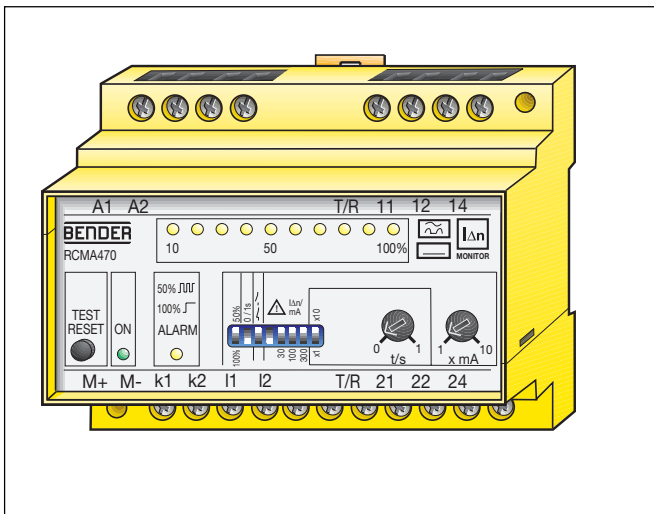


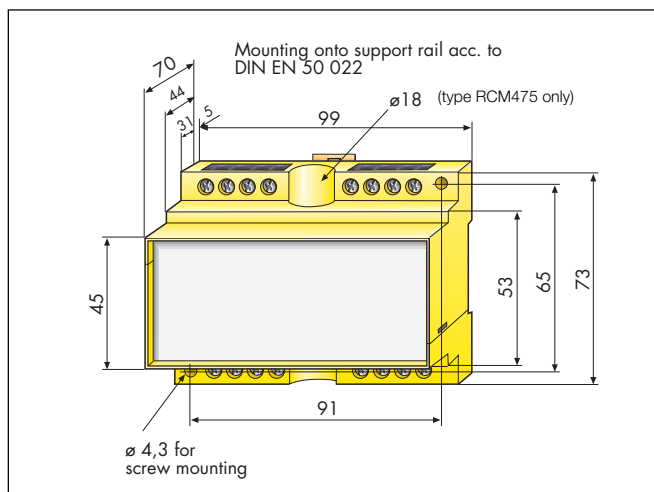


AC/DC sensitive residual current monitors for TN and TT AC and DC systems (earthed systems)



- Universal AC/DC residual current measurement in earthed AC and DC systems
- suitable also for systems with converter drives
- continuously adjustable alarm point and time delay
- internal or external measuring current transformer
- independent of nominal voltage and load current of the system
- CT connection monitoring
- prewarning and main alarm
- two separate alarm relays
- N/O or N/C operation, selectable
- LED bar graph indicator
- remote indication of the residual current
- Power On and alarm LED
- internal/external test and reset button

Dimension diagram



Intended use

The AC/DC sensitive residual current monitors of the RCMA series continuously monitor and indicate the level of the residual current in earthed systems (TN and TT systems). The devices can also be used in IT systems, if insulation faults can produce residual currents within the response range, as well as in high-resistance earthed systems.

Product description

The residual current is detected according to the measuring principle "magnetic compensation". The measuring principle allows reliable detection and evaluation of residual currents in AC as well as in DC systems.

The response value $I_{\Delta n}$ is steplessly adjustable. A prewarning is actuated as soon as 50% of the response value are exceeded. An additional time delay can be set. The measured value in per cent related to the set response value is continuously indicated by an LED bar graph indicator. An optional analog meter is also available for displaying the same information. .

All device versions, except for version RCMA475LY, utilize an external measuring current transformer. RCMA475LY utilizes an internal measuring current transformer.

Field of application

Residual current monitors are generally used for preventive monitoring and scheduled maintenance of electrical installations. RCMA's can be used additionally to RCDs to improve the protective measure. Early recognition of insulation faults increases the availability of power supply and helps to avoid interruptions to production and to reduce costs.

Electrical circuits of industrial systems very often include circuit elements which may cause DC fault currents with low ripple in the event of an insulation fault. Residual current protective devices, which are sensitive to pulsed DC currents only, do not detect these types of DC fault currents and their trigger function is influenced negatively. In this case, additional protective measures according to prEN 50178 (DIN VDE 0160) (electronic equipment for use in electrical power installations) must be taken.

