaves active (master)
		Data exchange with master active (slave)
	Off:	No data exchange

8 Pin Assignments of the IndraControl VEH Devices

8.1 Connection of the IndraControl VEH 30 via VAC 30

The IndraControl VEH 30 is connected via the connection module VAC 30.

Pin Assignment of the VAC 30

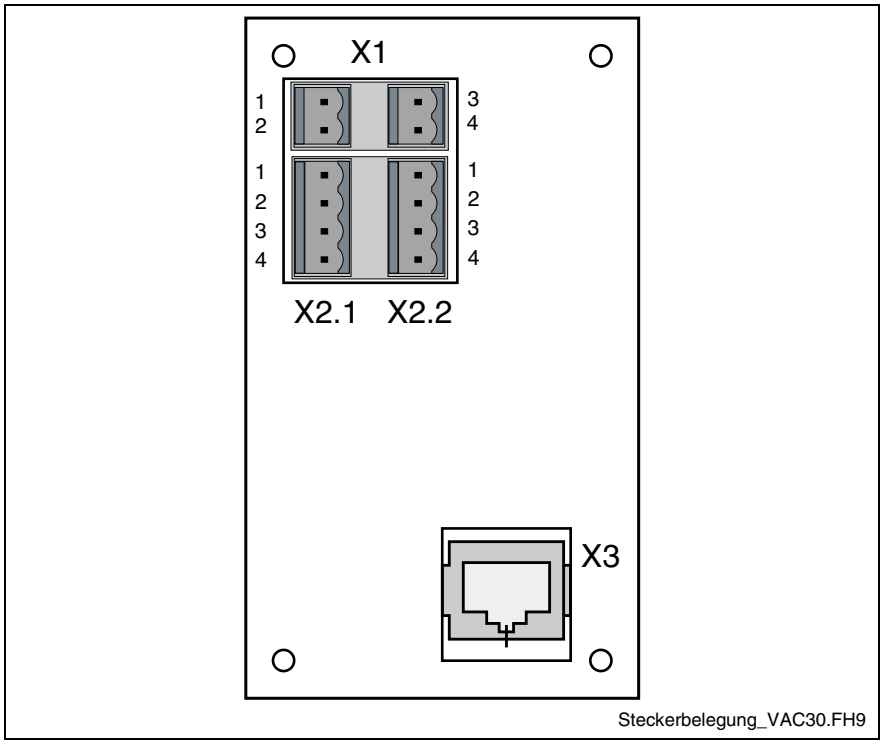


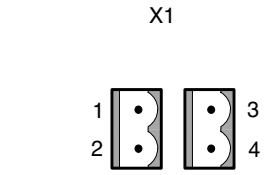
Fig. 8-1: Pin assignment of the VAC 30

Pin	Signal name
X1 Pin1	24 VDC
X1 Pin2	0 V
X1 Pin3	24 VDC
X1 Pin4	0 V
X2.1 Pin1	STOP pushbutton 1 IN
X2.1 Pin2	STOP pushbutton 1OUT
X2.1 Pin3	STOP pushbutton 2 IN
X2.1 Pin4	STOP pushbutton 2 OUT
X2.2 Pin1	Enabling device 1 IN
X2.2 Pin2	Enabling device 1 OUT
X2.2 Pin3	Enabling device 2 IN
X2.2 Pin4	Enabling device 2 OUT

Fig. 8-2: Assignment of the connection module

24 VDC Power Supply X1 on VAC 30

All internally required voltages are generated with electrical isolation via a DC/DC converter. The connection is designed as male connector strip SL 3,50 mm pin-spacing, 4-pin. Cables with a cross section of maximum 1.5 mm² can be connected to this connector terminal.



Pin	Assignment
1	24V
2	0V
3	24V
4	0V

x10.FH9

Fig. 8-3: Pin assignment of the 24 VDC power supply X1

Parameters	Value
Rated voltage U_N	24 VDC; (+19 V to +30 V)
Residual ripple for U_N	See figure below
Noise and surge immunity	U_{max}= 35 V (for t < 100 ms)
Current consumption for U_N	Max. 0.7 A
Line-side fuse	2.5 A medium time-lag
Reverse voltage protection	Via isolating diode The line-side fuse is activated when polarity reversal occurs.

Fig. 8-4: Technical data of the 24 VDC connection

DANGER

Danger without protective separation!

⇒ The 24 VDC input voltage must comply with the requirements of the "Protective separation".

⇒ Plug and unplug the connector only in no-voltage condition!

