

ISOSCAN® EDS460/490 - EDS461/491

Insulation fault locators with control and display function for EDS systems (insulation fault location systems)



ISOSCAN® EDS460/490 - EDS461/491



ISOSCAN® EDS460-L

Device features

- Insulation fault location in IT systems
- · For AC, 3AC, DC and IT systems
- · Control and display function in a single device (EDS...-D)
- 12 measuring channels (circuits) for measuring current transformers of the W, WR, WS series
- Up to 90 EDS insulation fault locators in the system (1080 measuring channels)
- · Scanning time max. 10 s for all measuring channels (parallel scanning)
- · Response sensitivity EDS460/490 2...10 mA, EDS461/491 0.2...1 mA
- · History memory to store 300 events
- Two alarm relays with one changeover contact each
- N/O or N/C operation, selectable
- · Connection external test/reset button
- Indication via graphical display resp. 7-segment display and alarm LEDs
- BMS address range 1...90
- Serial interface RS-485
- · Continuous CT connection monitoring
- · Fault memory behaviour selectable
- Device version EDS490/491 with one alarm contactor per channel
- Additional AC residual current measurement

Approvals







Product description

The insulation fault locators ISOSCAN® EDS460/490 in combination with the ISOMETER® IRDH575 or the locating current injector PGH are applied for localising insulation faults in unearthed systems (IT systems). The locating current signals generated by the insulation monitoring device IRDH575 or the locating current injector PGH are detected by measuring current transformers and evaluated by the insulation fault locators. Up to 12 measuring current transformers can be connected to one EDS460/490. A total of 90 EDS insulation fault locators can be connected via one RS-485 interface (BMS protocol). Hence, up to 1080 circuits can be monitored. The maximum scanning time is ... 10 s, see TGH1394.

Application

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

Function

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

When the locating current detected 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 locator 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 RS-485 interface. When the fault memory is deactivated, the alarm message remains stored until the insulation fault is eliminated.

History memory in EDS460/461-D/EDS490/491-D

The device utilises a history memory for failsafe storing of up to 300 measured values/ events (date, time, channel, event code, measured value), so that all data about an outgoing circuit or an area can be traced back at any time (what happend when).

AC residual current measurement

EDS insulation fault locators can also be used for the indication of AC residual currents in unearthed power supplies (IT systems). This is essential when also AC residual currents are to be localised in the circuits.

Device variants

EDS460-D

Device version EDS460-DG features a backlit graphical display where information can be displayed in various ways. This version is applied when detailed information about all devices in the switchboard cabinet, connected to the bus, are to be displayed locally. This device is capable of assigning parameters to all devices connected to the BMS bus and displaying all measurement details. Several EDS460-DG devices can be used in one system.

FDS460-L

Device version EDS490D/EDS490L utilises a two-digit 7-segment display where the address of this device is displayed within the BMS bus. Various error codes are displayed too. The alarm LEDs indicate in which measuring channel the response value has been exceeded. Parameter setting is only possible via an EDS...D, an ISOMETER® IRDH575, the alarm and test combination MK2430 or the protocol converter COM460IP.

EDS490-D/EDS490-L

In comparison to the device version described before, EDS490-D/EDS490-L feature a galvanically isolated alarm contact (N/O contact), for example, to trigger a circuit breaker in this subcircuit when a response value has been exceeded.



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

In comparison to the device versions described above, these versions provide a higher response sensitivity. They are preferrably used in control circuits or in medical locations up to AC 230 (DC 220) V.

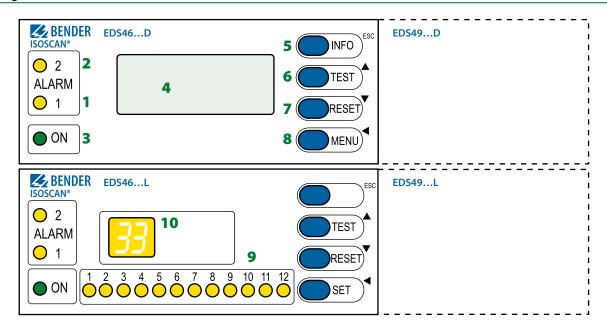
Standards

The ISOSCAN® EDS46... series complies with the requirements of the device standards: DIN EN 61557-8 (VDE 0413-8), EN 61557-8, IEC 61557-8, IEC 61326-2-4, DIN EN 60664-1 (VDE 0110-1), DIN EN 60664-3, DIN EN 61557-9, VDE 0413-9, IEC 61557-9, ASTM F1669M-96 (2007), ASTM F1207M-96 (2007)

