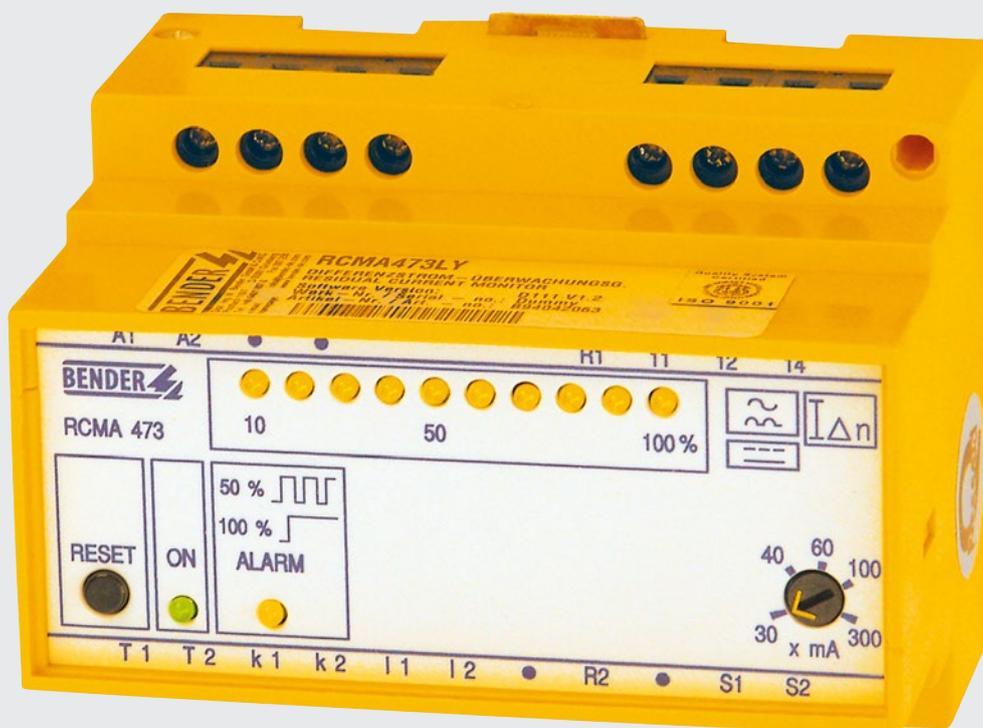


Residual current monitor RCMA473LY

AC/DC sensitive residual current monitor

for TN and TT systems (AC, DC, pulsed DC currents)

designed to be used as a protective device in combination with circuit breakers according to EN 60947-2



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RCMA473LY

Device features

- External measuring current transformer
- Two response values:
Alarm $I_{\Delta n1}$: 30 mA...300 mA (0...150 Hz)
Prewarning $I_{\Delta n2}$: 50% of $I_{\Delta n1}$
- Response time ≤ 130 ms
- Two separate alarm relays with one potential-free changeover contact and one N/C contact
- N/C operation
- Fault memory
- RESET button
- Test function with actual fault current
- LED bar graph indicator $I_{\Delta n}$ 0...100%
- CT connection monitoring
- Sealable transparent cover
- Separate supply voltage
- Type B acc. to IEC 60755

Approvals



Product description

The AC/DC sensitive residual current monitor RCMA473LY is designed for monitoring earthed power supply systems (TN and TT systems) where smooth DC fault currents or residual currents continuously greater than zero may occur. These are in particular loads containing six-pulse rectifiers or one way rectifiers with smoothing, such as converters, battery chargers, construction site equipment with frequency-controlled drives. In combination with a circuit breaker in accordance with EN 60947-2, this device can also be used as a protective device.

The prewarning stage (50% of the set response value $I_{\Delta n1}$) allow to distinguish between prewarning and alarm. Since the values are measured with measuring current transformers, the device is nearly independent of the load current and the nominal voltage of the system.

Application

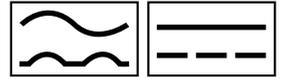
- AC/DC sensitive residual current monitoring in earthed two, three or four conductor systems.
- AC/DC sensitive current monitoring of single conductors de-energized under normal conditions (e. g. N and PE conductors).
- Variable-speed drives
- Uninterruptible power supply systems (UPS)
- Construction site equipment;
- Worksite distribution board
- Switching protective device in combination with a circuit breaker in accordance with EN 60947-2.

