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# LINETRAXX<sup>®</sup> RCMA423

Residual current monitor

for monitoring AC- and (pulsed) DC-currents

$I_{\Delta} = 30 \text{ mA} \dots 3 \text{ A}$  in TN- and TT systems





## Device features

- AC/DC sensitive residual current monitor Type B according to IEC 62020 and IEC 60755
- Two separately adjustable response ranges (prewarning, alarm)
- Adjustable switching hysteresis
- R.m.s. value measurement
- Starting delay, response delay and delay on release
- Measured value display via multi-functional LC display
- Alarm indication via LEDs (AL1, AL2) and changeover contacts (K1, K2)
- N/C operation or N/O operation selectable
- Password protection against unauthorized parameter changing
- Fault memory function can be switched off
- CT connection monitoring

## Intended use

The AC/DC sensitive residual current monitor RCMA423 is designed for use in earthed systems (TN and TT systems) where DC and AC fault currents 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. Two separately adjustable response ranges allow to distinguish between prewarning ( $I_{\Delta n1} = 50 \dots 100 \%$  of the set response value  $I_{\Delta n2}$ ) and alarm ( $I_{\Delta n2}$ ). Since the values are measured with measuring current transformers, the RCMA423 is nearly independent of the nominal voltage and the load current of the system being monitored.

In order to meet the requirements of the applicable standards, customised parameter settings must be made on the equipment in order to adapt it to local equipment and operating conditions. Please heed the limits of the range of application indicated in the technical data. Any use other than that described in this manual is regarded as improper.

## Function

Once the supply voltage  $U_s$  is applied, the starting delay is activated. Measured values changing during this time do not influence the switching state of the alarm relays.

Die Differenzstrommessung erfolgt über einen externen Messstromwandler CTUB101-CTBC20...210(P)

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 recognized easily.

If the measured value exceeds one or both response values, the response delays  $t_{on1/2}$  start running. 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 residual current falls below the release value (response value minus hysteresis), the delay on release  $t_{off}$  begins. Once the release delay  $t_{off}$  has elapsed, the alarm relays return to their original state 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.

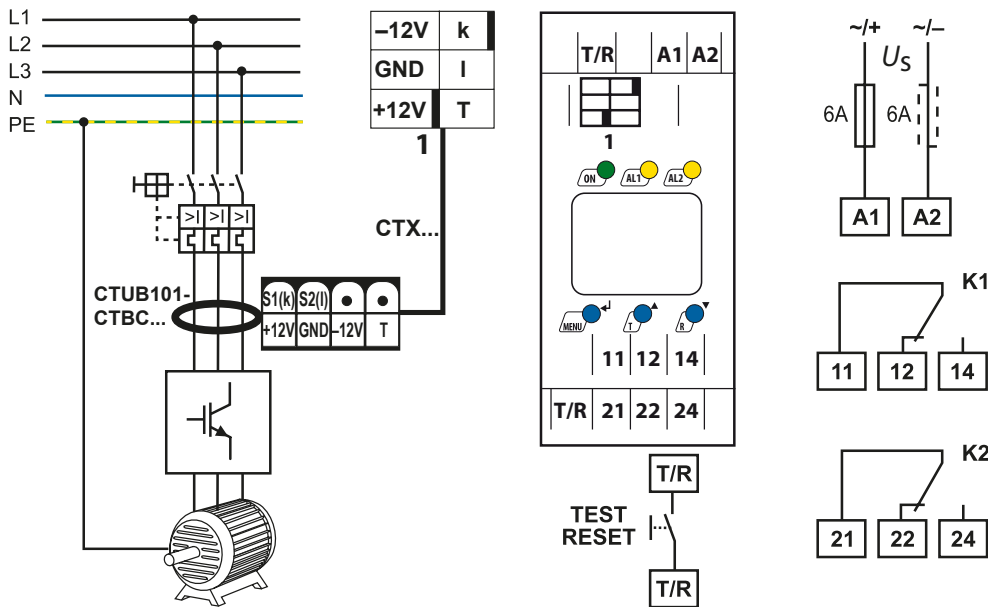
The device function can be tested using the test button. The parameterization of the device can be carried out via the LC display and the function keys integrated in the front plate and can be password-protected.

