rexroth
A Bosch Company

IndraControl PR21

Embedded Automation Computer

Operating Instructions
R911389662

Edition 02

Change Record

Edition 02, 2019-11

Refer to tab. 1-1 "Change Record" on page 1

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Editorial Department

Development Automation Systems Control Platform, JüKö (MaKo/MePe)

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1 About this documentation

Editions of this documentation

Edition	Release Date	Note
01	2018-04	First edition
02	2019-11	Notes on WLAN, Bluetooth and 4G removed, updates

Tab. 1-1: Change Record

1.1 Overview on target groups and product phases

In the following illustration, the framed activities, product phases and target groups refer to the present documentation.

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

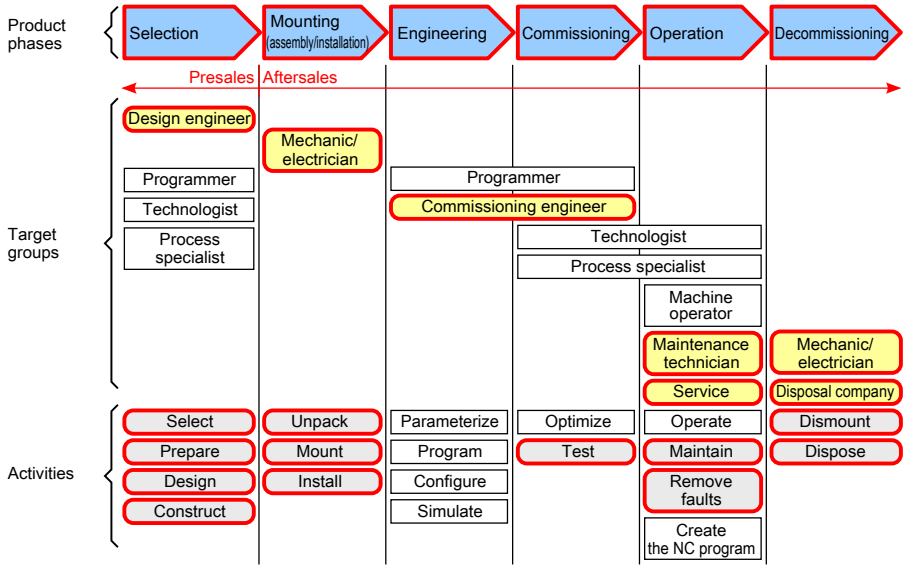


Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

1.2 Purpose

This document instructs the technical staff of the machine manufacturer on how to perform the mechanical and electrical installation safely and on how to commission the device.

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

1.3 Scope

This operating instruction applies to all embedded automation computers whose type code starts with "PR21...". The type code is located on the type plate of the device, also refer to chapter 2.1 "Product identification" on page 2.

1.4 Related documents

Title	Part number and document type
Rexroth IndraControl	R911339613
VAP 01	Operating Instructions
Power Supply Unit	
Rexroth IndraControl	R911384733
PR and VR Devices	Project Planning Manual
Software Applications	

Tab. 1-2: Required and supplementing documentation

1.5 Customer feedback

Customer requests, comments or suggestions for improvement are of great importance to us. Please email your feedback on the documentations to Feedback.Documentation@boschrexroth.de. Directly insert comments in the electronic PDF document and send the PDF file to Bosch Rexroth.

2 Product identification and scope of delivery

2.1 Product identification

Description	Example
Part number	PN: R911123456
Type code	TYPE: PR2100...
Serial number	SN: 123456789123456
Plant	(7260)
Manufacturing date	MD: 17W40
Name of origin	Made in...
Company address	Bosch Rexroth AG, 97816 Lohr, Germany
CE conformity marking	CE
Rexroth Data Matrix Code	

Description	Example
Voltage specification	U_N DC 24 V
Current specification	I_N 0.8 A
Ambient temperature	T(amb) 0-50 °C
Certification markings	UL, FCC, China-RoHS, ...

Tab. 2-1: Specifications on the type plate, example

2.2 Scope of delivery

- Embedded automation computer
- Safety instructions
- Assembly kit (already mounted)
- 24 V connection terminal
- Firmware image USB recovery stick

3 Using safety instructions

3.1 Structure of the safety instructions

The safety instructions are structured as follows:

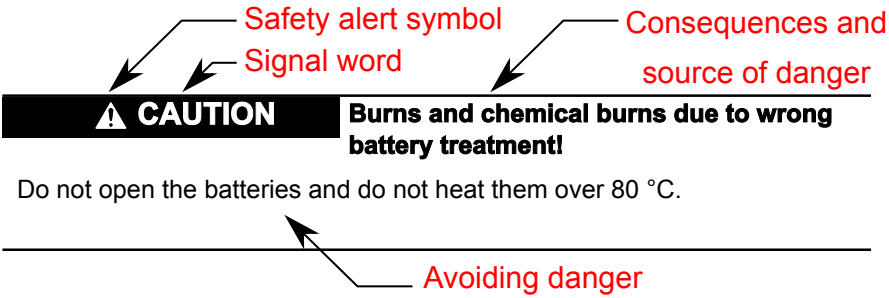


Fig. 3-1: Structure of the safety instructions

3.2 Explaining signal words and safety alert symbol

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

The signal word draws attention to the safety instruction and indicates the risk potential.