Overview of device types

Distinctive device features	EDS460-D/EDS461-D	EDS460-L/EDS461 -L	EDS490-D/EDS491 -D	EDS490-L/EDS491 -L		
December value	EDS460: 2	EDS460: 210 mA		EDS490: 210 mA		
Response value	EDS461: 0.21 mA		EDS491: 0.21 mA			
Residual current indication	EDS460: 100) mA10 A	EDS490: 100 mA10 A			
Residual Current indication	EDS461: 10) mA1 A	EDS491: 10	mA1 A		
Backlit graphics LC display		-		-		
7-segment display and LED line	-		-			
Parameter setting function		-		-		
Error code indication						
Address range	190	190	190	190		
Internal clock		-		-		
History memory		-		-		
Alarm contact "Common alarm" for all channels	2 x 1 changeover contact					
Alarm contact per channel	-		12 x 1 N/O contact			
Enclosure	XM460		XM490			

Operating elements EDS46...-D/-L und EDS49...-D/-L



- 1 LED "ALARM 1" lights up in case of the following system faults:
 - when the residual current exceeds > 10 A (EDS460/490) or > 1 A (EDS461/EDS491) (RCM function)
 - when there is a loss of power or short circuit in a measuring current transformer circuit (this function can be deactivated)
- 2 LED "Alarm 2" lights up when an insulation fault is detected on a channel (EDS function)
- 3 Power On LED "ON"
- 4 LC graphical display
- 5 "INFO" button: to query standard information (does not apply to EDS...L).

ESC button: back to menu function.

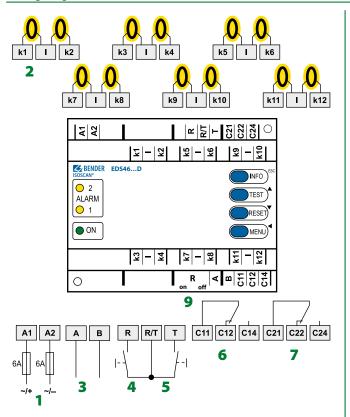
- **6** "TEST" button: to call up the self test Arrow up button: Parameter changes, scroll
- 7 "RESET" button: to acknowledge insulation and fault messages Arrow down button: Parameter changes, scroll
- 3 "MENU" button: EDS...-D: to toggle between the standard display, menu and alarm indication EDS...-L: to set the BMS address

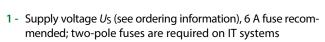
Enter button: to confirm parameter changes

- 9 Alarm LEDs "1...12", light up if an insulation fault has been detected in the relevant channel
- 10 Digital display for device address and error codes (parameter setting (EDS460/490-D only)

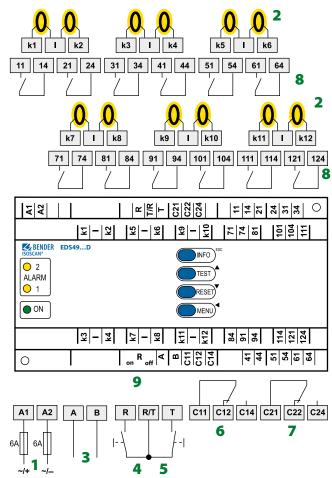


Wiring diagram - Mains connection EDS460/461-D/-L and EDS490/491-D/-L





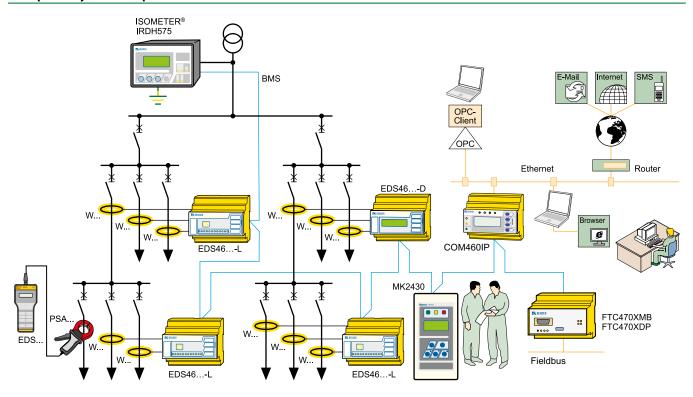
- 2 Connection measuring current transformers k1...k12
- 3 Serial interface RS-485
- 4 External reset button "R" (N/O contact)*
- 5 External test button "T" (N/O contact)*



