

You will find the Operating instructions on: 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 (www.a-eberle.de).

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### 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 shown.



 Our WEEE registration number is: DE 37396879

For old devices please also note the information on our homepage: <a href="https://www.a-eberle.de/ueber-uns/ruecknahme-recycling/">https://www.a-eberle.de/ueber-uns/ruecknahme-recycling/</a>

### 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: <u>https://www.a-eberle.de/agbs/</u>

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



# 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 it's stated ratings.
- Do not install or operate the device in environments where explosive gases, dust or vapors may be present.
- **C** 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:

	Nature ar	nd source of the danger.
$\Delta$ signal word	Consequences of non-compliance.	
	<b>Э</b> М	leasures to avoid the danger.

## 2.3 Types of warnings

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

	Warns of imminent danger that can result in death or seri- ous injuries if not avoided.
	Warns of a potentially dangerous situation that can result in death or serious injuries when not avoided.
	Warns of a potentially dangerous situation that can result in fairly serious or minor injuries when not avoided.
NOTICE!	Warns of a potentially dangerous situation that if not avoided could result in material or environmental damage.
l	Tips on the appropriate device use and recommendations

### 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 UKCA label guarantees the adherence of respective regulations in the United Kingdom.

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 ,U', the device has a RJ45 port.

- EOR-3DS possibly including C21/C25 and / or U10 Adapter
- Installation instructions
- Additionally ordered adapter cables and service adapters
- Additionally ordered case adapters for DIN rail mounting

We take care of it

### 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.

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 cutout. The plastic brackets have to be removed to dismount the device.

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.

	X5	• X6	(3)	
Mountin	g the DIN rai	il adapter onto	o the EC	R-3DS

EOR-3DS mounted on a DIN rail

**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!

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.

Attach the optional C21 and C25 current adapters onto the device. The optional U10 voltage adapter is designed for DIN rail mounting.

















### 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  $\stackrel{-}{=}$  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.

### A 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
- **O** 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.

### A 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 Ethe 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 bevor 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.
- **D** not take the supply voltage from the voltage transducer.

### 3.6 Variants in connecting the measurement inputs

NOTIOE	Personal or property damage due to disregarding the safety
NOTICE!	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.



- 1. Insulator with coupling capacitor
- 2. Interface cable (cable capacity) with overvoltage arrester
- 3. Adapter cable for parallel connection to a capacitive detection system

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





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

U06 / U07	
X5-6 0           X5-6 u           X5-7 0           X5-7 u	U1 U2
X5-8 o X5-8 u	U3
X5-9 o X5-9 u	Uen (Uo)

*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-adapter 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 connection for Siemens low power sensors

The EOR-3DS offers the possibility to connect Siemens low-power combi sensors (SIBushing) to measure voltage and current via RJ45.



### Terminal assignment for characteristic C31/U31

### **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 (Siemens SIBushing):



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. An inversion of the current direction by adjusting the respective parameters is not necessary.

### 3.6.2 Connecting of transducers

## A 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 taks!
- 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 $3I_0$ measurement) and U10



### Plug-on adapter C21 for current transducers



U10 adapter for voltage measurement 100 V / 110 V



# 3.6.2.2 Connection zero sequence voltage $U_{\text{en}}$ and zero sequence current $3I_{\text{o}}$

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

### BE3 (60 V DC) BE1 (132 V DC) BE1 GND BE3 GND X5-1u X5-2 o BE4 BE2 (60 V DC) (132 V DC) BE4 GND BE2 GND X5-2 u X6-4 X5-3 o BE5 (60 V DC) BE5 GND X5-3 u X1-9 R1 X1-7 BE6 (60 V DC) R2 X1-6 BE6 GND X5-4 u R3 X1-4 R4 X1-3 X5-5 o X5-5 u U10 adapter X1-1 X1-2 Notuse X5-6 o X5-6 u $\mathbf{m}$ U1 Notuse X1-5 X5-7.0 -**•**~~ U2 X1-8 Notuse X5-7 u Notus X1-10 X5-8 o -**@**^^ U3 X5-8 u Uen X5-9 o Jen (Uo) L(+) (Uo) X2-3 X1-2 X5-9 u Notused X2-2 L(-) X2-1 C21 adapter PE ⊕ X5-10 o $\hat{}$ 11 X5-11 o X5-11 u ETHO 움곱 $\overline{}$ 12 X5-12 o X5-12 u ≤₹₿ $\sim$ 13 X5-13 o X5-13 u **4** 310 RS485\_A X4-1 RS485\_B X4-2 Service RS485\_GND X4-3

Connection of zero sequence voltage ( $U_{en}$ ) and total current (31<sub>0</sub>) to EOR-3DS using U10 and C21/C25 adapters

# 3.6.2.3 Connection of phase to earth voltages U<sub>L1</sub>, U<sub>L2</sub>, U<sub>L3</sub> 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.  $U_{\rm en}$  and  $3I_0$  are not used.