The safety alert symbol (triangular safety reflector with exclamation marks), preceding the signal words Danger, Warning, Caution indicates hazards for persons.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

In case of non-compliance with this safety instruction, material damage can occur.

3.3 Symbols used

Pointers are displayed as follows:

This is a note.

Tips are displayed as follows:

This is a tip.

3.4 Explaining the signal alert symbol on the device

If this symbol is on your device, you have to observe the documentation on the device. The respective documentation informs on the type of hazard as well as the steps required to avoid this hazard.

4 Intended use

The embedded automation computers by Rexroth are intended for "IoT Gateway" applications.

NOTICE **Risk of destruction if accessory parts, mounting parts, components, cables, wires, software and firmware not expressly specified are used.**

The embedded automation computers may only be used as intended and with the accessories, mounting parts and other components specified in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same applies to cables and lines.

Only to be operated with the component configurations and combinations expressly defined and with the software and firmware specified in the corresponding functional description.

Typical areas of application of the embedded automation computers:

- Handling and assembly systems
- Packaging and food processing machines
- Printing and paper converting machines
- Machine tools
- Wood processing machines

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

5 Spare parts, accessories and wear parts

5.1 External 24 V power supply unit

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

Tab. 5-1: External 24 V power supply unit for the operator display

5.2 Wear parts

Wear parts are not subject to any warranty.

5.2.1 CMOS battery

The service life of the CMOS battery is 5 to 7 years.

6 Ambient conditions

Humidity	85% at 40°C (non-condensing)
Operating temperature	0 to 50 °C
Storage and transport temperature	-20 to 70 °C
Shock protection	IEC 60068-2-27
Overvoltage category	2
Contamination level	2, no condensation allowed
Mechanical strength	IEC 60068-2-64, acceleration: 2G

Tab. 6-1: Ambient conditions

NOTICE **Defective product due to gases jeopardizing functions**

Due to the risk of corrosion, avoid sulphurous gases (e.g. sulphur dioxide (SO_2) and hydrogen suphide (H_2S)). The product is not resistant against these gases.

NOTICE **Risk to damage the device due to external influences**

Keep the device away from oils and emulsions.

NOTICE **Failure of the product due to contaminated air**

- The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations
- The devices to be installed into the housing and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529.
- The device shall be provided in a suitable fire enclosure in the end-use application.

7 Technical data

	PR2100
CPU	Intel Atom Single Core E3815 1.46 GHz
GPU	Intel® HD Graphics
Memory	Onboard 4G DDR3L, 1066 MHz RAM

	PR2100
Bulk memory	32 G eMMC onboard
	Optional: 1 × full size mSATA (support mPCIe)
Mini PCIe (internal)	1 × Mini PCIe for the interface module mPCIe
Ethernet ports	2 × Realtek RTL8111E GbE
Serial ports	Only for variant NC: 2 × RS-232/422/485
Serial port speed	Maximum 115.2 kbps
USB	1 × USB 3.0
	Variant NB: In addition 3 x USB 2.0
Video port	1 × HDMI
RTC battery	Button cell BR2032
Mounting	Top-hat rail mounting
Input voltage	24 V DC +25 %, -20 %
Power consumption	20 W max.
Weight	0.4 kg
Degree of protection	IP20

Tab. 7-1: Technical data of PR2100

	2x GBit LAN (optional)
Controller	Intel® I350-AM2 LAN Controller
Ethernet	10/100/1000 Mbps

Tab. 7-2: Technical data 2x GBit LAN

8 Standards

The products have been developed according to the current German edition of the standards at the time of product development.

8.1 Standards used

Standard	Description
EN 60204 -1	Safety of machinery – Electrical equipment of machines
EN 61000-6-4	Generic standards – Emission standard (industrial environments)
EN 61000-6-2	Generic standards – Noise immunity (industrial environments)
EN 60068-2-6	Vibration test
EN 60068-2-27	Shock test
EN 60950-1	Information technology equipment - Safety

Tab. 8-1: Standards used

8.2 FCC

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

8.3 CE marking

8.3.1 Declaration of conformity

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

EMC directive 2014/30/EC

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

Standard	Title
DIN EN 61000-6-2	Electromagnetic compatibility (EMC)
	Part 6-2: Generic standards – Immunity for industrial environments
DIN EN 61000-6-4	Electromagnetic compatibility (EMC)
	Part 6-4: Generic standards – Emission standard for industrial environments

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

Loss of CE conformity due to modifications at the device

CE marking applies only to the device upon delivery. After modifying the device, verify the CE conformity.

