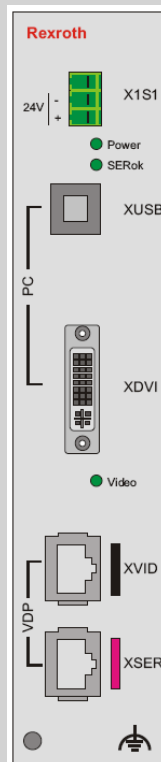


IndraControl VAC 02.1

CDI Box

Operating Instructions
R911346748

Edition 02



Change Record

Edition	Release Date	Notes
Edition 01	2015-03	First edition
Edition 02	2017-01	Supplements, connection description of a Y-repeater supplemented

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Editorial Department

Development Automation Systems Control Hardware HoBr (MaKo/MePe)

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1 About this documentation

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.

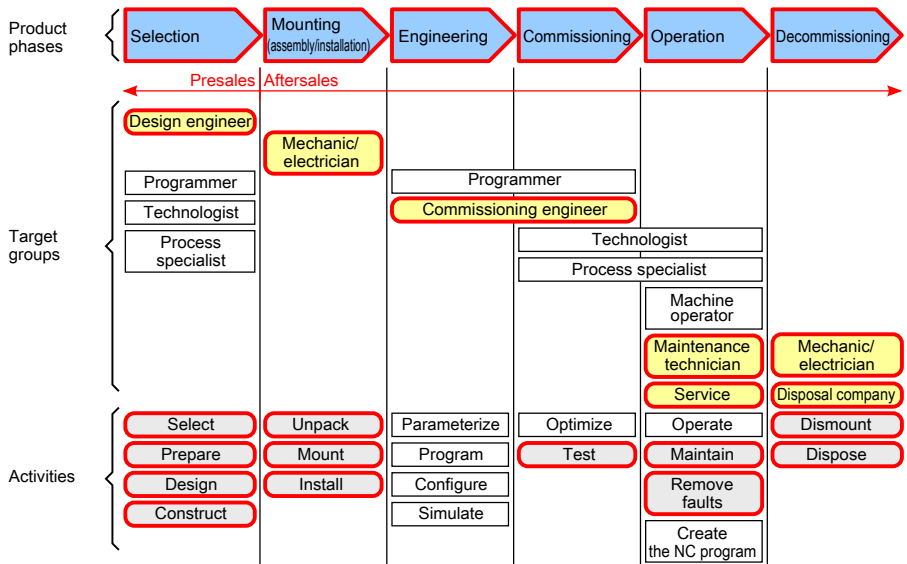


Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

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 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 variants whose type code starts with "VAC02...".

The type code specifications are located on the type plate of the device. Also refer to [chapter 15 "Ordering information" on page 28](#).

1.4 Related documents

Title	Part number	Document type
Rexroth IndraControl VAP 01 Power Supply Unit	R911339613	Operating Instructions
Rexroth IndraControl VDP 15.3, 18.3, 21.3 Multi Touch Operator Display – Built-In Devices	R911341191	Operating Instructions
Rexroth IndraControl VDP 16.3, 40.3, 60.3 Operator Display	R911336378	Operating Instructions
Rexroth IndraControl VPB 40.3 Control Cabinet PC	R911336750	Operating Instructions
Rexroth IndraControl VAC 01 Y-Repeater	R911336973	Operating Instructions

Tab. 1-1: Related documents

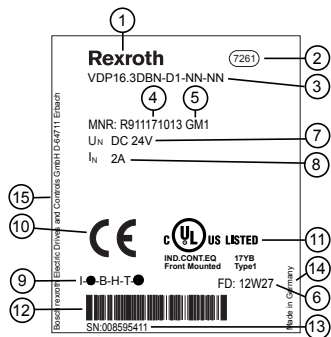
1.5 Customer feedback

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.

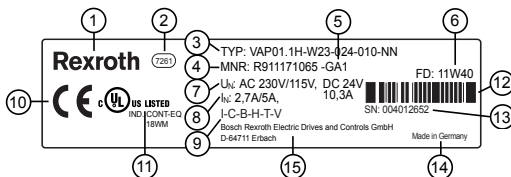
2 Product identification and scope of delivery

2.1 Product identification

The type plate is located on the rear side or at the side of the device.