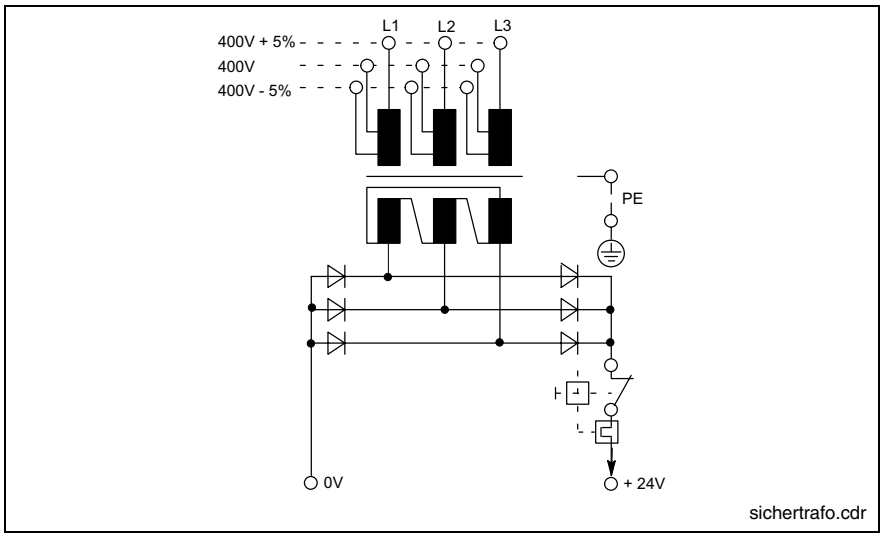


Fig. 8-5: Safety transformer according to EN 60742

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

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

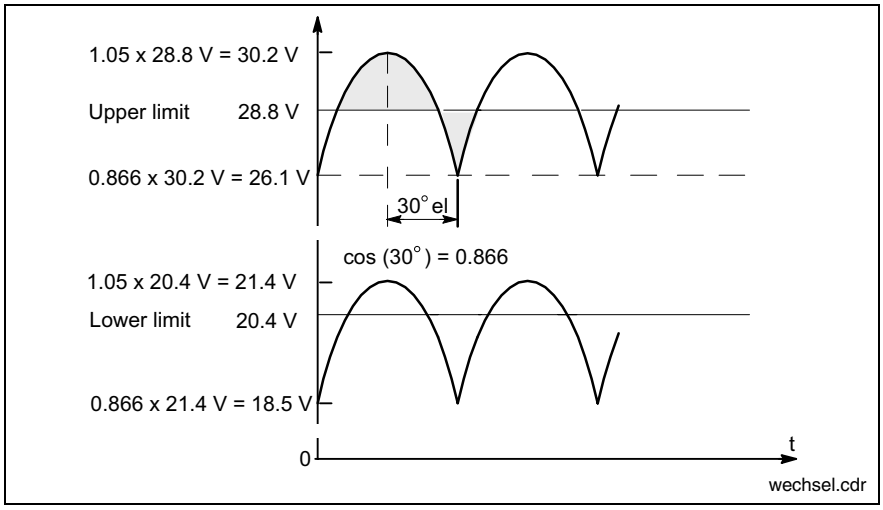


Fig. 8-6: Illustration of the limit values for the 24 VDC voltage

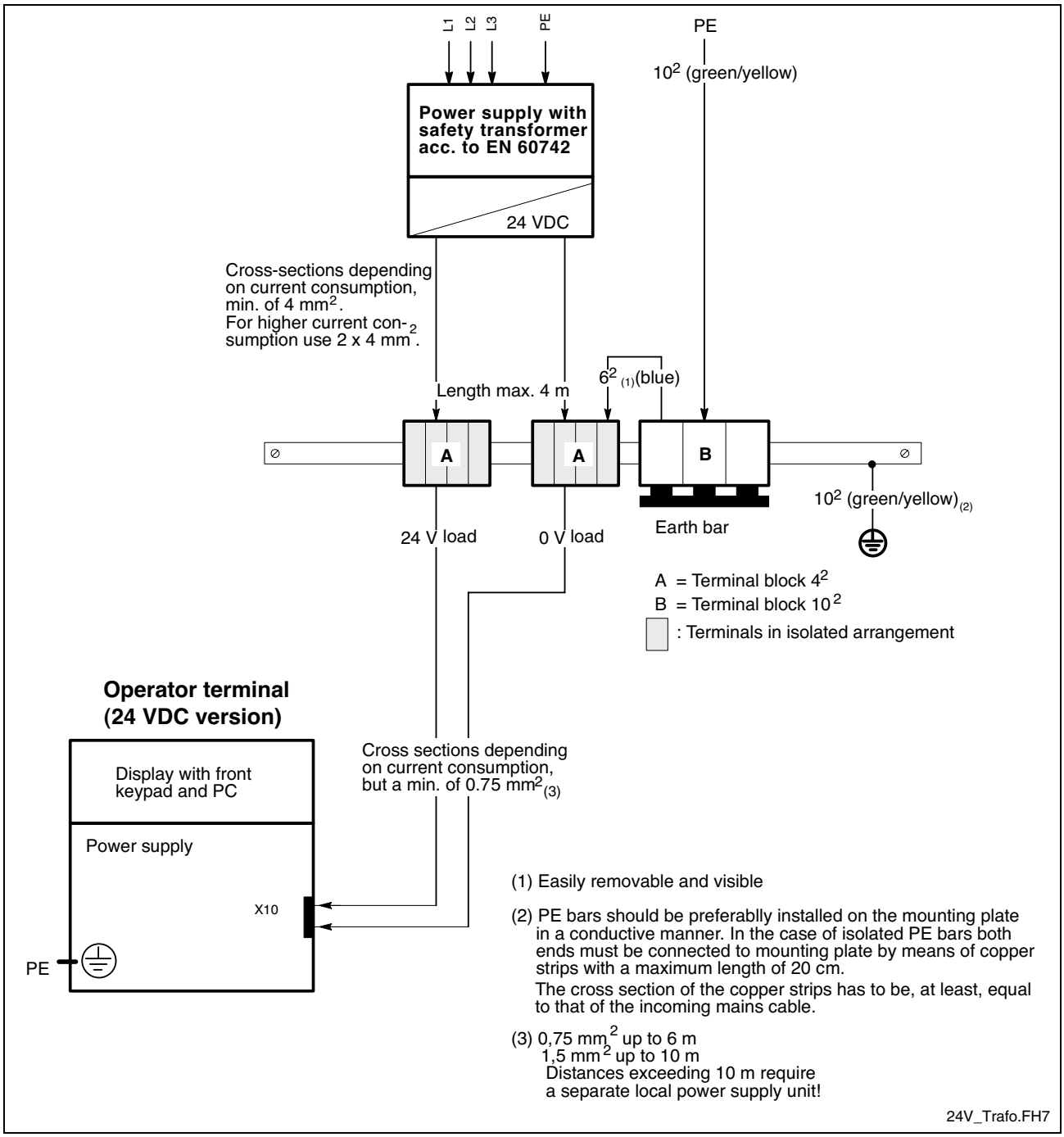


Fig. 8-7: Wiring of the power connection 24 VDC and the embedded terminal

STOP Pushbutton and Enabling Device X2 on VAC 30

Pin	Signal name
X2.1 Pin1	STOP pushbutton 1 IN
X2.1 Pin2	STOP pushbutton 1OUT
X2.1 Pin3	STOP pushbutton 2 IN
X2.1 Pin4	STOP pushbutton 2 OUT
X2.2 Pin1	Enabling device 1 IN
X2.2 Pin2	Enabling device 1 OUT
X2.2 Pin3	Enabling device 2 IN
X2.2 Pin4	Enabling device 2 OUT

Fig. 8-8: Pin assignment STOP pushbutton and enabling device X2

Ethernet Interface X3 on VAC 30

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

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

Fig. 8-9: Ethernet interface

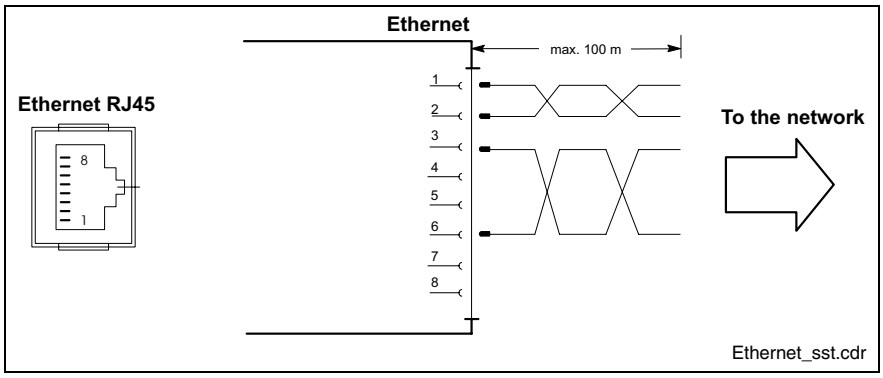


Fig. 8-10: Pin assignment of the Ethernet interface X3

The configuration of the Ethernet interfaces is described in chapter 10, "Software".

8.2 Personality Function

In the majority of cases, the system features a continuous Ethernet connection. However, e. g. M-Keys, STOP pushbuttons or enabling devices are firmly assigned to one control. The VAC 30 provides that an individual IP address and corresponding target addresses of the control are allocated to a hand-held terminal.

As far as IndraWorks is concerned, the intelligent connection module VAC 30 serves as wild card for a firmly projected CE operator terminal, for which the application is stored on a server in the network or ideally on the control (see IndraWorks VEP/VEH configuration dialogs).

When connecting the IndraControl VEH 30 via the VAC 30 all settings to be made under Rexroth CE Settings are archived in the VAC 30. If the VAC 30 does not provide any memory function, the settings are internally archived as it is the case for the IndraControl VEP devices.

If a VAC 30 is found, when the device is switched on, its configuration takes always priority. If no configuration data are found in the VAC 30, the IndraControl VEH 30 starts with the internally saved settings.

The settings of this values are made on the IndraControl VEH by the Rexroth CE Settings.

9 Maintenance and Installation

9.1 General Information

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

Maintenance

Include the following measures in your maintenance schedule:

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

CAUTION!

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

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

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

9.2 LCD Display

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

9.3 CMOS Battery

The VEP devices are provided with a lithium battery to buffer the real-time clock in the BIOS. If this battery is empty or weak, the time setting is lost in the BIOS. To exchange this battery, please contact the Bosch Rexroth Service.

9.4 Extension Cards

Slots for PC104 Bus

To place extensions cards two slots for PC104 bus are available.

CAUTION!

Risk of damage to the embedded terminal or corruption of application software by integrating not-released extension cards!

⇒ Installation of released extensions cards only by the Bosch Rexroth Service.

Insert an Extension Card

Due to the use of the embedded operating system, you can insert only special extension cards in the IndraControl VEP devices. To exchange extension cards, please contact the Bosch Rexroth Service.

10 Software

10.1 General Information

The IndraControl VEP/VEH-type devices are delivered with the embedded operating system Microsoft Windows CE .NET 4.2. The operating system contained in the FWA has to be separately ordered. Furthermore, this FWA contains the PLC "IndraLogicWinCE" and the visualization software WinStudio "lite". To be able to use the IndraLogicWinCE, the license must be enabled. The functional range of the visualization software WinStudio "lite" is restricted. If you want to use an extended functional range, you have to order a license.

The following tables provide an overview of the available licenses.

Ordering designation	Part number	Description
FWA-VE**01-CWL-01VRS-D0	R911307883	Windows CE 4.2 .NET with preinstalled IndraLogicWinCE and WinStudio "lite".

Fig. 10-1: Firmware types

Ordering designation	Part number	Description
SWL-VE**01-ILC-01VRS-NN	R911308258	IndraLogicWinCE license
SWS-WINSTU-RUN-06VRS-D0-WCE1K5	R911306954	WinStudio Runtime license Max. 1.500 variables, 256 array elements, 32 class elements
SWS-WINSTU-RUN-06VRS-D0-WCE4K	R911306951	WinStudio Runtime license Max. 4.000 variables, 512 array elements, 32 class elements

Fig. 10-2: Software options

Note: All necessary settings of the IndraControl VEP/VEH devices, especially the network settings are made via the configuration dialog "Rexroth CE Settings". Settings directly made in the control panel of Windows CE are overwritten by the Rexroth CE Settings!

All settings made under Windows CE are saved in the Windows CE registration database. Therefore, it is necessary to save each modification via the desktop icon Save Registry or Start – Program Files – Tools – Save Registry.

10.2 First Commissioning

To be able to configure the IndraControl VEP/VEH devices comfortably during the first commissioning, the configuration applications touch calibration and the Rexroth CE Settings start automatically. For just delivered devices these settings are already made ex works.

Note: To reset the IndraControl VEP/VEH to its original status, (e. g. the device cannot be operated because of wrong touch calibration), file boot.boo can be deleted in the main directory of the CompactFlash card. If you restart the IndraControl VEP the device behaves like after the first start.

10.3 Touch Calibration

Touch exactly the 4 calibration points one after each other with a touch pen (red point at the arrowhead). After having actuated the last calibration point, the display changes to the Windows desktop after a waiting time of approx. 5 seconds. Now, the proper calibration of the touch can be tested and can be confirmed with "OK".

If the touch calibration shall be repeated later, it can be started via the desktop icon "Touch Calibration" or via the start menu Start – Program Files – Tools – Touch Calibration.

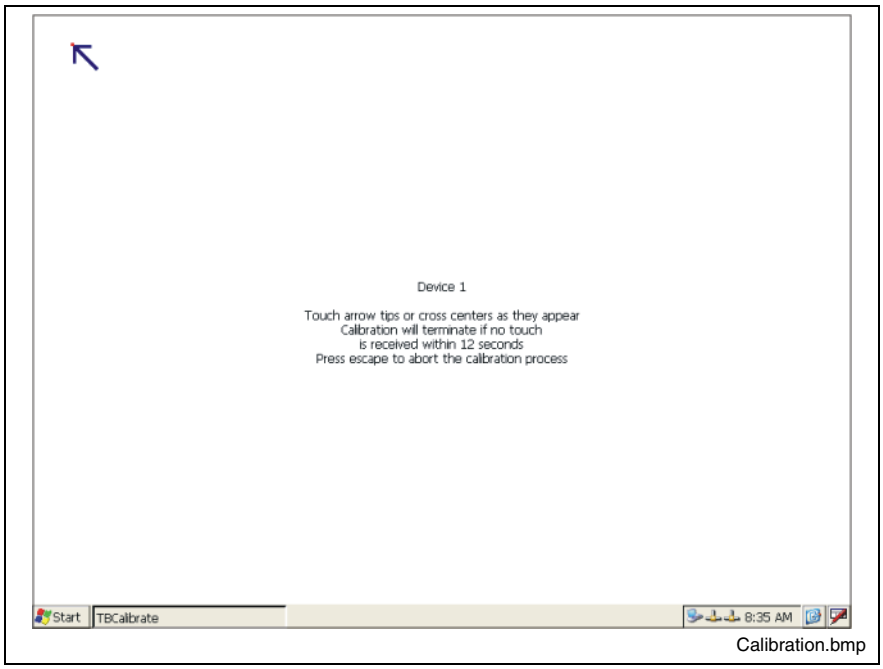


Fig. 10-3: Touch calibration of the IndraControl VEP / VEH

After the touch calibration the configuration tool "Rexroth CE Settings" starts automatically.

10.4 Rexroth CE Settings

All basic settings of the IndraControl VEP devices are made by the tool "Rexroth CE Settings". This tool starts automatically during the first commissioning after the touch calibration. As an alternative, it can be started via the desktop icon "Rexroth CE Settings" or via the start menu: Start – Program Files – Tools – Rexroth CE Settings.

Rexroth CE Settings – Ethernet Adapter

The Ethernet Adapter of the IndraControl VEP / VEH is configured in this tab (designation at the IndraControl VEP housing: Ethernet1).

