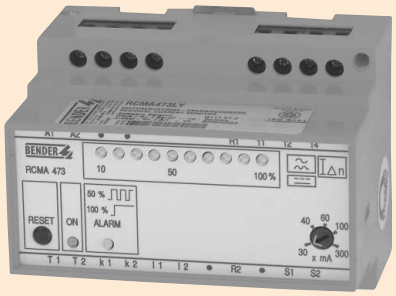
Residual current monitor RCMA473LY

AC/DC sensitive residual current monitor for TN and TT systems (AC, DC, pulsating DC currents) intended to be used as a protective device in combination with a circuit-breaker according to EN 60947-2



RCMA473LY

Device features

- External measuring current transformer
- Two response values:
  Alarm $I_{\Delta n1}$: 30…300 mA (0…150 Hz)
  Prewarning $I_{\Delta n2}$: 50 % of $I_{\Delta n1}$
- Time delay 130 ms
- Two separate alarm relays with one voltage free changeover contact each
- N/C operation
- Fault memory behaviour
- Reset button
- Test function using an actual fault current
- LED bar graph indicator $I_{\Delta n}$ 0…100 %
- CT connection monitoring
- Transparent dust cover for ingress protection
- Separate supply voltage
- Type B according to IEC 60755 A2

Product description

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

The prewarning stage (50 % of the set reponse value $I_{\Delta n1}$) allows to distinguish between prewarning and alarm. The measuring values are detected using measuring current transformers, therefore the device is nearly independent of the load current and nominal voltage of the system. The device is also suitable for busbar systems.

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-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 according to EN 60947-2

Function

The residual current is measured using an external measuring current transformer. When the current respectively the residual current exceeds the set response value, the respective alarm LED lights up and the associated alarm relay or the control output switches after the expiry of the set response delay.

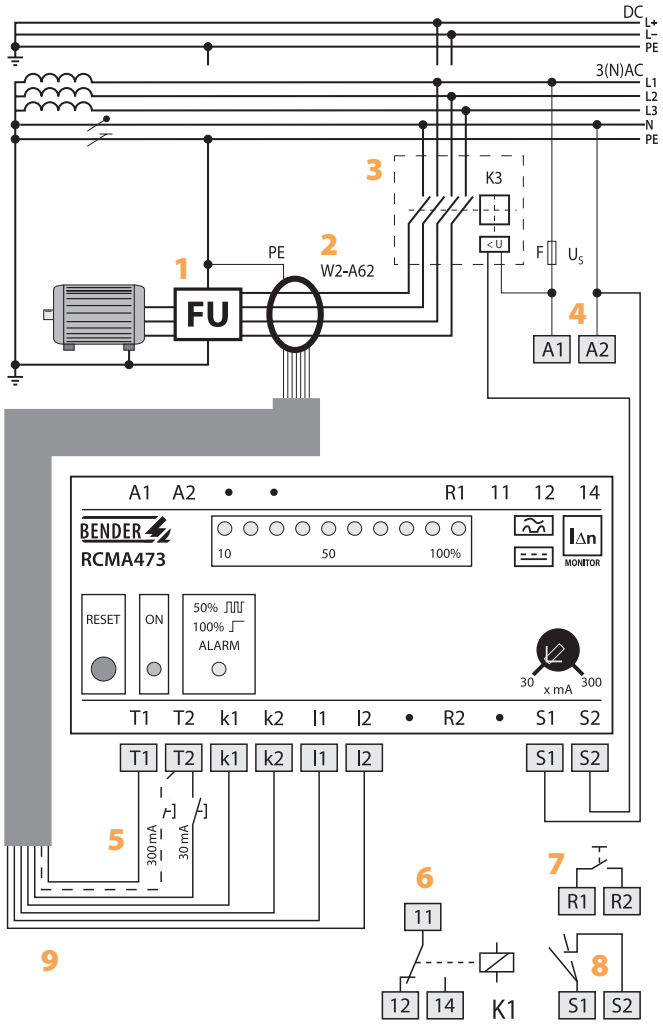
The alarm messages are stored. The alarm messages can be reset by pressing the reset button. The function of the device can be tested by pressing the external test button using a genuine residual current.

The currently measured value in per cent related to the set response value is indicated on the LED bar graph indicator. The CT circuit is continuously monitored. In case of wire breakage, the alarm relay switches and the Power On LED flashes.

Standards and regulations

The residual current monitor RCMA473LY complies with the requirements of DIN EN 62020 (VDE 0663): 1999-07, IEC 62020: 2003-11, EN 60947-2, BG I 608.

Wiring diagram – system connection, external connections



1 - Frequency converter

2 - External measuring current transformer W2-A62

3 - Circuit-breaker with undervoltage release according to EN 60947-2 t_{ab} < 20 ms

4 - Supply voltage U_S see ordering details, a 6 A fuse is recommended

5 - External test button, pressing the test button activates a test using a genuine residual current

6 - Alarm relay K1 “prewarning”: switches when the fault current exceeds 50 % of $I_{\Delta n1}$

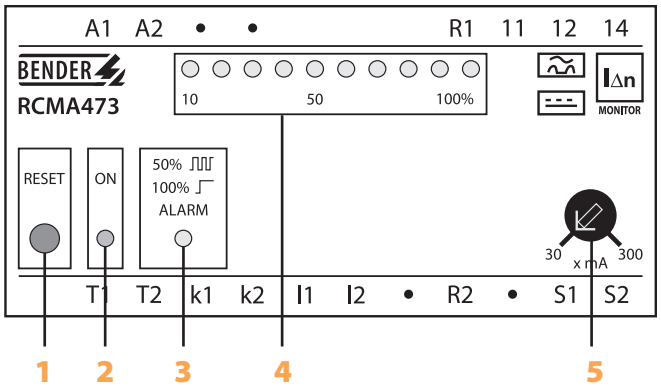
7 - External reset button, pressing the reset button deletes alarm messages

8 - NC contact to control the circuit-breaker “Alarm”:
--- = in operation (no fault message)

9 - Colour-code of the connecting cable:
T1 - grey, T2 - pink (30 mA) blue (300 mA), K1 - white,
K2 - green, L1 - brown, L2 - yellow

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

Wiring diagram – frontplate



1 - RESET button: deletes alarm messages.