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



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

Fig. 2-1: Exemplary type plates

2.2 Scope of delivery

- CDI box VAC 02.1
- Safety instructions
- 24 V female connector strip

3 Use of the safety instructions

3.1 Structure of the safety instructions

The safety instructions are structured as follows:

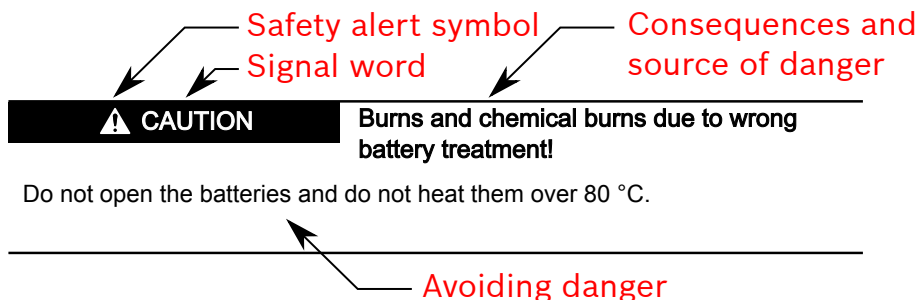


Fig. 3-1: Structure of the safety instructions

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 is used to draw attention to the safety instruction and also provides information on the severity of the hazard.

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

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

3.3 Symbols used

Hints are represented as follows:



This is an information.

Tips are represented as follows:



This is a tip.

3.4 Signal graphic explanation on the device



Prior to the installation and commissioning of the device, refer to the device documentation.

4 Intended use

The CDI box VAC 02.1 of Bosch Rexroth is designed for industrial environments.

NOTICE

Risk of damaging the device if not expressly stated accessories, mounting parts and other components, cables, and lines are used.

The CDI box VAC 02.1 may be used only as intended and with the accessories, mounting parts and other components specified in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same 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.

Areas of use and application of the CDI box VAC 02.1 together with a PC and an operator display are:

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

The CDI box VAC 02.1 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 Y-repeater

Connecting unit to connect two operator displays featuring the same resolution and the same version to one CDI box VAC 02.1.

Ordering code	Part number	Description
VAC01.1S-YD1-TCES	R911172852	Y-repeater for CDI interface

Tab. 5-1: Y-repeater

5.2 External 24 V power supply unit

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

Tab. 5-2: External 24 V power supply unit

5.3 Connecting cables for CDI interface



Malfunctions caused by using inappropriate CDI cables.

Use only cables listed in the following.

Ordering code	Part number	Description
RKB0008/000,5 (*****_*****_*****)	R911171484	Length: 0.5 m
RKB0008/001,0 (*****_*****_*****)	R911171485	Length: 1 m
RKB0008/002,5 (*****_*****_*****)	R911170151	Length: 2.5 m
RKB0008/005,0 (*****_*****_*****)	R911170152	Length: 5 m
RKB0008/007,5 (*****_*****_*****)	R911172971	Length: 7.5 m
RKB0008/010,0 (*****_*****_*****)	R911170153	Length: 10 m
RKB0008/015,0 (*****_*****_*****)	R911171183	Length: 15 m
RKB0008/020,0 (*****_*****_*****)	R911171184	Length: 20 m
RKB0008/025,0 (*****_*****_*****)	R911170154	Length: 25 m
RKB0008/030,0 (*****_*****_*****)	R911171381	Length: 30 m
RKB0008/035,0 (*****_*****_*****)	R911171369	Length: 35 m
RKB0008/040,0 (*****_*****_*****)	R911171382	Length: 40 m
RKB0008/050,0 (*****_*****_*****)	R911171383	Length: 50 m
RKB0008/055,0 (*****_*****_*****)	R911173779	Length: 55 m
RKB0008/060,0 (*****_*****_*****)	R911173780	Length: 60 m
RKB0008/065,0 (*****_*****_*****)	R911173781	Length: 65 m
RKB0008/070,0 (*****_*****_*****)	R911173782	Length: 70 m

Tab. 5-3: CDI connecting cable

Further cable lengths are available upon request.



Two cables are always required to establish a connection between the CDI box VAC 2.1 and the operator display (VDP).

5.4 Connecting cables for the USB interface

Ordering code	Part number	Description
RKB0019/000,5 (*****_*****_*****)	R911171165	Length 0.5 m
RKB0019/001,0 (*****_*****_*****)	R911171166	Length 1 m
RKB0019/003,0 (*****_*****_*****)	R911171167	Length 3 m
RKB0019/005,0 (*****_*****_*****)	R911171168	Length 5 m