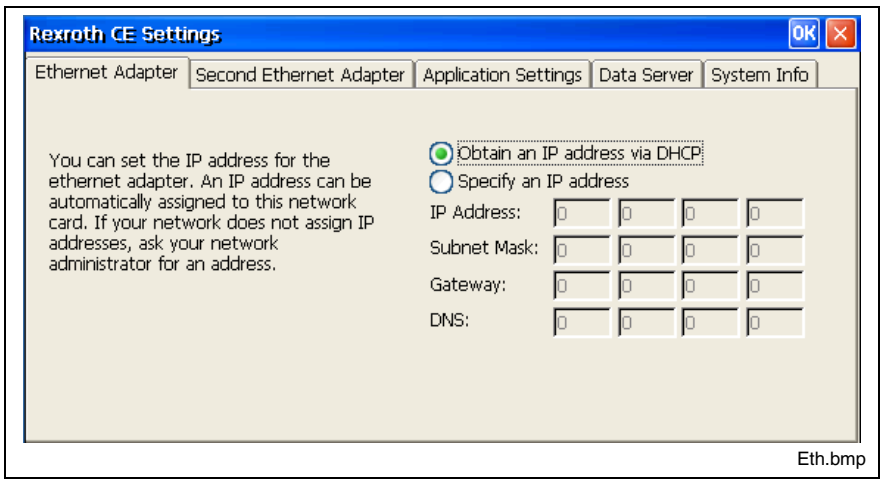


Fig. 10-4: Rexroth CE Settings – Ethernet Adapter

Obtain an IP address via DHCP

Automatic assignment of the network parameters via DHCP.

Specify an IP address

Manual configuration of the network parameters.

- **IP Address:** Manual input of the device's IP address.
- **Subnet Mask:** Manual input of the Subnet Mask.
- **Gateway:** Manual input of the Gateway.
- **DNS:** Manual input of the domain name server.

Rexroth CE Settings – Second Ethernet Adapter

The Ethernet Adapter of the IndraControl VEP / VEH is configured in this tab (designation at the IndraControl VEP housing: Ethernet2).

Note: The IndraControl VEH devices are only provided with one Ethernet Adapter.

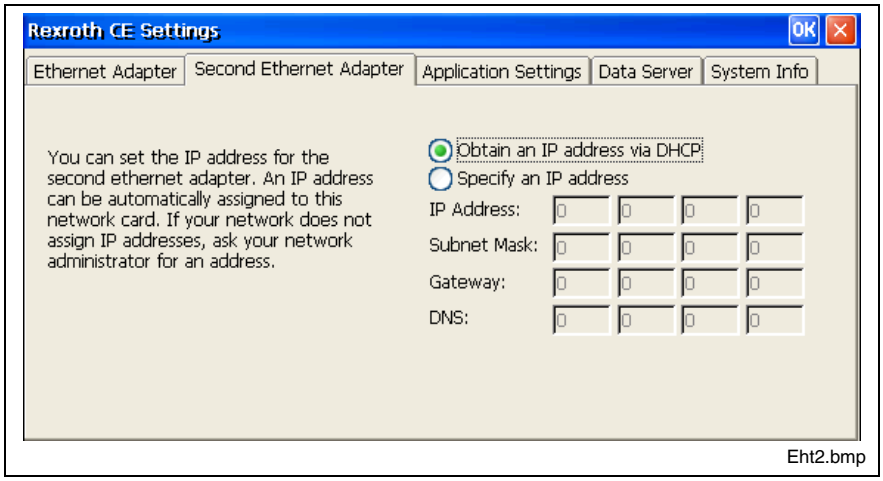


Fig. 10-5: Rexroth CE Settings – Second Ethernet Adapter

Obtain an IP address via DHCP

Automatic assignment of the network parameters via DHCP.

Specify an IP address

Manual configuration of the network parameters.

- **IP Address:** Manual input of the device's IP address.
- **Subnet Mask:** Manual input of the Subnet Mask.
- **Gateway:** Manual input of the Gateway.
- **DNS:** Manual input of the domain name server.

Rexroth CE Settings – Application Settings

In this tab the settings for autostart and the visualization connection to the control are configured.

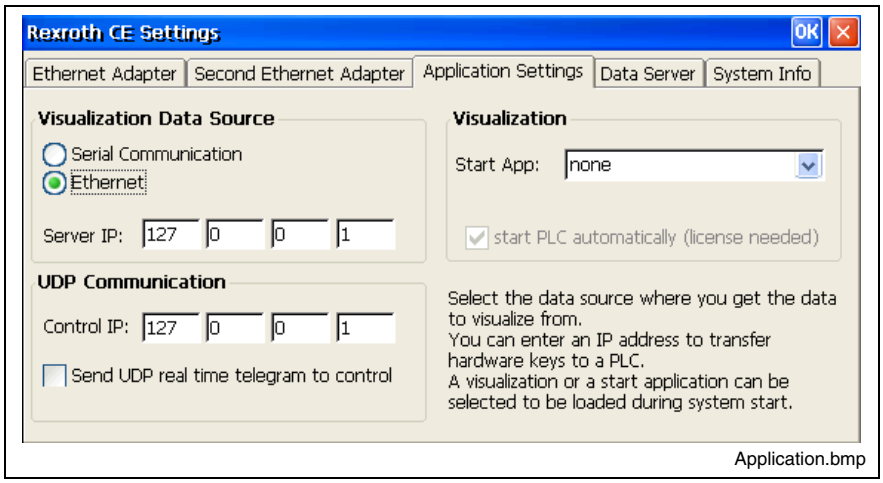


Fig. 10-6: Rexroth CE Settings – Application Settings

Visualization Data Source

- **Serial Communication:** Serial connection to the control with a defined transmission rate of 115 kbauds.
- **Ethernet:** Ethernet connection to the control.
- **Server IP:** IP address of the control connected via Ethernet.

UDP Communication

- **Control IP**: IP address of the control, to which the UDP telegrams are to be sent.
- **Send UDP real time telegram to control:** Selection, if the data are to be sent to the control (control IP) via UDP telegram.

The following data are sent to the control (control IP) via UDP telegram:

- Keyboard codes for IndraControl VEH 30.1
- Data of the additional elements for IndraControl VEH 30.1. For example, handwheel, override, key switch.

Visualization

Selection of the start application: The selection box "start PLC automatically (license needed)" is only a display function. It indicates, if the PLC is automatically started. It is ensured, that the PLC is started before the visualization.

- **None:** The visualization software is not automatically started.
- **Remote Desktop:** Autostart of the Remote Desktop Client. A PC with Remote Desktop Server in the network is operated by remote control via the IndraControl VEP / VEH.
- **Web Browser:** Start of a web visualization.
- **WinStudio:** Autostart of file StorageCard\Rexroth\Winstudio\startup.cmd. The user can modify the file to adapt the start behavior.
  If WinStudio was selected, the OPC server is registered and the corresponding information is entered in the OPCServer.ini.
- **VisiWin:** Autostart of file StorageCard\Rexroth\Winstudio\startup.cmd. The user can modify the file to adapt the start behavior.
- **UserStart:** Autostart of file StorageCard\Rexroth\User\startup.cmd. If this option is selected, in contrast to all other selection possibilities the PLC is not automatically started. The user can define the complete start process in this file.
- **Upload from DataSource:** Downloads file startup.cmd via FTP from the control (Visualization Data Source) to StorageCard\Rexroth\startup.cmd. To be able to do so, a FTP server must be activated on the control.

Rexroth CE Settings – Data Server

In this tab the start of FTP, WEB and Telnet server can be set.

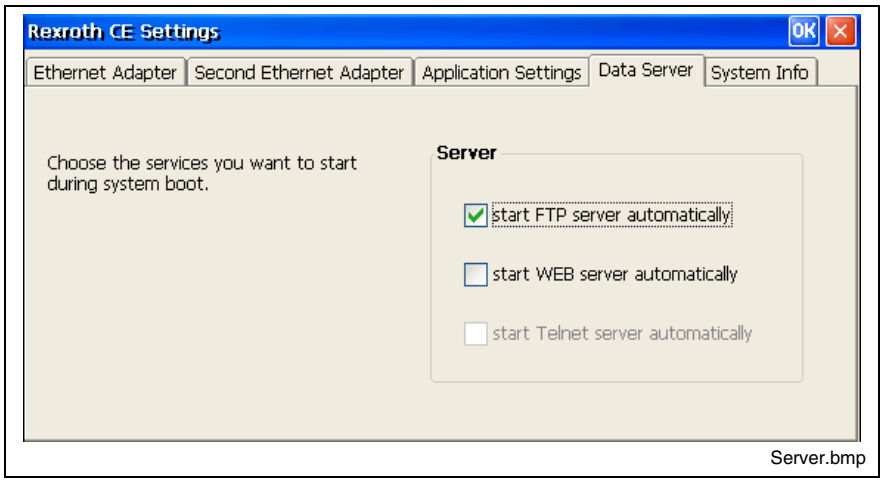


Fig. 10-7: Rexroth CE Settings – Data Server

start FTP server automatically

The autostart of the internal FTP server can be set here.

start WEB server automatically

The autostart of the internal web server can be set here.

start Telnet server automatically

The autostart of the internal telnet server can be set here. (The integration of the telnet server is currently in preparation!)

Rexroth CE Settings – System Info

This tab indicates information on the FWA and the IndraControl hardware.

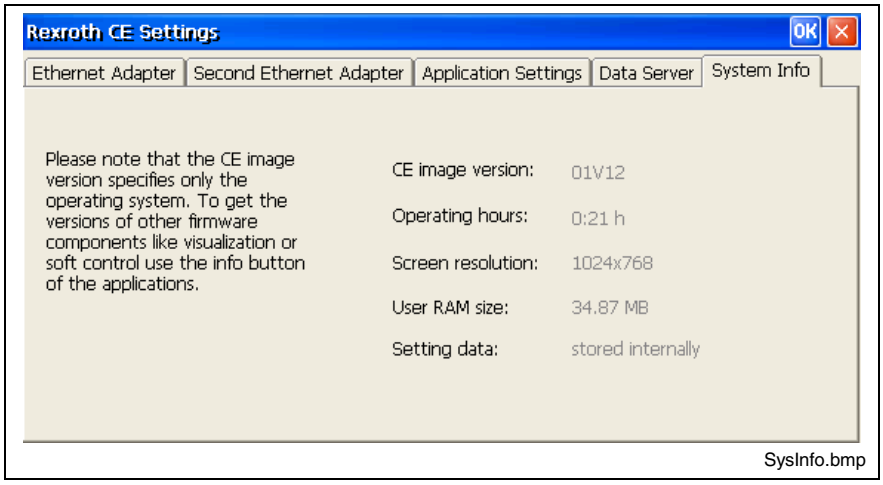


Fig. 10-8: Rexroth CE Settings – System Info

CE image version:

Version display of the Windows CE image.