Function

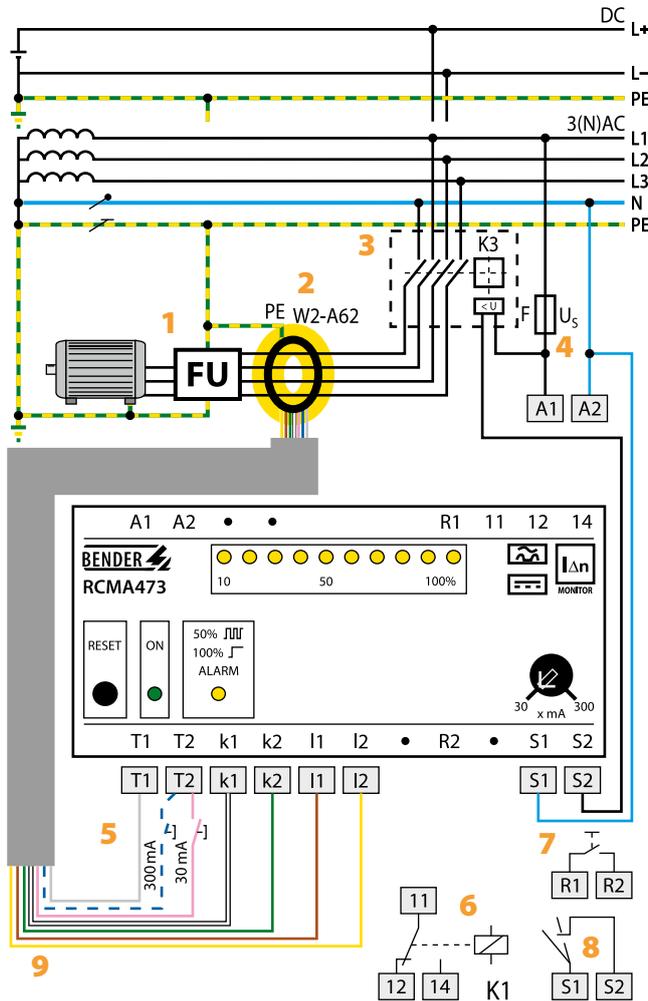
Residual current monitoring takes place via an external measuring current transformer. When the current respectively the residual current exceeds the prewarning level or the set response value, the alarm LED lights and the alarm relay respectively the control output switches. The prewarning response value $I_{\Delta n2}$ corresponds to 50% of the alarm response value $I_{\Delta n1}$.

The alarm message is stored. The alarm message can be reset by pressing the RESET button. The external test button can be used to test the device function using an actual residual current.

The actual current value in per cent is indicated on the LED bar graph indicator. The CT circuit is continuously monitored. In case of wire breakage or short circuit, the alarm relay switches and the Power On LED flashes.



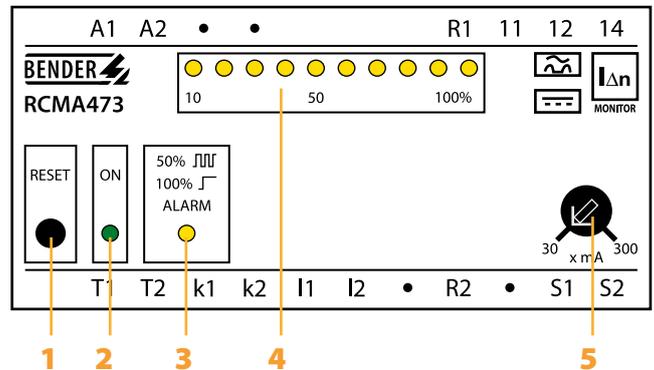
Wiring diagram – system connection, external connections



- 1 - Frequency converter
- 2 - External measuring current transformer W2-A62
- 3 - Circuit breaker in combination with an undervoltage tripping device in accordance with EN 60947-2 tab < 20 ms.
- 4 - Supply voltage U_s (see ordering information), a 6 A fuse recommended for line protection.
- 5 - External TEST button, pressing the test button starts a test using an actual residual current.
- 6 - Alarm relay K1 "prewarning", switches when the fault current exceeds 50% of the response value.
- 7 - External RESET button, pressing the TEST button deletes alarm messages.
- 8 - N/C contact (N/O contact in N/C operation) to control the circuit breaker Alarm, --- in operation without fault alarm.
- 9 - Colour coding of the connecting cable:
T1 – grey, T2 – pink (30 mA) blue (300 mA), k1 – white, k2 – green, I1 – brown, I2 – yellow

Note! Do not route the PE conductor through the measuring current transformer!

Wiring diagram – front plate



- 1 - RESET button: pressing the button deletes alarm messages.
- 2 - Power On LED: lights when the device is in operation and flashes in case of interruption of the CT connection, defective CT or when the measuring range is exceeded.
- 3 - Alarm LED: lights when the fault current exceeds the set response value and flashes when 50% of the set response value are reached.
- 4 - LED bar graph indicator, shows the measuring value in per cent related to the preset response value.
- 5 - Potentiometer for setting the response value (30...300 mA).

