

## EDS460 / 490 and EDS461 / 491



Multi-channel insulation fault evaluator with control and display function for EDS systems

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EDS460

### Device features

- Insulation fault location und residual current measurement
- For AC, 3AC, DC and IT-systems
- Control and display function within one device (EDS...-D)
- 12 measuring channels (outgoing circuits) for measuring current transformers of the W, WR, WS series
- Up to 90 EDS evaluators in the system (1080 measuring channels)
- Scanning time 10 s for all measuring channels
- Response sensitivity  
EDS460/490 2...10 mA (100 Ω/V)  
EDS461/491 0.2...1 mA (1000 Ω/V)
- Alarm history for 300 events
- Two alarm relays with one changeover contacts each
- N/O or N/C operation, selectable
- Connection external TEST/RESET button
- Indication via graphical display respectively 7-segment display and alarm LEDs
- BMS address range 1...90
- Serial interface RS485
- Continuous CT connection monitoring
- Fault memory behaviour, selectable
- Device version EDS490/491 with one alarm contact per channel
- Additional residual current measurement

### Product description

Insulation fault evaluators of the EDS460/490 series in combination with the A-ISOMETER® IRDH575 or the insulation fault test device PGH are used for localisation of insulation faults in unearthed power supply systems (IT systems). Using measuring current transformers the evaluators record test current signals generated by the insulation monitoring device IRDH575 or the insulation fault test device PGH and evaluate them. Up to 12 measuring current transformers can be connected per one EDS. A total of 90 EDS evaluators can be connected via one RS485 interface (BMS protocol). Hence up to 1080 circuits can be monitored. The maximum scanning time is approx. 4...10 s, see TGH1394.

### Application

- Insulation fault location in AC, AC / DC and DC IT systems
- Main and control circuits in industrial installations and ships
- Diode-decoupled DC IT systems in power stations
- Systems for medical locations

### Function

Insulation fault location is started via the A-ISOMETER IRDH575 or PGH. Once started, the insulation fault evaluator EDS simultaneously scans all measuring current transformers (channels). If several EDS exist, these devices are also scanned simultaneously.

When the test current recorded by a measuring current transformer exceeds the set response value, the alarm LED 2 lights up, the common alarm relay switches and the faulty circuit is indicated as plain text on the graphical display. Version EDS...L indicates faulty outgoing circuits via alarm LEDs. The connection between the measuring current transformer and the insulation fault evaluator is continuously monitored. In the event of wire interruption, the alarm LED 1 lights up and the alarm relay switches.

With the fault memory activated, the alarm messages of the individual channels remains stored until the RESET button is pressed or until a RESET command is given via the RS485 interface. Is the fault memory deactivated, the alarm message only remain stored as long as the insulation fault exists.

### Alarm history in EDS460/461-D/EDS490/491-D

The device utilizes an alarm history for fail-safe storage of up to 300 measured values/ events. (date, time, channel, event code, measured value), that provides reproducibility of the behaviour of a circuit or a sector at any time.

### Residual current measurement

EDS4... evaluators can also be used for the indication of residual currents in unearthed power supply systems (IT systems). This is essential when also AC residual currents are to be localized.

### Device variants

#### EDS460-D

Device version EDS 460D provides a backlit graphical display where information can be displayed in a variety of different ways. This version is used when detailed information of all devices in the cabinet that are connected to the bus are to be displayed on-site. All devices connected to the BMS bus can be parameterized and detailed information on the measurement can be displayed. Several EDS460D can be used in one system.

#### EDS460-L

Device version EDS460L utilizes a two-digit seven-segment display showing the address of this device within the BMS bus instead of a graphical display. Various error codes are displayed too. The alarm LEDs indicate in which measuring channel the response value has been exceeded. Parameterization is only possible via an EDS...D, an A-ISOMETER® IRDH575 or a protocol converter FTC470XET

### EDS490D / EDS490L

The function of device version EDS490D/EDS490L corresponds to the function described before. In addition, one alarm contact (make contact) for each measuring channel is available in order to trigger a circuit breaker when a response value is exceeded in this circuit, for example.