8.4 UL/CSA certified

The devices are certified acc. to

- UL 60950-1 (Information Technology Equipment)
- CAN/CSA C22.2 No. 60950-1-07

UL file E499751

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

Loss of UL/CSA conformity due to modifications at the device

UL and CSA marking applies only to the device upon delivery. After modifying the device, verify the UL and the CSA conformity.

9 Interfaces

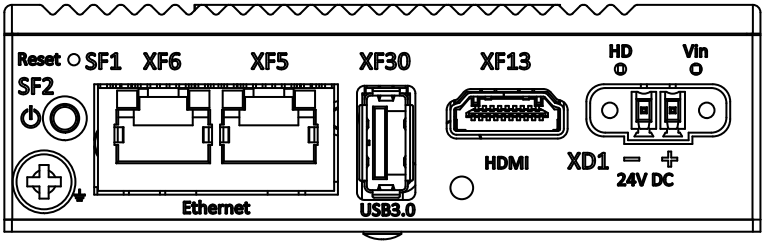


Fig. 9-1: Interfaces device variant NA

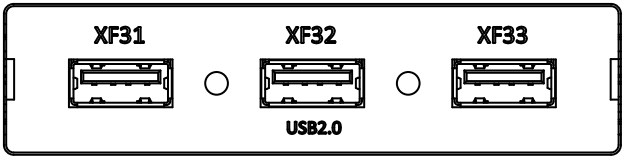


Fig. 9-2: Additional interfaces at device variant NB

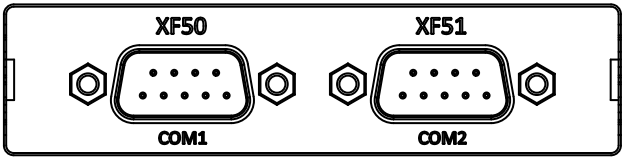


Fig. 9-3: Additional interfaces at device variant NC

9.1 Overview

The following connections are available:

Labeling at the housing	Connection type	Connection type (at the device)	Mating connector or cable (from outside)
XD1	PC voltage supply	Male connector strip, 2-pin	Female connector strip, 2-pin
XF5, XF6	Ethernet interfaces 10/100/1000 Base-T	RJ45 socket, 8-pin	RJ45 plug (twisted pair, 8-wire)

Labeling at the housing	Connection type	Connection type (at the device)	Mating connector or cable (from outside)
XF30	USB3.0 ports	USB female connector, type A	USB plug, type A
XF13	Connection for external monitor	HDMI female connector	HDMI connector
XF50, XF51	Serial interfaces	D-Sub plug, 9-pin	D-SUB socket, 9-pin
XF31, XF32, XF33	USB2.0 ports	USB female connector, type A	USB plug, type A
XF40, XF41	Ethernet interfaces 10/100/1000 Base-T	RJ45 socket, 8-pin	RJ45 plug (twisted pair, 8-wire)

Tab. 9-1: Interfaces

NOTICE **Malfunctions due to insufficient shielding!**

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

9.2 PC voltage supply XD1

The 24 V DC voltage supply for the embedded automation computer is connected via the "XD1" connection.

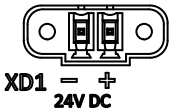


Fig. 9-4: Connection of the 24 V voltage supply at the device

Pin	Function
①	+24 V supply voltage
②	0 V supply voltage

Tab. 9-2: Pin assignment

9.3 USB ports XF30 to XF33

PR21 devices are usually equipped with one USB3.0 interface (XF30) in all variants.

Devices with the abbreviation "NB" for "Miscellaneous hardware properties" are equipped with three additional USB2.0 interfaces (XF31, XF32, XF33).

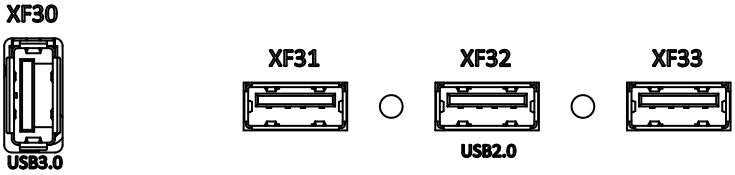


Fig. 9-5: USB ports

The maximum current carrying capacity of the USB3.0 interface XF30 is 900 mA. The maximum current carrying capacity of the USB2.0 interfaces XF31, XF32, XF33 is 500 mA.

9.4 Ethernet interfaces XF5, XF6

The embedded automation computer can be connected to an Ethernet network via the Ethernet interfaces XF5 and XF6.

9.5 Video interface

A monitor with HDMI port can be connected to the HDMI video port (XF13).

9.6 2 x GBit LAN

2 x GBit LAN are available as ordering option "B" under interface extensions.

