

## Ground fault monitor RCM470LY

Ground Fault Monitor / Relay  
for Grounded AC Systems



### Device features

- External measuring current transformer
- Wide response value ranges:  
10 mA ... 10 A, 6 mA ... 600 mA  
(40 ... 400 Hz)
- Response delay, adjustable 0...10 s
- Alarm relay with voltage-free DPDT contact
- Selectable between normally energized and normally deenergized operation
- Latching or non-latching operation
- TEST / RESET button, internal / external
- LED bar graph indicator  $I_{\Delta n}$  0...100 %
- Optional external meter terminal
- CT connection monitoring
- Sealable transparent cover
- Separate auxiliary supply voltage
- Type A according to IEC 60755

### Approvals



### Product description

The RCM70LY monitors for ground faults in grounded and high-resistance grounded AC systems, both single- and three-phase. The RCM470LY is specially designed to provide advanced warning of developing ground faults without the problems associated with high sensitivity nuisance tripping.

A wide, steplessly adjustable setpoint range allows for flexibility in a variety of systems. A DPDT contact allows for both information transmission (such as to a PLC) and power interruption (such as through a contactor or shunt trip breaker).

Since the values are measured using a special current transformer, the RCM470LY is nearly independent of the load current and the system voltage. The device can also be used for busbar systems.

### Application

- Ground fault detection in single- or three-phase AC systems
- Motors and motor control systems
- Generators, portable and fixed
- Alarm systems, safety devices
- Current monitoring of normally offline single conductors
- Cooling equipment with valuable frozen goods
- Industrial controls
- Heat tracing systems

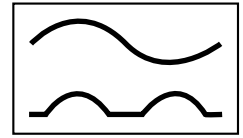
### Function

Measurements of the system's ground fault current are taken via an external current transformer. All phases (including the neutral if one exists) are placed through the current transformer. The currently measured value (measured as a percentage of the setpoint) is indicated on the LED bar graph.

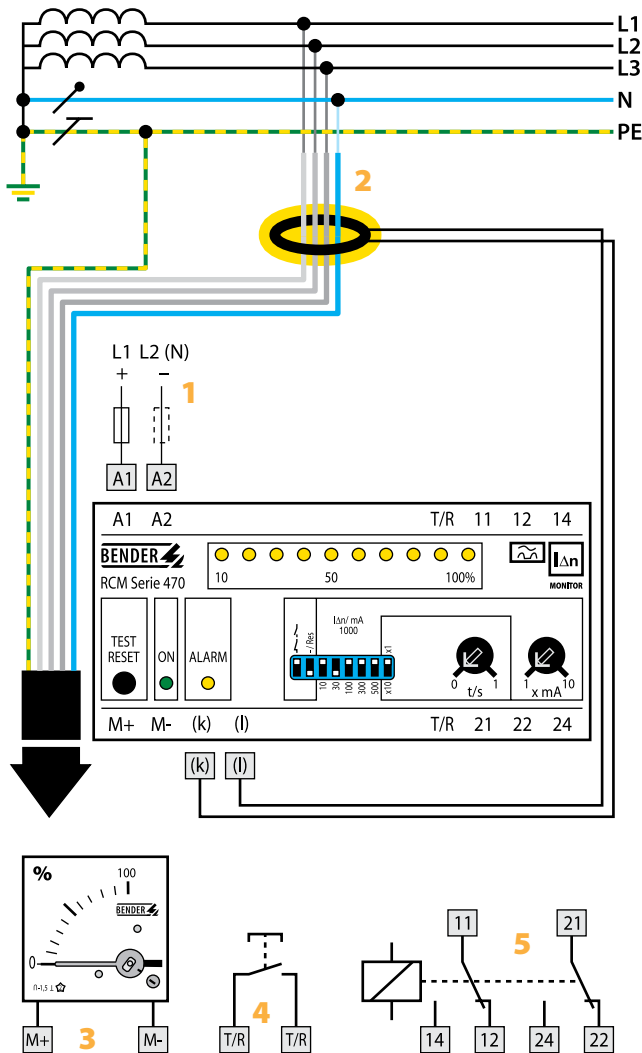
If the measured value exceeds the response value, the contacts switch over and the alarm LEDs activate after the time delay has expired. If the device is set to non-latching mode and the ground fault clears, the alarms will then clear. If the device is set to latching mode, the alarms will not clear until the device is reset manually or the supply voltage is lost.

