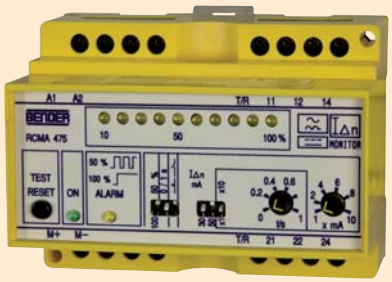
Residual current monitor RCMA475LY

AC / DC sensitive residual current monitor for TN and TT systems (AC, DC, pulsating DC currents)



RCMA475LY

Device features

- Internal measuring current transformer ø 18 mm
- Two response values
  Alarm $I_{\Delta n1}$: 30 mA…500 mA (0…700 Hz)
  prewarning $I_{\Delta n2}$: 50 % / 100 % of $I_{\Delta n1}$
- Response delay, adjustable 0…10 s (prewarning 0 / 1 s)
- Two separate alarm relays with one potential-freee changeover contact each
- N / O or N / C operation, selectable
- Fault memory
- Combined test / reset button
- Connection external test and reset button
- LED bar graph indicator $I_{\Delta n}$ 0…100 %
- Connection external measuring instrument $I_{\Delta n}$ 0…100 %
- Sealable transparent cover
- External supply voltage
- Type B acc. to IEC 60755

Approvals and certifications

c UL us LISTED PCT AE25

Product description

The AC / DC sensitive residual current monitor RCMA475LY is designed for monitoring earthed power supply systems (TN and TT systems) where 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.

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

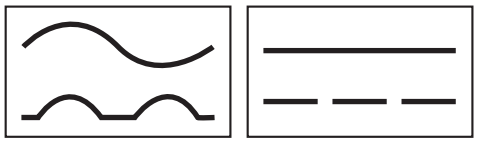
- AC / DC sensitive residual current monitoring in earthed two, three or four conductor systems (TN and TT systems)
- AC / DC sensitive current monitoring of single conductors de-energised under normal conditions (e.g. N and PE conductors)
- Variable-speed drives
- Uninterruptible power supply systems (UPS)

Function

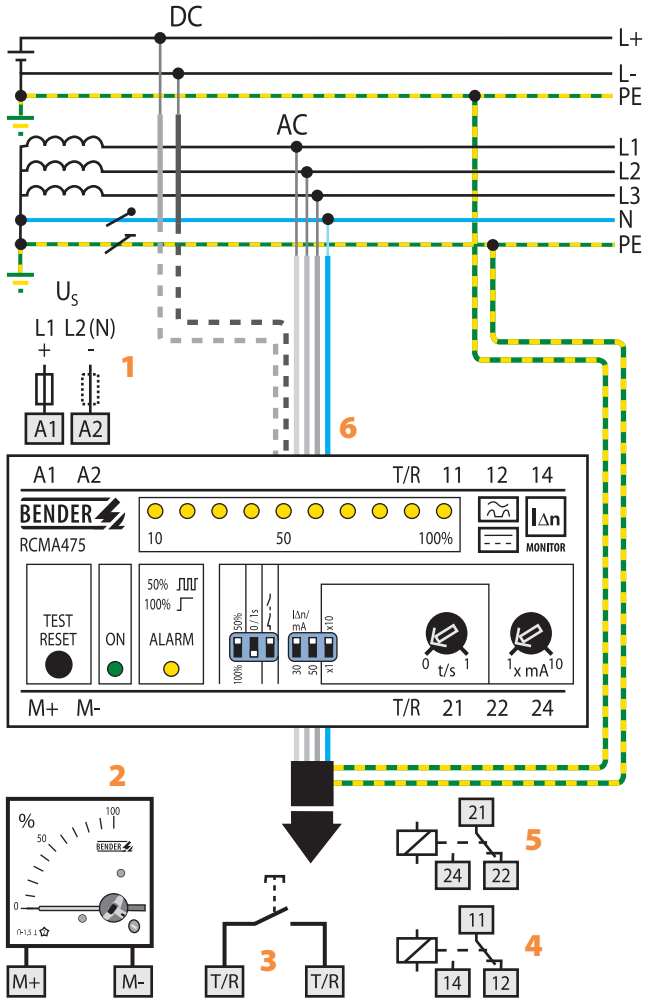
Residual current monitoring takes place via an internal measuring current transformer. When the current respectively the residual current exceeds the set response value, the alarm LED lights and the associated alarm relay switches when the set response delay has elapsed.