10 Mounting, assembly and electrical installation

NOTICE **Mechanic damage due to incorrect mounting torque.**

Tighten the screws and nuts with the corresponding torque according to the following table.

Thread	Mounting torque
M2.5	0.4 Nm
M3	0.7 Nm
M4	1.4 Nm
M5	1.0 Nm

Tab. 10-1: Mounting torque

10.1 Dimensions of the embedded automation computer

The devices can be mounted on the top-hat rail. For the corresponding dimensions, please refer to the following figures:

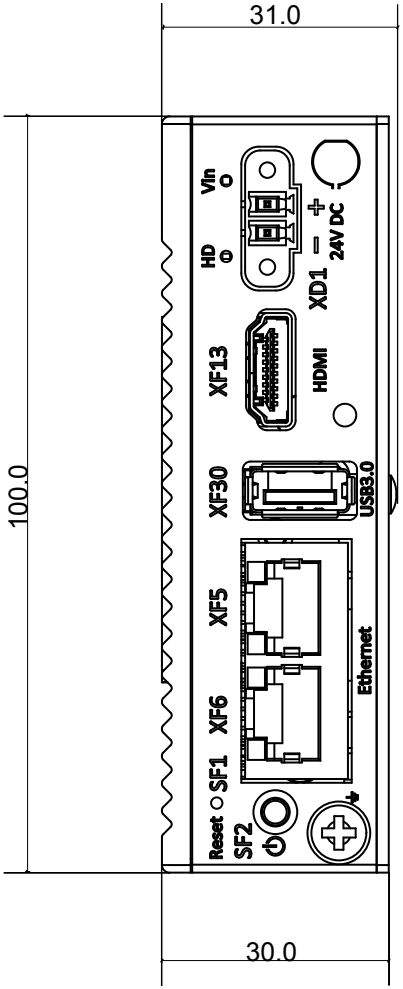


Fig. 10-1: Mounting dimensions for device variant NA, top-hat rail mounting

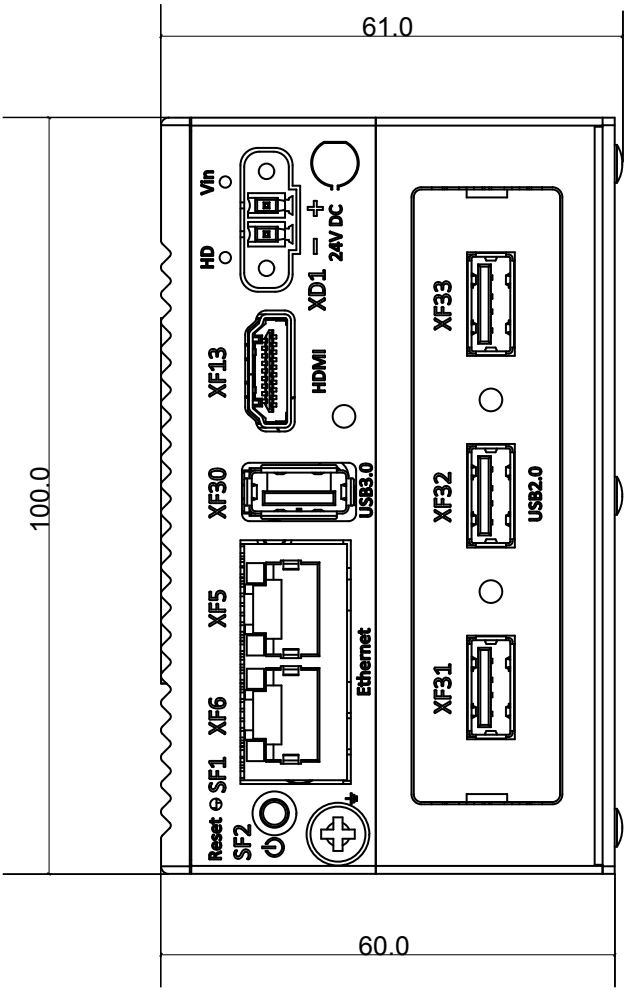


Fig. 10-2: Mounting dimensions for device variant NB, top-hat rail mounting

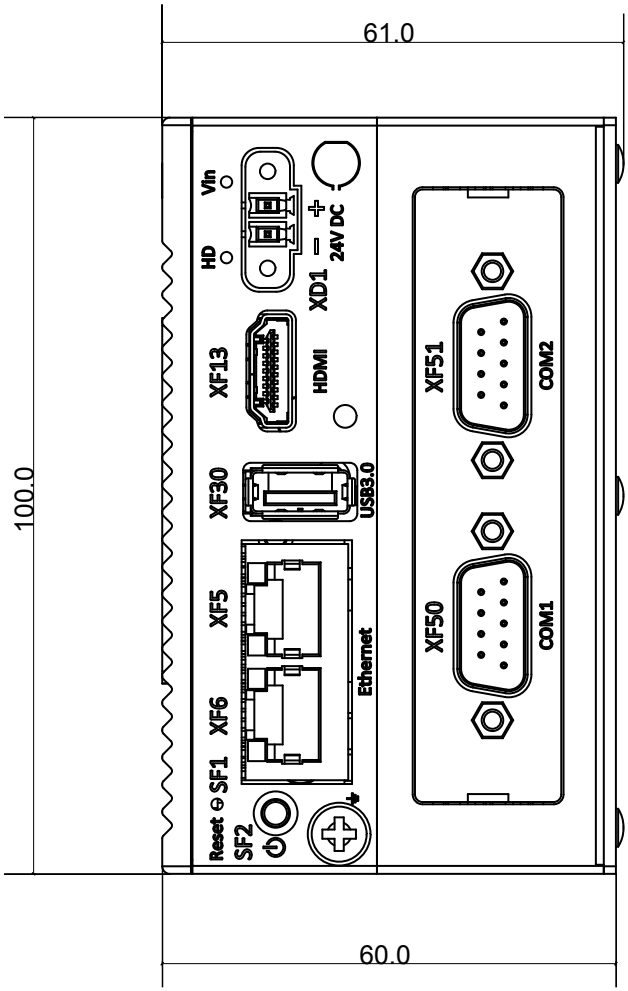


Fig. 10-3: Mounting dimensions for device variant NC, top-hat rail mounting

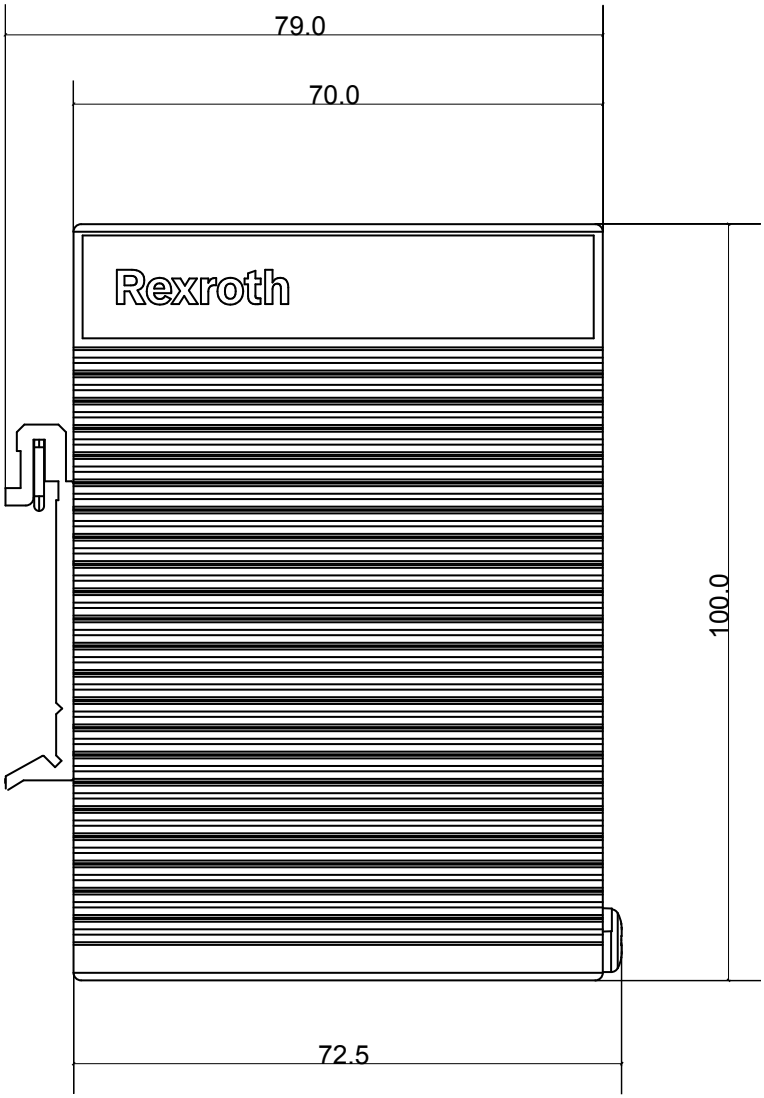


Fig. 10-4: Housing dimensions for device variants NA and NB, top-hat rail mounting, left side view