Operating hours:

Display of the IndraControl devices's runtime.

Screen resolution:

Indication of the display resolution.

User RAM size:

Display of the RAM memory available for the user.

Setting data:

Display of the device setting's memory location. "Stored internally" for IndraControl VEP; "stored in VAC Socket Device" for IndraControl VEH connected via VAC 30.

- **stored internally:** For IndraControl VEP devices.
- **stored in VAC socket device:** For IndraControl VEH 30 devices connected via VAC 30

10.5 Windows CE 4.2 .NET

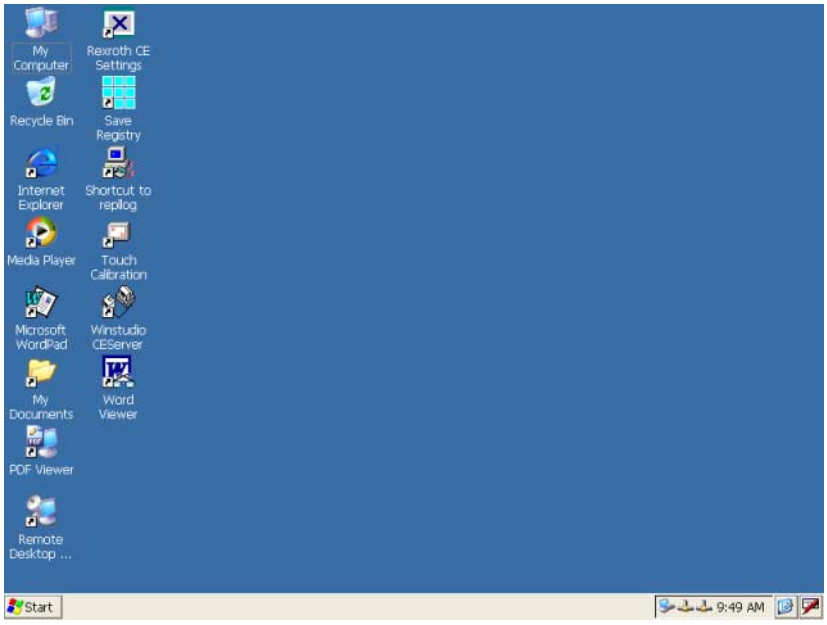


Fig. 10-9: Windows CE 4.2 .NET desktop

The Windows CE 4.2 .NET operating system image provides various programs and tools.

Operation

Touch Screen

The IndraControl VEP devices are operated by touch screen. For this, use your finger or better a touch pen.

The function of the "right mouse button" can be activated by touching the screen for 2 seconds. For a better appreciation of this waiting time a small circle appears around the mouse pointer.

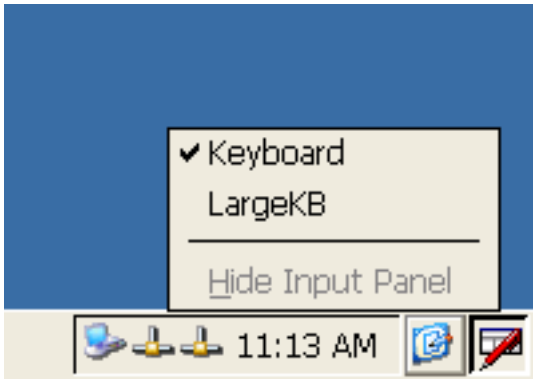
CAUTION

Danger of touch screen destruction!

⇒ Do not use any inappropriate and pointed objects to operate the touch screen.

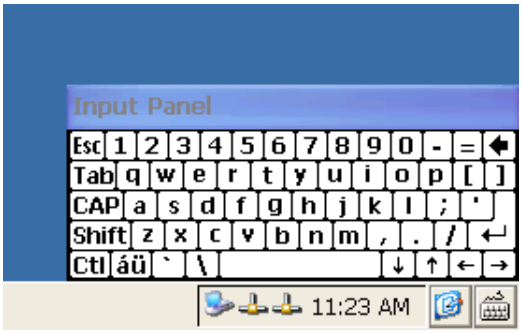
Text Input via Virtual Keyboard

To enter texts into the corresponding dialogs, a virtual keyboard, that can be operated via the touch screen, is automatically opened.. To call up this keyboard manually, you must activate the "Input Panel" icon in the start bar on the right bottom side of the desktop. Here, you can also modify the seize of the virtual keyboard or close it.



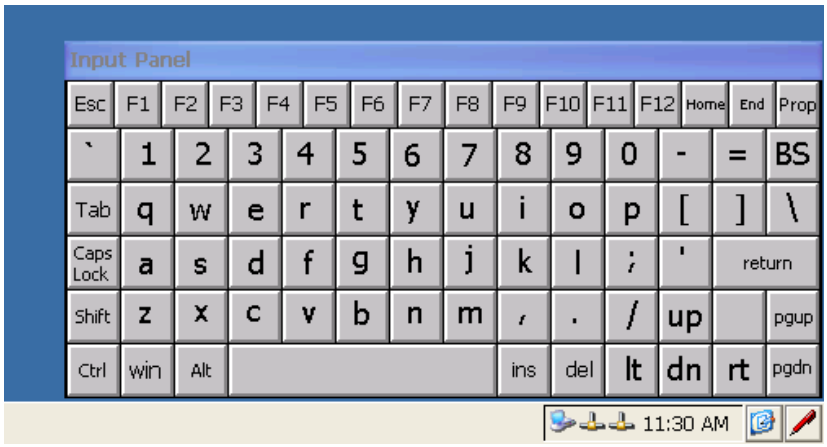
SetKeyboard.bmp

Fig. 10-10: Selecting the virtual keyboard



SmallKeyboard.bmp

Fig. 10-11: Virtual keyboard, small



LargeKeyboard.bmp

Fig. 10-12: Virtual keyboard, large

USB Support of the IndraControl VEP

Windows CE .NET 4.2 is an embedded operating system with selected devices and drivers. For this reason, only particular USB devices released by Bosch Rexroth can be operated at the IndraControl VEP devices. It is possible that other devices mentioned in the table below may work, however, Bosch Rexroth does not assume any warranty for this.

Device class	Exact designation	Remarks
USB keyboard	Standard USB keyboards without internal USB stroke. HP model no.: KU-0133 Logitech Internet Navigator Keyboard Cherry G81-3000	
USB mouse	IBM model: MO09BO Cherry Mouse Model M-5000 Microsoft Basic Optical Mouse	
USB memory stick	MC OSFLASHUSB-064M	Can be ordered at Bosch Rexroth – See "Accessories".

Fig. 10-13: Released USB devices

Microsoft Programs

The following programs can be either called up by links on the desktop or by the start menu.

Microsoft File Viewer

- **Microsoft Excel Viewer:** Program to display table files in *.XL* format.
- **Microsoft Image Viewer:** Program to display image files, slideshows and to generate slideshows.
- **Microsoft PDF Viewer:** Program to display portable document files in *.PDF format.
- **Microsoft PowerPoint Viewer:** Program to display presentation files in *.PPT and *.PPS format.
- **Microsoft Word Viewer:** Program to display text documents in *.DOC and *.RTF format.

Further Microsoft Programs

- **Command Prompt:** MS DOS prompt.
- **Internet Explorer:** Program to display web sides.
- **Media Player:** Program to display media data.
- **Microsoft WordPad:** Program to display and generate text data.
- **Remote Desktop Connection:** Remote desktop client. Permits to operate computers by remote control with the remote desktop server in the network.
- **Windows Explorer:** Program to display the file structure and to create and delete files.

Further Desktop Icons

- **My Computer:** Shows data structure and files on the IndraControl VEP.
- **Recycle Bin:** Recycle bin.
- **My Documents:** Opens the folder "My Documents".
- **Save Registry:** Saves the Windows CE 4.2 .NET registry.
- **Shortcut to repllog:** Starts the active sync server allowing connections from another computer via an active sync connection.
- **WinStudio CE Server:** Starts the WinStudio CE server. You will find further information in section "WinStudio."

FTP Server

The FTP server can be activated or deactivated via the Rexroth CE Settings (see section "Rexroth CE Settings – Data Server"). If a user logs in as "Anonymous" at the FTP server, he will get access to directory \FTP_Public on the RAM disk. This directory is automatically generated while accessing the FTP server for the first time. If a user registered on the CE device logs in, he has also access to directory \FTP_Public\Storagecard, that allows direct access to the flash disk. The users are registered via the control panel.

Note: A password must be assigned to the user via the control panel, so that he can log in as registered user on the FTP server.

Web Server

A web server, that can be activated via the Rexroth CE Settings, is integrated in the device (see section "Rexroth CE Settings – Data Server"). The home directory for the web server is Windows\www\wwwpub. The web application must be configured on the flash disk under \Storagecard\CE\Profiles\Windows\www\wwwpub. During the start, the data are automatically copied to the home directory.

Telnet Server

The telnet server is deactivated.

CE User Configuration

Entries in the start menu as well as desktop links and web applications are configured on the flash disk under \Storagecard\CE\Profiles\Windows and its subdirectories. When starting the device, all files are copied to the Windows system directory and interpreted.

10.6 IndraLogicWinCE

The IndraControl VEP devices contain the soft PLC IndraLogicWinCE. This soft PLC is EN 61131-3-compliant. To be able to use this PLC in the IndraControl VEP devices, it is necessary to order a license to enable the IndraLogicWinCE.

The IndraLogic can be enabled via the Start menu – Program Files – Rexroth – IndraLogic – ILConfigurator.