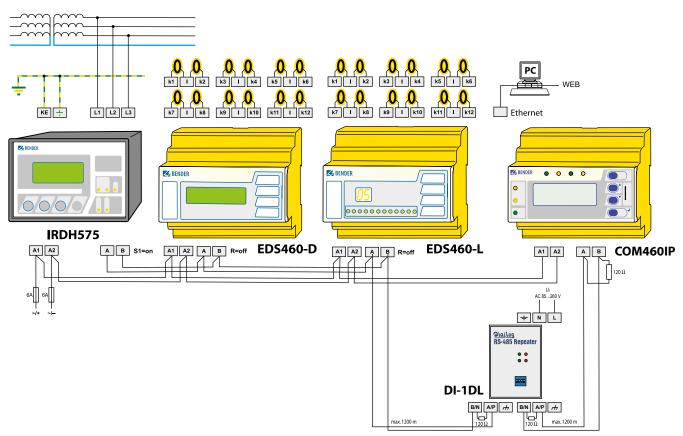
- 6 Alarm relay 1
- 7 Alarm relay 2
- 8 Alarm relay: one N/O contact per channel (EDS490/491 only)
- 9 $R_{\text{On/off:}}$ Termination of the serial RS-485 interface (A/B) with 120 Ω
 - * The external test/reset buttons of several devices must not be connected to one another



Example for system set-up



Example for system set-up



Note:

The DI-1 interface repeater only is required when the length of the cable exceeds 1200 m or when more than 32 devices are connected to the bus.