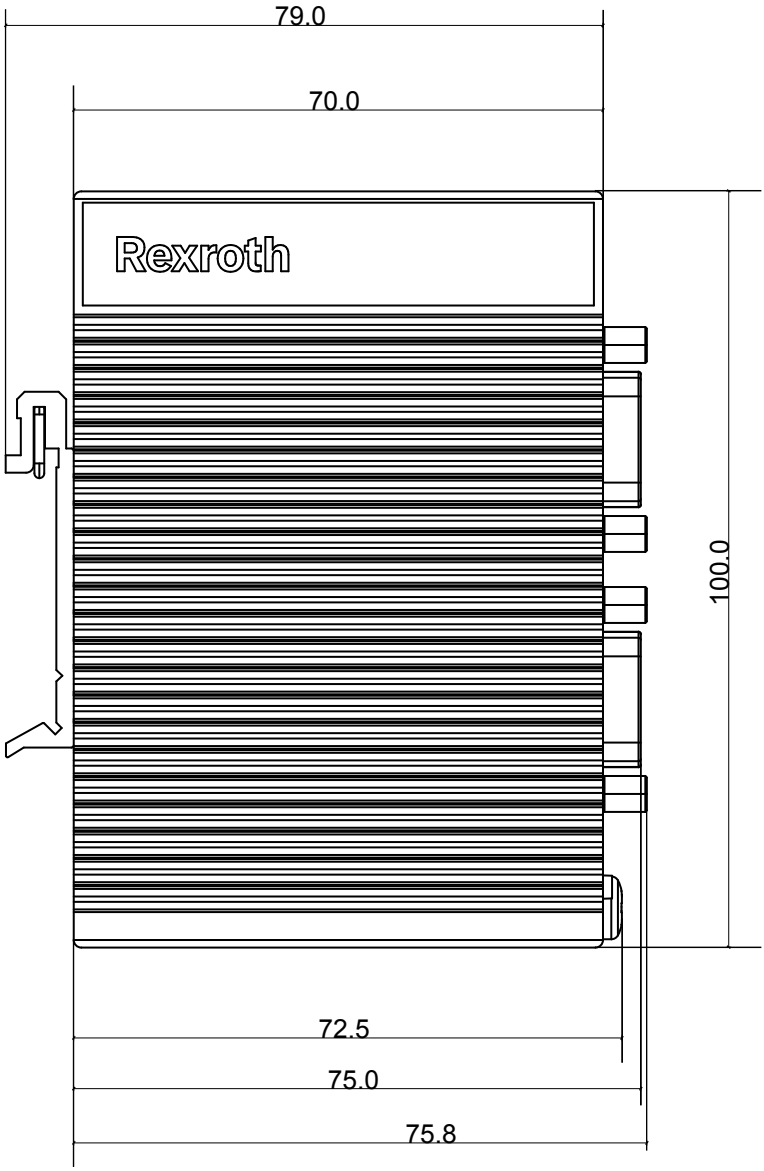


Fig. 10-5: Housing dimensions for device variant NC, top-hat rail mounting, left side view

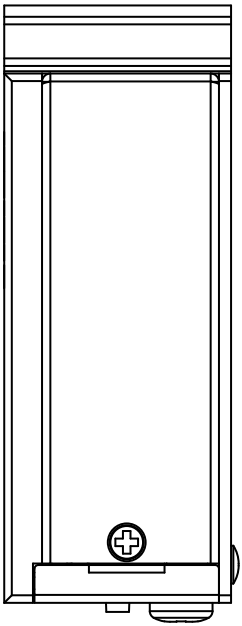


Fig. 10-6: Device variant NA, top-hat rail mounting, top view

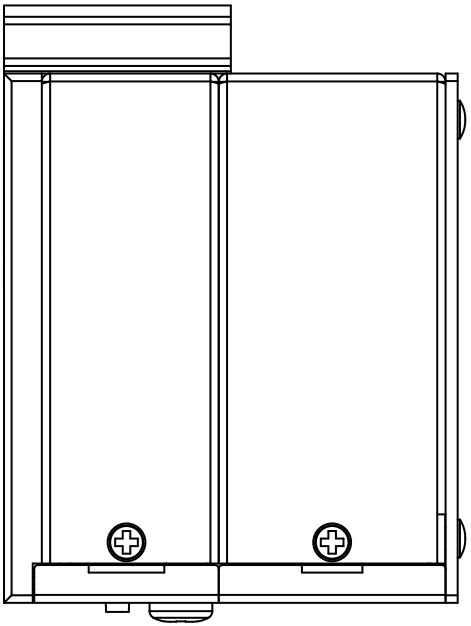


Fig. 10-7: Device variant NB, top-hat rail mounting, top view

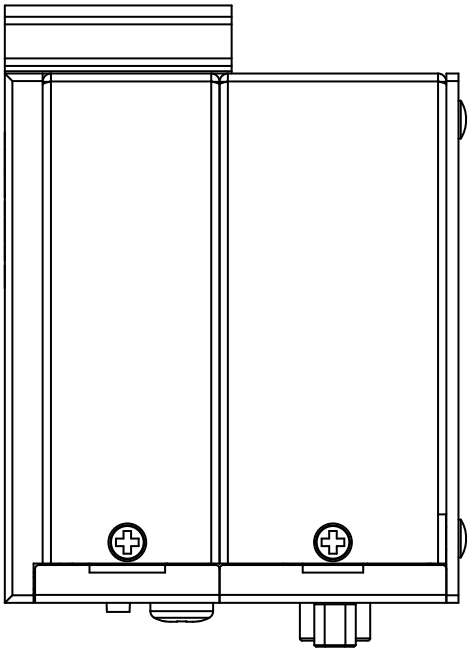


Fig. 10-8: Device variant NC, top-hat rail mounting, top view

10.2 Installation notes

- Provide a space of 50 mm on all sides for sufficient cooling and cable routing.
- The LED display on the operator panel must not be covered.
- Wire all cables in loops. Use strain reliefs for all cables.
- Do not lay signal carrying cables in parallel to motor cables or to other noise sources, as the signal transmission can be disturbed. Keep the maximum distance possible from interference sources.