Tab. 5-4: USB connection cable to the PC

6 Ambient conditions

	In operation	Transport	Storage
Max. ambient temperature	+5 °C to +45 °C	-20 °C to +60 °C	-20 °C to +60 °C
Max. temperature gradient	Temporal temperature changes up to 3 K per minute		
Humidity	Min. relative humidity: 5 %	Min. relative humidity: 5 %	Min. relative humidity: 5 %
	Max. relative humidity: 85 %	Max. relative humidity: 75 %	Max. relative humidity: 85 %
	Min. absolute humidity: 1 g/m ³	Min. absolute humidity: 1 g/m ³	Min. absolute humidity: 1 g/m ³
	Max. absolute humidity: 25 g/m ³	Max. absolute humidity: 25 g/m ³	Max. absolute humidity: 25 g/m ³
	Condensation not allowed	Condensation not allowed	Condensation not allowed
	Corresponds to climatic class 3K3 acc. to EN 60721-3-3	Corresponds to climatic class 2K2 acc. to EN 60721-3-2	Corresponds to climatic class 1K2 acc. to EN 60721-3-1
Air pressure	Up to 3,000 m above sea level acc. to EN 61131-2		
Mechanical strength	Max. vibration:	Max. shock:	Max. shock:
	Frequency range: 10 ... 150 Hz	15 g 11 ms	15 g 11 ms
	Excursion: 0.75 mm at 10 ... 57 Hz	Acc. to EN 60068-2-27, No malfunction	Acc. to EN 60068-2-27, No malfunction
	Acceleration: 1 g at 57 ... 150 Hz		
	Acc. to EN 600068-2-6		
Contamination level	2		
Overvoltage category	2	–	

Tab. 6-1: Ambient conditions

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
- Housing and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529

NOTICE

Defective product due to gases jeopardizing functions

Due to the risk of corrosion, avoid sulphurous gases (e.g. sulphur dioxide (SO₂) and hydrogen sulphide (H₂S)). The product is not resistant against these gases.

7 Technical data

Interfaces	<ul style="list-style-type: none">• CDI interface (Compact Display Interface) Image and data interface to the operator display (VDP) 2 × RJ45• 1 × DVI• 1 × USB port (type A)• 1 × voltage connection (3-pin)
Degree of protection	IP 20
Voltage supply	24 V DC (use a 24 V power supply unit acc. to DIN EN 60742, classification VDE 0551, for example the power supply unit VAP01.1H-W23-024-010-NN, part number R911171065)
Current consumption	5 V / 200 mA or 24 V / 40 mA
Max. power consumption	1.0 W
Weight	Approx. 0.52 kg

Tab. 7-1: Technical data of the CDI box VAC 02.1

8 Standards

8.1 Standards used

Standard	Meaning
EN 60 204-1	Safety of machinery - Electrical equipment of machines
EN 61 000-6-4	Generic standards - Emission standard (industrial environments)
EN 61 000-6-2	Generic standards – Noise immunity (industrial environments)

Standard	Meaning
EN 61 558-2-6	Transformer for 24 V power supply unit, safe separation
EN 60 664-1	Overvoltage category II
EN 61 131-2	24 V output requirements
EN 61 131-2	24 V current supply requirements
ISO 13 850	Safety of machinery, E-STOP devices
EN 60 529	Degrees of protection (including housings and installation compartments)
EN 60 068-2-6	Vibration test
EN 60 068-2-27	Shock test
EN 60 721-3-1 and EN 60 721-3-3	Climatic class

Tab. 8-1: Standards used

8.2 CE marking

8.2.1 Declaration of conformity



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

EMC directive 2004/108/EC

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

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

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



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.

8.3 UL/CSA certified



The devices are certified acc. to

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

UL file no. E210730

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

NOTICE

Material damages to electronics due to missing functional earth!

Ensure that the functional earth is connected between CDI box and operator display, as otherwise, the electronics can be destroyed by a potential difference between the operator display and the CDI box if the voltage supply is interrupted to only one device and established again. A direct connection of the functional earth between operator display and CDI box is optimal. If the functional earth is connected to a neutral point, operator display and CDI box have to be connected to this neutral point.



To avoid malfunctions, use only shielded cables and metallic or conductive connector/coupling covers with large-area shield support.

9.1 View

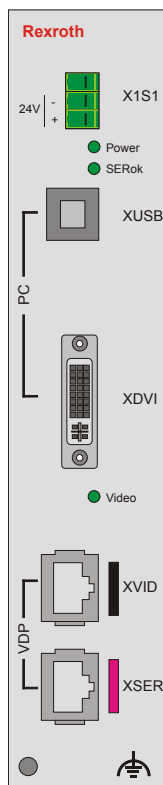



Fig. 9-1: Interfaces of the CDI box

9.2 Overview

Labeling at the housing	Connection type	Connector type, integrated	Mating connector or cable (from outside)
X1S1	24 V DC voltage supply	3-pin, MC1,5/3- G-3,5 THT	3-pin, FK-MCP 1,5/3-ST-3,5
XUSB	USB interface USB 2.0 connection to the PC. Length of 5 m max. Suitable ready-made cables are listed in chapter 5.4 "Connecting cables for the USB interface" on page 7	USB socket, Type A	USB plug, Type A
XDVI	PC with DVI interface (HDMI or DP interface at the PC can be connected via adapter)	DVI(A) female connector (24-pin and 5-pin)	DVI connector

Labeling at the housing	Connection type	Connector type, integrated	Mating connector or cable (from outside)
XVID	CDI interface, image	RJ45 socket	RJ45 plug
XSER	CDI interface, data	RJ45 socket	RJ45 plug
	Functional earth (FE)	M5	Ring cable lug

Tab. 9-1: Interface description

NOTICE

Malfunctions due to insufficient shielding!