### EDS461-D/-L and EDS491-D/-L

The function of these device versions corresponds to the function described above, but these versions provide a higher response sensitivity. They are preferably used in control circuits, in medical locations or in diode-decoupled systems up to AC 230 (DC 220) V.

### Approvals

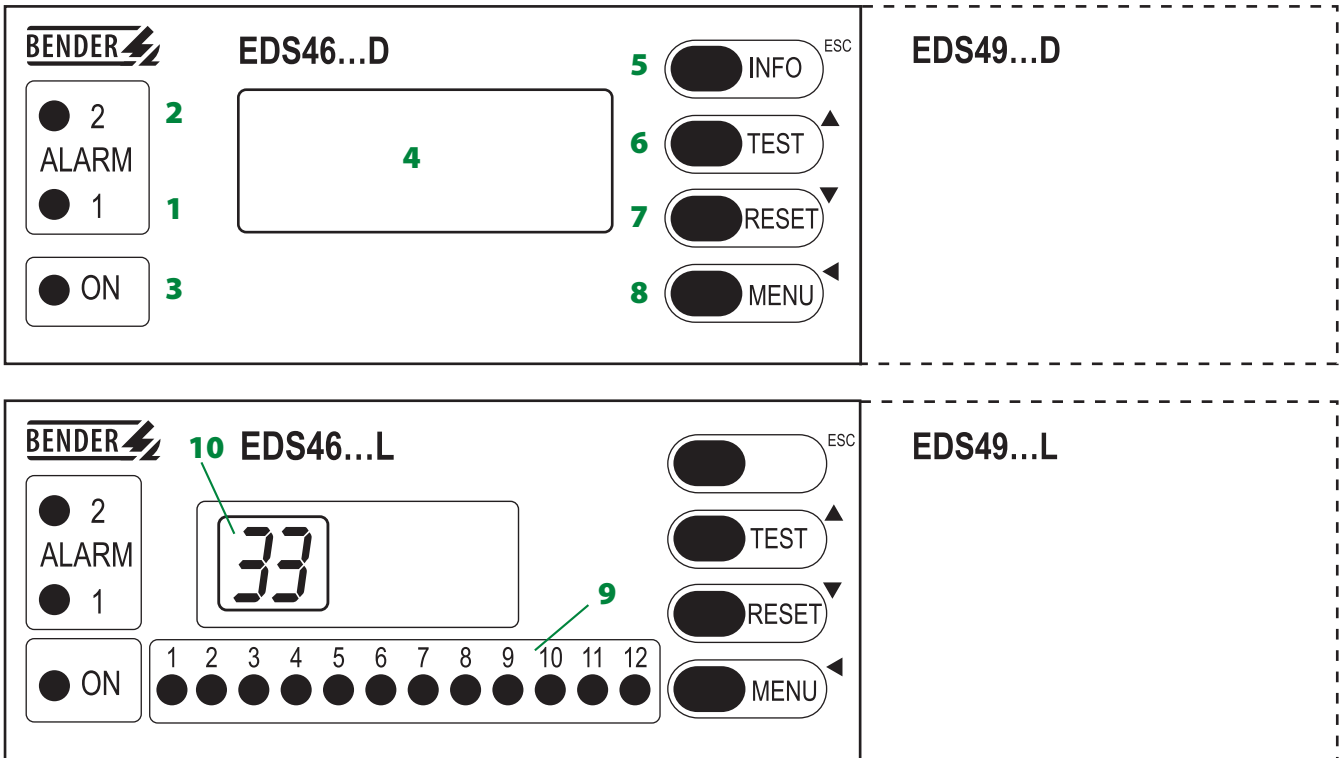
LR, UL in preparation.

### Standards

The EDS series corresponds to the requirements of DIN EN 61557-9 (VDE 0413 Teil 9): 2000-08, IEC 61557-9: 1999-09, EN 61557-9: 1999-11.