The TEST function allows for an internal operation testing of the device. Settings are modified via the device's DIP switches and potentiometers.

The connections between the device and the external current transformer are continuously monitored. If the device detects a connection error, the CT connection monitoring alarm will activate, and the contacts will change over without delay.



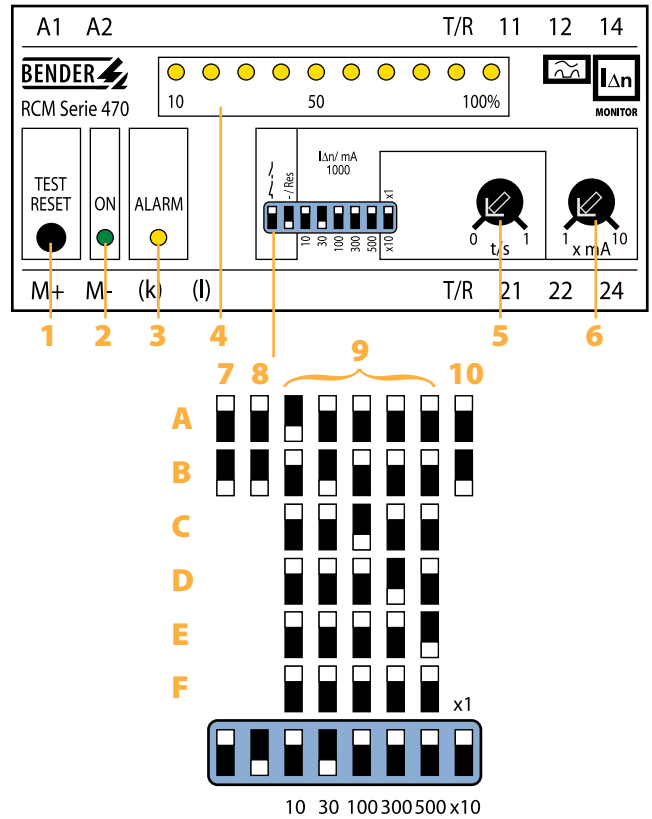
Wiring diagram – system connection, external connections



- 1 - External supply voltage used to power device, a 6 A fuse recommended for line protection.
- 2 - Connection to external current transformer. All phases, including the neutral if one exists, are placed through the CT.
- 3 - Optional external measuring instrument
- 4 - External TEST and RESET button terminal
- 5 - DPDT alarm contact

**Note: Do not route the ground conductor through the measuring current transformer when also routing the power conductors!**

Device setup



- 1 - Combined TEST and RESET button: short depress (< 1s) = RESET; long depress (> 2s) = TEST
- 2 - Power On LED
- 3 - Alarm LED: Illuminates when the response value has been exceeded. Flashes when the CT connection alarm is active.
- 4 - LED bar graph indicator: shows the measuring value in percent of 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)
- DIP switch settings (white = switch position)
  - 7 - Alarm relay operation settings
    - A - Normally deenergized
    - B - Normally energized
  - 8 - Fault memory / latching behavior settings
    - A - Fault memory ON (latching mode)
    - B - Fault memory OFF (non-latching mode)
  - 9 - Sample response value settings
 

RCM470LY		RCM470LY-71..
A - 10 mA	}	A - 6 mA
B - 30 mA		B - 10 mA
C - 100 mA		C - 20 mA
D - 300 mA		D - 30 mA
E - 500 mA		E - 40 mA
F - 1000 mA		F - 60 mA
- 10 - Time delay settings
  - A - x 1
  - B - x 10

## Technical data: Ground fault monitor RCM470LY

### 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 details
Operating range of $U_S$	0.85...1.1 x $U_S$
Frequency range of $U_S$	DC / 50...400 Hz
Power consumption	≤ 3 VA