The alarm messages are stored. The fault memory can be reset by pressing the reset button. The device function can be tested using the test button.

The currently measured value in per cent related to the set response value is indicated on the LED bar graph indicator.



Wiring diagram – system connection, external connections



1 - Supply voltage U_S, see ordering information (6 A fuse recommended)

2 - External measuring instrument

3 - External test and reset button "T / R"

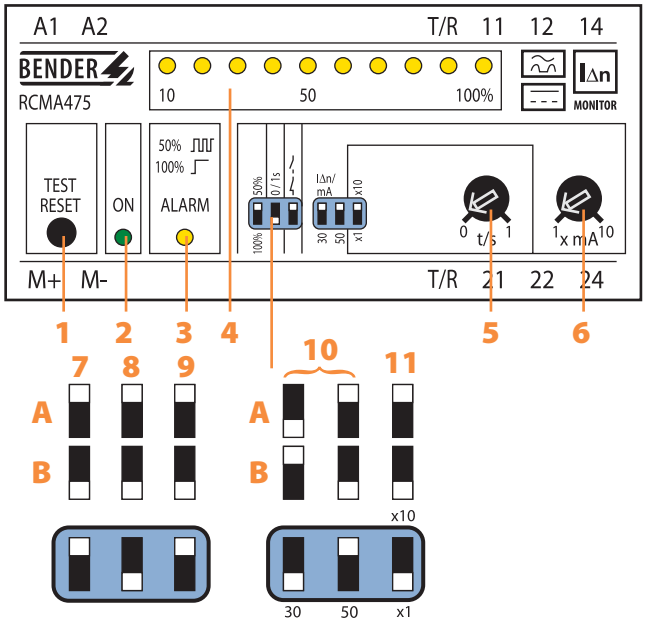
4 - Alarm relay (Alarm): switches when the fault current exceeds the response value of $I_{\Delta n1}$

5 - Alarm relay (prewarning): switches when the fault current exceeds 50 % or 100 % of $I_{\Delta n1}$

6 - Internal measuring current transformer

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

Wiring diagram – front plate



1 - Combined test / reset button "TEST / RESET"; short-time pressing (< 1s) = RESET, long-time pressing (> 2s) = TEST

2 - Power On LED "ON": lights when the device is in operation and flashes when the measuring range is exceeded

3 - Alarm LED "ALARM": 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 delay (0…1 s)

6 - Potentiometer for setting the response value (x 1…10 mA)

Setting of the DIP switches (white = switch position)

7 - Contact 21-22-24 (prewarning)
- A - at 50 % of $I_{\Delta n1}$
- B - at 100 % of $I_{\Delta n1}$

8 - Response delay prewarning
- A - Delay 1 s
- B - Delay 0 s

9 - Alarm relay
- A - N / O operation
- B - N / C operation

10 - Response range
- A - 30 mA } x 1…10
- B - 50 mA }

11 - Response delay
- A - Setting value $^t/_s$ x 10
- B - Setting value $^t/_s$ x 1

4.2

Technical data residual current monitor RCMA475LY

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	DC / 50…60 Hz
Power consumption	≤ 3.5 VA