The AC/DC sensitive residual current monitors work according to the special measuring principle "magnetic compensation" which ensures reliable detection of insulation faults even in systems including DC components or in pure DC systems. Therefore these devices are particularly suitable for systems containing various types of converters, power converters, actuators or DC components, e.g. drive control with converters, UPS systems, welding systems.

Standards

Residual current monitors of the RCMA series comply with the standard draft of IEC 62020. The response time and response accuracy comply with IEC 60755, amendment 1 and IEC 60755, amendment 2. The devices are type B classified.

Technical data RCMA47.LY

Insulation coordination acc. to IEC 60664-1:

Rated insulation voltage	AC 250 V
Rated impulse withstand voltage/ contamination level	4 kV/3
Dielectric test acc. to IEC 60255	2 kV

Supply voltage

Supply voltage U_S	see ordering details resp. nameplate
Operating range of U_S AC	0.85 ... 1.1 x U_S
Frequency range	50...60 Hz
Operating range of U_S DC	see ordering details resp. nameplate
Max. power consumption	approx. 3.5 VA

Outputs

Meter output	0 ... 100 %
Current source / max. load	0...400 μ A/12.5 k Ω

Contact circuit

Switching components	2 relays with 1 change-over contact each
Contact class acc. to DIN IEC 60255 Teil 0-20	II B
Rated contact voltage	AC 250 V/DC 300 V
Admissible number of operations	12000 cycles
Making capacity	UC 5 A
Breaking capacity	
AC 230 V and $\cos \phi = 0.4$	AC 2 A
DC 220 V and $L/R = 0.04$ s	DC 0.2 A
Operating principle, selectable	N/O / N/C operation
Pre-set by factory	N/O operation

Type tests

Test of the Electromagnetic Compatibility (EMC):	
Interferences acc. to EN 61 543 as well as EN 50082-2	
Emissions acc. to EN 50 081:	
Emissions acc. to EN 55 011/CISPR11	see ordering details
Mechanical tests:	
Shock resistance acc. to IEC 60068-2-27	15g/11ms
Bumping acc. to IEC 60068-2-29	40g/6ms
Vibration strength acc. to IEC 60068-2-6	10..150 Hz / 0.15mm -2g

Environmental conditions

Ambient temperature, during operation	-10°C ... +55°C/263K...328K
Storage temperature range	-40°C ... +60°C/233K...333K
Climatic class acc. to IEC 60 721	3K5, except condensation and formation of ice

General data

Mounting	any position
Internal CT opening (RCMA475LY)	18 mm
Connection	modular terminals
Tightening torque for terminal screws	0.5 ... 0.6 Nm
Connecting cable	aluminium or copper
Temperature range, cable	60° (18...16 AWG) 75° (14...12 AWG)
Cross sectional area of connecting cable	
single wire	0.2...4 mm ²
flexible	0.2...2.5 mm ² (AWG 24-12)
DIN rail mounting	DIN EN 50 022
Screw fixing	90.7 x 64.8 mm
Protection class acc. to EN 60 529	
Built-in components	IP 30
Terminals	IP 20
Type of enclosure	X 470/XL470
Flammability class	UL94V-0
Weight approx.	350 g

Ordering details for residual current monitors

Type	Supply voltage U_S	Art. No.
RCMA470LY 1)	AC 230 V	B 94042001
RCMA470LY-13 1)	AC 90 ... 132 V*	B 94042003
RCMA471LY 1)	AC 230 V	B 94042005
RCMA471LY-13 1)	AC 90 ... 132 V*	B 94042006
RCMA472LY 1)	AC 230 V	B 94042007
RCMA475LY 1)	AC 230 V	B 94042002
RCMA475LY-13 1)	AC 90 ... 132 V*	B 94042004
RCMA470LY-21 2)	DC 9.6 ... 84 V*	B 94042008
RCMA470LY-23 2)	DC 77 ... 286 V*	B 94042009
RCMA471LY-21 2)	DC 9.6 ... 84 V	B 94042010
RCMA471LY-23 2)	DC 77 ... 286 V*	B 94042011
RCMA472LY-21 2)	DC 9.6 ... 84 V*	B 94042012
RCMA472LY-23 2)	DC 77 ... 286 V	B 94042013
RCMA475LY-21 2)	DC 9.6 ... 84 V*	B 94042014
RCMA475LY-23 2)	DC 77 ... 286 V*	B 94042015

* This information represents absolute values for the supply voltage.
Other supply voltages on request.