## Connection monitoring

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 (Error Code E.01). After eliminating the fault, the alarm relays automatically return to their initial position, provided that the fault memory M is deactivated. With the fault memory activated, K1/ K2 return to their initial position by pressing the reset button R. A second cascaded measuring current transformer will not be monitored.

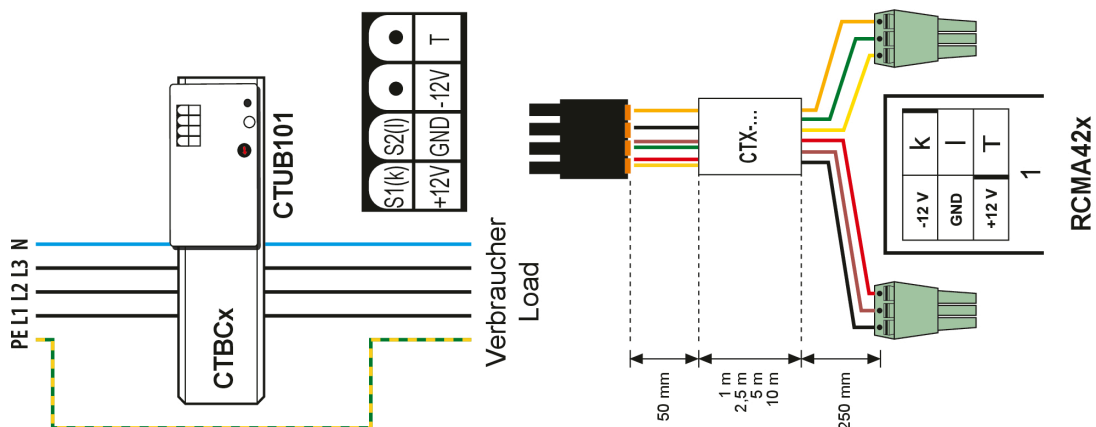
**Wiring**

Connect the device according the wiring diagram.  
Observe the manuals of the respective measuring current transformer.



| Terminal   | Connections   |
|------------|---|
| A1, A2     | Connection for supply voltage $U_s$   |
| 1          | Socket for the connecting cable CTX... to the measuring current transformer |
| T/R        | Connection for combined test and reset button                               |
| 11, 12, 14 | Alarm relay K1  |
| 21, 22, 24 | Alarm relay K2  |

**Connection of measuring current transformers**



Connection to the RCMA423 residual current monitor using the CTX-... connecting cable. Colour coding for CTX-...: k = yellow, I = green, -12 V = black, GND = brown, +12 V = red, Test (T) = orange

## Technical data

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

#### RCMA42x-D-1

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

#### RCMA42x-D-2

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

### Supply voltage

#### RCMA423-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              |

#### RCMA423-D-2

|                            |                   |
|----------------------------|-------------------|
| Supply voltage range $U_s$ | AC/DC 100...250 V |
| Operating range $U_s$      | AC/DC 70...300 V  |
| Frequency range $U_s$      | DC, 42...460 Hz   |

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

Voltage test according to IEC 61010-1 2.21 kV

Power consumption  $\leq 6.5$  VA

### Measuring circuit

External measuring current transformer type CTUB101-CTBC20...210(P)

Rated insulation voltage (measuring current transformer) 800 V

Operating characteristic acc. to IEC 62020-1 and IEC 60755 Typ B

Frequency range 0...2000 Hz

Relative uncertainty at

$f \leq 2$  Hz 0...-35 %

$f > 2... < 16$  Hz -35...+100 %

$f \geq 16... \leq 1000$  Hz 0...-35 %

$f > 1000... \leq 2000$  Hz  $\pm 35$  %

Operating uncertainty  $\pm 17.5$  %

### Response values

Rated residual operating current  $I_{\Delta n1}$  (prewarning, AL1) 50...100 %  $\times I_{\Delta n2}$  (50 %)\*

Rated residual operating current  $I_{\Delta n2}$  (main alarm, AL2) 30 mA...3 A (30 mA)\*

