

You will find the operating manual  
on: [www.a-eberle.de](http://www.a-eberle.de)

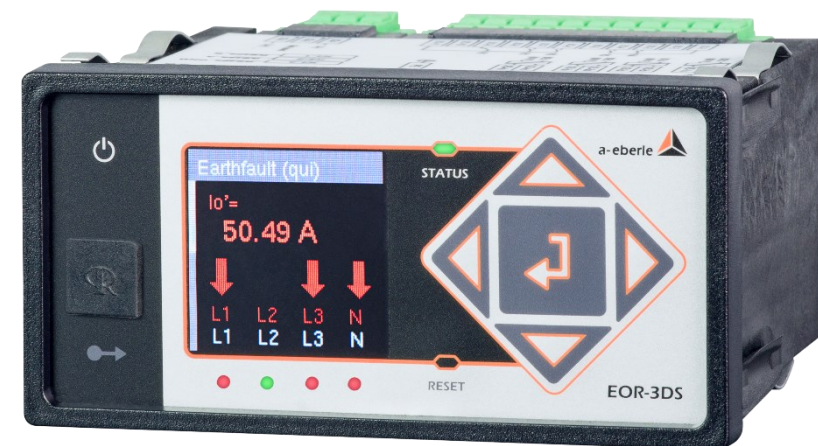


# Installation Instructions

## Earth Fault and Short Circuit Indicator

Model: EOR-3DS

- ▶ General information
- ▶ Safety details
- ▶ Installation
- ▶ Operation / Display
- ▶ Technical specifications



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# 1. General Information

## 1.1 General Information

This installation manual contains all important information regarding mounting and commissioning. Read this manual carefully and completely as it contains important information about the product. Use this information and obey the security details and warnings. Store this manual securely and make sure that it is always available to the product operator.

The company **A. Eberle GmbH & Co. KG** does not accept any liability for damage or losses of any kind arising from noncompliance with this information as well as printing errors or changes in this manual. Furthermore, the company **A. Eberle GmbH & Co. KG** will not accept any liability for loss or damage of any kind resulting from faulty equipment or devices that have been modified by the user.

## 1.2 Changes

Please notice that these installation instructions may not always contain the latest information concerning the device. If, for example, the firmware version has changed, then the present description may be incorrect in some points.

In this case please contact us or use the current version of this document and any additional documents concerning this device on our website (<https://www.a-eberle.de/en/>).

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Changes reserved

## 1.3 Disposal

Directive 2012/19/EU, better known as the WEEE2 directive, deals with the return and recycling of electronic waste and electrical equipment in order to recover valuable raw materials. This concerns all A. Eberle products marked with the symbol of a waste garbage can.



- Our WEEE registration number is:  
DE 37396879

For old devices please also note the information on our homepage:

<https://www.a-eberle.de/en/about-us/take-back-recycling/>

## 1.4 Warranty

We guarantee that every product of A. Eberle GmbH & Co. KG is free of material and manufacturing defects under normal use. The detailed conditions for the warranty can be found in our general terms and conditions of business under: <https://www.a-eberle.de/en/general-terms/>.

To claim warranty, please contact A. Eberle GmbH & Co KG in Nuremberg or use the RMA formular on our homepage under <https://www.a-eberle.de/en/>.

## 2. Safety details

### 2.1 Safety instructions


IT IS IMPORTANT TO OBEY THESE INSTRUCTIONS IN ORDER TO ENSURE THE SAFETY OF INDIVIDUALS. THESE INSTRUCTIONS ARE TO BE STORED SECURELY!

- Observe the operating instructions.
- Always keep the operating instructions with the unit.
- Make sure that the device is never operated in a damaged or compromised condition.
- Make sure that only specialized personnel operate the unit.
- The device must be connected according to the manufacturer's installation instructions.
- Make sure that the device is never operated beyond its stated ratings.
- Do not install or operate the device in environments where explosive gases, dust or vapors may be present.
- Ensure that protective covers are always in place and are functional.
- Ensure that the five safety regulations according to DIN VDE 0105 are always observed.
- Clean the appliance only with commercially available detergents.

These installation instructions do not contain every safety detail necessary for operating the device. Special operating conditions may require additional measures. These installation instructions contain references that have to be obeyed for your personal safety and to prevent property damage.


### 2.2 Structure of warnings


Warnings are structured as follows:


 <b>SIGNAL WORD</b>	<p><b>Nature and source of the danger.</b></p> <p>Consequences of non-compliance.</p> <ul style="list-style-type: none"> <li>➤ Measures to avoid the danger.</li> </ul>
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### 2.3 Types of warnings


Warnings are distinguished by the type of danger they are warning against:

 <b>DANGER!</b>	Warns of imminent danger that can result in death or serious injuries if not avoided.
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 <b>WARNING!</b>	Warns of a potentially dangerous situation that can result in death or serious injuries when not avoided.
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 <b>CAUTION!</b>	Warns of a potentially dangerous situation that can result in fairly serious or minor injuries when not avoided.
---	--

<b>NOTICE!</b>	Warns of a potentially dangerous situation that if not avoided could result in material or environmental damage.
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	Tips on the appropriate device use and recommendations
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## 2.4 Intended use

The Earth Fault and Short Circuit Indicator EOR-3DS is intended for fixed installation and the continual measurement, monitoring and evaluation of voltages and currents.

The EOR-3DS is exclusively intended for use in electrical power engineering facilities and installations, where professionals carry out the necessary work.

Professionals are defined as people who are familiar with the installation, assembly, commissioning and operation of such products. They have qualifications that meet the requirements of their activities.

The earth fault and short circuit indicator EOR-3DS complies with the laws, rules and standards applicable at the time of delivery, in particular with relevant safety and health requirements.

In order to maintain this condition and ensure safe operation, the operator must follow all the instructions and warnings in the user manual and the technical data must be observed.

A. Eberle GmbH & Co. KG accepts no liability for damage resulting from unauthorized or improper modification or use of the product. Improper modifications of the product without consultation with A. Eberle GmbH & Co. KG can lead to personal injury, property damage and malfunctions.

The EOR-3DS is suitable for the following sites of installation and may only be operated in these locations:

- Switch panel mounting
- DIN rail mounting

## 2.5 Other applicable documents

For safe and correct use of the facility also notice the additional documents, e. g. the complete operating instructions and included documents as well as effective standards and laws.

## 2.6 Target group

The installation manual is intended for skilled technicians and trained and certified operators. The contents of this installation manual must be accessible to people tasked with the installation and operation of the system. To avoid personal or property damage the operating personnel must be an electrically trained person with the following knowledge.

- Knowledge of national accident prevention guidelines
- Knowledge of standards in safety engineering
- Knowledge of installation, commissioning and operation

## 2.7 Cleaning instructions

Use a soft, slightly damp, lint-free cloth. Make sure no liquid gets in the housing. Do not use window cleaners, sprays, dissolvent, cleaners that contain alcohol, ammonia solutions or abrasive cleaning agents.

Only use water for cleaning.

## 2.8 Meaning of the symbols in use



**CAUTION - DANGER!** Read the operating instructions and security details



Functional ground of the measuring device



Service adapter connection



TCP-IP interface



The CE label guarantees the adherence of europeans directives and the regulations concerning the EMV.



The CMIM label guarantees the adherence of safety standards for electronic products in Morocco.