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

# **3.6.2.4** Connection to the busbar side neutral point of the current transducer

The voltage measurement is identical to chapter 3.6.2.3. 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'.

### L1 BE1 (60 V DC) (132 V DC) BE1 GND BE3 GND X5-1u X5-2 o BE2 (132 V DC) BF4 X6-3 (60 V DC) BE4 GND BE2 GND X6-4 BE5 (60 V DC) X1-11 BES GND X1-9 X5-4 o R1 BE6 (60 V DC) R2 X1-6 BE6 GND R3 X5-4 u R4 X1-3 X5-5 o U10 adapter X1-1 ¥5.5 II X1-2 Not use U1 X1-5 Not use X5-6 u X1-4 $\sim$ Notus X1-8 X1-10 Notus $\sim$ (Uo L(+) Notused X2-2 L(-) X2-1 C21 adapter PE (<del>+</del>) ₫ 🖬 🖬 X5-10 o 11 -태이 몸몸 X5-11 o ≤ X5-12 o X5-12 u ൝ ETH2 R **C 4** 310 RS485 X4-1 R\$485 B X4-2 Service R\$485 GN X4-3

*Connection of the phase voltages and phase currents with the neutral point in busbar direction using U10 and C21 adapters* 

# **3.6.2.5** 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 pase 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



Кеу	Description	Function
	Up / Higher	<ol> <li>Move up in the menu</li> <li>Increase parameter value</li> </ol>
$\mathbf{\nabla}$	Down / Lower	<ol> <li>Move down in the menu</li> <li>Decrease parameter value</li> </ol>
	Left	<ol> <li>Switch to previous / higher level in the menu: 'Back'</li> </ol>
		<ol><li>For parameters with more than one num- ber, move to the left (cursor)</li></ol>
		<ul> <li>3. 20 keystrokes in start screen</li> <li>→ option for factory reset</li> </ul>
	Right	<ol> <li>Change to the next / lower level in the menu: 'Forward'</li> </ol>
		<ol><li>For parameters with more than one num- ber, move to the right (cursor)</li></ol>
1	Return / Enter	1. Jump to the menu from the start screen
-		<ol> <li>Selection of a particular menu item</li> <li>Confirmation of a changed parameter</li> </ol>
		5. Commation of a changed parameter
	RESET	1. Quick press $\rightarrow$ Resetting of the signals
RESET		<ol> <li>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 k $\Omega$  rated burden and Un = 3,25 V /  $\sqrt{3}$  e.g. sensors from Zelikso, 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 M $\Omega$  rated burden and U<sub>n</sub> = 3,25 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 ΜΩ
Accuracy	± 0,5 %

### 5.5 AC voltage input U10

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 ΜΩ
Accuracy	± 1,0 %

### 5.6 AC voltage input U29

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

0 8 VAC
Sine
48 52 Hz
2 ΜΩ
± 0,5 %

### 5.7 AC voltage input U31

Low power sensors from Siemens (SIBushing) acc. to IEC 61869 with RJ45 plug (with sensor configuration file)

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

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## 5.8 AC current input C10

Inductive low power sensors with U<sub>r</sub> = 255mV, 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	≥ 60 kΩ
Accuracy	± 0,5 %

# 5.9 AC current input C21/C25

### Classical current transducers 1A / 5A secondary

Measuring voltage	0 20 A
Shape of the curve	Sine
Frequency range of fundamental wave	48 52 Hz
Burden	$\leq$ 0,1 VA
Accuracy	± 1,0 %

## 5.10 AC current input C29

# Low power sensors ABB acc. to IEC 60044 or 61869 with RJ45 plug

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

# 5.11 AC current input C31

Low power sensors from Siemens (SIBushing) acc. to IEC 61869 with RJ45 plug (with sensor configuration file)

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

## 5.12 Binary inputs

### Inputs BI1 + BI2

Input voltage (valid for order codes C29/U29 and C31/U31)	DC 0 60 V
Input voltage (valid for order codes except C29/U29 and C31/U31)	DC 0 110 132 V
Curve shape, permissible	Rectangular
H – Level	DC 20 V
L – Level	DC 15 V
Input resistance	>16 kΩ
Potential isolation	Impedance isola- tion