Hysteresis 10...25 % (15 %)\*

### Specified time

Starting delay  $t$  0...10 s (0.5 s)\*

Response delay  $t_{on1}$  (prewarning) 0...10 s (1 s)\*

Response delay  $t_{on2}$  (main alarm) 0...10 s (0 s)\*

Delay on release  $t_{off}$  0...99 s (1 s)\*

Operating time  $t_{ae}$  at  $I_{\Delta n} = 1 \times I_{\Delta n1/2}$   $\leq 180$  ms

Operating time  $t_{ae}$  at  $I_{\Delta n} = 5 \times I_{\Delta n1/2}$   $\leq 30$  ms

Response time  $t_{an}$   $t_{an} = t_{ae} + t_{on1/2}$

Recovery time  $t_b$   $\leq 300$  ms

Starting delay  $t$  0...10 s (0.5 s)\*

Response delay  $t_{on1}$  (prewarning) 0...10 s (1 s)\*

Response delay  $t_{on2}$  (main alarm) 0...10 s (0 s)\*

Delay on release  $t_{off}$  0...99 s (1 s)\*

Operating time  $t_{ae}$  at  $I_{\Delta n} = 1 \times I_{\Delta n1/2}$   $\leq 180$  ms

Operating time  $t_{ae}$  at  $I_{\Delta n} = 5 \times I_{\Delta n1/2}$   $\leq 30$  ms

Response time  $t_{an}$   $t_{an} = t_{ae} + t_{on1/2}$

Recovery time  $t_b$   $\leq 300$  ms

Number of reload cycles 0...100 (0)\*

### Displays, memory

Display range, measured value AC/DC 0...6 A

Error of indication  $\pm 17.5$  % /  $\pm 2$  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 mm<sup>2</sup> 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

Minimum contact load (relay manufacturer's reference) 10 mA/5 V DC

### 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



**Environment/EMC**

|     |            |
|-----|------------|
| EMC | EN 61326-1 |
|-----|------------|

**Ambient temperatures**

|                       |              |
|-----------------------|--------------|
| Operating temperature | -25...+55 °C |
| Transportation        | -25...+70 °C |
| Storage               | -25...+55 °C |

**Classification of climatic conditions IEC 60721 (except condensation and formation of ice)**

|                                |      |
|--------------------------------|------|
| Stationary use (IEC 60721-3-3) | 3K22 |
| Transportation (IEC 60721-3-2) | 2K11 |
| Storage (IEC 60721-3-1)        | 1K22 |

**Classification of mechanical conditions acc. to IEC 60721**

|                                |      |
|--------------------------------|------|
| Stationary use (IEC 60721-3-3) | 3M11 |
| Transportation (IEC 60721-3-2) | 2M4  |
| Storage (IEC 60721-3-1)        | 1M12 |

**Option "W" data different from the standard version**

**Classification of climatic conditions acc. to IEC 60721 (condensation and formation of ice is possible)**

|                                |      |
|--------------------------------|------|
| Stationary use (IEC 60721-3-3) | 3K23 |
|--------------------------------|------|

**Classification of mechanical conditions acc. to IEC 60721**

|                                |      |
|--------------------------------|------|
| Stationary use (IEC 60721-3-3) | 3M12 |
|--------------------------------|------|

**Connection**

**For UL applications:** Use 60/70 °C copper conductors only!

**Connection type screw-type terminals**

|  |  |
|--|--|
| Connection properties  |  |
| rigid/flexible   | 0.2...4 / 0.2...2.5 mm <sup>2</sup><br>(AWG 24...12)   |
| multi-conductor connection (2 conductors with the same cross section) rigid/flexible | 0,2...1,5 / 0,2...1,5 mm <sup>2</sup><br>(AWG 24...16) |
| Stripping length   | 8...9 mm   |
| Tightening torque  | 0.5...0.6 Nm   |

**Connection type push-wire terminals**

|                           |  |
|---------------------------|--|
| Connection properties     |  |
| rigid                     | 0.2...2.5 mm <sup>2</sup> (AWG 24...14)  |
| flexible without ferrules | 0.75...2.5 mm <sup>2</sup> (AWG 19...14) |
| flexible with ferrules    | 0,2...1,5 mm <sup>2</sup> (AWG 24...16)  |
| Stripping length          | 10 mm                                    |
| Opening force             | 50 N                                     |
| Test opening, diameter    | 2.1 mm                                   |