Fig. 10-14: Enabling the IndraLogicWinCE

10.7 WinStudio

The IndraControl VEP / VEH devices contain the runtime of the visualization software WinStudio "lite". The functional range of the "lite" variant is restricted. If an extended functional range is required, you must order a license (see chapter 10, "Software" – "General Information").

Variables	200
Arrays	256
Class elements	32
Number of missing images	1
Simultaneously used drivers	1

Fig. 10-15: Functional range of WinStudio "lite"

To transmit a visualization application to the IndraControl VEP, the WinStudio CE server must be started. For this, use the corresponding desktop icon or path Start – Program Files – Rexroth – WinStudio – Shortcut to CE Server.

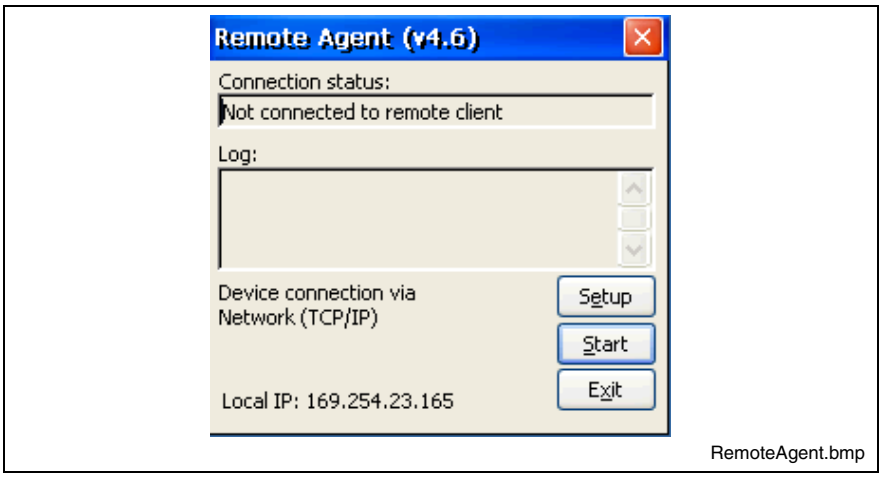


Fig. 10-16: WinStudio CE Server – Remote Agent

- **Connection status:** Shows the status of the connection.
- **Log:** Shows log messages.
- **Setup:** Button to call up the setup dialog.
- **Start:** Button to start the visualization application.
- **Exit:** Button to finish the Remote Agent.

Remote Agent Setup

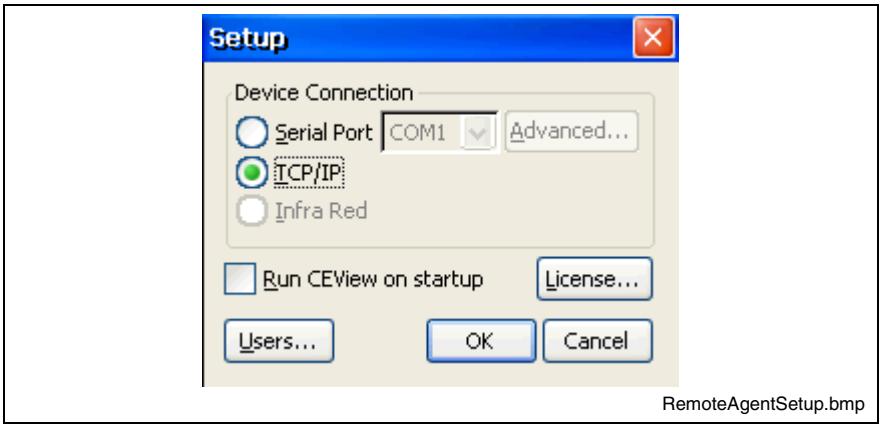


Fig. 10-17: Remote Agent Setup

- **Device Connection:** Configuration of the connection. Connections are possible via TCP/IP or via a serial interface. Infra-red is not possible. In the case of a serial connection, the baud rate and the use of the signals RTS and CTS can be configured via button "Advanced".
- **Run CEView on startup:** Here, you can choose, if the CEView shall be automatically started while starting the system.
- **License:** Here, you can license the product or modify the license.
- **Users:** The safety system can be started here. It allows the user management.

11 Ordering Information

11.1 Type Code

The embedded terminals VEP 30.1, VEP 40.1, VEP 50.1 and VEH 30.1 are available as different variants according to the following type codes:

VEP 30.1

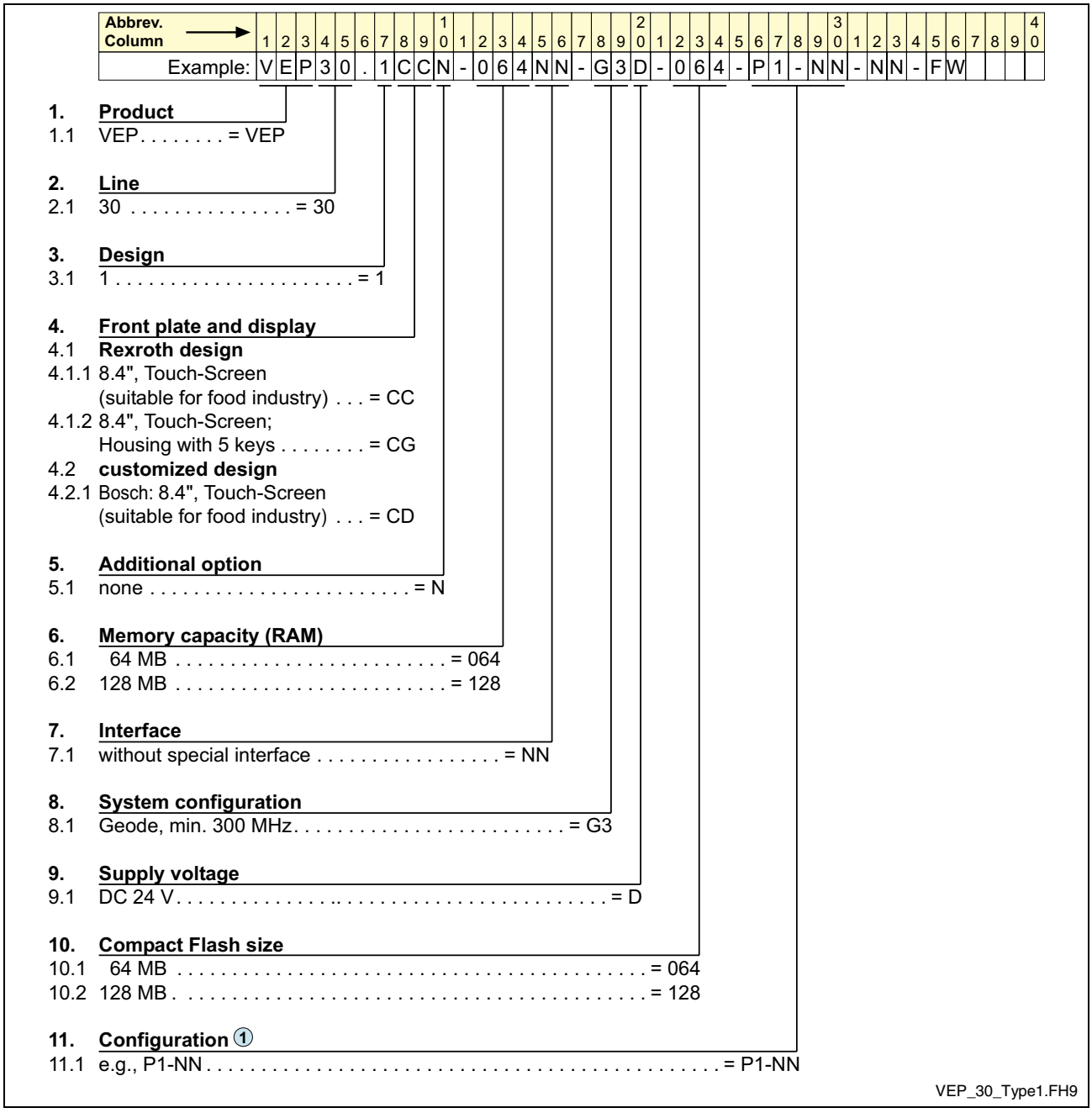


Fig. 11-1: VEP 30.1 – Type code

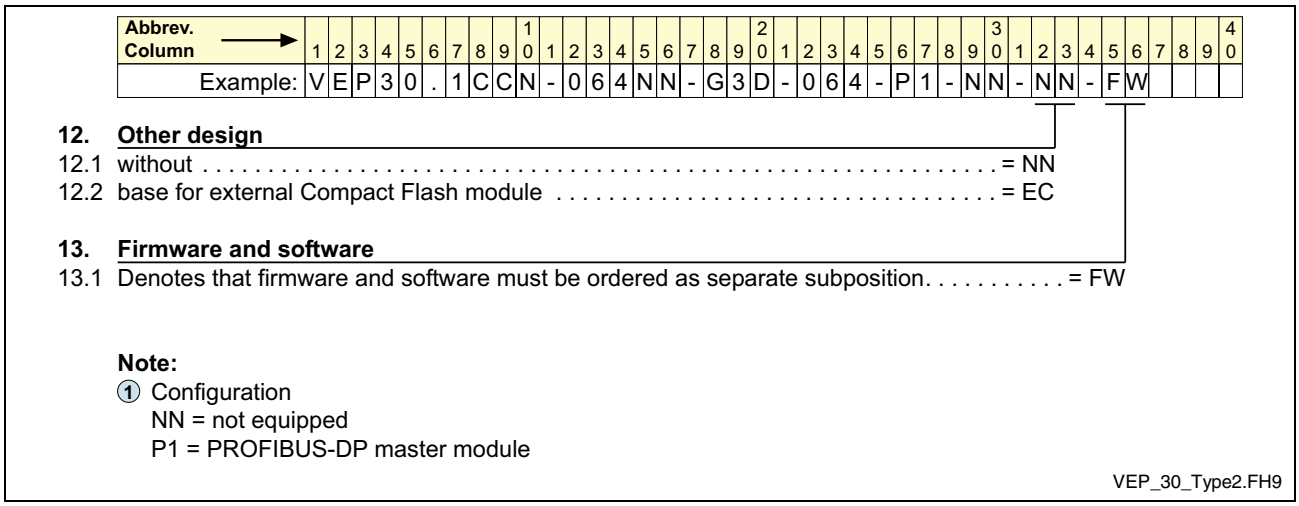


Fig. 11-2: VEP 30.1 – Type code, continuation

VEP 40.1

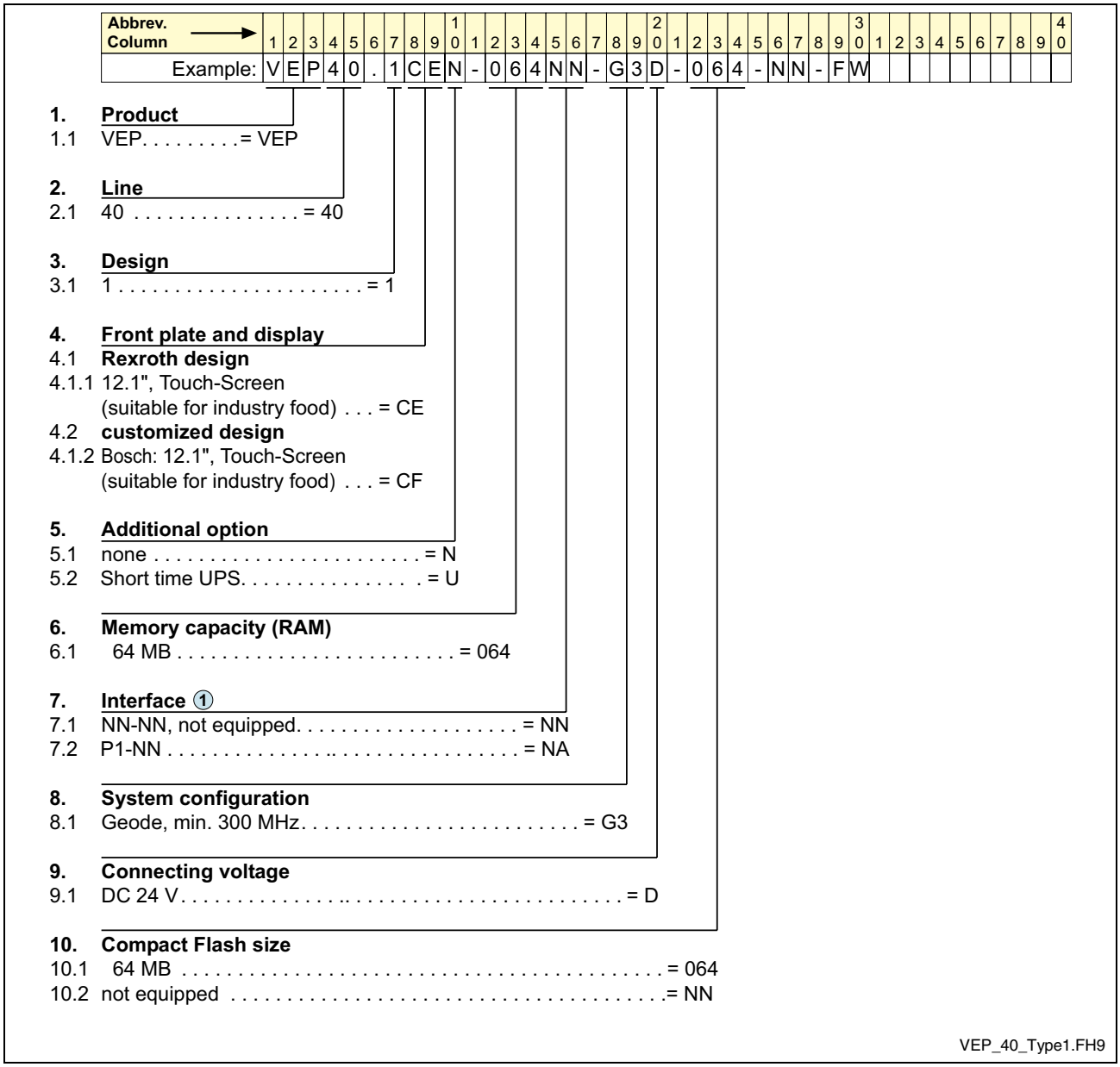


Fig. 11-3: VEP 40.1 – Type code

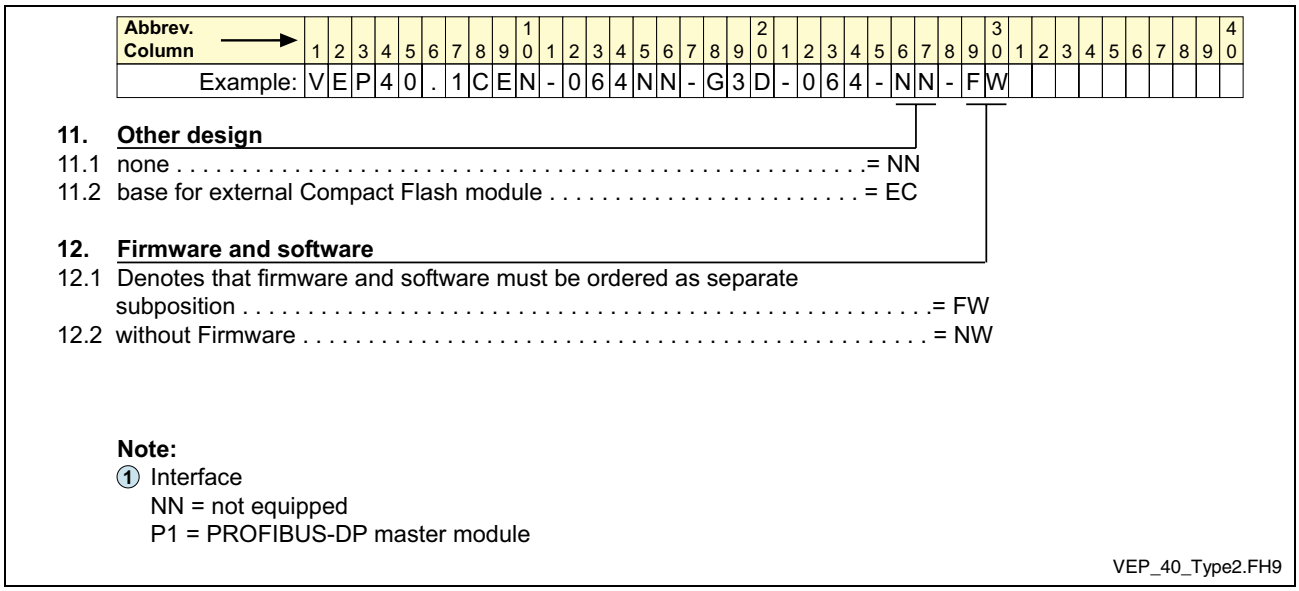


Fig. 11-4: VEP 40.1 – Type code, continuation

VEP 50.1

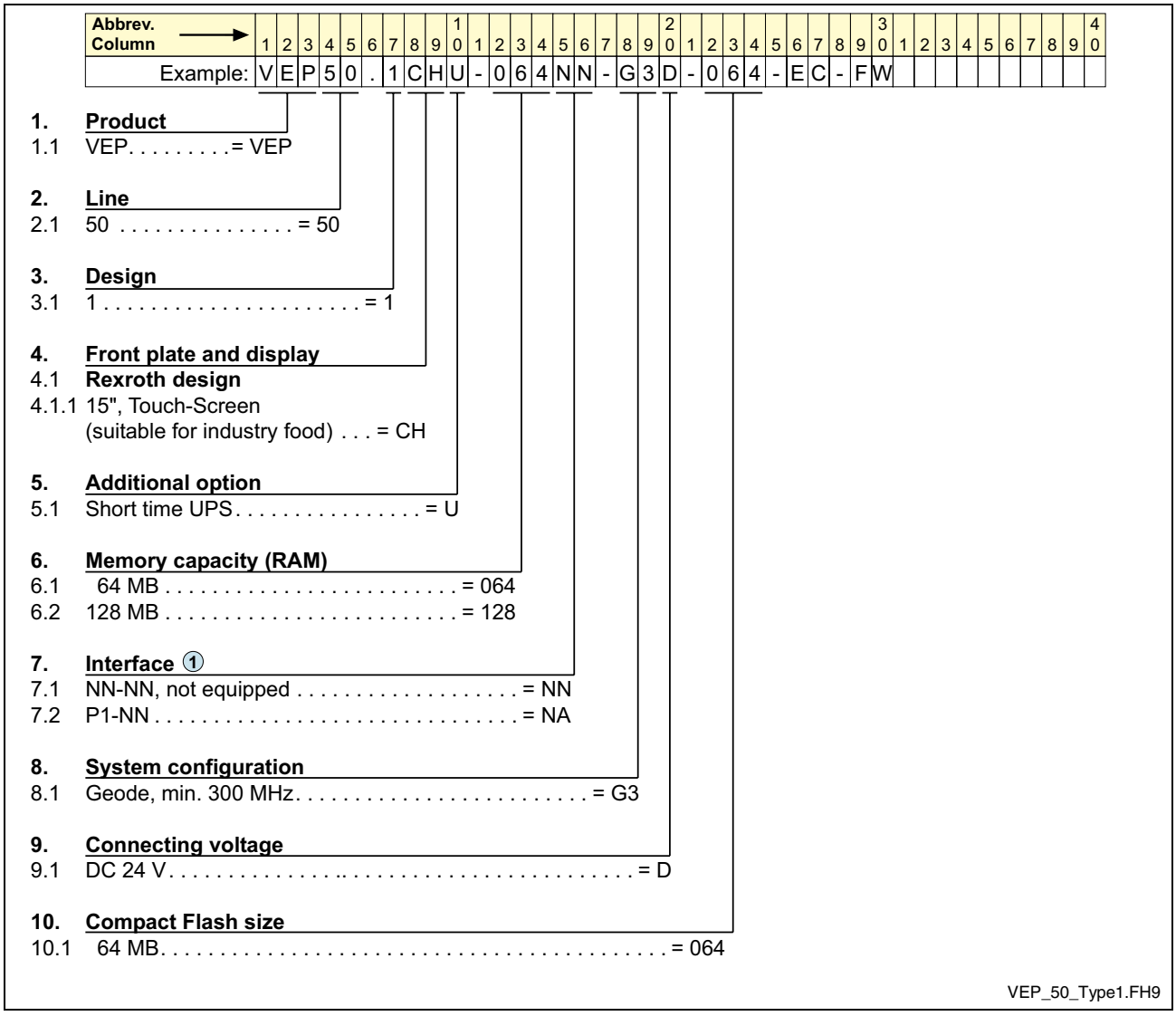


Fig. 11-5: VEP 50.1 – Type code

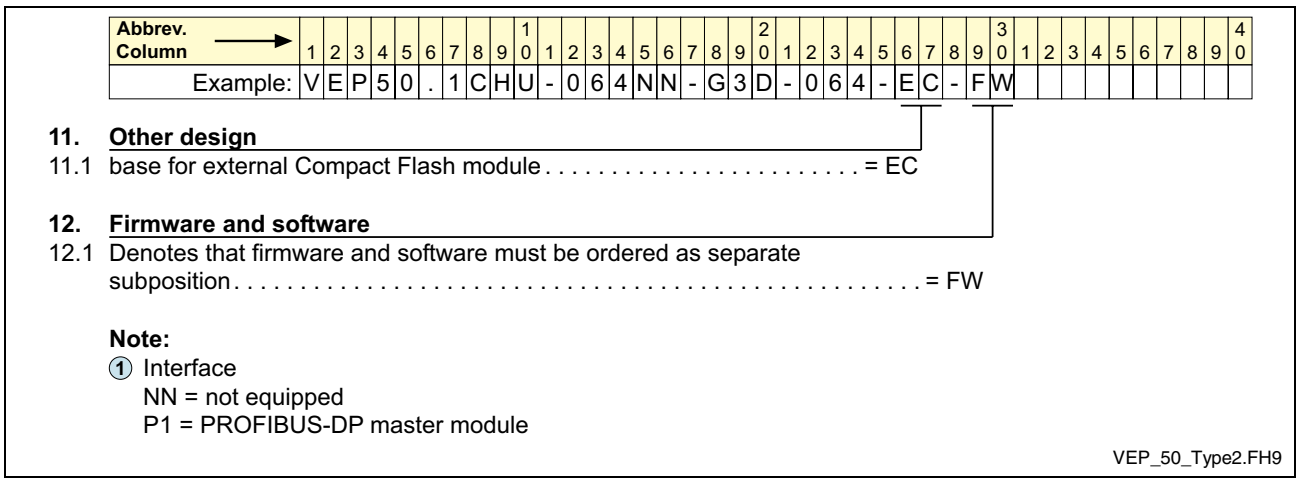


Fig. 11-6: VEP 50.1 – Type code, continuation