Technical data

Insulation coordination acc. to IEC 60664-1/IEC 60664-3	Time response
for versions with a supply voltage of AC/DC 70276 V/AC 42460 Hz	Response delay t_{on} 024 s
Rated insulation voltage AC 250 V	Delay on release t _{off} 024 s
Rated impulse voltage/pollution degree 6 kV/3	Scanning time for all channels approx. 824 s (EDS460 490/)
Protective separation (reinforced insulation) between (A1, A2) - (k1, Ik12, R, T/R, T, A, B,),	approx. 1430 s (EDS461/491)
C11, C12 C14), (C21, C22, C24), (11,14), (21,24), (31,34), (41,44), (51,54),	Disulate mamaru
61,64), (71,74), (81,84), (91,94), (101,104), (111,114), (121,124)	Displays, memory
Protective separation (reinforced insulation) between (C11, C12, C14) - (C21, C22, C24) -	LEDs ON/ALARM (EDS4D)
(11, 14, 21, 24, 31, 34) - (41, 44, 51, 54, 61, 64) - (71,74) -	ON/ALARM/measuring channel 112 (EDS4L)
(81,84) - (91,94) - (101,104) - (111,114) - (121,124)	LC display backlit graphical display (EDS4D)
Voltage test acc. to IEC 61010-1 3.536 kV	7-segment display 2 x 7.62 mm (EDS4L)
Rated insulation voltage AC 250 V	History memory 300 data records (EDS4D)
Rated impulse voltage/pollution degree 4 kV/3	Password off/0999 (off)*
Basic insulation between: k1, lk12, R, T/R, T, A, B) - (C11, C12, C14), (C21, C22, C24)	Language D, GB, F (GB)*
Basic insulation between: (11, 14) - (21, 24) - (31, 34) - (41, 44) - (51, 54) - (61, 64)	Fault memory alarm relay on/ off (off)*
Voltage test acc. to IEC 61010-1 2.21 kV	Inputs/outputs
Insulation coordination acc. to IEC 60664-1/IEC 60664-3	Test/reset button internal/external
for versions with a supply voltage of DC 1694 V, AC 1672 V/42460 Hz	Cable length for external test/reset button 010 m
Rated insulation voltage AC 100 V	Interface
Rated impulse voltage/pollution degree 2.5 kV/3	
Protective separation (reinforced insulation) between (A1, A2) - (k1, Ik12, R, T/R, T, A, B)	Interface/protocol RS-485/BMS
Voltage test acc. to IEC 61010-1 1.344 kV	Baud rate 9.6 kbit/s Cable length 01200 m
Rated insulation voltage AC 250 V	Cable length 01200 m Cable (twisted pair, one end of shield connected to PE) recommended: J-Y(St)Y min. 2 x 0.8
Rated impulse voltage/pollution degree 4 kV/3	Terminating resistor 120 Ω (0.25 W) connectable via DIP switch
Basic insulation between (A1, A2), (k1, Ik12, R, T/R, T, A, B) -	Device address, BMS bus 120 12 (0.25 W) Connectable via Dir Switch 190 (2)*
(C11, C12, C14), (C21, C22, C24), (11,14), (21,24), (31,34), (41,44), (51,54),	Device address, Divis bus
(61,64), (71,74), (81,84), (91,94),(101,104), (111,114), (121,124)	Connection: EDS - measuring current transformer
Basic insulation between: (11, 14) - (21, 24) - (31, 34) - (41, 44) - (51, 54) - (61, 64)	Single wire $\geq 0.75 \text{ mm}^2$ 01 m
Voltage test acc. to IEC 61010-1 2.21 kV	Single wire, twisted $\geq 0.75 \text{ mm}^2$ 110 m
Rated insulation voltage AC 250 V	Shielded cable $\geq 0.5 \text{ mm}^2$ 1040 m
Rated impulse voltage/pollution degree 6 kV/3 Protective separation (reinforced insulation) between (C11, C12, C14) - (C21, C22, C24) -	Shielded cable (shield on one side connected to L-conductor, not connected to earth)
(11, 14, 21, 24, 31, 34) - (41, 44, 51, 54, 61, 64) - (71,74) -	recommended: J-Y(St)Y min. 2 x 0.8
(81,84) - (91,94) - (101,104) - (111,114) - (121,124)	Switching elements
Voltage test acc. to IEC 61010-1 3.536 kV	Number two relays, each with one changeover contact (EDS46.)
Total get test dec. to lee of total	two relays, each with one changeover contact, 12 relays, each with one N/O contact (EDS49.)
Supply voltage	Operating principle NC or N/O operation (N/O operation)*
Supply voltage U_{S} see ordering information	Electrical endurance, number of cycles 10000
Frequency range <i>U</i> _S AC 42460 Hz	Contact data acc. to IEC 60947-5-1
Power consumption ≤ 10 VA (EDS460/461)	Utilisation category AC-13 AC-14 DC-12 DC-12 DC-12 Potent approximately lighters 220 V 220 V 24 V 110 V 220 V
≤ 14 VA (EDS490/491)	Rated operational voltage 230 V 230 V 24V 110 V 220 V Rated operational current (common alarm relays) 5 A 3 A 1 A 0.2 A 0.1 A
Measuring circuit	Rated operational current (common alarm relays) 5 A 3 A 1 A 0.2 A 0.1 A Rated operational current (alarm relay) 2 A 0.5 A 5 A 0.2 A 0.1 A
	Minimum contact rating $2 \times 0.5 \times 0.5 \times 0.2 \times 0.1 \times 0$
Nominal system voltage <i>U</i> _n see IRDH575, PGH (EDS460, EDS490)	
AC 20276 V, DC 20308 V (EDS461, EDS491) External measuring current transformers type W, WR, WS (EDS460, EDS490)	Environment/EMC
71	EMC IEC 61326-2-4 Ed. 1.0
W/8000, WS/8000 (EDS461, EDS491) CT monitoring on/off (on)*	Operating temperature -25+55 °C
CT monitoring on/off (on)* Load 10Ω (EDS460/490), 1.5 $k\Omega$ (EDS461/491)	Climatic class acc. to IEC 60721
Rated insulation voltage (measuring current transformer) 800 V	Stationary use (IEC 60721-3-3) 3K5 (except condensation and formation of ice)
Response sensitivity	Transport (IEC 60721-3-2) 2K3 (except condensation and formation of ice)
EDS460/490 210 mA	Long-time storage (IEC 60721-3-1) 1K4 (except condensation and formation of ice)
EDS461/491 0.21 mA	Classification of mechanical conditions acc. to IEC 60721
Rated frequency DC, AC 400, 60, 50 Hz	Stationary use (IEC 60721-3-3) 3M4
Measuring range EDS function 1.550 mA (EDS460/490)	Transport (IEC 60721-3-2) 2M2
0.155 mA (EDS461/491)	Long-time storage (IEC 60721-3-1) 1M3
Measuring range RCM function 100 mA10 A (EDS460/490)	
10 mA1 A (EDS461/491)	
Number of measuring channels (per device/system) 12/1080	



Connection	
Connection	screw-type terminals
Connection	
rigid/flexible	0.24/0.22.5 mm ² (AWG 2412)
Multi-conductor connection (2 conductors with t	he same cross section):
rigid/flexible	0.21.5/0.21.5 mm ²
Stripping length	89 mm
Tightening torque	0.50.6 Nm
Other	
Operating mode	continuous operation
Position of normal use	any
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonate
Flammability class	UL94 V-0
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Weight	≤ 360 g (EDS46.)
	≤ 530 g (EDS49.)