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

9.3 DC 24 V voltage supply



Connect +24 V if the PC does not provide any voltage supply or a voltage supply that is too low at the USB interfaces.

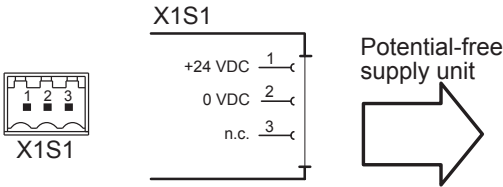


Fig. 9-2: Connection of 24 V voltage supply

Pin	Function
1	DC +24V supply voltage
2	0 VDC supply voltage
3	n.c.

Use a 24 V industrial power supply unit acc. to DIN EN 60742, classification VDE 0551, for example "VAP01.1H-W23-024-010-NN" (part number R911171065) for the voltage supply.



Use only copper wires to wire the connection terminals.

9.4 USB interface

A USB interface is provided at the CDI box.

This interface is used to transmit USB data sent from the operator display to the CDI box via the XSER interface to the PC.

9.5 XSER and XVID interfaces

9.5.1 CDI interface

The CDI interface is assigned to the two RJ45 female connectors XSER and XVID. The connection between the CDI box and the operator display is established at these sockets via two ready-made cables available as accessory, see [chapter 5.3 "Connecting cables for CDI interface" on page 6](#).

The CDI interface includes the data interface (XSER) as well as the image interface (XVID).

9.5.2 XVID and XSER marking

The CDI interfaces are color-coded on the device:

CDI interface, data (XSER)	Violet
CDI interface, image (XVID)	Black

Tab. 9-2: Color-coding of the interface

9.6 DVI interface XDVI

At the DVI connection (XDVI), a PC with DVI interface can be connected. PCs can be connected to HDMI or DP interface via adapter.

DVI socket, 24 + 5-pin

Cable length:	1.5 m max.
Cable type:	Shielded, cross-section min. 0.14 mm ²
Max. resolution:	1920 × 1080 (full HD)

The resolution and number of the colors are set in the control panel of the operating system.

10 Mounting, demounting and electric installation

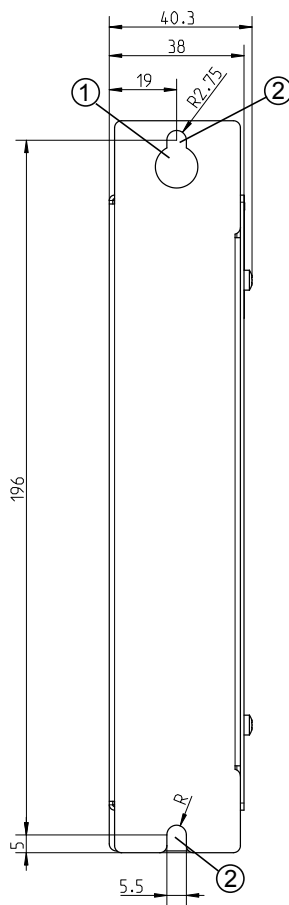
10.1 Installation notes

- Provide a space of 50 mm on all sides of the device for sufficient cooling and cable routing
- Wire all cables in loops. Use strain reliefs for all cables
- Keep the maximum distance possible from interference sources
- Do not lay the CDI cables in parallel to motor cables or to other noise sources, as the CDI connection can be disturbed

10.2 Housing dimensions



All dimensions in millimeters.