2 - Power ON LED: lights up indicating that 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, indicates the measured value in % related to the set response value.

5 - Potentiometer for setting the response value in the range of 30…300 mA.

4.2

Technical data residual current monitor RCMA473LY

Insulation coordination acc. to IEC 60664-1:

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

Voltage ranges

Supply voltage U_S	see ordering details
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

Type of external measuring current transformer	W2-A62
Operating characteristics 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
Rated residual operating current $I_{\Delta n1}$ (alarm)	30…300 mA
Rated frequency	0…150 Hz
Relative percentage error	see table "conditions of operation"
Hysteresis	approx. 25 % of the response value
Response time t_{an} at $I_{\Delta n1} = 5 \times I_{\Delta n1/2}$ ($t_v = 0$ s)	< 20 ms
Response time t_{an} at $I_{\Delta n1} = 1 \times I_{\Delta n1/2}$ ($t_v = 0$ s)	< 130 ms

Displays and LEDs

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

Inputs / outputs

Test / reset button	internal, external
Cable length test / reset button	≤ 10 m
Connection to CT:	
single wire 6 x 0.75 mm²	0…10 m

Switching elements

Switching elements	1 changeover contact for "prewarning"
Operating principle	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
Limited breaking capacity	2 A, AC 230 V, cos phi = 0.4 0.2 A, DC 220 V, L / R = 0.04 s
Fault memory behaviour	without fault storage
Switching elements	1 NC contact for circuit-breaker control
Switching voltage	AC / DC 90…264 V
Making capacity	1200 VA
Continuous current	500 mA
Operating principle	N/C operation
Fault memory	automatic fault storage

General data

EMC immunity	acc. to EN 61543
EMC emission	acc. to EN 61000-6-4
Shock resistance IEC 60068-2-27 (device in operation)	15 g / 11 ms
Bumping IEC 60068-2-29 (during transport)	40 g / 6 ms
Vibration resistance IEC 60068-2-6 (device in operation)	1 g / 10…150 Hz
Vibration resistance IEC 60068-2-6 (device out of operation)	2 g / 10…150 Hz
Ambient temperature (during operation)	-25 °C…+70 °C
Storage temperature range	-40 °C…+75 °C
Climatic category DIN IEC 60721-3-3	3K5
Operating mode	continuous operation
Position	any position
Connection	screw terminals
Cross sectional area of connecting cable	
Rigid, flexible	0.2…4 mm² / 0.2…2.5 mm²
Flexible with ferrules without / with plastic collar	0.25…2.5 mm²
Conductor sizes (AWG)	24-12
Degree of protection DIN EN 60529	
Internal components	IP 30
Terminals	IP 20
Type of enclosure	X470
Enclosure, material	polycarbonate
Screw fixing	2 x M4
DIN rail mounting acc. to	DIN EN 60715 / IEC 60715
Installation into standard distribution panels acc. to	DIN 43871
Flammability class	UL94V-0
Instruction leaflet	404003
Weight	approx. 350 g

Ordering details

Type	Response range $I_{\Delta n}$	Rated frequency	Time delay	Measuring current transformer	Indication	Fault memory behaviour	Supply voltage U_S	Art. No.
RCMA473LY	30 mA…300 mA	0…150 Hz	0 s	W2-A62	internal	automatic fault storage	AC 230 V	B 9404 2063

Accessories

External measuring current transformer

Type	Internal diameter (mm)	Art. No.
W2-A62	ø 62	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:

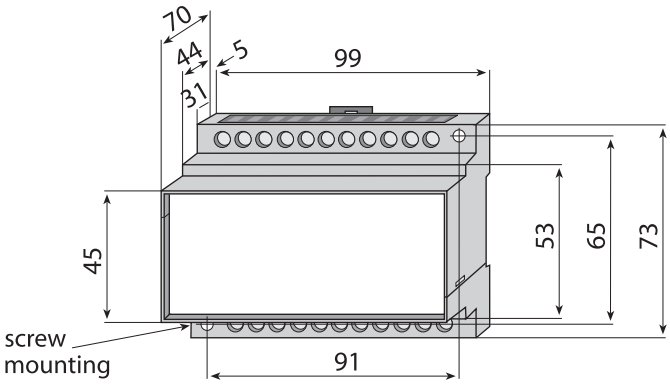
Manufacturer	Type
Moeller	NZM 7
ABB-SACE	S1, S2, S3

Other types on request

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

Type of current	Wave form	Tripping current
Alternating currents (50 Hz)		0.5…1 x $I_{\Delta n}$
Residual 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 DC residual current		0.5…2 x $I_{\Delta n}$

Dimension diagram, enclosure X470



Dimensions in mm