VEH 30.1

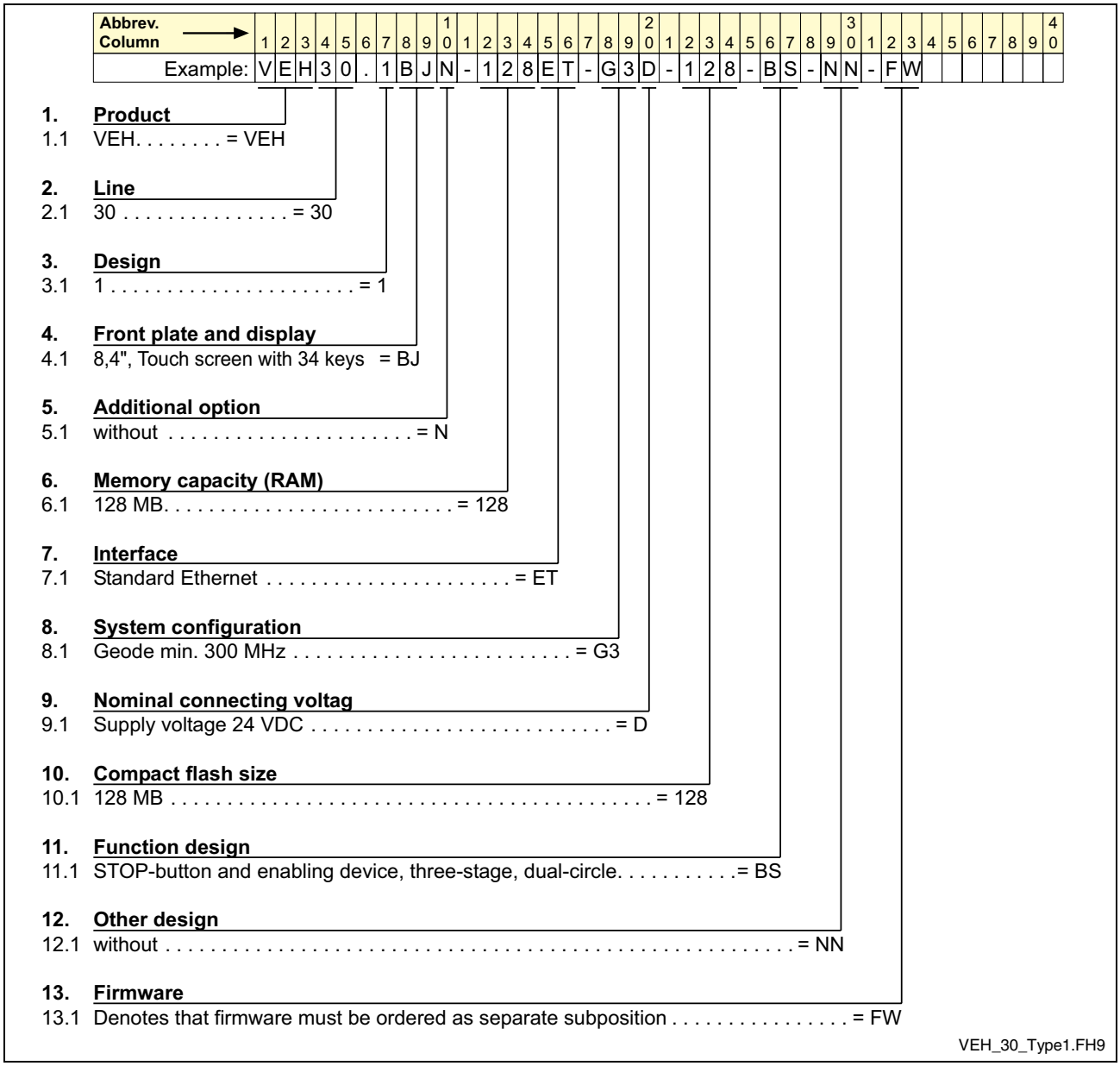


Fig. 11-7: VEP 30.1 – Type code

VAC 30.1

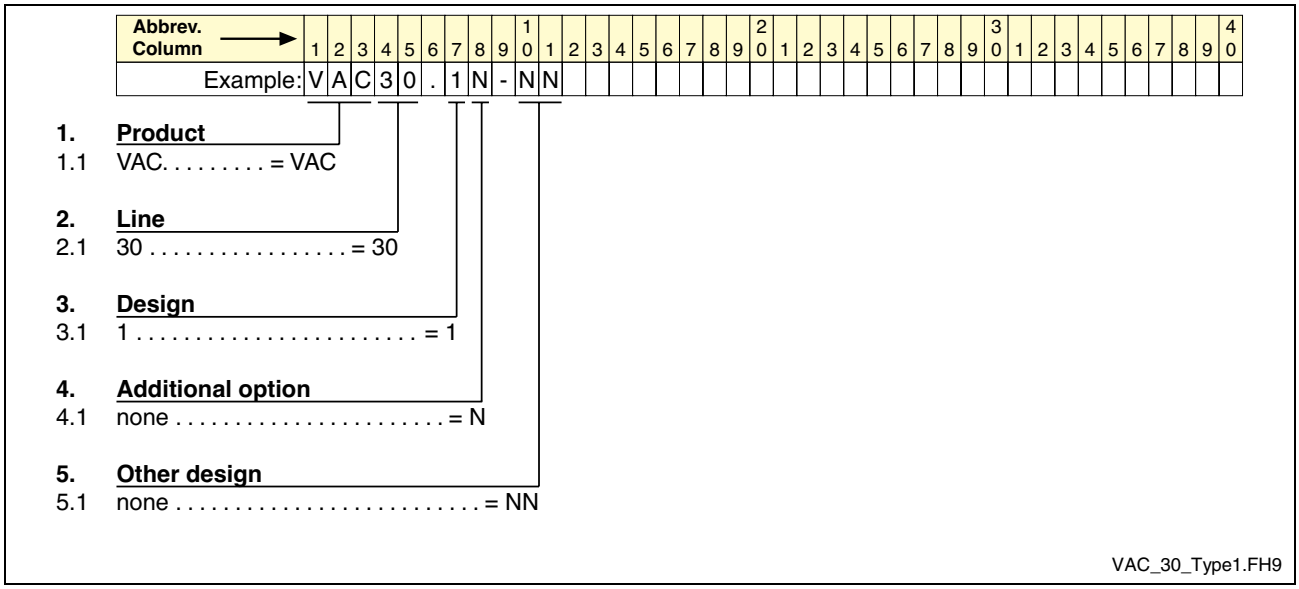


Fig. 11-8: VAC 30.1 – Type code

11.2 Accessories

Connectors and Ready-Made Cables

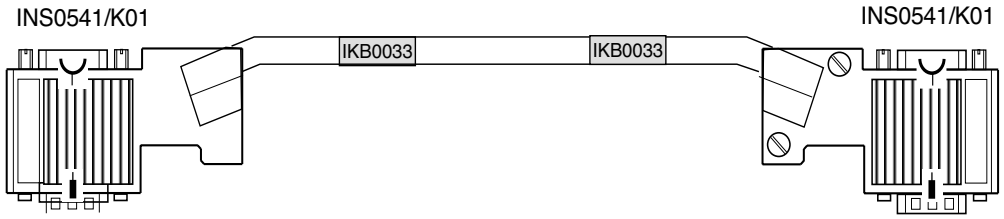
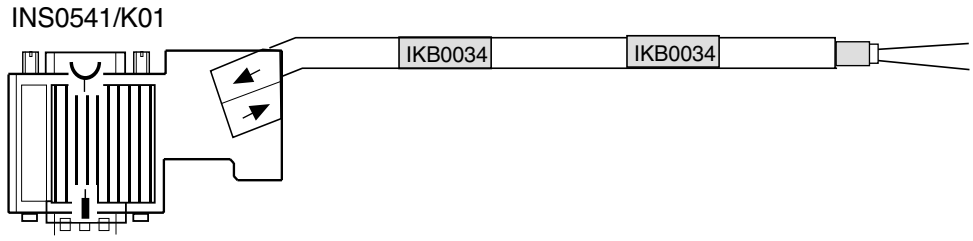
Ordering designation of the prefabricated cables	Mating connector of the unit	Rexroth cable	Design of the cable end
IKB0033/000,0 PN: R911291808 PROFIBUS cable			
IKB0034/000,0 PN: R911291809			