DC Voltage



WEEE2 label, see chapter 1.3

## 3. Commissioning

### 3.1 EOR-3DS short description

The EOR-3DS combines earth fault and short circuit location in a compact device. The advantages of various locating methods can be used and prioritized. The device has been developed for locating on one feeder. Through a multitude of SCADA protocols, SPS functionality, the use of monostable relays and IT-security features the EOR-3DS is especially designed for the use in intelligent secondary substations.

### 3.2 Scope of delivery

The EOR-3DS's scope of delivery includes a display unit for indication and localization of short circuits and earth faults. Depending on the order characteristics 'C' and 'U' the device is delivered with different measurement cards and / or additional current and voltage adapters. In addition, depending on the order characteristic 'V' the device has a RJ45 port.

- EOR-3DS possibly including C21/C25 and / or U10 Adapter (with connection cables towards EOR-3DS device and mounting option 'device frame' or 'DIN rail adapter')
- Installation instructions
- Additionally ordered adapter cables and service adapters
- Additionally ordered case adapters for DIN rail mounting

### 3.3 Mounting

The EOR-3DS is designed for mounting in a compact switch gear. It is mounted in a control panel cut-out or with an additional available housing adapter on a DIN rail.

The cut-out needs the following dimensions: 92+0,8 x 45+0,6 mm.

**NOTICE!** Property damage by failure to comply to the mounting instructions

The device can be damaged by disregarding the mounting instructions or through incorrect mounting!

The EOR-3DS has metal brackets on the top and bottom, as well as plastic brackets on the side. When correctly mounted these brackets lock in place in the cut-out. The plastic brackets have to be removed to dismount the device.



*EOR-3DS in control panel cut-out*

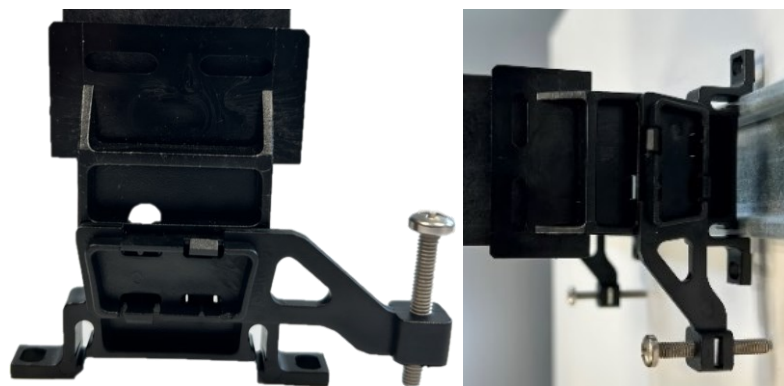


*EOR-3DS mounted on a DIN rail*

To mount the DIN rail adapter the four screws on the back of the EOR-3DS have to be removed. Afterwards the rail adapter can be mounted using the provided, longer screws. There are two additional provided braces that can be used to support the device additionally.



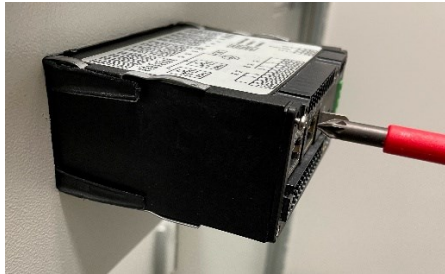
*Mounting the DIN rail adapter onto the EOR-3DS*



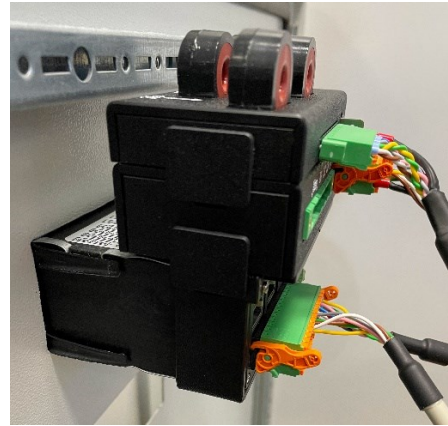
*Mounting the additional braces onto the EOR-3DS*

Connect the braces to the outside of the adapter. Put the slot nut into the slot. Afterwards the screw can be mounted and the device can be aligned horizontally.

The optional C21 and C25 current adapters and the optional U10 voltage adapter can be mounted on the top of the device with the help of a device frame on top of the EOR-3DS. Therefore the two upper screws on the back of the EOR-3DS have to be removed and the device frame incl. the plug-on adapters be mounted with the two additional provided longer screws.



*EOR-3DS without adapter mounted in panel*



*EOR-3DS with plug-on adapters incl. fixing by upper two screws at backside of EOR-3DS*

Alternatively, the adapters can be mounted with the help of a DIN rail adapter separately. Therefore connection cables in different lengths (0.3 m / 1.5 m / 3.0 m) can be ordered.

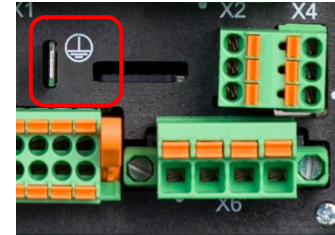


*EOR-3DS and DIN rail adapter mounted separately*

*EOR-3DS and C21/U10 adapter mounted on DIN rail with separate adapters*

### 3.4 Ground connection

The device contains a functional ground that is also used as a reference potential for voltage measurement with order characteristic C31/U31.



The functional ground is labeled  $\perp$  on the measurement device.

Connect the ground cable with the connector on the EOR-3DS. Use a PE flat connector (6.3 mm). Notice the additional instructions in chapter 5.23.

**⚠ DANGER! Risk of death through electric shock!**

The incorrect connection of this measuring device can lead to death, serious injuries or risk of fire.

- ➡ The functional ground **must always be** connected to the PE potential
- ➡ Under no conditions the functional ground can carry dangerous voltage

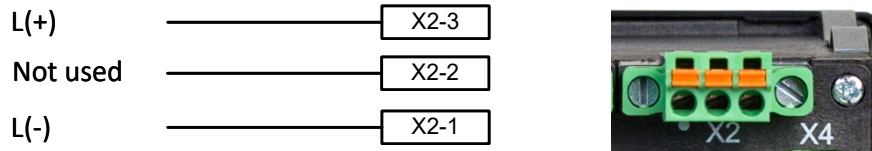
### 3.5 Supply voltage

The connection of EOR-3DS power supply is identical for all devices as there is only one power supply version (feature H23) available. The EOR-3DS has a wide range power supply that can be used in the range between DC 20...148 V. The power supply is protected against polarity reversal, i. e. a connection with reverse polarity on terminals X2-1 and X2-3 in the range of the permitted operating voltage does not damage the device. The terminal X2 is located on the back of the device in the upper right corner, as shown in the following image. A detailed connection description (e. g. wire cross section) can be found in chapter 5.23.

**⚠ DANGER!** Risk of death through electric shock!

Serious injuries or death can occur by:

- Touching blank or not insulated live wires
- Touching hazardous connectors on the device
- ➡ Assemble / disassemble the device only in voltage free state
- ➡ Make sure all wires are connected and strain-relieved.
- ➡ The cable requirements of all connector blocks have to be met.



*Connecting the supply voltage*

After connection and switch on of the supply voltage the power LED will show a green light and the device will start. As soon as the device is operable, the status LED will light up green. The LED layout can be found in chapter 4.1. The terminal assignment can be found in chapter 5.23.