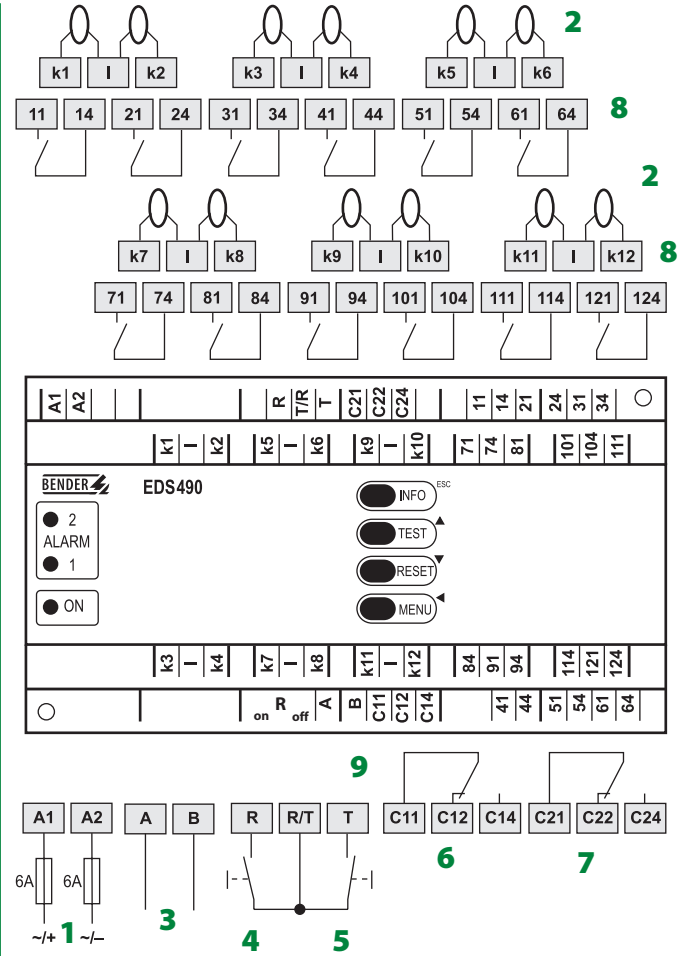
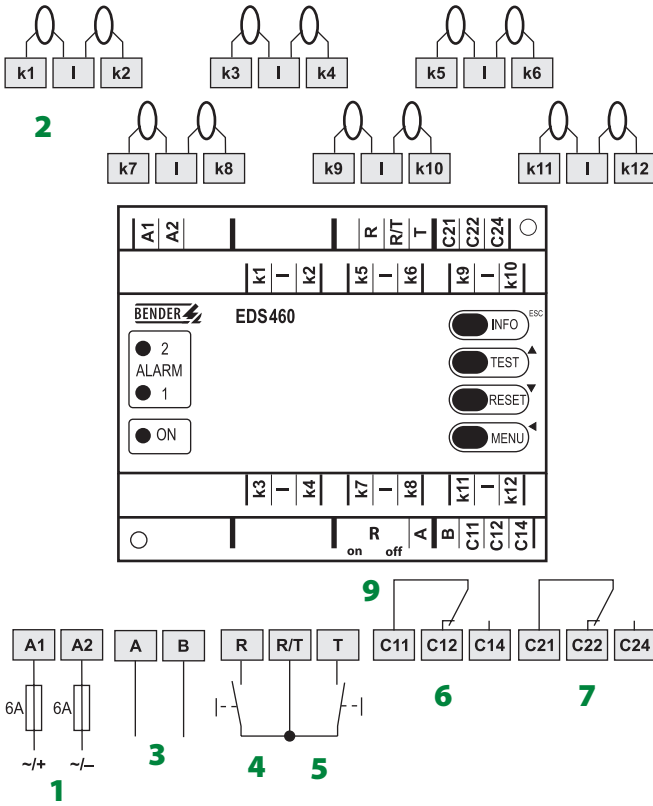
### Overview of different device versions

Device / distinctive features	EDS460-D/EDS461-D	EDS460-L/EDS461 -L	EDS490-D/EDS491 -D	EDS490-L/EDS491 -L
Response value ▶	EEDS460: 2...10 mA EDS461: 0.2...1 mA (in preparation)		EDS490: 2...10 mA EDS491: 0.2...1 mA (in preparation)	
Display of residual current ▶	EDS460: 100 mA...10 A EDS461: 10 mA...1 A (in preparation)		EDS490: 100 mA...10 A EDS491: 10 mA...1 A (in preparation)	
Backlit graphical display ▶	×	--	×	--
7-segment and LED line ▶	--	×	--	×
Parameter setting function ▶	×	--	×	--
Display error code ▶	×		×	
Address range ▶	1...90	2...90	1...90	2...90
Internal clock ▶	×	--	×	--
Alarm history ▶	×	--	×	--
Alarm contact "common alarm" for all channels ▶	2 x 1 W	2 x 1 W	2 x 1 W	2 x 1 W
Alarm contact per channel ▶	--		12 x 1 S	
Enclosure ▶	XM460		XM490	

