LINETRAXX® RCMA420

Residual current monitor for monitoring AC, DC and pulsed DC currents in TN and TT systems

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Device features

- AC/DC sensitive residual current monitor Type B acc. to IEC 62020 and IEC/TR 60755
- r.m.s. value measurement (AC+DC)
- Two separately adjustable response values 10…500 mA
- Frequency range 0…2000 Hz
- Start-up delay, response delay and delay on release
- Digital measured value display via LC display
- Measured value memory for operating value
- CT connection monitoring
- LEDs: Power On, Alarm 1, Alarm 2
- Internal/external test/reset button
- Two separate alarm relays (one changeover contact each)
- N/O or N/C operation and fault memory selectable
- Continuous self monitoring
- Multi-functional LC display
- Password protection for device settings
- Sealable transparent cover
- Two-module enclosure (36 mm)
- RoHS compliant

Approvals

Product description

The AC/DC sensitive residual current monitor RCMA420 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. Currents in single conductors can be monitored too.

The prewarning stage (50…100 % of the set response value $I_{\Delta n2}$) 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.

Applications

- AC/DC sensitive residual current monitoring in earthed two, three or four conductor systems (TN and TT systems)
- Monitoring of variable-speed drives, UPS systems, construction site equipment, printing machines, battery systems, laboratory equipment, wood working machines, MF welding systems, furniture industry, medical electrical equipment, etc.
- AC/DC sensitive current monitoring of, in the normal case, de-energised single conductors (e.g. N and PE conductors)

Function

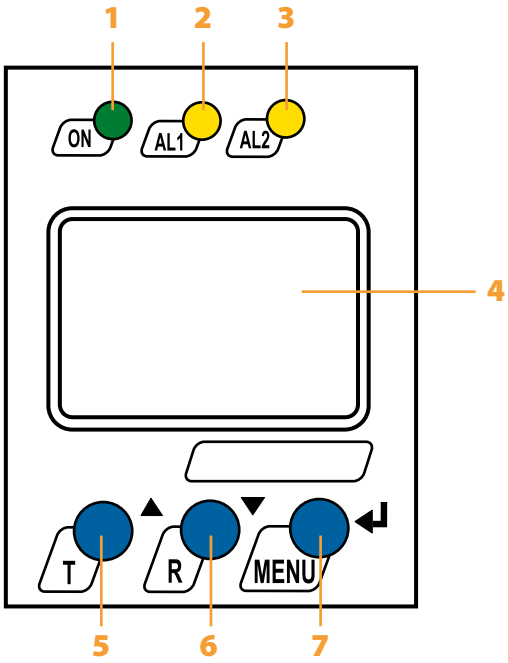
Once the supply voltage U_S is applied, the start-up delay is activated. Measured values changing during this time do not influence the switching state of the alarm relays.

Residual current measurement takes place via an external measuring current transformer of the CTUB100 series. The currently measured value is shown on the LC display. In this way any changes, for example when circuits are connected to the system, can be recognised easily. If the measured value exceeds the set response values, the response delays $t_{on1/2}$ begin. Once the response delay $t_{on1/2}$ has elapsed, the K1/K2 alarm relays switch and the alarm LEDs AL1/AL2 light up. If the current falls below the release value (response value plus hysteresis), the release delay t_{off}. When toff has elapsed, the alarm relays return to their initial position and the alarm LEDs AL1/AL2 go out. If the fault memory is activated, the alarm relays remain in the alarm state and the LEDs light until the reset button is pressed or until the supply voltage is interrupted. The device function can be tested using the test button. Parameters are assigned to the device via the LCD and the control buttons on the front panel; this function can be password-protected.

Connection monitoring

The function of the device and the CT connections are continuously monitored. In the event of a fault, the alarm relays K1/K2 switch without delay, the alarm LEDs AL1/AL2/ON flash. On removal of the fault, the alarm relays return to their initial position either automatically or by pressing the reset button.

Operating and display elements



1 - Power On LED “ON” (green); lights when supply voltage is applied and flashes in the event of system fault alarm respectively in the event of CT malfunction.

2 - Alarm LED “AL1” (yellow), prewarning; lights when the set response value $I_{\Delta n1}$ is exceeded or flashes in the event of system fault alarm respectively in the event of CT malfunction

3 - Alarm LED “AL2” (yellow), alarm; lights when the set response value $I_{\Delta n2}$ is exceeded or flashes in the event of system fault alarm respectively in the event of CT malfunction.