**NOTICE!**

**Property damage due to disregarding the terminal assignment or improper voltages!**

By disregarding the terminal assignment or exceeding the permitted voltage range the device can be damaged or destroyed. Make sure to follow these instructions before connecting the device to the supply voltage:

- ➡ Voltage and frequencies have to correspond to the identification plate! Obey limits according to the technical specifications in chapter 5.
- ➡ Do not take the supply voltage from the voltage transducer.

### 3.6 Variants in connecting the measurement inputs

**WARNING!**

**Personal or property damage due to disregarding the safety instructions**

- ➡ Please read this manual carefully before connecting the terminals and obey the given safety instructions.

The EOR-3DS can be connected to low power sensors and classic (inductive) transducers. The suitable analog input is selected during order process (order characteristics 'C' and 'U'). For technical data of the different analog inputs please refer to the latest EOR-3DS data sheet or chapter 5.

The EOR-3DS has a maximum of four voltage inputs and four current inputs. Hereby three phase voltages and three phase currents as well as the zero sequence voltage ( $U_{en}$ ) and the zero sequence current ( $3I_0$ ) can be measured.

The following chapter explains the connection of the measuring transformer and low power sensors depending on the chosen features.



Notice the technical specifications when connecting the different 'C' and 'U' features (chapter 5).

#### 3.6.1 Connecting low power sensors LR/LRM systems

**⚠ DANGER!** Risk of death through electric shock

Attention dangerous contact voltage!

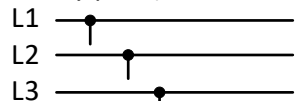
- ➡ Ensure that the PE connector (ground) on the EOR-3DS is connected.
- ➡ Check for zero potential before executing this task!
- ➡ Make sure all wires are connected and strain-relieved.
- ➡ The cable requirements of all connector blocks have to be met. (see chapter 5.23)



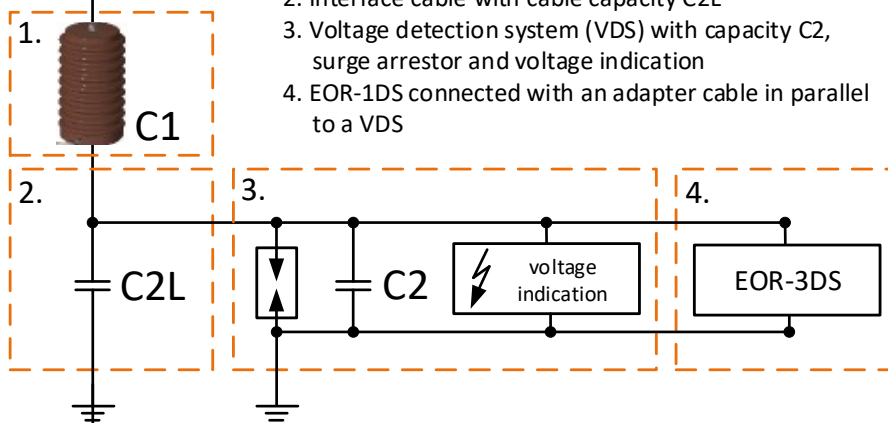
### 3.6.1.1 U05 connection for capacitive LR and LRM systems (incl. adapter cable)

With the EOR-3DS it is possible to measure voltage parallel to a capacitive voltage detecting system.

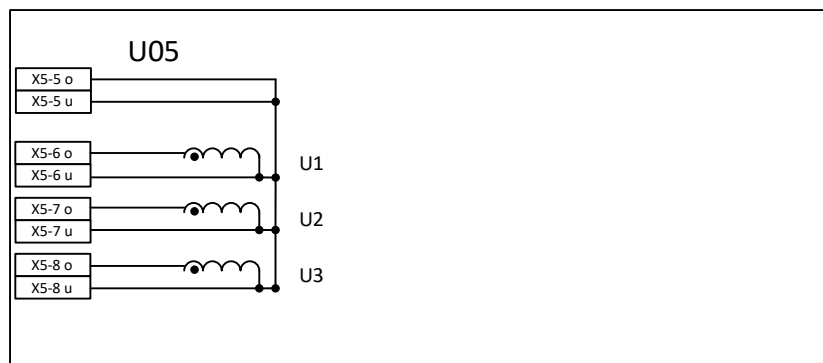
primary part (middle voltage)



1. Insulator with coupling capacitor C1
2. Interface cable with cable capacity C2L
3. Voltage detection system (VDS) with capacity C2, surge arrester and voltage indication
4. EOR-1DS connected with an adapter cable in parallel to a VDS

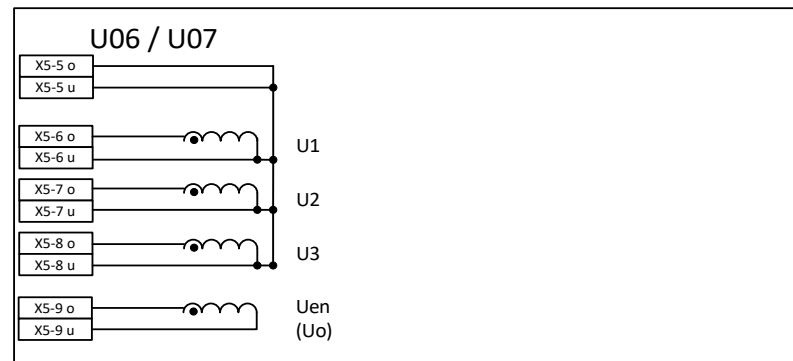


Principle schematic of connecting the EOR-3DS to a capacitive transducer



Terminal assignment for U05 characteristic

### 3.6.1.2 U06/U07 connection for low power voltage sensors (burden 200 kΩ or 2 MΩ)



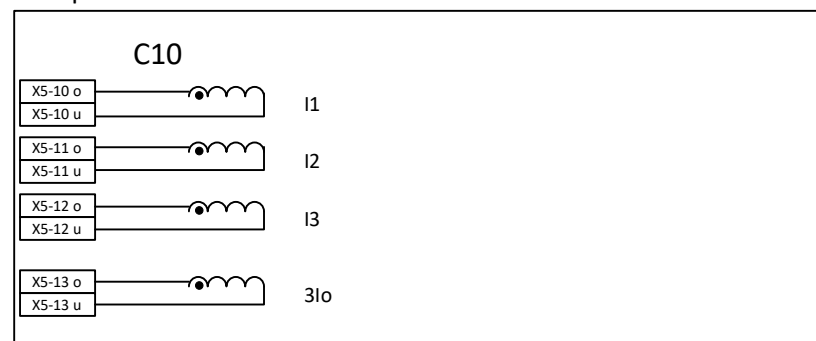
Terminal assignment for characteristics U06/U07



Normally  $U_{en}$  is not measured using low power sensors. This means the parameter 'calculate  $U_{en}$ ' must be activated in the EOR-3DS.

### 3.6.1.3 C10 connection for low power current sensors

The EOR-3DS offers the possibility to connect low power current sensors from multiple manufacturers.



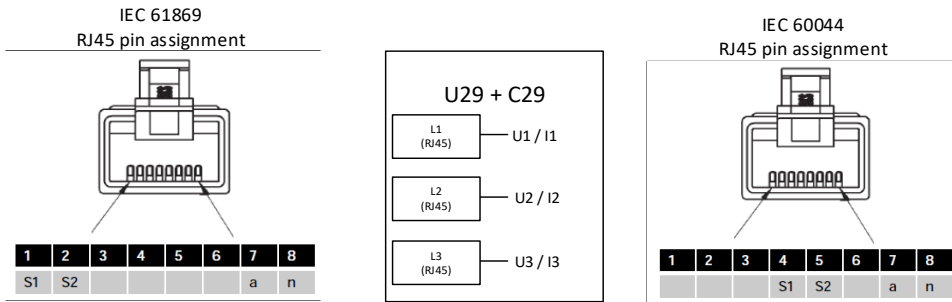
Terminal assignment for characteristic C10

### 3.6.1.4 C29/U29 connection for ABB low power sensors

The EOR-3DS offers the possibility to connect ABB low power current and voltage sensors via RJ45. This way a combined sensor or separate sensors for current and voltage with y-adaptor can be connected.