**Wiring diagram – Operating elements EDS46...-D/-L and EDS49...-D/-L**


- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 - ALARM LED 1 lights in the event of system faults of the following type:</p> <ul style="list-style-type: none"> <li>• Residual current above 10 A at EDS460/490 or above 1 A at EDS461/EDS491 (RCM function)</li> <li>• Interruption or short circuit in a CT circuit (this function can be disabled)</li> </ul> <p>2 - ALARM LED 2 lights up when an insulation fault is found in a channel (EDS function)</p> <p>3 - Power ON LED</p> <p>4 - LC graphical display</p> <p>5 - INFO key: query basic information (not available at EDS...L)<br/>ESC key: return to MENU function</p> | <p>6 - TEST button: call up the self test<br/>Up key: parameter change, scrolling</p> <p>7 - RESET key: confirm insulation and fault messages<br/>Down key: parameter change, scrolling</p> <p>8 - MENU key: -D: alternating of standard, MENU and alarm display<br/>-L: BMS-address setting<br/>Enter key: confirmation parameter change</p> <p>9 - ALARM LEDs, light up when an insulation fault has been found in the respective channel</p> <p>10 - Digital display for device address and error codes (parameter setting only possible with EDS460/490D)</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Wiring diagram – system connection EDS460/461-D/-L and EDS490/491-D/-L

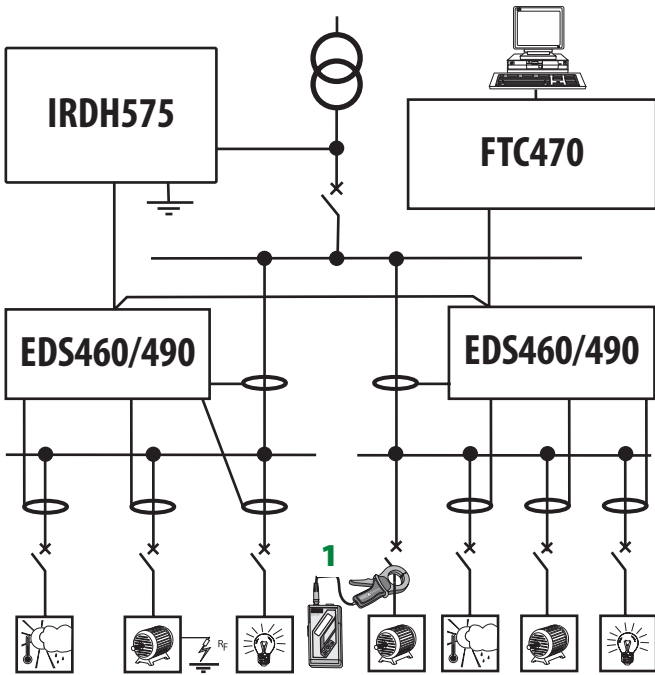


- 1 - Supply voltage  $U_s$ , see ordering information, 6 A fuse recommended, IT systems require two fuses
- 2 - Connection measuring current transformers k1...k12
- 3 - Serial interface RS485
- 4 - External RESET button (make contact)\*
- 5 - External TEST button (make contact)\*

- 6 - Alarm relay 1
- 7 - Alarm relay 2
- 8 - Alarm relay : 1 make contact per channel
- 9 - R on/off: Termination of the serial RS485 interface (A/B) with 120  $\Omega$