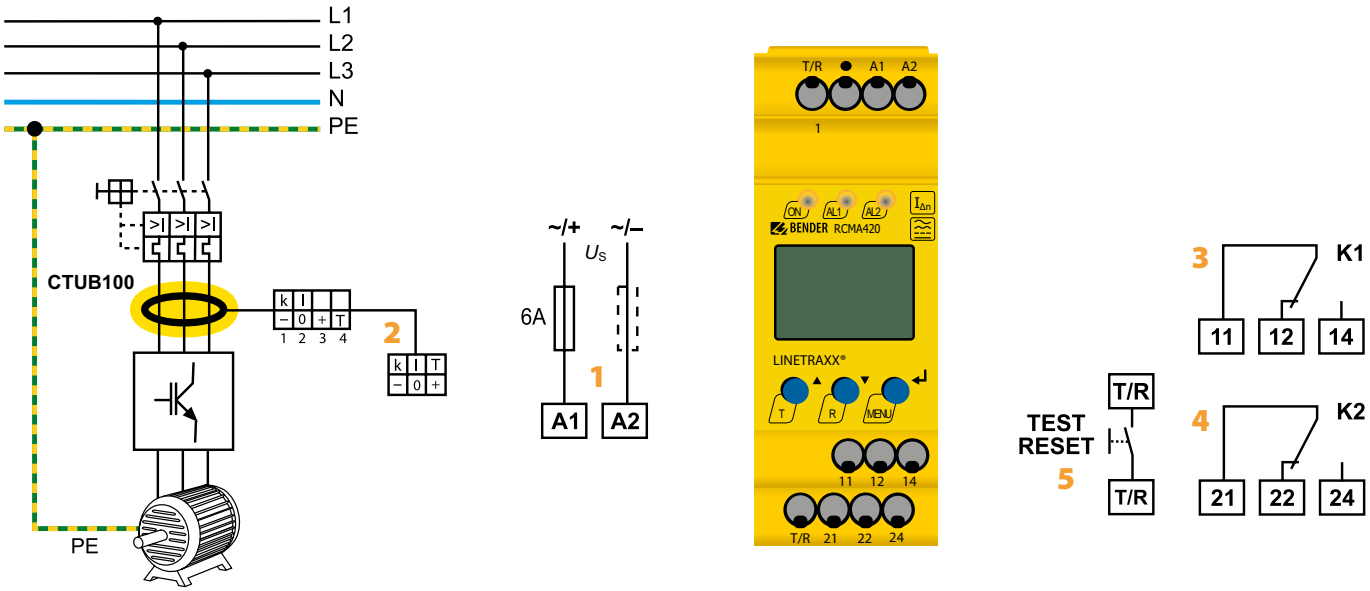
4 - Multi-functional LC display

5 - Test button “T”: to call up the self test.
Arrow up button: parameter change, to move up in the menu

6 - Reset button “R”: to delete saved alarms.
Arrow down button: parameter change, to move down in the menu

7 - “MENU” button: to call up the menu system.
Enter button: to confirm parameter change.
“ESC” button: press the button > 1.5 seconds.

Wiring diagram



1 - **A1, A2** Supply voltage U_S see ordering information, 6 A fuse recommended

2 - Connector for the external CTUB10x-CTBC20… CTUB10x-CTBC60 series measuring current transformer

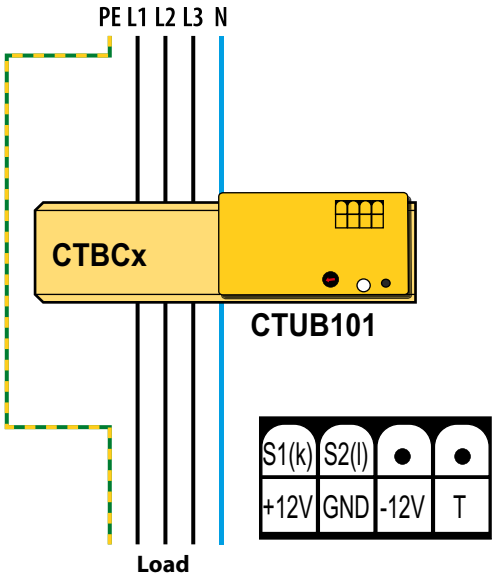
3 - **11, 12, 14** Alarm relay “K1”: $I_{\Delta n1}$ (prewarning)