**NOTICE!** Property damage due to disregarding the mounting instructions!

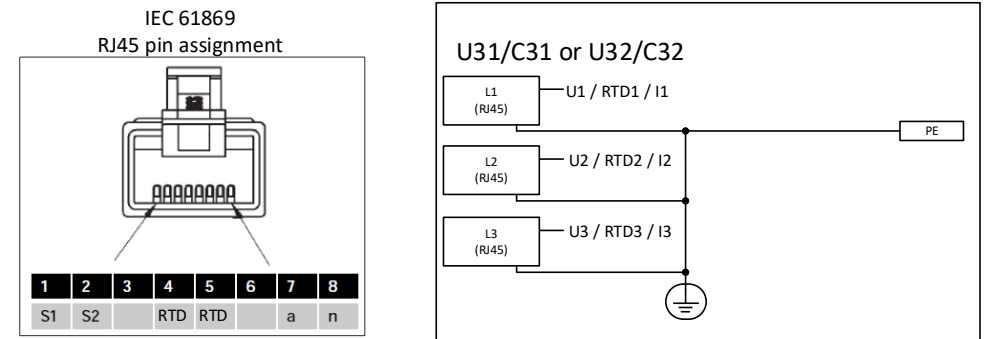
The RJ45 connector cables must be preformed and strain-relieved in order to connect them mechanically tension free to the device. Otherwise, there is a risk of damaging the RJ45 ports on the EOR-3DS.



Terminal assignment for characteristic C29/U29

### 3.6.1.5 U31/C31 or C32/U32 connection for low power sensors from e.g. Siemens or 3M

The EOR-3DS offers the possibility to connect low-power combi sensors from e.g. Siemens (SIBushing) or 3M (IPVS/CCS) to measure voltage and current via RJ45.



Terminal assignment for characteristic C31/U31 or C32/U32

**NOTICE!** Property damage due to disregarding the mounting instructions!

The RJ45 connector cables must be pre formed and strain relieved in order to connect them mechanically tension free to the device. Otherwise, there is a risk of damaging the RJ45 ports on the EOR-3DS.

**Definition P1/P2 on measuring card C31/U31 (with sensor configuration file) or C32/U32 (without sensor configuration file):**



In the Siemens SIBushing P1 is in feeder direction and P2 in busbar direction. The EOR-3DS considers this fact automatically with measurement card C31/U31 or C32/U32. An inversion of the current direction by adjusting the respective parameters is not necessary.

### 3.6.2 Connecting of transducers

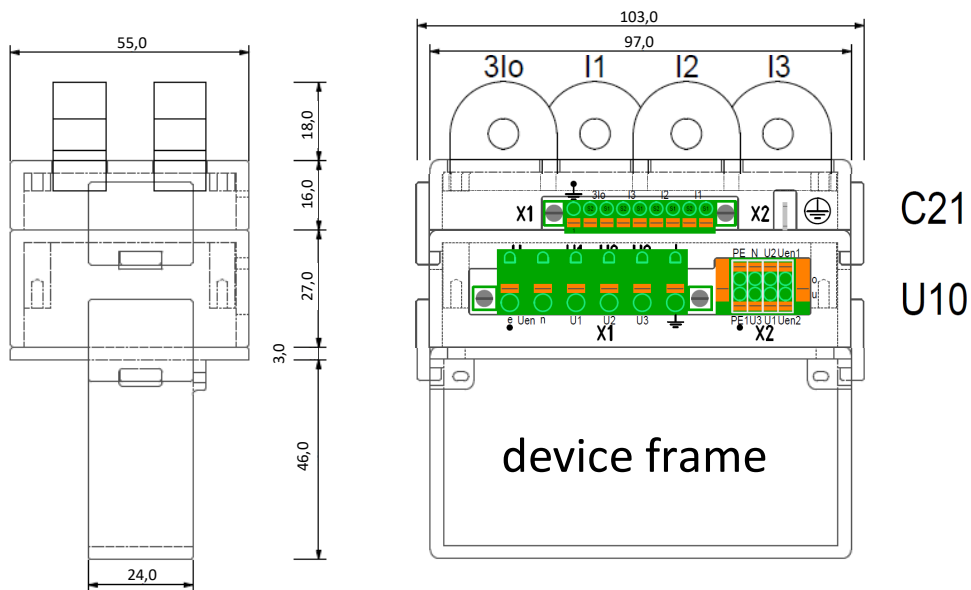
**⚠ DANGER!** Risk of death through electric shock!

Attention dangerous contact voltage!

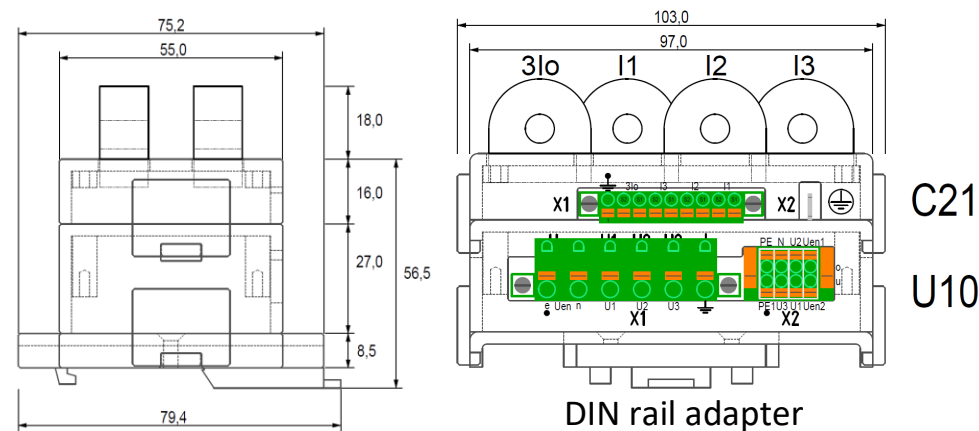
Voltage spark over and high short circuit currents in CAT II and CAT III possible!