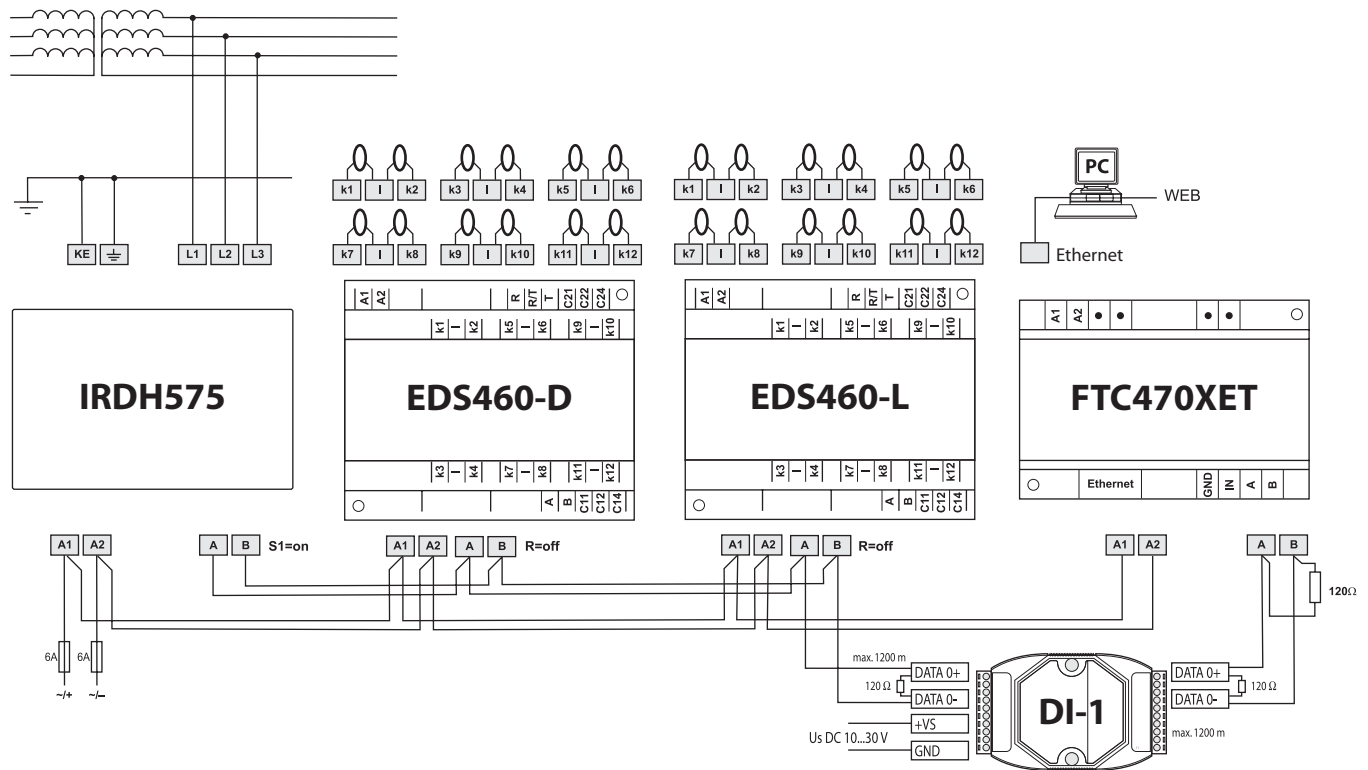
\* External TEST/RESET buttons of several devices may not be connected with each other.

Example for system set-up



1 - EDS165 and PSA

Wiring example for a system set-up



**Note:**  
The DI-1 interface converter is only required when the cable length exceeds 1200 m or when the number of bus participants exceeds 32 devices.

**Technical data**
**Insulation coordination acc. to IEC 60664-1 / IEC 60664-1**

Rated voltage	AC 250 V
Rated impulse voltage / pollution degree	4 kV / III
Protective separation (reinforced insulation) between (A1, A2) - (K1, L...K12, R / RT / T, AB) - (11, 12, 14) - (21, 22, 24)	
Voltage test acc. to IEC 61010-1	2.21 kV

**Supply voltage**

Supply voltage $U_s$	see ordering details
Frequency range $U_s$	AC 42...460 Hz
Power consumption	≤ 10 VA (EDS460 / 461) ≤ 14 VA (EDS490 / 491)