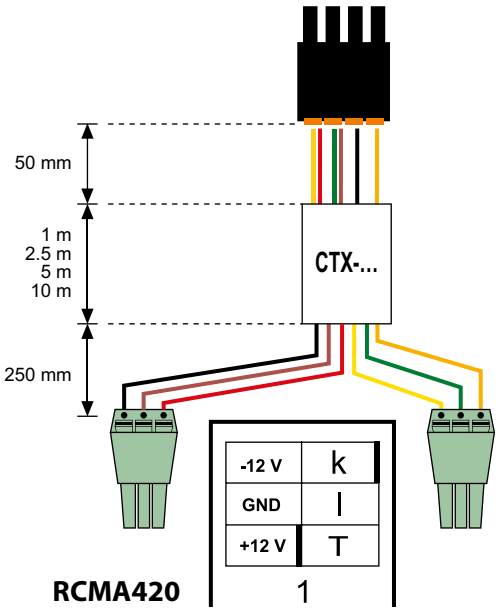
4 - **21, 22, 24** Alarm relay “K2”: alarm $I_{\Delta n2}$ (alarm)

5 - **T/R** Combined test and reset button “T/R”
short-time pressing (< 1.5 s) = RESET
long-time pressing (> 1.5 s) = TEST

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

Connection of measuring current transformers





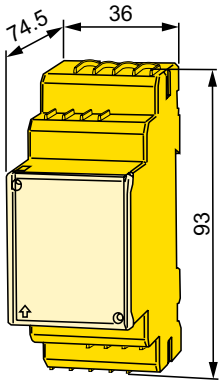
Connection to the RCMA420 residual current monitor using the CTX-… connecting cable.

Colour coding for CTX…: k = yellow, l = green, -12 V = black, GND = brown, +12 V = red, Test (T) = orange

Dimension diagram XM420

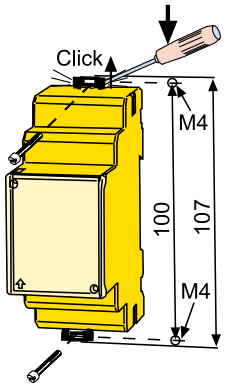
Dimensions in mm

Open the front plate cover in direction of arrow!



Screw mounting

Note: The upper mounting clip must be ordered separately (see ordering information).



Technical data

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

RCMA420-D-1:

Rated insulation voltage	100 V
Overvoltage category/pollution degree	III/3
Rated impulse voltage	2.5 kV/3

RCMA420-D-2:

Rated insulation voltage	250 V
Overvoltage category/pollution degree	III/3
Rated impulse voltage	4 kV

Supply voltage

RCMA420-D-1:

Supply voltage range U_S	AC 24…60 V/DC 24…78 V
Operating range U_S	AC 16…72 V/DC 9.6…94 V
Frequency range U_S	DC, 42…460 Hz

RCMA420-D-2:

Supply voltage range U_S	AC/DC 100…250 V
Operating range U_S	AC/DC 70…300 V
Frequency range U_S	42…460 Hz

Protective separation (reinforced insulation) between
(A1, A2) - (k/l, T/R) - (11, 12, 14) - (21, 22, 24)

Voltage test according to IEC 61010-1	2.21 kV
Power consumption	≤ 6.5 VA

Measuring circuit

External measuring current transformer	CTUB100 series
Rated insulation voltage (measuring current transformer)	800 V
Frequency range	0…2000 Hz
Measuring range AC	0…1.5 A
Measuring range DC	0…600 mA
Relative uncertainty for f	
≤ 2 Hz	0…-35 %
> 2 …<16 Hz	-35…+100 %
≥ 16 … ≤ 1000 Hz	0…-35 %
> 1000 …≤ 2000Hz	± 35 %
Operating uncertainty	0…35%

Response values

Rated residual operating current $I_{\Delta n1}$ (prewarning, AL1)	50…100 % x $I_{\Delta n2}$, (50 %)*
Rated residual operating current $I_{\Delta n2}$ (Alarm, AL2)	10…500 mA (30 mA)*
Hysteresis	10…25 % (15%)*