- ➡ Ensure that the PE connector (ground) on the EOR-3DS is connected.
- ➡ Check for zero potential before executing this task!
- ➡ Short circuit the current transducer before executing this task.
- ➡ Make sure all wires are connected and strain relieved.
- ➡ The cable requirements of all connector blocks have to be met. (see chapter 5.23)

#### 3.6.2.1 Adapter modules C21, C25 (only 3I<sub>o</sub> measurement) and U10



C21 adapter for current measurement 1A / 5A and U10 adapter for voltage measurement 100 V / 110 V incl. frame for mounting on EOR-3DS device

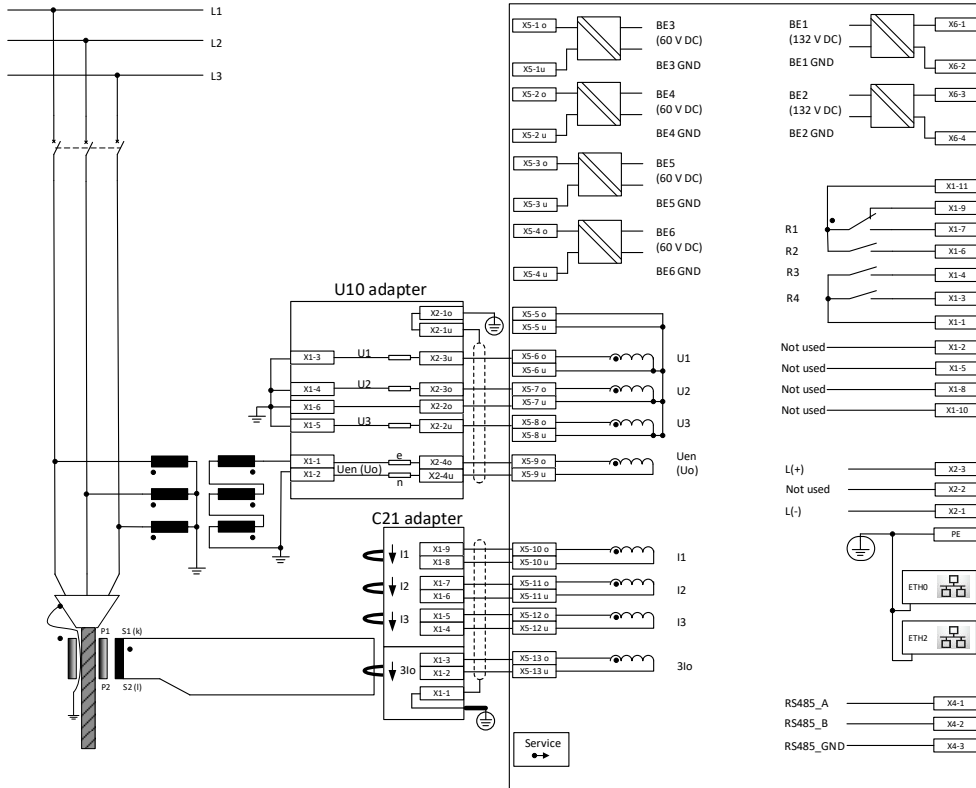


C21 adapter for current measurement 1A / 5A and U10 adapter for voltage measurement 100 V / 110 V incl. DIN rail adapter for separate mounting

A detailed connection description (e. g. wire cross section) can be found in chapter 5.23.

### 3.6.2.3 Connection zero sequence voltage $U_{en}$ and zero sequence current $3I_0$

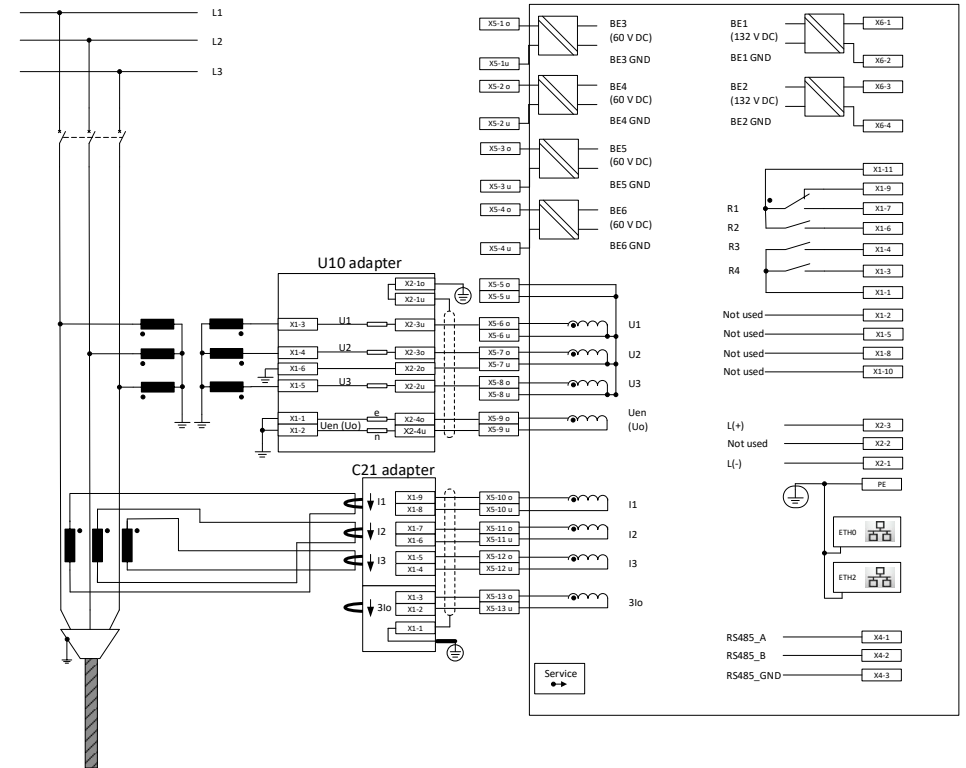
The connection of zero sequence voltage (referred as  $U_{en}$  or  $U_0$ ) takes place via the so-called open delta winding. A core-balanced current transformer is used to measure  $3I_0$ .



Connection of zero sequence voltage ( $U_{en}$ ) and total current ( $3I_0$ ) to the EOR-3DS using U10 and C21/C25 adapters

### 3.6.2.4 Connection of phase to earth voltages $U_{L1}$ , $U_{L2}$ , $U_{L3}$ and phase currents $I_{L1}$ , $I_{L2}$ , $I_{L3}$

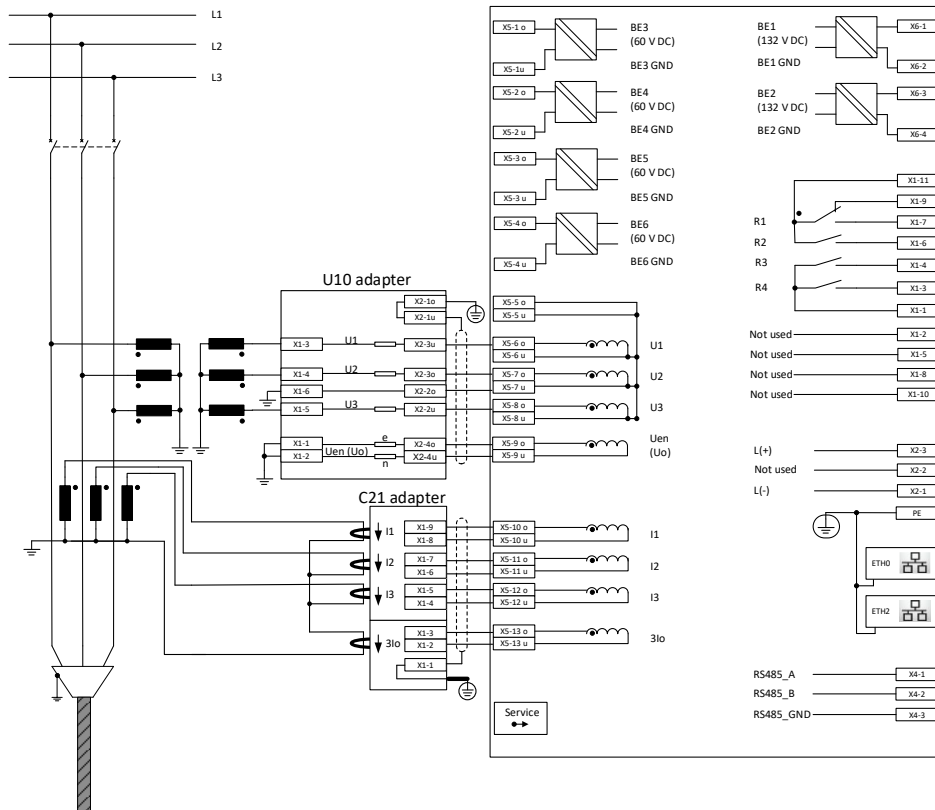
In the following example, only the phase voltages and the phase currents are connected to the EOR-3DS.  $U_{en}$  and  $3I_0$  are not used.