- 1) Class B devices are suitable for household and industrial use.
- 2) Class A devices are designed for industrial use. For any other use, it may be necessary to take additional measures for interference suppression.

Ordering details for external measuring current transformers

Type	Internal \varnothing	Art. No.
W1-A35-S	35 mm	B 911744
W2-A70-S	70 mm	B 911746
W3-A105-S	105 mm	B 911745
W4-A140-S	140 mm	B 911747
W5-A210-S	210 mm	B 911748
W465 -A26	26 mm	B 911754

For details on technical data refer to 1.11/1.15

Ordering details for measuring instruments

Type	Scale	Art. No.	Dimensions
9604-4241	0 - 100%	B 986 807	96 x 96 mm
7204-4241	0 - 100%	B 986 805	72 x 72 mm

Response values

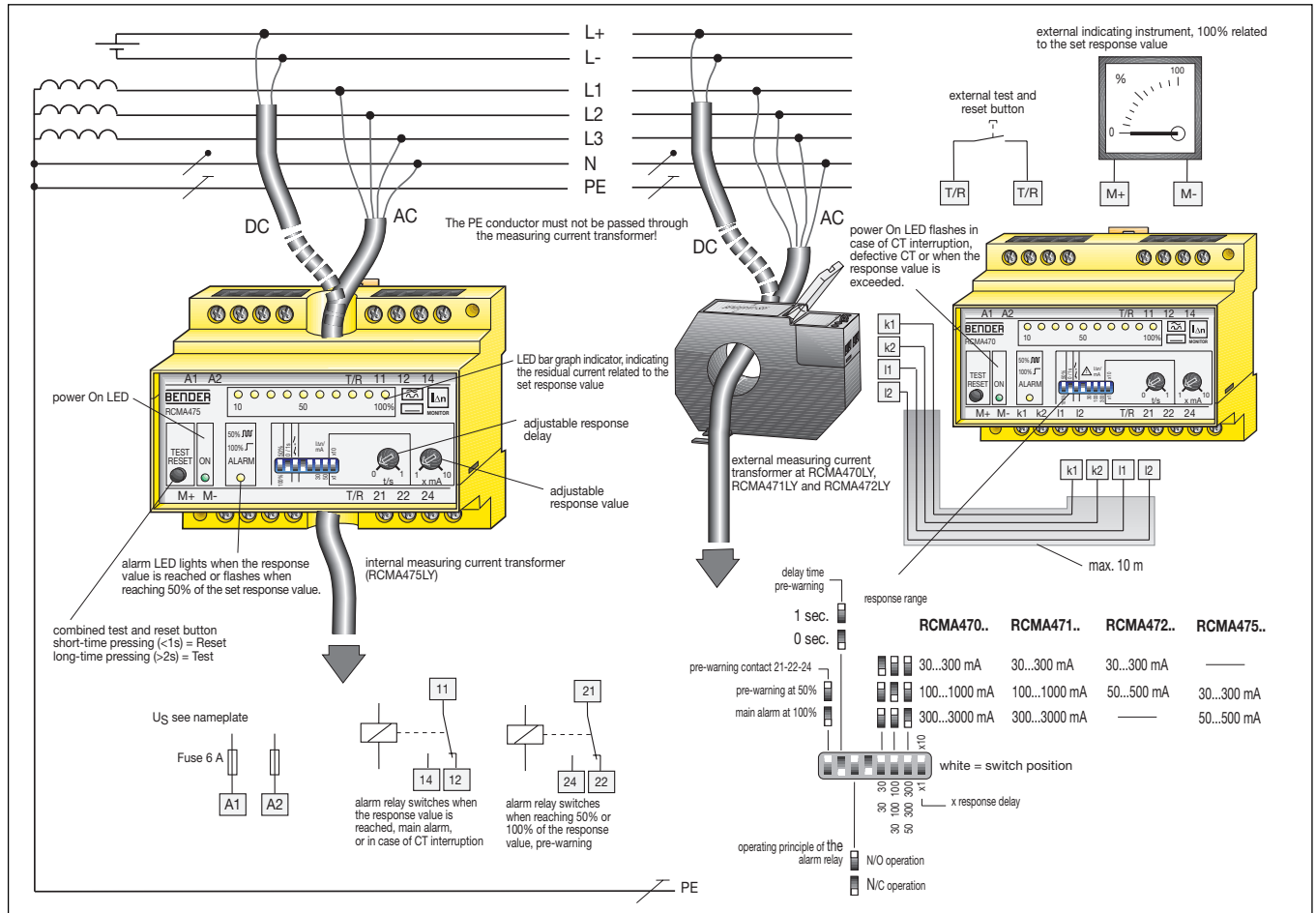
	RCMA470LY	RCMA471LY	RCMA472LY	RCMA475LY
Rated residual current $I_{\Delta n}$ adjustable	30 mA - 3A	100mA - 3A 30mA - 3A when using W3A...	30 mA - 500 mA	30 mA - 500mA
Frequency range for measuring current transformers	0 - 150 Hz W1-A35-S W2-A70-S W5-A210-S*	0 - 60 Hz W3-A105-S W4-A140-S*	0 - 1000 Hz W465 - A26	0 - 700 Hz internal transformer \varnothing 18mm
Response time ($1 \times I_{\Delta n}$) Response time ($5 \times I_{\Delta n}$) Delay time, adjustable: Prewarning $I_{\Delta n}^2$ Hysteresis LED bar graph indicator Display (residual current)	≤ 70 ms (DC; 50 Hz) ≤ 40 m s (DC; 50 Hz) 0 - 10 s 50 % of $I_{\Delta n}$ approx. 25% of the pre-set value 10... 100% of the pre-set value for residual currents DC, $f > 15$ Hz			