- ① Keyhole for vertical mounting
- ② Slots to tighten the device

Fig. 10-1: Rear view

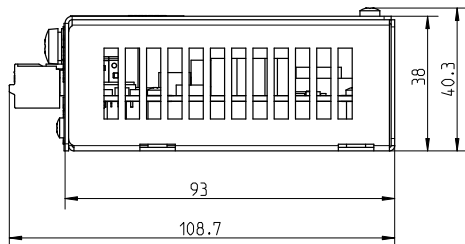


Fig. 10-2: Top view

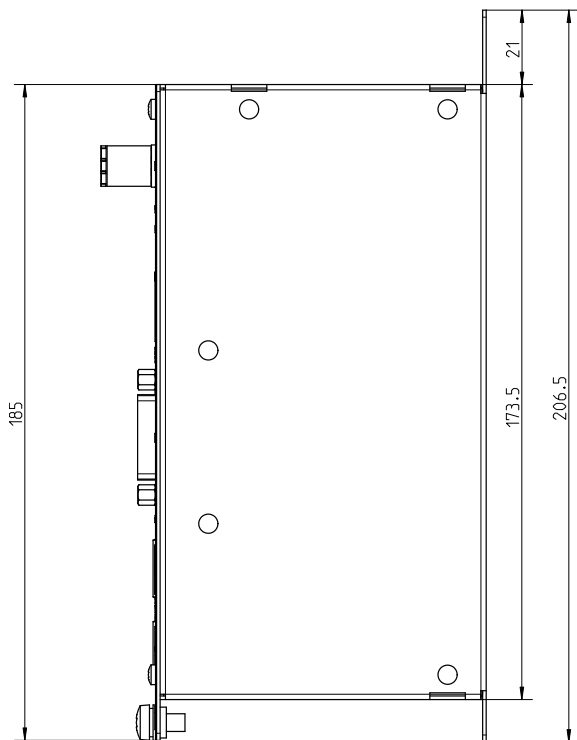


Fig. 10-3: View from right

10.3 Mounting

1. Mounting CDI box at rear panel

The distances of the mounting holes is listed in [fig. 10-1 "Rear view" on page 14](#).

Use two M5 screws to attach the CDI box to the rear panel.

2. Fixing the cables

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

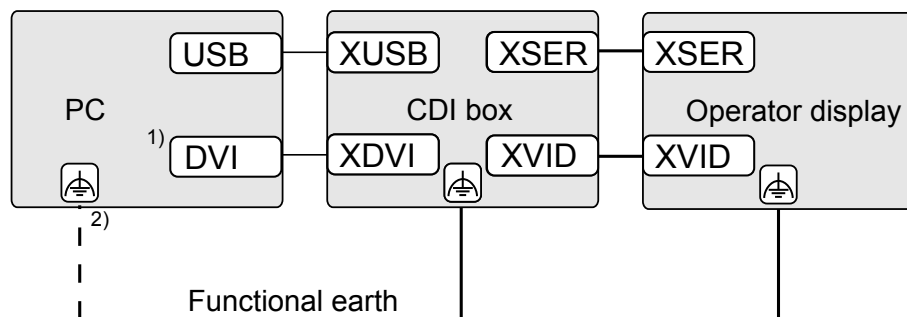
10.4 Demounting

1. Disconnect the CDI box from voltage.
2. Remove all connected cables (including the cables at the function earth connection).
3. Loose both screws used to screw the CDI box to the rear panel.
4. Lift the CDI box vertically and remove the CDI box from the rear panel.

10.5 Electric connection

10.5.1 Connect the CDI box to the operator display and to the PC

Connection diagram



1) HDMI and DP connection can be connected via adapter

2) Connect the functional earth if a functional earth connection is available

Fig. 10-4: Cabling of operator display, PC or CDI box

Connection

1. Connect the functional earth.



2. Connect the violet RJ45 data interface "XSER" at the operator display to the RJ45 data interface "XSER" at the CDI box.
3. Connect the black RJ45 image data interface "XVID" at the operator display to the RJ45 image data interface "XVID" at the CDI box.

4. Connect the XDVI connection of the CDI box to the DVI connection of the PC (for a PC with HDMI or DP connection, connecting via adapter is possible).
5. Connect the XUSB connection of the CDI box to a USB connection of the PC.

NOTICE**Material damages to electronics due to missing functional earth!**

Ensure that the functional earth is connected, as otherwise the electronics can be destroyed by a potential difference between the VDP and the CDI box if the voltage supply is interrupted to only one device and re-established. If there is an FE connection at the PC, also connect the PC to the functional earth.

A direct connection of the functional earth between operator display, CDI box and PC (optional). If the functional earth is connected to a neutral point, operator display, CDI box and PC (optional) have to be connected to this neutral point.



When wiring CDI cables with a diameter of 7.4 mm, observe the following bending radii:

- Radius when bended once during wiring: $4 \times$ cable diameter
- Minimum bending radius when moved permanently: $8 \times$ cable diameter
- Optimum bending radius when moved permanently: $12.5 \times$ cable diameter

**Malfunction due to mechanical forces on the CDI cables.**

Avoid mechanical stress (tensile, compressive, torsional and lateral forces) caused by plugs to the RJ45 socket.

**Malfunction operation due to interchanged CDI cables.**

To clearly identify cables, label them, e.g. with cable markers or clips.



The maximum cable length depends on the display resolution:

- Up to 50 meters: 1920 × 1080 pixels (only VDP 21.3)
- Up to 60 meters: 1280 × 1024 pixels (only VDP 60.3)
- Up to 70 meters: 1366 × 768 pixels (only VDP 15.3 and VDP 18.3)
- Up to 70 meters: 1024 × 768 pixels (only VDP 40.3 and VDP 60.3)
- Up to 80 meters: 800 × 600 pixels (all VDP xx.3)

Longer cables can be used when using a Y-repeater. Also refer to the operating instruction of the Y-repeater ([R911336973](#)).