### Inputs BI3 ... BI6

Input voltage	DC 060 V
Curve shape, permissible	Rectangular

H – Level	DC 20 V
L – Level	DC 15 V
Input resistance	>16 kΩ
Potential isolation	Impedance isola- tion

### 5.13 Binary outputs

$\leq$ 1 Hz
Isolated from all device-
internal potentials
AC 60 V / 1.0 A
DC 30 V / 2.0 A
DC 60 V / 0.5 A
In secondary circuit, galvanic
separated from line voltage
DC 1500 V
100 mW
> 10 <sup>6</sup> electrical
monostable relay with
change over contacts
monostable relays (normal
open contacts)

### 5.14 Serial RS485 interface

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

# 5.15 Supply voltage

Character- istic	Voltage range	Power consumption
H23:	DC: 20 148 V	< 4 W (boot)
	protect. against	< 3 W (operation)
	polarity reversal	< 6 W (operation +
		service adapter)

# 5.16 Rated conductor cross section

Rated conductor length	10 mm
Terminal X1	0,5 - 1,5 mm²
(digital outputs)	
Terminal X2	0,5 - 1,5 mm²
(power supply)	
Terminal X4	0,5 - 1,5 mm²
(RS485)	
Terminal X5	0,5 - 1,5 mm²
(measurement inputs &	
binary inputs 36)	
Terminal X6	0,5 - 2,5 mm²
(binary inputs 1&2)	
Terminal X6	0,5 - 1,5 mm²
(binary inputs 16 - only with	
features C29/U29 or C31/U31)	
PE flat connector (6.3 mm)	2,5 mm²

## 5.18 Environment parameters

Reference temp.	23°C ± 1 K
Operation	-20 °C+50 °C
Transport and stor- age	-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	1
	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 16, measurement inputs
DC 132 V	Binary inputs 1+2 (except C29/U29 or C31/U31)
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)

### 5.17 Measurement value recording

≤ 32 GB
<



### 5.23 Anschluss / Klemmen



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

In devices with the characteristics C29/U29 & C31/U31 there is no connector X5 and the assignment of connector X6 varies. This connection is described on page 18.

Connector	Name		Function	Connector	Cross sec-
block nr.				nr.	tion [mm <sup>2</sup> ]
X1	relay	R1/R2	Pole R1/R2	11	0,5 – 1,5
		R1	NC	9	
			NO	7	
		R2	NO	6	
		R3	NO	4	
		R4	NO	3	
		R3/R4	Pole R3/R4	1	
PE	PE flat con-	GND	PE	PE	2,5
	nector (6,3 mm)				
X2	Supply voltage		L(+)	3	0,5 - 1,5
				2	
			L(-)	1	
X4	RS485		RS485_A	1	0,5 – 1,5
			RS485_B	2	
			RS485_GND	3	
X6	Binary input 1	BI1	BI1	1	0,5 – 2,5
			GND	2	
	Binary input 2	BI2	BI2	3	
			GND	4	
X5	Binary input 3	BI3	BI3	10	0,5 – 1,5
			GND	1u	
	Binary input 4	BI4	BI4	20	
			GND	2u	
	Binary input 5	BI5	BI5	30	1
			GND	3u	]

Connector	Name		Function	Connector	Cross sec-
block nr.				nr.	tion [mm <sup>2</sup> ]
	Binary input 6	BE6	BI6	40	
			GND	4u	
X5	Phase voltage L1		U1	60	0,5 – 1,5
			GND	6u	
	Phase voltage L2		U2	70	
			GND	7u	
	Phase voltage L3		U2	80	
			GND	8u	
Zero sequence voltage U0		U0	90		
	(depending on feature U)		GND	9u	
X5 Phase current L1		11	10o	0,5 – 1,5	
			GND	10u	
	Phase current L2		12	110	
			GND	11u	
	Phase current L3		13	120	
			GND	12u	
	Zero sequence current 3I <sub>0</sub>		3I <sub>0</sub>	130	
(depending on feature C)		iture C)	GND	13u	



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

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.

Connector	Name	Function	Connector	Cross sec-
DIOCK III.			11r.	
X6	Binary input 1&2	GND 1/2	10	0,5 – 1,5
		BI1	20	
		BI2	30	
	Binary input 3-6	GND 3-6	1u	
		BI3	40	
		BI4	2u	
		BI5	3u	
		BI6	4u	



Connector blocks EOR-3DS with order characteristics C29/U29 or C31/U31C21/C25

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



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