Connection of the phase voltages and phase currents to the EOR-3DS using U10 and C21 adapters

### 3.6.2.5 Connection to the busbar side neutral point of the current transducer

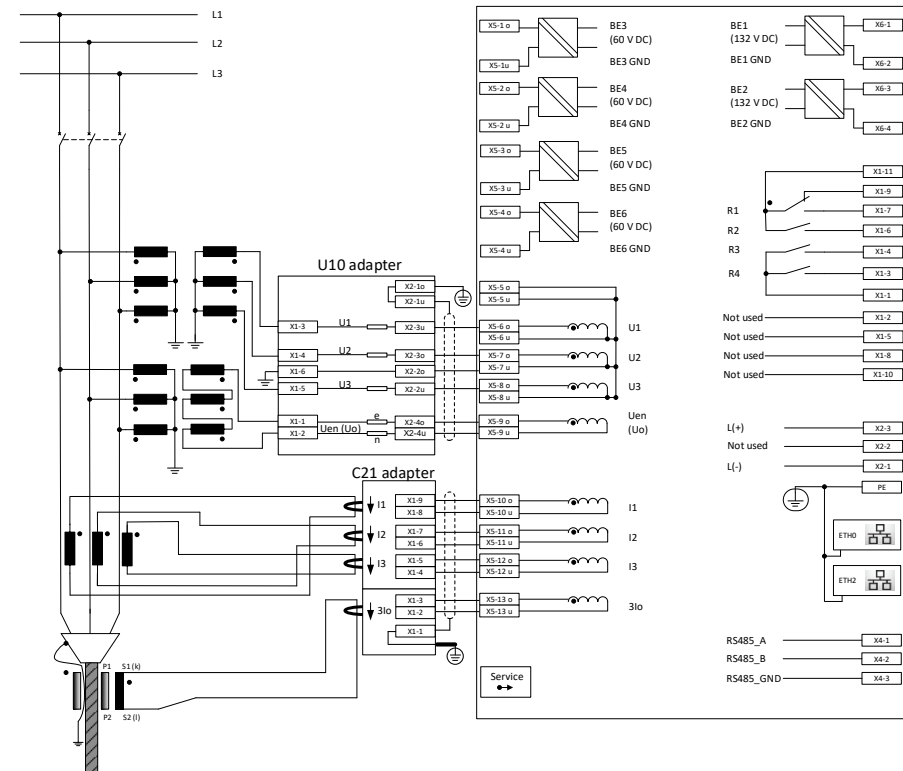
The voltage measurement is identical to chapter 3.6.2.4. However, the current measurement is wired in a way that a connection from one transducer is combined with the other two current transducers. The sum of the three phase currents (i. e.  $3I_0$ ) can consequently be measured at this 'node'.



Connection of the phase voltages, phase currents and sum current ( $3I_0$ ) with the neutral point in busbar direction using U10 and C21 adapters

### 3.6.2.6 Separate connection of phase voltages and currents, zero sequence voltage and sum current

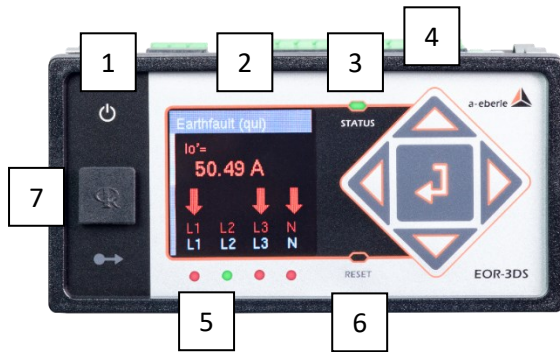
Beside the measurements for phase voltages and phase currents, measurements also exist for the zero sequence voltage ( $U_{en}$ ) and zero sequence current ( $3I_0$ ).



Connection of the phase voltages and phase currents with the neutral point in feeder direction as well as zero sequence voltage ( $U_{en}$ ) and sum current ( $3I_0$ ) using U10 and C21 adapters

## 4. Operation / Display

### 4.1 EOR-3DS housing



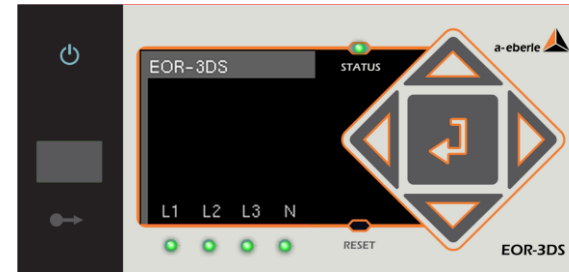
Front side EOR-3DS

- 1) Power LED
- 2) OLED colour display
- 3) Status LED
- 4) Operating keys
- 5) Signaling LEDs
- 6) RESET key
- 7) Service port



USB or ethernet adapters are available for the service port. More information is included in the EOR-3DS data sheet.

### 4.2 Menu navigation with the operating keys on the device



Key	Description	Function
	Up / Higher	<ol style="list-style-type: none"> <li>1. Move up in the menu</li> <li>2. Increase parameter value</li> </ol>
	Down / Lower	<ol style="list-style-type: none"> <li>1. Move down in the menu</li> <li>2. Decrease parameter value</li> </ol>
	Left	<ol style="list-style-type: none"> <li>1. Switch to previous / higher level in the menu: 'Back'</li> <li>2. For parameters with more than one number, move to the left (cursor)</li> <li>3. 20 keystrokes in start screen → option for factory reset</li> </ol>
	Right	<ol style="list-style-type: none"> <li>1. Change to the next / lower level in the menu: 'Forward'</li> <li>2. For parameters with more than one number, move to the right (cursor)</li> </ol>
	Return / Enter	<ol style="list-style-type: none"> <li>1. Jump to the menu from the start screen</li> <li>2. Selection of a particular menu item</li> <li>3. Confirmation of a changed parameter</li> </ol>
	RESET	<ol style="list-style-type: none"> <li>1. Quick press → Resetting of the signals</li> <li>2. Long press (&gt; 4 seconds) → restart</li> </ol>

## 5. Technical specifications

### 5.1 Regulations and standards

IEC 60255-1:2022  
 DIN EN 61010-1:2020  
 DIN EN 61010-2-030:2022  
 DIN EN 61000-6-5:2016  
 DIN EN 55032:2016 (CISPR 32:2015)



### 5.2 AC voltage input U05

Capacitive voltage tap-off on LR/LRM systems

Measuring voltage	0 ... 42 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	110 pF
Accuracy	± 1,0 %

### 5.3 AC voltage input U06

Low power sensors with 200 kΩ rated burden and  $U_n = 3,25 \text{ V} / \sqrt{3}$  e.g. sensors from Zelisko, Greenwood Power, etc.