**Other**

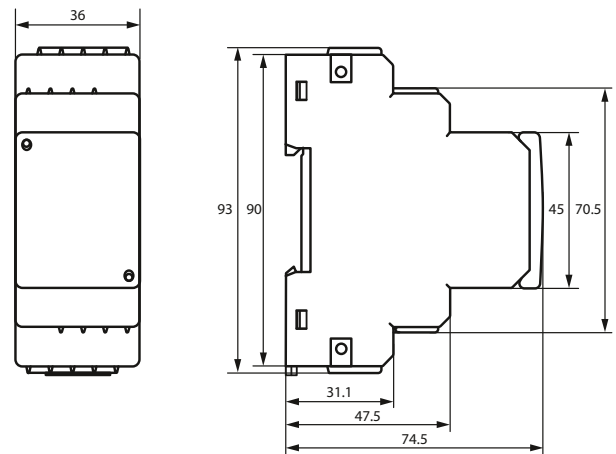
|   |                           |
|---|---------------------------|
| Operating mode                                    | continuous operation      |
| Position of normal use                            | display oriented          |
| Protection class, internal components (IEC 60529) | IP30                      |
| Protection class, terminals (IEC 60529)           | IP20                      |
| Enclosure material                                | polycarbonate             |
| Flammability class                                | UL94V-0                   |
| DIN rail mounting acc. to                         | IEC 60715                 |
| Screw mounting                                    | 2 x M4 with mounting clip |
| Software version                                  | D330 V1.0x                |
| Weight  | ≤ 150 g                   |

( ) \* = factory setting

**Standards, approvals and certifications**



**Dimensions**



Dimension diagram (in mm)

## Ordering information

|   | RCMA423-D-1  | RCMA423-D-2  |
|---|--|--|
| Response range $I_{\Delta n}$             | 30 mA...3 A  |  |
| Rated frequency                           | 0...2000 Hz  |  |
| Measuring current transformers            | CTUB101-CTBC... series                             |  |
| Supply voltage $U_s^*$                    | DC 9,6...94 V /<br>AC 42...460 Hz, 16...72 V       | DC 70...300 V /<br>AC 42...460 Hz, 70...300 V      |
| Art. No.<br>(B 7... = push-wire terminal) | B74043023<br>B74043023W<br>B94043023<br>B94043023W | B74043025<br>B74043025W<br>B94043025<br>B94043025W |

\* Absolute values of the voltage range

### External measuring current transformers

| Type             | Inner diameter | shielded | Art. No.  |
|------------------|----------------|----------|-----------|
| CTUB101-CTBC20   | ø 20 mm        | —        | B78120010 |
| CTUB101-CTBC20P  |                | X        | B78120020 |
| CTUB101-CTBC35   | ø 35 mm        | —        | B78120012 |
| CTUB101-CTBC35P  |                | X        | B78120022 |
| CTUB101-CTBC60   | ø 60 mm        | —        | B78120014 |
| CTUB101-CTBC60P  |                | X        | B78120024 |
| CTUB101-CTBC120  | ø 120 mm       | —        | B78120016 |
| CTUB101-CTBC120P |                | X        | B78120026 |
| CTUB101-CTBC210  | ø 210 mm       | —        | B78120018 |
| CTUB101-CTBC210P |                | X        | B78120028 |

### Measuring current transformer connecting cable

| Type     | Length (m) | Art. No.  |
|----------|------------|-----------|
| CTX-100  | 1          | B98110080 |
| CTX-250  | 2,5        | B98110081 |
| CTX-500  | 5          | B98110082 |
| CTX-1000 | 10         | B98110083 |

### RCMA42... accessories

|  | Art. No.  |
|--|-----------|
| Mounting clip for screw fixing<br>(1 piece per device) | B98060008 |



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Subject to change!  
The specified standards take into account the  
edition valid until 07.2024 unless otherwise  
indicated.