()* factory setting

Ordering information EDS460/490-D, EDS461/491-D

Measurii	ng range	Common alarm relay	· · · · · · · · · · · · · · · · · · ·		Supply voltage ¹⁾ U _S			Art. No.							
EDS-Funktion	RCM-Funktion	for all channels	per channel	AC	DC	AC/DC	Туре	AI C. NO.							
2 10 1	100 A 10 A	2 v 1 Washalar		1672 V, 42460 Hz	1694 V	-	EDS460-D-1	B 9108 0001							
210 mA	100 mA10 A	2 x 1 Wechsler	_	42460 Hz	-	70276 V	EDS460-D-2	B 9108 0002							
0.21 mA	10 mA1 A	2 x 1 Wechsler	_	1672 V, 42460 Hz	1694 V	-	EDS461-D-1	B 9108 0005							
U.Z1 IIIA	IU IIIAI A		2 x i wedisiei	2 x i wedisiei	Z X I WECHSIEI	Z X I Weclisiei	Z X I Wedisiei	2 X I Weclisiei	2 X T Weclisiei	Z X I WECHSIEI	z x i weclisiei —	42460 Hz	-	70276 V	EDS461-D-2
210 mA	100 mA10 A	2 x 1 Wechsler	12 x 1 Schließer	1672 V, 42460 Hz	1694 V	-	EDS490-D-1	B 9108 0009							
2 IU IIIA	100 IIIA 10 A	2 x i wechsier	12 X 1 Schilleiser	42460 Hz	-	70276 V	EDS490-D-2	B 9108 0010							
0.2 1 1	0.21 mA 10 mA1 A 2 x 1 Wechsler	12 x 1 Schließer	1672 V, 42460 Hz	1694 V	-	EDS491-D-1	B 9108 0013								
0.21 MA			42460 Hz	-	70276 V	EDS491-D-2	B 9108 0014								

¹⁾ Absolute values

Ordering information EDS460/490-L, EDS461/491-L

Measurii	ng range	Common alarm relay	Alarm relay	Sup	oply voltage ¹⁾ <i>U</i> S		Туре	Art. No.				
EDS-Funktion	RCM-Funktion	for all channels	per channel	AC	DC	AC/DC	Турс	AI C. NO.				
2 10 mA	100 m A 10 A	2 v 1 Washslar		1672 V, 42460 Hz	1694 V	_	EDS460-L-1	B 9108 0003				
2 IU IIIA	210 mA 100 mA10 A 2 x 1 Wechsler	2 x i wechsier	_	42460 Hz	-	70276 V	EDS460-L-2	B 9108 0004				
0.2 1 1	10 1 1 1	2 114 1 1	2 1	2 - 1 Wh -l	2 1 Whl	2 1 W L - L		1672 V, 42460 Hz	1694 V	-	EDS461-L-1	B 9108 0007
0.21 mA	.1 mA 10 mA1A 2 x 1 Wechsler	_	42460 Hz	-	70276 V	EDS461-L-2	B 9108 0008					
2 10 mA	100 m A 10 A	2 v 1 Washslar	12 x 1 Schließer	1672 V, 42460 Hz	1694 V	-	EDS490-L-1	B 9108 0011				
2 IU IIIA	210 mA 100 mA10 A 2 x 1 Wechsler 12 x	(I wechsier 12 x i Schileiser	42460 Hz	-	70276 V	EDS490-L-2	B 9108 0012					
0.2 1 m /	0.21 mA 10 mA1A 2 x 1 Wechsler	12 x 1 Schließer	1672 V, 42460 Hz	1694 V	-	EDS491-L-1	B 9108 0015					
U.ZI IIIA		Z X I WECHSIEI	12 x 1 3CHHeiser	42460 Hz	-	70276 V	EDS491-L-2	B 9108 0016				