10.3 Electric installation

10.3.1 Connecting the embedded automation computer to the 24 V voltage supply

1. Connect the "XD1" interface for the 24 V voltage supply to the industrial power supply unit.

For the voltage supply, use a 24 V industrial power supply unit acc. to DIN EN 60742, classification VDE 551, for example "VAP01.1H-W23-024-010-NN" (part number R911171065).

10.3.2 Overall connection diagram – Power supply unit and embedded automation computer

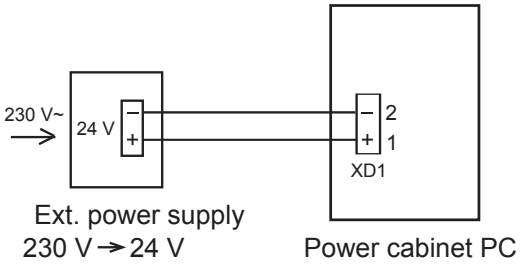


Fig. 10-9: Overall connection diagram – Power supply unit and embedded automation computer

11 Commissioning

11.1 IT security

The operation of installations, systems and machines requires the implementation of an integral concept for state-of-the-art IT security. Bosch Rexroth products are part of this integral concept. Bosch Rexroth product characteristics have to be taken into consideration in an integral IT security concept. The relevant characteristics are documented in the IT security guideline (R911342562).

11.2 Network configuration

See "Rexroth IndraControl PR and VR Devices Software Applications".

11.3 Interface configuration XF50, XF51

The device variant NC contains two serial interfaces XF50 and XF51. These serial interfaces are configured in the BIOS of the devices. Proceed as follows:

- Connect a USB PC keyboard and an HDMI monitor to PR21
- Switch on the supply voltage of PR21
- Press "Del" on the USB PC keyboard to access BIOS
- Go to "Advanced – IT8768E Super IO Configuration" in BIOS

The XF50 and XF51 interfaces can be configured as follows:

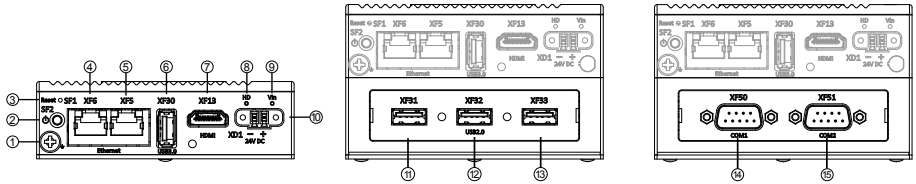
XF50	Serial port 1 configuration
XF51	Serial port 2 configuration

Tab. 11-1: Configuration XF50, XF51
The following configurations are available:

- RS-232 mode
- RS-485 mode
- RS-422 mode

12 Device description

The PR21 with Ubuntu Core does not support any UPS.



① Functional earth
② Power button
③ Reset button
④, ⑤ Ethernet interfaces
⑥ USB port (USB3.0)
⑦ HDMI port
⑧ LED, hard disk access
⑨ LED power
⑩ Voltage supply
⑪, ⑫, ⑬ USB interfaces (USB2.0)
⑭, ⑮, Serial interfaces

Fig. 12-1: Device views

12.1 Reset and power buttons

Reset button SF1		Hardware reset
Power button SF2	On, off	Operating system shutdown

Tab. 12-1: Reset and power buttons

12.2 Operating and error display

LED	On	Off	Flashes
Vin	S0: green, S3/S5: yellow	No supply voltage connected	N/A
HD	N/A	no mSATA access or device shut down	mSATA access read/ write: flashing green

S0 Working
S3 Standby
S5 Soft-Off

Tab. 12-2: LED description

13 Error causes and troubleshooting

Repairs at the device by the customer are not permitted. Exceptions are maintenance works listed in the chapter "Maintenance".

For further information in the event of repair, please contact the Bosch Rexroth Service.

For error display on the PC box, refer to chapter 12.2 "Operating and error display" on page 21.

Error	Correction
No screen at monitor at XF13 (HDMI)	• Connect the supply voltage and check the XD1 connection • Connect the HDMI cable correctly

Tab. 13-1: Error causes and troubleshooting

14 Maintenance

Only the maintenance works at the device listed in this chapter are permitted.