Fig. 11-9: Connectors and cables for IndraControl VEP devices

Storage Media

Ordering designation	Part number	Description
MC OSFLASHUSB-064M	1070170184	USB memory stick 64 Mbytes
CFM01.1-0064-N-LBA-NN-NW	R911308470	Compact Flash module 64 Mbytes
CFM01.1-0128-N-LBA-NN-NW	R911308469	Compact Flash module 128 Mbytes

Fig. 11-10: Storage media for IndraControl VEP devices

12 List of Figures

13 Index

K

M

O

P

R

S

T

U

V

W

14 Service & Support

14.1 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
  - via Service Call Entry Center Mo-Fr 7:00 am - 6:00 pm
- per Fax - by fax: **+49 (0) 9352 40 49 41**
- per e-Mail - by e-mail: **service.svc@boschrexroth.de**

14.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

After helpdesk hours, contact our service department directly at

+49 (0) 171 333 88 26

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

14.3 Internet

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

Verkaufsniederlassungen
Niederlassungen mit Kundendienst

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

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

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

sales agencies
offices providing service

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

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

14.4 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.

14.5 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
Rexroth Indramat 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

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from abroad: don't dial (0) after country code, Italy: dial 0 after country code

Austria - Österreich Bosch Rexroth GmbH Electric Drives & Controls Stachegasse 13 1120 Wien Tel.: +43 (0) 1 985 25 40 Fax: +43 (0) 1 985 25 40-93	Austria – Österreich Bosch Rexroth GmbH Electric Drives & Controls Industriepark 18 4061 Pasching Tel.: +43 (0)7221 605-0 Fax: +43 (0)7221 605-21	Belgium - Belgien Bosch Rexroth NV/SA Henri Genessestraat 1 1070 Bruxelles Tel: +32 (0) 2 451 26 08 Fax: +32 (0) 2 451 27 90 info@boschrexroth.be service@boschrexroth.be	Denmark - Dänemark BEC A/S Zinkvej 6 8900 Randers Tel.: +45 87 11 90 60 Fax: +45 87 11 90 61
Great Britain – Großbritannien Bosch Rexroth Ltd. Electric Drives & Controls Broadway Lane, South Cerney Cirencester, Glos GL7 5UH Tel.: +44 (0)1285 863000 Fax: +44 (0)1285 863030 sales@boschrexroth.co.uk service@boschrexroth.co.uk	Finland - Finnland Bosch Rexroth Oy Electric Drives & Controls Ansatie 6 017 40 Vantaa Tel.: +358 (0)9 84 91-11 Fax: +358 (0)9 84 91-13 60	France - Frankreich Bosch Rexroth SAS Electric Drives & Controls Avenue de la Trentaine (BP. 74) 77503 Chelles Cedex Tel.: +33 (0)164 72-63 22 Fax: +33 (0)164 72-63 20 **Hotline: +33 (0)608 33 43 28**	France - Frankreich Bosch Rexroth SAS Electric Drives & Controls ZI de Thibaud, 20 bd. Thibaud (BP. 1751) 31084 Toulouse Tel.: +33 (0)5 61 43 61 87 Fax: +33 (0)5 61 43 94 12
France – Frankreich Bosch Rexroth SAS Electric Drives & Controls 91, Bd. Irène Joliot-Curie 69634 Vénissieux – Cedex Tel.: +33 (0)4 78 78 53 65 Fax: +33 (0)4 78 78 53 62	Italy - Italien Bosch Rexroth S.p.A. Strada Statale Padana Superiore 11, no. 41 20063 Cernusco S/N.MI **Hotline: +39 02 92 365 563** Tel.: +39 02 92 365 1 Service: +39 02 92 365 300 Fax: +39 02 92 365 500 Service: +39 02 92 365 516	Italy - Italien Bosch Rexroth S.p.A. Via Paolo Veronesi, 250 10148 Torino Tel.: +39 011 224 88 11 Fax: +39 011 224 88 30	Italy - Italien Bosch Rexroth S.p.A. Via Mascia, 1 80053 Castellamare di Stabia NA Tel.: +39 081 8 71 57 00 Fax: +39 081 8 71 68 85
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Poland – Polen Bosch Rexroth Sp.zo.o. Biuro Poznan ul. Dabrowskiego 81/85 60-529 Poznan Tel.: +48 061 847 64 62 /-63 Fax: +48 061 847 64 02	Romania - Rumänien East Electric S.R.L. Bdul Basarabia no.250, sector 3 73429 Bucuresti Tel./Fax:: +40 (0)21 255 35 07 +40 (0)21 255 77 13 Fax: +40 (0)21 725 61 21 eastel@rdsnet.ro	Romania - Rumänien Bosch Rexroth Sp.zo.o. Str. Drobety nr. 4-10, app. 14 70258 Bucuresti, Sector 2 Tel.: +40 (0)1 210 48 25 +40 (0)1 210 29 50 Fax: +40 (0)1 210 29 52	Russia - Russland Bosch Rexroth OOO Wjatskaja ul. 27/15 127015 Moskau Tel.: +7-095-785 74 78 +7-095 785 74 79 Fax: +7 095 785 74 77 laura.kanina@boschrexroth.ru
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Hongkong Bosch Rexroth (China) Ltd. 6th Floor, Yeung Yiu Chung No.6 Ind Bldg. 19 Cheung Shun Street Cheung Sha Wan, Kowloon, Hongkong Tel.: +852 22 62 51 00 Fax: +852 27 41 33 44 alexis.siu@boschrexroth.com.hk	India - Indien Bosch Rexroth (India) Ltd. Electric Drives & Controls Plot. No.96, Phase III Peenya Industrial Area Bangalore – 560058 Tel.: +91 80 51 17 0-211...-218 Fax: +91 80 83 94 345 +91 80 83 97 374 mohanvelu.t@boschrexroth.co.in	India - Indien Bosch Rexroth (India) Ltd. Electric Drives & Controls Advance House, II Floor Ark Industrial Compound Narol Naka, Makwana Road Andheri (East), Mumbai - 400 059 Tel.: +91 22 28 56 32 90 +91 22 28 56 33 18 Fax: +91 22 28 56 32 93 singh.op@boschrexroth.co.in	India - Indien Bosch Rexroth (India) Ltd. S-10, Green Park Extension New Delhi – 110016 Tel.: +91 11 26 56 65 25 +91 11 26 56 65 27 Fax: +91 11 26 56 68 87 koul.rp@boschrexroth.co.in
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Korea Bosch Rexroth-Korea Ltd. 1515-14 Dadae-Dong, Saha-gu Electric Drives & Controls Pusan Metropolitan City, 604-050 Tel.: +82 51 26 00 741 Fax: +82 51 26 00 747 eunkyong.kim@boschrexroth.co.kr	Malaysia Bosch Rexroth Sdn.Bhd. 11, Jalan U8/82, Seksyen U8 40150 Shah Alam Selangor, Malaysia Tel.: +60 3 78 44 80 00 Fax: +60 3 78 45 48 00 hhlim@boschrexroth.com.my rexroth1@tm.net.my	Singapore - Singapur Bosch Rexroth Pte Ltd 15D Tuas Road Singapore 638520 Tel.: +65 68 61 87 33 Fax: +65 68 61 18 25 lai.ts@boschrexroth.com.sg	South Africa - Südafrika TECTRA Automation (Pty) Ltd. 100 Newton Road, Meadowdale Edenvale 1609 Tel.: +27 11 971 94 00 Fax: +27 11 971 94 40 **Hotline: +27 82 903 29 23** georgv@tectra.co.za
Taiwan Bosch Rexroth Co., Ltd. Taichung Industrial Area No.19, 38 Road Taichung, Taiwan 407, R.O.C. Tel : +886 - 4 -235 08 383 Fax: +886 - 4 -235 08 586 jim.lin@boschrexroth.com.tw david.lai@boschrexroth.com.tw	Taiwan Bosch Rexroth Co., Ltd. Tainan Branch No. 17, Alley 24, Lane 737 Chung Cheng N.Rd. Yungkang Tainan Hsien, Taiwan, R.O.C. Tel : +886 - 6 –253 6565 Fax: +886 - 6 –253 4754 charlie.chen@boschrexroth.com.tw	Thailand NC Advance Technology Co. Ltd. 59/76 Moo 9 Ramintra road 34 Tharang, Bangkhen, Bangkok 10230 Tel.: +66 2 943 70 62 +66 2 943 71 21 Fax: +66 2 509 23 62 Hotline +66 1 984 61 52 sonkawin@hotmail.com	

Nordamerika – North America

USA Headquarters - Hauptniederlassung	USA Central Region - Mitte	USA Southeast Region - Südost	**USA SERVICE-HOTLINE**
Bosch Rexroth Corporation Electric Drives & Controls 5150 Prairie Stone Parkway Hoffman Estates, IL 60192-3707 Tel.: +1 847 645-3600 Fax: +1 847 645-6201 servicebrc@boschrexroth-us.com repairbrc@boschrexroth-us.com	Bosch Rexroth Corporation Electric Drives & Controls 1701 Harmon Road Auburn Hills, MI 48326 Tel.: +1 248 393-3330 Fax: +1 248 393-2906	Bosch Rexroth Corporation Electric Drives & Controls 2810 Premiere Parkway, Suite 500 Duluth, GA 30097 Tel.: +1 678 957-4050 Fax: +1 678 417-6637	- 7 days x 24hrs - **+1-800-REXROTH** **+1 800 739-7684**
USA Northeast Region – Nordost	USA West Region – West		
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