¹⁾ Absolute values



Suitable system components

Type designation	Design	Туре	Art. No.
	Bus repeater	DI-1DL	B 9501 2047
RS-485 repeater	Supplied by the USB port, no additional power supply required. DI-2USB		B 9501 2045
	Power supply unit for DI-1 or DI-2	AN471	B 924 189
Protocol converters	BMS bus — TCP IP via Ethernet	COM460IP	B 9506 1010
	BMS bus — Modbus/RTU	FTC470XMB	B 9506 1002
	BMS bus – PROFIBUS DP	FTC470XDP	B 9506 1000

Measuring current transformers for EDS460/490

Type of construction	Internal diameter/mm	Туре	Art. No.
	20	W20	B 9808 0003
	35	W35	B 9808 0010
circular	60	W60	B 9808 0018
	120	W120	B 9808 0028
	210	W210	B 9808 0034
	20 x 30	WS20x30	B 9808 0601
	50 x 80	WS50x80	B 9808 0603
split-core	80 x 80	WS80x80	B 9808 0605
	80 x 120	WS80x120	B 9808 0606
	80 x 160	WS80x160	B 9808 0608

Alternative measuring current transformers from the Bender range

Type of construction	Internal diameter/mm	Туре	Art. No.
	10	W10/600	B 911 761
	20	W0-S20	B 911 787
	35	W1-S35	B 911 731
circular	70	W2-S70	B 911 732
	105	W3-S105	B 911 733
	140	W4-S140	B 911 734
	210	W5-S210	B 911 735
	70x175	WR 70x175S	B 911 738
uo eta n mula n	115x305	WR 115x305S	B 911 739
rectangular	150x350	WR 150x350S	B 911 740
	200x500	WR 200x500S	B 911 763
	50x80	WS 50x80S	B 911 741
split-core	80x80	WS 80x80S	B 911 742
	80x120	WS 80x120S	B 911 743
	80x160	WS 80x160S	B 911 755

Measuring current transformers for EDS461/491

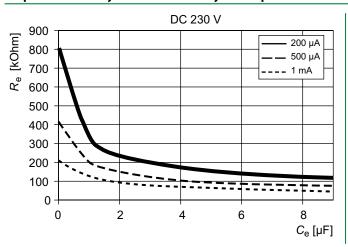
Type of construction	Internal diameter/mm	Туре	Art. No.
	20	W20-8000	B 9808 0009
circular	35	W35-8000	B 9808 0017
	60	W60-8000	B 9808 0027
split-core	20 x 30	WS20x30-8000	B 9808 0602
	50 x 80	WS50x80-8000	B 9808 0604

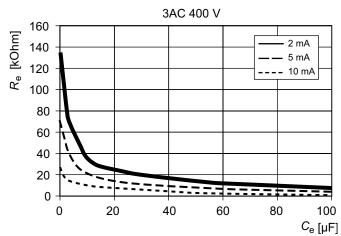
Alternative measuring current transformers from the Bender range

Type of construction	Internal diameter/mm	Туре	Art. No.
circular	10	W10/8000	B 911 759
	35	W1-35/8000	B 911 756
circular, 6 x	10	W10/8000-6	B 911 900
split-core	20 x 30	WS20x30/8000	B 911 764
	50 x 80	WS50x80/8000	B 911 757

BENDER

Response sensitivity in relation to the system capacitance





Explanatory notes on the response sensitivity

The value of the maximum response sensitivity decreases in relation to the system leakage capacitance. The following maximum response values can be reached:

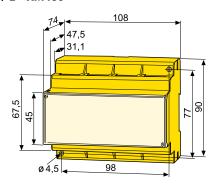
 $30~\Omega/V$ with a system voltage of max. 20000 μFV (product of the nominal voltage and system leakage capacitance)

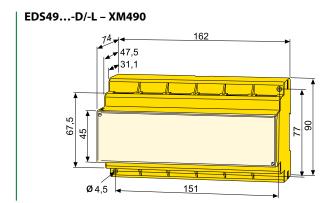
Example: system voltage 230 V 20000 μ FV/230 V = 87 μ F 230 V x 30 Ω /V = 6.9 $k\Omega$ minimum response value at 87 μ F system leakage capacitance

Dimension diagrams XM460 and XM490

Dimensions in mm

EDS46...-D/-L - XM460







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