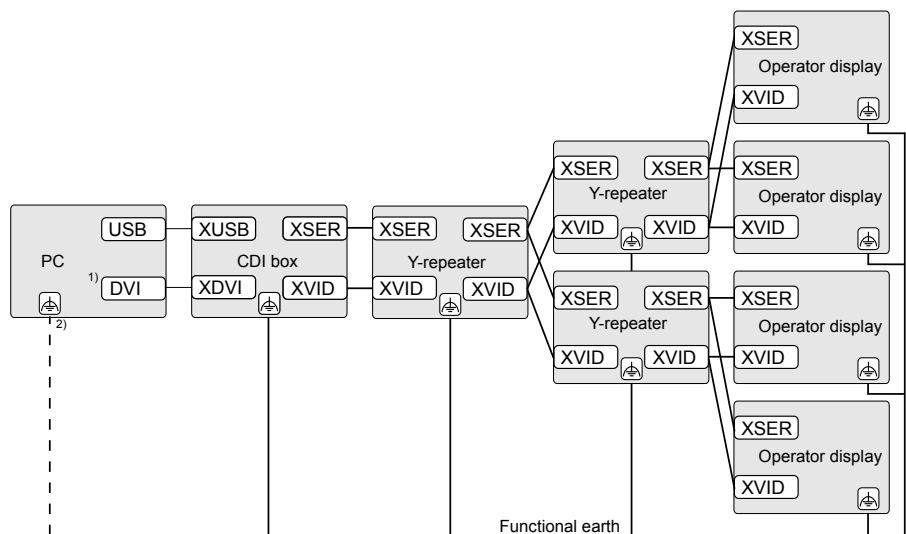


Malfunctions caused by using inappropriate cables.

Use only cables listed in [chapter 5.3 "Connecting cables for CDI interface"](#) on page 6.

10.5.2 Connecting CDI box at a Y-repeater, PC and operator display

Connection diagram



- 1) HDMI and DP connection can be connected via adapter
- 2) Connect functional earth (FE) if FE connection available

XSER Violet RJ45 data interface
XVID Black RJ45 image data interface

Fig. 10-5: Cabling PC and CDI box with two Y-repeaters and four operator displays

Connection

1. Connect the functional earth.



2. Connect the violet RJ45 data interface "XSER" at the operator display to the RJ45 data interface "XSER" at the Y-repeater.
3. Connect the black RJ45 image data interface "XVID" at the operator display to the RJ45 image data interface "XVID" at the Y-repeater.
4. Connect the violet RJ45 data interface "XSER" at the Y-repeater to the RJ45 data interface "XSER" at the CDI box.
5. Connect the black RJ45 image data interface "XVID" at the Y-repeater to the RJ45 image data interface "XVID" at the CDI box.
6. Connect the XDVI connection of the CDI box to the DVI connection of the PC (for a PC with HDMI or DP connection, connecting via adapter is possible).
7. Connect the XUSB connection of the CDI box to a USB connection of the PC.

NOTICE

Material damages to electronics due to missing functional earth!

Ensure that the functional earth is connected, as otherwise the electronics can be destroyed by a potential difference between the VDP and the CDI box if the voltage supply is interrupted to only one device and re-established. If there is an FE connection at the PC, also connect the PC to the functional earth.

A direct connection of the functional earth between operator display, CDI box and PC (optional). If the functional earth is connected to a neutral point, operator display, CDI box and PC (optional) have to be connected to this neutral point.



When wiring CDI cables with a diameter of 7.4 mm, observe the following bending radii:

- Radius when bended once during wiring: $4 \times$ cable diameter
- Minimum bending radius when moved permanently: $8 \times$ cable diameter
- Optimum bending radius when moved permanently: $12.5 \times$ cable diameter



Malfunction due to mechanical forces on the CDI cables.

Avoid mechanical stress (tensile, compressive, torsional and lateral forces) caused by plugs to the RJ45 socket.

**Malfunction operation due to interchanged CDI cables.**

To clearly identify cables, label them, e.g. with cable markers or clips.



For the possible cable lengths with a Y-repeater, refer to the operating instructions of the Y-repeater, part number [R911336973](#).

**Malfunctions caused by using inappropriate cables.**

Use only cables listed in [chapter 5.3 "Connecting cables for CDI interface"](#) on page 6.

10.5.3 Connecting CDI box to 24 V voltage supply

Connect +24 V if the PC does not provide any voltage supply or a voltage supply that is too low at the USB interfaces.

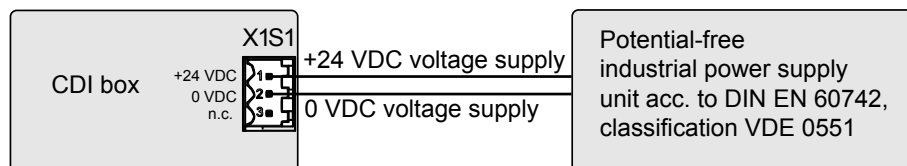
Connection diagram

Fig. 10-6: Cabling power supply unit to CDI box

Connection

1. Connect "X10" for the 24 V voltage supply to the industrial power unit.

Use a 24 V industrial power supply unit acc. to DIN EN 60742, classification VDE 0551, for example "VAP01.1H-W23-024-010-NN" (part number R911171065) for the voltage supply.