**Measuring circuit**

Nominal system voltage $U_n$	see IRDH575, PGH
External measuring current transformers	W... , WR... , WS... (EDS460, EDS490) W... /8000, WS... /8000 (EDS461, EDS491)
CT monitoring	on / off (on)*
Load	10 $\Omega$
Rated voltage (measuring current transformer)	800 V
Response sensitivity	2...10 mA (EDS460 / EDS490) 0.2...1 mA (EDS461 / EDS491)
Rated frequency	50 / 60 / 400 Hz
Measuring range EDS function	2...50 mA (EDS460 / EDS490) 0.2...5 mA (EDS461 / EDS491)
Measuring range RCM function	100 mA...10 A (EDS460 / EDS490) 10 mA...1.1 A (EDS461 / EDS491)
Number of measuring channels (per device/per system)	12 / 1080

**Specified time**

Response delay $t_{on}$	0...24 s
Delay on release $t_{off}$	0...24 s
Scanning time for all channels	approx. 4...10 s see TGH1394

**Connection EDS – measuring current transformer**

Single wire $\geq 0.75 \text{ mm}^2$	0...1 m
Single wire, twisted $\geq 0.75 \text{ mm}^2$	1...10 m
Shielded cable $\geq 0.5 \text{ mm}^2$	10...40 m
Recommended cable (shielded, shield on one side connected to I-conductor, not connected to PE)	J-Y (ST) Y min. 2 x 0.8

**Displays; memory**

LEDs	Power ON / ALARM (EDS...-D) Power ON / ALARM / channel 1...12 (EDS...-L)
LC display	backlit graphical display (EDS...-D)
7-segment display	2 x 7,62 mm (EDS...-L)
Alarm history	300 data records (EDS...-D)
Password	off / 0...999 (off)*
Language	D, GB, F (GB)*
Fault memory alarm relay	on / off (off)*

**Inputs / outputs**

TEST/RESET button	internal / external
Cable length external TEST/RESET button	0...10 m

**Interfaces**

Interface/protocol	RS-485 / BMS
Cable length	0...1200 m
Recommended cable (shielded, shield on one side connected to PE)	J-Y(ST) Y 2 x 0.8
Terminating resistor	120 $\Omega$ (0,25 W) via DIP switch connectable
Device address, BMS bus	1...90

**Switching elements**

Number of switching elements	2 relays with 1 changeover contact (EDS460) 2 relays with 1 changeover contact, 12 relays with 1 N/O contact each (EDS490)
Operating principle	N/C or N/O operation (N/O operation)*
Electrical service life (under rated operating conditions)	10.000 switching operations
Contact data acc. to IEC 60947-5-1	
Utilization category	AC-13 AC-14 DC-12 DC-12 DC-12
Rated operational voltage	230 V 230 V 24 V 110 V 220 V
Rated operational current	5 A 3 A 1 A 0,2 A 0,1 A
Minimum contact load	1 mA at AC / DC $\geq 10$ V

**Environment / EMC**

EMC	IEC 61326
Operating temperature	-25°C...+55°C
Classification of climatic conditions IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Long-time storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions IEC 60731	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

**Connection**

Type of connection	screw terminals
rigid / flexible / AWG	0.2...4 / 0.2...2.5 mm <sup>2</sup> / AWG 12...24
Multi-conductor connection (two conductors with the same cross section)	
rigid / flexible	0.2...1.5 / 0.2...1.5 mm <sup>2</sup>
Stripping length	8...9 mm
Tightening torque	0.5...0.6 Nm

**Other**

Operating mode	continuous operation
Position	any position
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonat
Flammability class	UL94V-0
Screw fixing	2 x M4
DIN rail mounting	IEC 60715
Instruction leaflet/techn. manual	108017 / TGH1394
Weight	≤ 360 g (EDS460) ≥ 510 g (EDS490)