Measuring voltage	0 ... 4 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	220 kΩ
Accuracy	± 0,5 %

### 5.4 AC voltage input U07

Low power sensors with 2 MΩ rated burden and  $U_n = 3,25 \text{ V} / \sqrt{3}$ , e.g. sensors from ABB, Zelisko, Greenwood Power, etc.

Measuring voltage	0 ... 4 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	2 MΩ
Accuracy	± 0,5 %

### 5.5 AC voltage input U10 adapter

Classical voltage transducers with 100 V or 110 V; all values refer to the connection at the U10 adapter; AC voltage input at indicator itself like U06 feature

Measuring voltage	0 ... 150 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	10 MΩ
Accuracy	± 1,0 %

### 5.6 AC voltage input U29

Low power sensors with 2 MΩ rated burden, e.g. ABB sensors acc. to IEC 60044 or 61869 with RJ45 plug

Measuring voltage	0 ... 8 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	2 MΩ
Accuracy	± 0,5 %

### 5.7 AC voltage input U31/U32

Low-power sensors acc. to IEC 61869 with RJ45 plug, e.g. sensors from Siemens (SIBushing), 3M (IPVS), etc.;

**U31:** EOR-3DS uses sensor configuration file in \*.json format of manufacturer (e.g. Siemens)

**U32:** EOR-3DS uses no sensor configuration file, correction factors have to be set manually.

Measuring voltage	0 ... 8 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	2 MΩ
Accuracy	± 0,5 %

## 5.8 AC current input C10

**Inductive low power sensors with  $U_r = 255\text{mV}$ , e.g. sensors from ABB, Zelisko, Greenwood Power, etc.**

Measuring voltage	0 ... 500 mVAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	$\geq 60 \text{ k}\Omega$
Accuracy	$\pm 0,5 \%$

## 5.9 AC current input C21/C25 adapter

**Classical current transducers 1A / 5A secondary; all values refer to the connection at the C21 or C25 adapter; AC voltage input at indicator itself like C10 feature**

Measuring voltage	0 ... 20 A
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	$\leq 0,1 \text{ VA}$
Accuracy	$\pm 1,0 \%$
Overload capacity	10 A continuous 30 A for 10 s 60 A for 1s 500 A for 5 ms

## 5.10 AC current input C29

**Low-power sensors, e.g. ABB sensors acc. to IEC 60044 or 61869 with RJ45 plug**

Measuring voltage	0 ... 4,69 VAC
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Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	$\leq 0,1 \text{ VA}$
Accuracy	$\pm 0,5 \%$

## 5.11 AC current input C31/C32

**Low power sensors acc. to IEC 61869 with RJ45 plug, e.g. sensors from Siemens (SIBushing), 3M (IPVS);**

**U31: EOR-3DS uses sensor configuration file in \*.json format of manufacturer (e.g. Siemens)**

**U32: EOR-3DS uses no sensor configuration file, correction factors have to be set manually.**

Measuring voltage	0 ... 1,125 VAC
Shape of the curve	Sine
Frequency range of fundamental wave	48 .. 52 Hz
Burden	$\leq 0,1 \text{ VA}$
Accuracy	$\pm 0,5 \%$

## 5.12 Binary inputs

**Inputs BI1 + BI2**

Input voltage (valid for order codes C29/U29, C31/U31, C32/U32)	DC 0 ... 60 V
Input voltage (valid for order codes except C29/U29, C31/U31, C32/U32)	DC 0 ... 110 ... 132 V
Curve shape, permissible	Rectangular
H – Level	DC 20 V
L – Level	DC 13 V

Input resistance	$> 16 \text{ k}\Omega$
Potential isolation	Impedance isolation

**Inputs BI3 ... BI6**

Input voltage	DC 0 ... 60 V
Curve shape, permissible	Rectangular
H – Level	DC 20 V
L – Level	DC 13 V
Input resistance	$> 16 \text{ k}\Omega$
Potential isolation	Impedance isolation

## 5.13 Binary outputs

max. switching frequency	$\leq 1 \text{ Hz}$
Potential isolation	Isolated from all device-internal potentials
Contact load (maximum values with ohmic load)	AC 60 V / 1.0 A DC 30 V / 2.0 A DC 60 V / 0.5 A
Type of use	In secondary circuit, galvanic separated from line voltage
max. isolation voltage	DC 1500 V
min. switching load	100 mW
Switch. operations	$> 10^6$ electrical
BO 1	monostable relay with change over contacts
BO 2..4	monostable relays (normal open contacts)



## 5.14 Serial RS485 interface

Type	2-wire RS485 interface
Potential isolation	galvanic separated
Connection	shielded cable
120 Ω termination	via DIP switch on backside

## 5.15 Supply voltage

DC	20 V - 148 V protect. against polarity reversal
Power consumption DC	< 4 W (boot) < 3 W (operation) < 6 W (operation + service adapter)
Long-life capacitor supply voltage	Min. 4 s
Long-life capacitor RTC (Real time clock)	Min. 15 days

## 5.16 Rated conductor cross section

Rated conductor length	10 mm
Terminal X1 (digital outputs)	0,5 - 1,5 mm <sup>2</sup>
Terminal X2 (power supply)	0,5 - 1,5 mm <sup>2</sup>
Terminal X4 (RS485)	0,5 - 1,5 mm <sup>2</sup>
Terminal X5 (measurement inputs & binary inputs 3..6)	0,5 - 1,5 mm <sup>2</sup>

Terminal X6 (binary inputs 1&2)	0,5 - 2,5 mm <sup>2</sup>
Terminal X6 (binary inputs 1..6 - only with features C29/U29, C31/U31, C32/U32)	0,5 - 1,5 mm <sup>2</sup>
PE flat connector (6.3 mm)	2,5 mm <sup>2</sup>

## 5.17 Measurement value recording

Non-volatile	≤ 32 GB
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## 5.18 Environment parameters

Reference temp.	23°C ± 1 K
Operation	-20 °C...+65 °C
Transport and storage	-25 °C...+65 °C
Relative humidity	5 %..95 % non-condensing
Altitude	Up to 2000 meters

## 5.19 Limit-value monitoring

Limit values	programmable
Response times	programmable
Alarm indicators	programmable LED; Display

## 5.20 Weight

EOR-3DS B04	0.29 kg
EOR-3DS B04 with C21 adapter	0.41 kg
EOR-3DS B04 with U10 adapter	0.46 kg
EOR-3DS B04 with C21 & U10 adapter	0.58 kg

## 5.21 Electrical safety

DIN EN 61010-1:2020	
DIN EN 61010-2-030:2022	
Degree of protection:	
Device front with attached service interface coverage	IP50
Device back	IP20
Protection class	I
Degree of pollution	2
Measurement category (only U10-adapter)	III/150 V
Measurement category (only U10-adapter)	II/300 V
Overvoltage category	II

## Operating voltages

DC 50 V	RS485, Ethernet
DC 60 V	Binary inputs 1..6, measurement inputs
DC 132 V	Binary inputs 1+2 (except C29/U29, C31/U31, C32/U32)
DC148 V	Power supply
AC 60 V	Binary outputs
AC 150 V	U10 voltage adapter

## 5.22 Electromagnetic compatibility

Immunity	DIN EN 61000-6-5:2016
Emissions	DIN EN 55032:2016 (CISPR 32:2015)

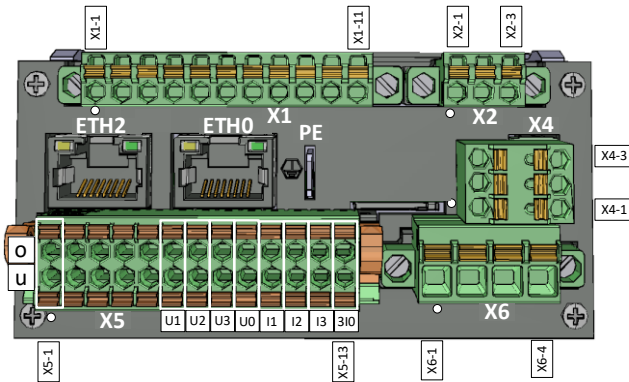
### 5.23 Connection / Terminals EOR-3DS as well as C21/C25 and U10 adapter



Please notice the security instructions and information given in the previous chapters regarding the connection of the device according to the characteristics 'C' and 'U' and according to the respective connection to low power sensors and transducers



For each connector block the length of the wire end ferrule or stripped wire must be 10mm..