Specified times

Starting delay t	0…10 s (0.5 s)*
Response delay t_{on1} (prewarning)	0…10 s (1 s)*
Response delay t_{on2} (alarm)	0…10 s (0 s)*
Delay on release t_{off}	0…99 s (1 s)*
Operating time t_{ae} at $I_{\Delta n}$ = 1 x $I_{\Delta n1/2}$	≤ 180 ms
Operating time t_{ae} at $I_{\Delta n}$ = 5 x $I_{\Delta n1/2}$	≤ 30 ms
Response time t_{an}	$t_{an} = t_{ae} + t_{on1/2}$
Recovery time t_b	≤ 300 ms

Displays, memory

Display range, measured value AC	0…1.5 A
Display range, measured value DC	0…600 mA
Error of indication	±17.5 %/± 2 digit
Measured-value memory for alarm value	data record measured values
Password	off/0…999 (off)*
Fault memory alarm relay	on/off (on)*

Inputs/outputs

Cable length for external test/reset button	0…10 m

Cable lengths for measuring current transformers

Connection CTX…	1 m/2.5 m/5 m/10 m
or alternatively: single wire 6 x 0.75 mm²	0…10 m

Switching elements

Number of switching elements	2 x 1 changeover contact
Operating principle	N/C operation/N/O operation (N/C operation)*
Electrical service life under rated operating conditions	10000 switching operations

Contact data acc. to IEC 60947-5-1

Utilization category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	24 V	110 V	220 V
Rated operational voltage UL	200 V	200 V	24 V	110 V	200 V
Rated operational current	5 A	3 A	1 A	0.2 A	0.1 A
Minimum contact load	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	IEC 62020
Operating temperature	-25…+55 °C

Classification of climatic conditions IEC 60721

Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transportation (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)

Classification of mechanical conditions acc. to IEC 60721:

Stationary use (IEC 60721-3-3)	3M4
Transportation (IEC 60721-3-2)	2M2
Storage (IEC 60721-3-1)	1M3

Connection

For UL applications:
use 60°C/70°C copper conductors only

Connection type	screw-type terminal or push-wire terminal

Screw-type terminal

Connection properties:	
rigid/flexible/AWG	0.2…4/0.2…2.5 mm²/AWG 24…12
Two conductors with the same cross section:	
rigid/flexible	0.2…1.5/0.2…1.5 mm²
Stripping length	8 mm
Tightening torque, terminal screws	0.5…0.6 Nm

Push-wire terminals

Connection properties:	
rigid	0.2…2.5 mm² (AWG 24…14)
flexible without ferrules	0.75…2.5 mm² (AWG 19…14)
flexible with ferrules	0.2…1.5 mm² (AWG 24…16)
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm

Other

Operating mode	continuous operation
Position of normal use	display-oriented
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Enclosure material	polycarbonate
Flammability class	UL94V-0
DIN rail mounting acc. to	IEC 60715
Screw fixing	2 x M4 with mounting clip
Documentation number	D00059
Weight	≤ 150 g

( )* = factory setting

Ordering information

Supply voltage[1] U_S		Type	Art. No.	
AC	DC		Screw-type terminal	Push-wire terminal
16…72 V, 42…460 Hz	9,6…94 V	RCMA420-D-1	B94043001	B74043001
70…300 V, 42…460 Hz	70…300 V	RCMA420-D-2	B94043002	B74043002

[1] Absolute values

Accessories

Description	Art. No.
Mounting clip for screw mounting (1 piece per device)	B98060008

Passende Systemkomponenten

Description	Internal diameter (mm)	Type	Art. No
Measuring current transformers CTUB100 series	ø 20	CTUB101-CTBC20	B78120010
		CTUB101-CTBC20P	B78120020
	ø 35	CTUB101-CTBC35	B78120012
		CTUB101-CTBC35P	B78120022
	ø 60	CTUB101-CTBC60	B78120014
		CTUB101-CTBC60P	B78120024

Description	Length/m	Type	Art. No
Connection cable measuring current transformer CTUB100 series	1	CTX-100	B98110080
	2,5	CTX-250	B98110081
	5	CTX-500	B98110082
	10	CTX-1000	B98110083

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