* The measuring current transformers type W4.../W5... will be adjusted to the respective RCMA471 relay individually. Further information about the selection is indicated on the nameplate.

Tripping conditions in conformance with the standards draft of IEC 62020, IEC 60755 amendment 2, type B

Type of current	Waveform	Operating current
AC fault currents (50 Hz)		$0.5 \dots 1 \times I_{\Delta n}$
Half-wave rectified fault currents (pos. and neg. half-wave)		$0.5 \dots 1.4 \times I_{\Delta n}$
Phase-controlled half-wave current Current delay angle 90° el 135° el		$0.5 \dots 1.4 \times I_{\Delta n}$
Half-wave rectified current with smooth DC fault current of 6 mA superimposed		$0.5 \dots 1.4 \times I_{\Delta n}$
Smooth DC fault current		$0.5 \dots 2 \times I_{\Delta n}$

Wiring diagram



- i** The connection to the external current transformer is continuously monitored. Interruption of the CT connection or a short-circuit in the CT circuit is signalled by a flashing ON LED and the switching of the alarm relay 0 (1 1-12-14). The CT circuit and measuring circuit, the alarm LEDs, and the alarm relay can be checked by means of the test buttons
- i** The internal and external indication of the residual current exclusively applies to DC and AC fault currents $f > 15$ Hz.
- i** Changing the functions:
The functions N/O operation / N/C operation can only be changed when no fault exists.

Factory setting:

	RCMA470LY	RCMA471LY	RCMA472LY	RCMA475LY
Response value	30 mA	100 mA	30 mA	30 mA
Response delay	0 sec.	0 sec.	0 sec.	0 sec.
Relay mode	N/O operation	N/O operation	N/O operation	N/O operation

Safety instructions



Please check for correct supply voltage !

The PE conductor must not be passed through the measuring current transformer !

In order to check the proper connection of the device, it is recommended to carry out a functional test, before using the RCMA.

When insulation or voltage tests are to be carried out, the device must be isolated from the system for the test period.



Electrical equipment must be assembled and installed only by qualified electricians. The applicable safety regulations must be observed.



Use the test button to check the device function at regular intervals.

In addition to this data sheet, the supplementary sheet "Important safety instructions for BENDER products" has to be observed.

Right to modifications reserved