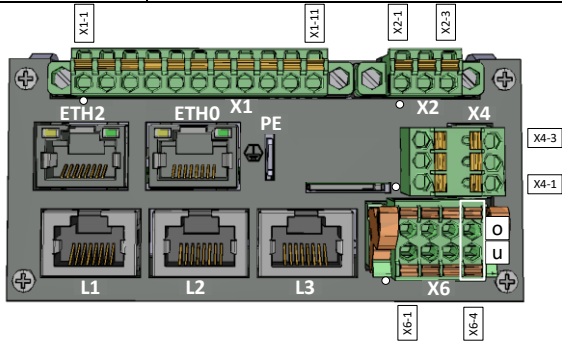
Connector blocks EOR-3DS with features U05/U06/U07/U10 and C10/C21/C25 without additional adapter for the features U10/C21/C25

No.	Name	Function	Connector EOR-3DS	Cross section
X1	relay	R1/R2	Pole R1/R2	0,5 – 1,5 mm <sup>2</sup>
		R1	NC	
		R2	NO	
		R3	NO	
		R4	NO	
		R3/R4	Pole R3/R4	
PE	PE	GND	PE flat connector (6,3 mm)	2,5 mm <sup>2</sup>

No.	Name	Function	Connector EOR-3DS	Cross section		
X2	Supply voltage	L(+)	3	0,5 – 1,5 mm <sup>2</sup>		
		---	2			
		L(-)	1			
X4	RS485	RS485_A	1	0,5 – 1,5 mm <sup>2</sup>		
		RS485_B	2			
		RS485_G	3			
X6	Binary input 1	BI1	1	0,5 – 2,5 mm <sup>2</sup>		
	Binary input 2	BI2	GND		2	
			BI2		3	
			GND		4	
X5	Binary input 3	BI3	1o	0,5 – 1,5 mm <sup>2</sup>		
	Binary input 4	BI4	GND		1u	
			BI4		2o	
	Binary input 5	BI5	GND		2u	
			BI5		3o	
	Binary input 6	BE6	BI6		4o	
X5	Phase voltage L1	U1	6o	0,5 – 1,5 mm <sup>2</sup>		
	Phase voltage L2	U2	GND		6u	
			U2		7o	
	Phase voltage L3	U2	GND		7u	
			U2		8o	
	Zero sequence voltage U0 (depending on feature U)	U0	GND		8u	
			U0		9o	
	X5	Phase current L1	I1		10o	0,5 – 1,5 mm <sup>2</sup>
		Phase current L2	I2		GND	
I2				11o		
Phase current L3		I3	GND	11u		
			I3	12o		
Zero sequence current 3I <sub>0</sub> (depending on feature C)		3I <sub>0</sub>	GND	12u		
			3I <sub>0</sub>	13o		
		GND	13u			

Assignment of connector block X6 for devices with order characteristics C29/U29 & C31/U31. In this case the connector block X5 is replaced by three RJ45 ports L1, L2, L3.

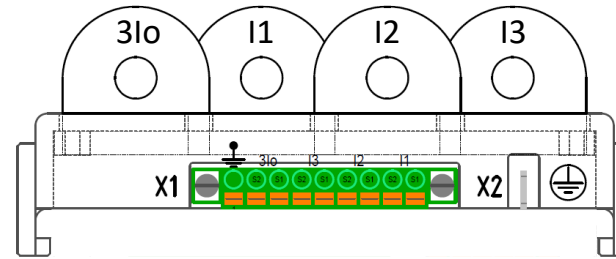
No.	Name	Function	Connector EOR-3DS.	Cross section
X6	Binary input 1&2	GND 1/2	1o	0,5 – 1,5 mm <sup>2</sup>
		BI1	2o	
		BI2	3o	
	Binary input 3-6	GND 3-6	1u	
		BI3	4o	
		BI4	2u	
	BI5	3u		
	BI6	4u		



Connector blocks EOR-3DS with order characteristics C29/U29, C31/U31, C32/U32

### C21/C25 Current adaptor for 1 / 5 A

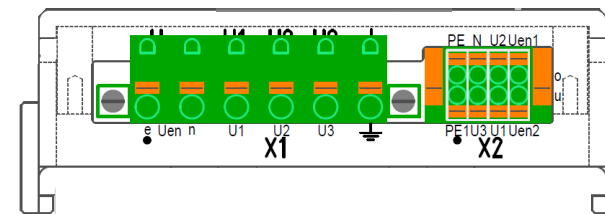
No.	Name	Function	Colour Code	Connector adapter	Connector EOR-3DS	Cross-section
X1	Phase current L1	I1 - S1	white	X1-9	X5-10o	0,5 – 1,5 mm <sup>2</sup>
		I1 - S2	brown	X1-8	X5-10u	
	Phase current L2	I2 - S1	green	X1-7	X5-11o	
		I2 - S2	yellow	X1-6	X5-11u	
	Phase current L3	I3 - S1	grey	X1-5	X5-12o	
		I3 - S2	pink	X1-4	X5-12u	
	Zero sequence current 3I0	3I0 - S1	blue	X1-3	X5-13o	
		3I0 - S2	red	X1-2	X5-13u	
Cable shield	Cable shield	black	X1-1	-		
	grounding cable shield	Cable shield	free choice	Flat connector 6,3 mm	PE	2,5 mm <sup>2</sup>



Connection terminals current adapter C21 (3I0 + I1..3) or. C25 (only 3I0)

### U10 voltage adapter for 100 / 110 V

No.	Name	Function	Colour Code	Con-connector adapter	Connector EOR-3DS	Cross section
X1	Zero voltage U0	Uen - e	-	X1-1	-	0,5 – 2,5 mm <sup>2</sup>
		Uen - n	-	X1-2	-	
	Phase voltage L1	U1	-	X1-3	-	
	Phase voltage L2	U2	-	X1-4	-	
	Phase voltage L3	U3	-	X1-5	-	
	Measurement reference	PE measurement	-	X1-6	-	
X2	Zero voltage U0	Uen-e	grey	X2-4o	X5-9o	0,5 – 1,5 mm <sup>2</sup>
		Uen-n	pink	X2-4u	X5-9u	
	Phase voltage L1	U1	white	X2-3u	X5-6o	
	Phase voltage L2	U2	brown	X2-3o	X5-7o	
	Phase voltage L3	U3	green	X2-2u	X5-8o	
	Measurement reference	PE	yellow	X2-2o	X5-7u	
	Cable shield	Cable shield	black	X2-1u	-	
	Grounding cable shield	Cable shield	free choice	X2-1o	-	



Connection terminals U10 voltage adapter for 100 / 110 V

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