Use only copper wires to wire the connection terminals.

NOTICE

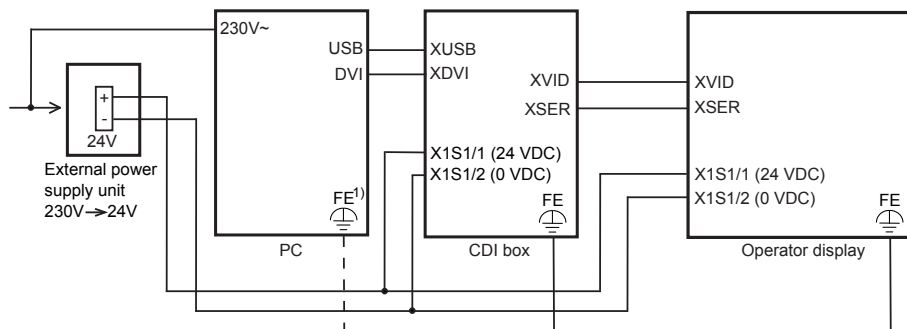
In case of greater distance between the operator display (VDP) and the CDI box, equalizing currents may flow when using a non-isolated power supply unit as pin 2 is internally connected to the housing.

In this case, use an isolated power supply unit.



Generating 24 V is described in the operating instructions "Rexroth IndraControl VAP 01.1 Power Supply Unit" part no. R911339613).

10.5.4 Overall connection scheme



1) Connect FE if available

Fig. 10-7: Connection diagram with power supply unit, PC, CDI box and operator display

10.5.5 Recommendation for the mounting of CDI cables with long lengths in an interference-prone environment

The CDI cable is a connection cable with RJ45 plug to connect the CDI interface of the control cabinet PC to the remote operator display or the Y-repeater.

These mounting recommendations facilitate an optimized signal transmission. In particular in case of great cable lengths and distances between the control cabinet PC and the remote operator display, ensure that the cable is installed correctly and that the shield is connected correctly.

Cables routing

Observe the following when routing cables:

- Keep the maximum possible distance to interference-prone cables and lines
- Limit parallel routing with other lines
- Keep the maximum possible distance to sources of interference such as drives and frequency converters
- Mechanical protection against tensile and compressive load on the cables
- Comply with the permissible bending stress and torsional stress of the cable
- Avoid collection of dirt at the RJ45 plug which can occur while drawing the cables into the system.

Potential equalization

Ensure that no compensating current flows via the cable shield of the CDI cables between device and machine parts during the installation of the equipotential bonding.

Shielding

The shielding is an important component of the CDI cable. The shielding is used to shield the data wires in the cable against electrical interferences from the environment. The shielding has to be connected to the potential equalization of the devices to shield the data wires. In most cases, a connection via the RJ45 connectors is sufficient.

Remove any collection of dirt from the shield surfaces of the RJ45 plugs before plugging them in.



Fig. 10-8: RJ45 plug shielding areas

Additional shielding connection in case of strong electrical interferences and long cables

In case of strong electrical interferences and long cable lengths, it can be required to additionally connect the shielding to the earthing potential.

Observe the following for an additional shielding connection:

- Mount suitable EMC shielding clamp close to the control cabinet PC, the remote operator display or the Y-repeater
- Ensure that the CDI cable is not crimped when connecting the shielding to the equipotential bonding
- Avoid mechanical stress (tensile, compressive) on the plug
- Use an EMC shielding clamp suitable for the cable diameter. Crimping the cable impairs the electrical properties of the CDI cable

To mount the shielding connection, proceed as follows:

1. Only remove the CDI cable jacket on the length required for the connection.



The CDI cable is sensitive to mechanical load where the jacket was removed. Ensure that the CDI cable shielding is not damaged when removing the cable jacket.



Fig. 10-9: CDI cable with RJ45 plug



Fig. 10-10: CDI cable with partially removed jacket

2. Remove the foil shield.



CDI cables are equipped with an additional foil shield. The foil shield must not be used for the connection with the shielding clamp. The foil shield is usually plastic-coated on one side for an improved stability. The plastic coating is insulating.