### Measuring circuit

External measuring current transformers	W..., WR..., WS... series
Load	180 Ω
Load RCM470LY-72	18 Ω
Operating characteristic acc. to IEC 60755	Type A
Rated residual operating current $I_{\Delta n}$	10 mA...10 A / 100 A
Response delay $t_v$ , adjustable	0...10 s
Accuracy of response delay	+ / - 20 %
Rated frequency	40...400 Hz
Relative percentage error	40...400 Hz: 0...- 25 % 400...1000 Hz: 10...- 25 %
Hysteresis	approx. 25 % of the response value
Response time $t_{an}$ at $I_{\Delta n} = 1 \times I_{\Delta n}$ ( $t_v = 0$ s)	≤ 250 ms
Response time $t_{an}$ at $I_{\Delta n} = 5 \times I_{\Delta n}$ ( $t_v = 0$ s)	≤ 20 ms
Number of measuring channels	1

### Displays

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

### Inputs/outputs

TEST and RESET button	internal / external
Cable length external TEST and RESET button	≤ 10 m
Current source for external measuring instrument	DC 0...400 μA
Load	12.5 kΩ

### Cable lengths for measuring current transformers

Single wire ≥ AWG 20 (0.75 mm <sup>2</sup> )	0...3.2 ft (0...1 m)
Single wire, twisted ≥ AWG 20 (0.75 mm <sup>2</sup> )	0...32.8 ft (0...10 m)
Shielded cable ≥ AWG 22 (0.5 mm <sup>2</sup> )	0...131 ft (0...40 m)

Recommended cable (shielded, shield on one side connected to terminal I of the RCM470, not connected to ground) J-Y(ST)Y min. 2 x 0.8

### Switching elements

Number of switching elements	1 DPDT contact
Operating principle, adjustable	normally energized or deenergized
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, PF = 0,4 0.2 A, DC 220 V, L / R = 0.04 s
Fault memory behavior	ON / OFF (Latching / Non-latching)

### General data

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	-10 °C...+55 °C
Ambient temperature, when stored	-40 °C...+70 °C
Climatic category IEC 60721-3-3	3K5
Operating mode	continuous operation
Mounting	any position
Connection	screw terminals
Connection properties	
rigid / flexible	AWG 24...12 / 24...14
flexible with ferrules without / with plastic collar	AWG 24...14
Conductor sizes (AWG)	24...12
Protection class, internal components (IEC 60529)	IP30, NEMA 1
Protection class, terminals (IEC 60529)	IP20, NEMA 1
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
Instruction leaflet	BP401003
Weight	≤ 350 g

### Ordering information: Ground fault monitor RCM470LY

Type	Response range $I_{\Delta n}$	Rated frequency	Response delay	Measuring current transformers	Display	Fault memory behaviour	Supply voltage $U_S$	Art. No.
RCM470LY	10 mA...10 A	40...400 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	AC 230 V	B 94012017
RCM470LY-13	10 mA...10 A	40...400 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	AC 90...132 V*	B 94012019
RCM470LY-13A	10 mA...10 A	50 / 60 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	AC 90...132 V*	B 94012019A
RCM470LY-11	10 mA...10 A	40...400 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	AC 24 V	B 94012025
RCM470LY-21	10 mA...10 A	40...400 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	DC 9.6...84V*	B 94012021
RCM470LY-23	10 mA...10 A	40...400 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	DC 77...286V*	B 94012024
RCM470LY-7113	6 mA...600 mA	50 / 60 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	AC 90...132 V*	B 94012051
RCM470LY-7213	100 mA...100 A	40...400 Hz	0...10 s	W..., WR..., WS...	internal / external	selectable	AC 90...132 V*	B 94012074

Other supply voltages on request \* Absolute values of the operating range

**Accessories**

<b>External measuring current transformers</b>		
Type	Inside diameter (mm)	Art. No.
W20	∅ 20	B 9808 0003
W35	∅ 35	B 9808 0010
W60	∅ 60	B 9808 0018
W120	∅ 120	B 9808 0028
W210	∅ 210	B 9808 0034
WR70x175	70 x 175	B 9808 0609
WR115x305	115 x 305	B 9808 0610
WS20x30	20 x 30	B 9808 0601
WS50x80	50 x 80	B 9808 0603
WS80x120	80 x 120	B 9808 0606

Other measuring current transformer types on request.

<b>External panel mounted meter</b>			
Type	Display range	Size (mm)	Art. No.
9604-4241	0...100 %	96 x 96	B 986 807

<b>Measuring signal converter</b>			
Type	Input	Output	Art. No.
RK170	0...400 µA	0...10 V 0 / 4...20 mA	B 9804 1500

**Dimension diagram X470**

Dimensions in mm