(\*) Factory setting

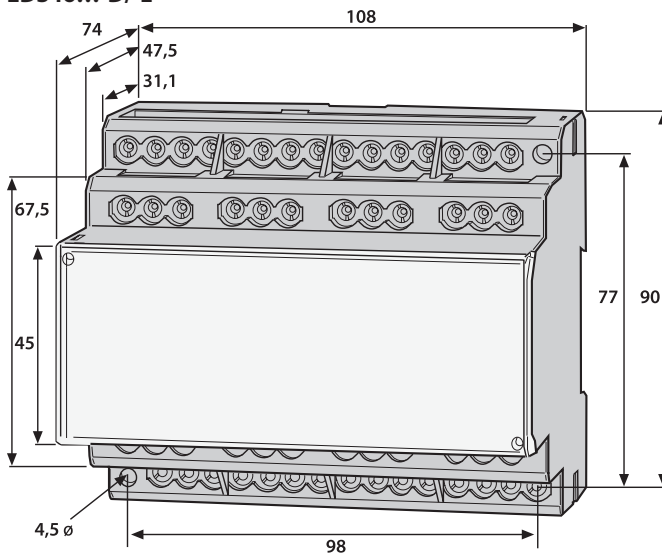
## Ordering information

Type	Supply voltage $U_s^*$	Response value	Art. No.
EDS460-D-1	DC 16...94 V AC 42...460 Hz 16...72 V	2...10 mA	B 9108 0001
EDS460-D-2	AC/DC 70...276 V AC 42...460 Hz	2...10 mA	B 9108 0002
EDS460-L-1	DC 16...94 V AC 42...460 Hz 16...72 V	2...10 mA	B 9108 0003
EDS460-L-2	AC/DC 70...276 V AC 42...460 Hz	2...10 mA	B 9108 0004
EDS461-D-1	DC 16...94 V AC 42...460 Hz 16...72 V	0.2...1 mA	B 9108 0005
EDS461-D-2	AC/DC 70...276 V AC 42...460 Hz	0.2...1 mA	B 9108 0006
EDS461-L-1	DC 16...94 V AC 42...460 Hz 16...72 V	0.2...1 mA	B 9108 0007
EDS461-L-2	AC/DC 70...276 V AC 42...460 Hz	0.2...1 mA	B 9108 0008
EDS490-D-1	DC 16...94 V AC 42...460 Hz 16...72 V	2...10 mA	B 9108 0009
EDS490-D-2	AC/DC 70...276 V AC 42...460 Hz	2...10 mA	B 9108 0010
EDS490-L-1	DC 16...94 V AC 42...460 Hz 16...72 V	2...10 mA	B 9108 0011
EDS490-L-2	AC/DC 70...276 V AC 42...460 Hz	2...10 mA	B 9108 0012
EDS491-D-1	DC 16...94 V AC 42...460 Hz 16...72 V	0.2...1 mA	B 9108 0013
EDS491-D-2	AC/DC 70...276 V AC 42...460 Hz	0.2...1 mA	B 9108 0014
EDS491-L-1	DC 16...94 V AC 42...460 Hz 16...72 V	0.2...1 mA	B 9108 0015
EDS491-L-2	AC/DC 70...276 V AC 42...460 Hz	0.2...1 mA	B 9108 0016

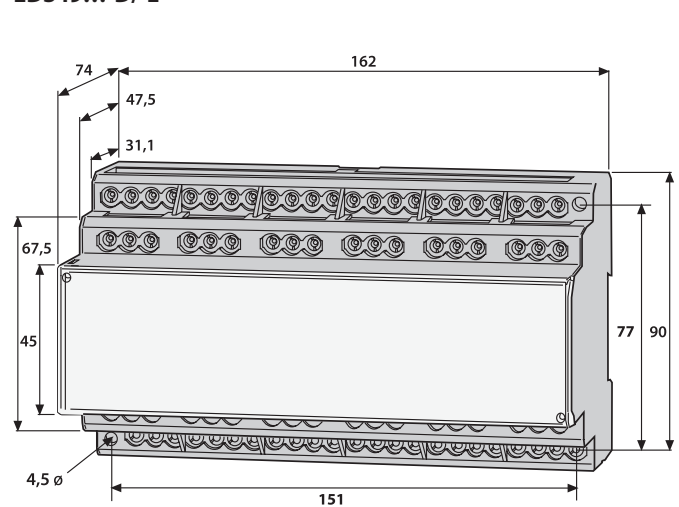
\*absolute values

## Dimension diagrams Dimensions in mm

EDS46...-D/-L



EDS49...-D/-L



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