Fig. 10-11: Foil shield of the CDI cable



Fig. 10-12: Foil shield removed

3. Fasten cable with EMC shielding clamp.

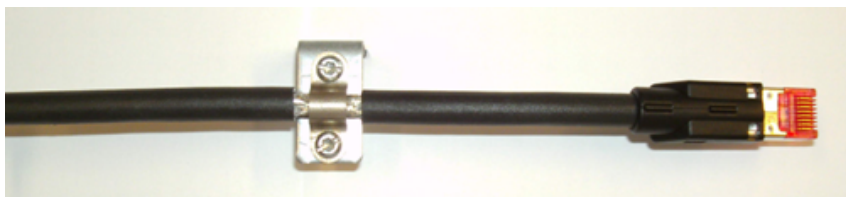


Fig. 10-13: CDI cable with shielding clamp

More shielding clamps:



- ① Vendor: Ikotec
- ② Vendor: Phoenix Contact

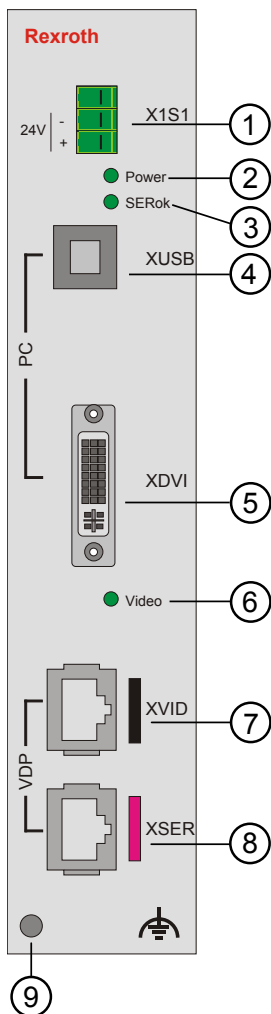
Fig. 10-14: Shielding clamps

11 Commissioning

The product can be used directly. No configuration is required.

12 Device description

The VDP xx.3 operator displays can be connected to any PC using the Rexroth IndraControl VAC 02.1 CDI box.



- | | |
|--------------------------------|-------------------------|
| ① 24 V power supply connection | ⑤ DVI input |
| ② LED "Power" | ⑥ LED "Video" |
| ③ LED "SERok" | ⑦, ⑧ CDI Interface |
| ④ USB port | ⑨ Functional earth (FE) |

Fig. 12-1: Position of connections and status LED

12.1 Operating and error displays

There are three LEDs on the front panel to display device states and errors. Take one of the following measures if one of the succeeding LEDs displays an error or a note.

LED	Display	Meaning	Action
Power	LED green	Normal operation	–
	LED off	No supply voltage (no +5 V from USB port of the PC (or no +24 V at the optimum con- nection X1S1))	Check supply voltage
SERok	LED green	Serial data transmission OK	–
	LED off	No serial connection to the operator display	Check cables
Video	LED green	Image transmission OK	–
	LED off	No image transmission to the operator display	Check cables

Tab. 12-1: LEDs for operating and error display on the front panel

12.2 Y-repeater

Two operator displays can be connected to one CDI box using a Y-repeater. It cascades up to four operator displays. For more information on the Y-repeater, refer to the operating instructions "Rexroth IndraControl VAC 01 Y-Repeater" (see [chapter 1.4 "Related documents" on page 2](#)).

13 Error causes and troubleshooting

For information on the error display on the front panel, refer to [chapter 12.1 "Operating and error displays" on page 25](#).

Errors	Troubleshooting
No image visible	<ul style="list-style-type: none">● Connect the supply voltage and check the X1S1 connection● Connect the CDI cable correctly and check XVID and XSER● Set the image output in the graphics driver to DVI output● Switch on the voltage at the VDP before or at the same time as the PC
Wrong display resolution	<ul style="list-style-type: none">● Set the correct display resolution in the graphics driver● Restart the PC

Tab. 13-1: 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.

14 Maintenance

NOTICE

Loss of IP degree of protection due to incorrect maintenance.

Ensure that the IP degree of protection remains during 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.

14.1 Tightening torques

NOTICE

Damage to the mechanics caused by wrong tightening torque.

If screws were removed due to maintenance works, fasten them again with the corresponding tightening torque according to the following table.

Thread	Tightening torque
M5	2.8 Nm

Tab. 14-1: Tightening torques

14.2 Cleaning notes

NOTICE

Damage of connections due to solvents!

- Do not use any solvents (e. g. diluents)!
- Do not use high pressure cleaning device!

14.3 Regular maintenance tasks

- Check all plug and terminal connections of the components for proper tightness and possible damage at least once a year
- Check that no cables are broken or pinched
- Replace damaged parts 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

Type short description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Example:	V	A	C	0	2	.	1	S	-	C	D	1	-	N	N	N	N			2
Product	VAC					= VAC														
Line	2					= 02														
Design	1					= 1														
Mounting style	Standard					= S														
Function mode	Converter					= C														
Control panel interface	CDI					= D1														
Other design	Standard					= NNNN														

Fig. 15-1: Type code VAC 02.1

16 Disposal

16.1 Return

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

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

Send the products free of charge to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Bürgermeister-Dr.-Nebel-Straße 2
D-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 to Bosch Rexroth.

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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Notes

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