Measuring circuit / response values

Internal measuring current transformer	ø 18 mm
Operating characteristics acc. to IEC 60755	Type B
Rated residual operating current $I_{\Delta n2}$ (prewarning)	50 % / 100 % of $I_{\Delta n1}$
Response delay t_v	0 / 1 s
Rated residual operating current $I_{\Delta n1}$ (Alarm)	30…500 mA
Response delay t_v, adjustable	0…10 s
Rated frequency	0…700 Hz
Relative uncertainty	0…- 25 %
Hysteresis	approx. 25 % of the response value
Response time t_{an} at $I_{\Delta n1} = 1$ x $I_{\Delta n1\,/\,2}$ ($t_v = 0$ s)	≤ 70 ms
Response time t_{an} at $I_{\Delta n1} = 5$ x $I_{\Delta n1\,/\,2}$ ($t_v = 0$ s)	≤ 40 ms

Displays

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

Inputs / outputs

Test and reset button	internal / external
Cable length for external test and reset button	≤ 10 m
Current source for external measuring instrument 0…100 %	DC 0…400 µA
Load	≤ 12.5 kΩ

Switching elements

Number of switching elements	2 x 1 changeover contact
Operating principle, adjustable	N / C operation / N / O operation
Electrical endurance, number of cycles	12000
Rated contact voltage	AC 250 V / DC 300 V
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	ON

General data

EMC immunity	EN 61543
EMC emission	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 °C…+ 70 °C
Ambient temperature, when stored	- 40 °C…+ 75 °C
Climatic class acc. to DIN IEC 60721-3-3	3K5
Operating mode	continuous operation
Mounting	any position
Connection	modular terminals
Connection properties	
rigid / flexible	0.2…4 / 0.2…2.5 mm²
flexible with ferrules without / with plastic sleeve	0.25…2.5 mm²
Conductor sizes (AWG)	24…12
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Type of enclosure	X475
Enclosure material	polycarbonate
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Installation into standard distribution panels acc. to	DIN 43871
Flammability class	UL94V-0
Product standards	DIN EN 62020 (VDE 0663): 2005-11, IEC 62020: 2003-11
Operating manual	TBP404001
Weight	≤ 350 g

Ordering information

Type	Response range $I_{\Delta n}$	Rated frequency	Time delay	Measuring current transformer inside diameter	Displays	Fault memory behaviour	Supply voltage U_S	Art. No.
RCMA475LY	30…500 mA	0…700 Hz	0…10 s	ø 18 mm	internal / external	×	AC 230 V	B 9404 2002[2)]
RCMA475LY-13	30…500 mA	0…700 Hz	0…10 s	ø 18 mm	internal / external	×	AC 90…132 V*	B 9404 2004[2)]
RCMA475LY-21	30…500 mA	0…700 Hz	0…10 s	ø 18 mm	internal / external	×	DC 9.6…84V*	B 9404 2014[1)]
RCMA475LY-23	30…500 mA	0…700 Hz	0…10 s	ø 18 mm	internal / external	×	DC 77…286V*	B 9404 2015[1)]

Other supply voltages on request

* Absolute values of the operating range

[1)] For industrial application only

[2)] For industrial and household applications

Accessories

External measuring instrument			
Type	**Displays**	**Size (mm)**	**Art. No.**
9604-4241	0…100%	96 x 96	B 986 807

Measuring converter			
Type	**Input**	**Output**	**Art. No.**
RK170	0…400 µA	0…10 V / 0 / 4…20 mA	B 9804 1500

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…1 x $I_{\Delta n}$
Pulsating direct currents (positive and negative half waves) half-wave current		0.5…1.4 x $I_{\Delta n}$
Phase-controlled half-wave currents current delay angle 90° el / 135° el		0.5…1.4 x $I_{\Delta n}$
Half-wave current superimposed by a smooth direct current of 6 mA		0.5…1.4 x $I_{\Delta n}$
Smooth direct current		0.5…2 x $I_{\Delta n}$

Dimension diagram

Dimensions in mm