For further information in the event of repair, please contact the Bosch Rexroth Service.

NOTICE **Loss of IP degree of protection due to incorrect maintenance.**

Ensure that the IP degree of protection is retained during maintenance!

14.1 Scheduled maintenance tasks

- Check all plug and terminal connections of the components for proper tightness and possible damage at least once a year
- Check for wire breaks or crimped lines.
- Damaged parts must be replaced immediately.

15 Ordering information

15.1 Accessories and spare parts

For ordering information on accessories and spare parts, refer to chapter 5 "Spare parts, accessories and wear parts" on page 5.

15.2 Type code

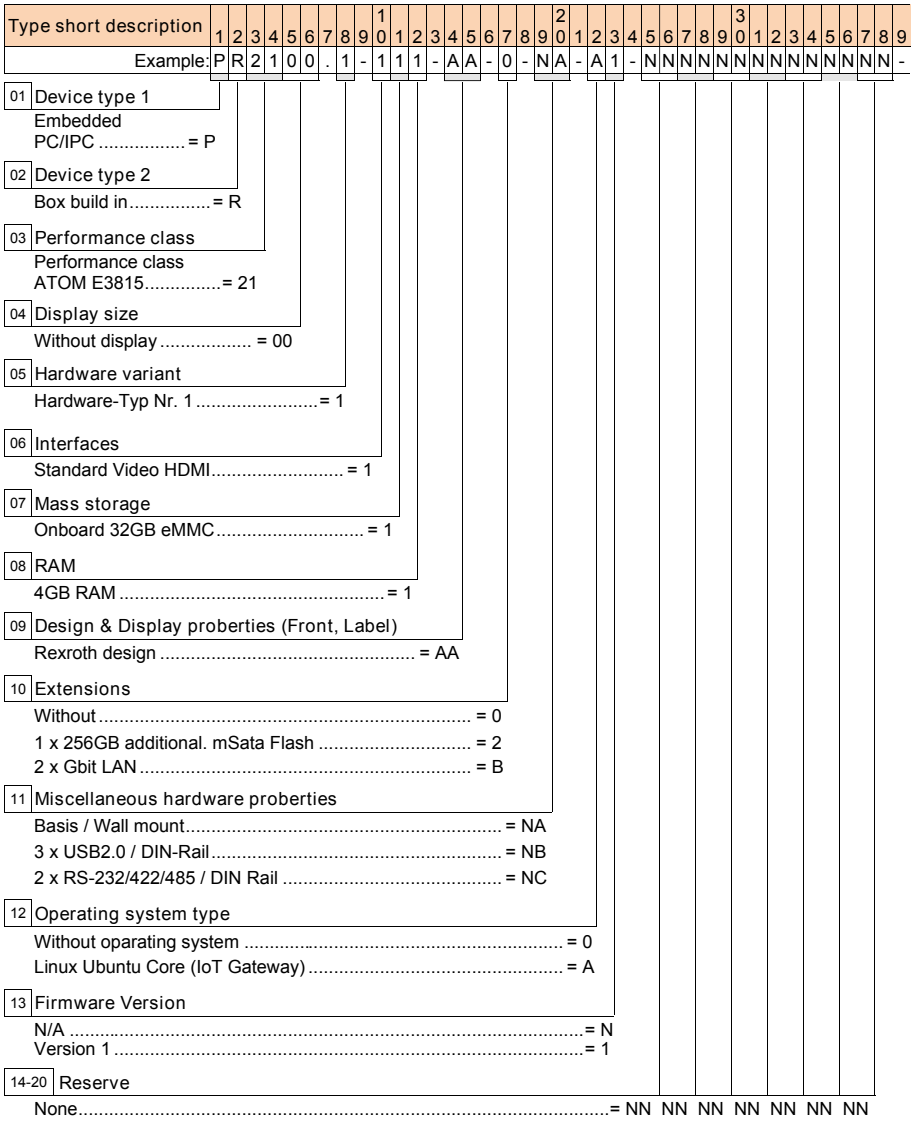


Fig. 15-1: Type code for PR21 devices

F10 (interface extension)	F11 (miscellaneous hardware properties)
0, 2, B	NA
0, 2, A	NB
0	NC

Tab. 15-1: Available combinations

16 Disposal

16.1 Return

For disposal, our products can be returned free of charge. However, the products must be free from remains such as oil, grease or other impurities.

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

Send the products free of charge to the following address:

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

16.2 Packaging

The packaging material consists of cardboard, plastics, wood or styrofoam. Packaging material can be recycled anywhere.

For ecological reasons, please do not return empty packages.

17 Service and support

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

Service Germany

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

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

Phone:	**+49 9352 40 5060**
Fax:	**+49 9352 18 4941**
E-mail:	service.svc@boschrexroth.de
Internet:	http://www.boschrexroth.com

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

Service worldwide

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

Preparing information

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

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

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