Technical data

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Voltage ranges

Supply voltage U_S	see ordering information
Operating range of U_S	0.85...1.1 x U_S
Frequency range of U_S	50...60 Hz
Power consumption	≤ 4.5 VA
Voltage interruption	≤ 40 ms

Measuring circuit/response values

External measuring current transformer	W2-A62
Operating characteristic acc. to IEC 60755	Type B
Rated residual operating current $I_{\Delta n2}$ (prewarning)	50 % of $I_{\Delta n1}$
Response delay t_v	1 s
Delay on release	1 s
Rated residual operating current $I_{\Delta n1}$ (alarm)	30...300 mA
Rated frequency	0...150 Hz
Relative percentage error	0...-25 %
Hysteresis	approx. 25 % of the response value
Response time $t_{\Delta n}$ at $I_{\Delta n1} = 1 \times I_{\Delta n1/2}$ ($t_v = 0$ s)	≤ 130 ms
Response time $t_{\Delta n}$ at $I_{\Delta n1} = 5 \times I_{\Delta n1/2}$ ($t_v = 0$ s)	≤ 20 ms

Displays

LED bar graph indicator	0...100 %
LEDs	Power On, prewarning, alarm

Inputs/outputs

TEST and RESET button	internal/external
Cable length external TEST and RESET button	≤ 10 m

Cable lengths for measuring current transformers

Single wire ≥ 0.75 mm ²	0...10 m
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Switching elements

Switching elements	1 changeover contact, for prewarning
Operating principle, adjustable	N/C operation
Electrical endurance, number of cycles	12000
Rated contact voltage	AC 250 V/DC 300 V
Limited making capacity	AC/DC 5 A
Breaking capacity	2 A, AC 230 V, cos phi = 0,4 0.2 A, DC 220 V, L/R = 0.04 s
Fault memory	without fault storage
Switching elements	1 N/C contact for alarm
Switching voltage	AC/DC 90...264 V
Power consumption	1200 VA
Continuous current	500 mA
Operating principle	N/C operation
Fault memory	ON

Environment/EMC

EMC immunity	acc. to EN 61543
EMC emission	acc. to EN 61000-6-4
Shock resistance IEC 60068-2-27 (during operation)	15 g/11 ms
Bumping IEC 60068-2-29 (during transport)	40 g/6 ms
Vibration resistance IEC 60068-2-6 (during operation)	1 g/10...150 Hz
Vibration resistance IEC 60068-2-6 (during transport)	2 g/10...150 Hz
Ambient temperature (during operation)	-25...+70 °C
Ambient temperature (when stored)	-40...+75 °C
Climatic category IEC 60721-3-3	3K5

Connection

Connection	screw terminals
Connection properties	
rigid/flexible	0.2...4/0.2...2.5 mm ²
flexible with ferrules without/with plastic collar	0.25...2.5 mm ²
Conductor sizes (AWG)	24...12

Other

Operating mode	continuous operation
Mounting	any position
Protection class, internal components (IEC 60529)	IP30
Protection class, terminals (IEC 60529)	IP20
Type of enclosure	X470
Enclosure material	polycarbonate
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94V-0
Standards	IEC 62020, EN 60947-2
Instruction leaflet	BP404003
Weight	≤ 350 g

Ordering information

Response-range I_{Δ}	Rated frequency	Response delay	Measuring current transformers	Indication	Fault memory	Supply voltage U_s		Type	Art. No.
						AC			
30/300 mA	0...150 Hz	0 s	W2-A62	intern	■	230 V		RCMA473LY	B 9404 2063

Accessories

External measuring current transformer		
Inside diameter (mm)	Type	Art. No.
ø 62	W2-A62	B 911 762

Appropriate circuit breakers

In order to meet the requirements of EN 60947-2, the following circuit breakers are recommended to be used, for example:

Manufacturer	Type
Moeller	NZM 7, NZM 2
ABB-SACE	S1, S2, S3

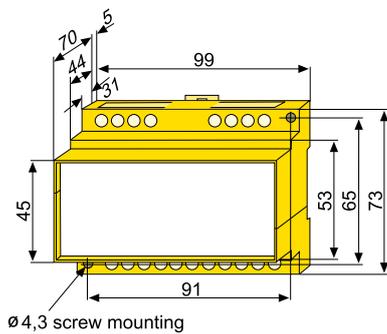
Other types on request.

Conditions of operation according to IEC 62020, IEC 60755 amendment 2, Type B

Current type	Graphic representation	Operating current
Alternating currents (50 Hz)		$0.5 \dots 1 \times I_{\Delta n}$
Pulsed DC residual currents (positive and negative half waves) half-wave current		$0.5 \dots 1.4 \times I_{\Delta n}$
Phase-controlled half-wave currents Current delay angle $90^\circ \text{el} \dots 135^\circ \text{el}$		$0.5 \dots 1.4 \times I_{\Delta n}$
Half-wave current superimposed by a smooth direct current of 6 mA		$0.5 \dots 1.4 \times I_{\Delta n}$
Smooth DC residual current		$0.5 \dots 2 \times I_{\Delta n}$

Dimension diagram X470

Dimensions in mm





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