

LINETRAXX® RCMA423AS

Residual current monitor for monitoring AC- and (pulsed) DC-currents in TN- and TT systems (acc. norm AS/NZS 2081:2011)





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Device features

- AC/DC sensitive residual current monitor for mining according to AS/NZS 2081:2011
- Two separately adjustable response ranges (prewarning, main alarm)
- Adjustable switching hysteresis
- r.m.s. value measurement
- Start-up 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 unauthorised parameter changing
- Fault memory function can be switched off
- CT connection monitoring

Approvals



AS/NZS 2081:2011 "Electrical protection devices for mines and quarries"

Product description

The AC/DC sensitive residual current monitor RCMA423AS 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 main alarm ($I_{\Delta n2}$). Since the values are measured with measuring current transformers, the RCMA423AS is nearly independent of the nominal voltage and the 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.

Applications

- AC/DC sensitive residual current monitoring in earthed two, three or four conductor systems (TN and TT systems)
- AC/DC sensitive residual current monitor for mining according to AS/NZS 2081:2011
- 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 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 external CTUB101-CTBC20...210P series measuring current transformers. 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. When the measured values exceed the 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 residual current falls below the release value (response value minus hysteresis), the delay on release t_{off} begins. Once t_{off} 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. The parameterisation of the device can be carried out via the LC display and the control keys integrated in the front plate and can be password-protected.

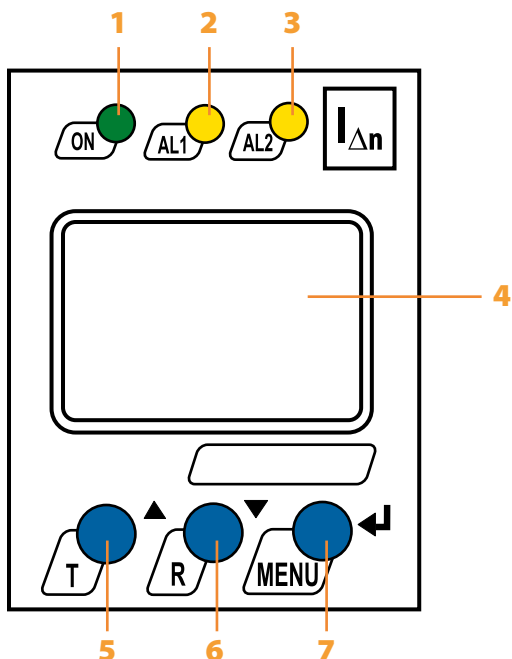
Connection monitoring

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.

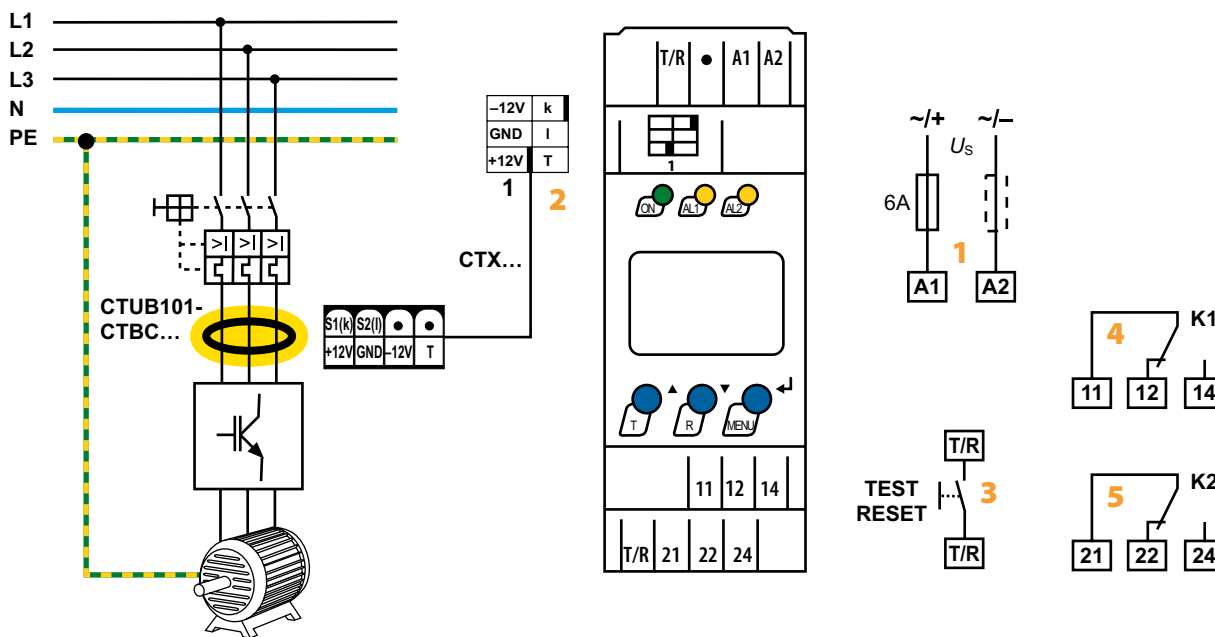


Operating and display elements



- 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.

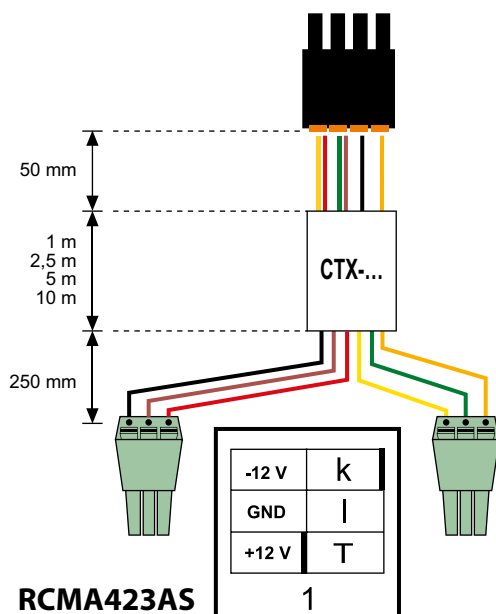
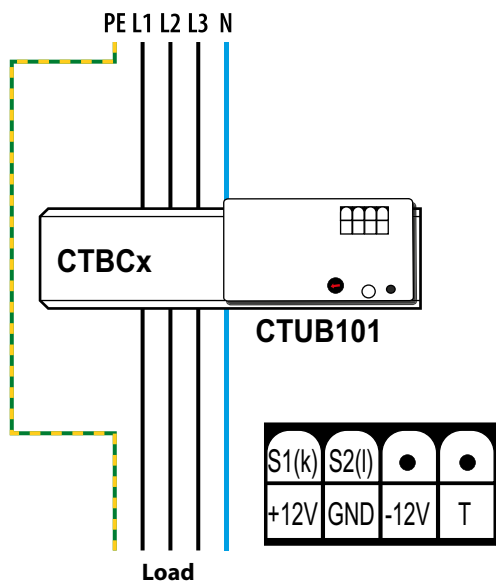
Wiring diagram



- 1 - A1, A2 Connection for supply voltage U_s
- 2 - 1 Socket for the connecting cable CTX... to the measuring current transformer
- 3 - T/R Connection for combined test and reset button
- 4 - 11, 12, 14 Alarm relay K1
- 5 - 21, 22, 24 Alarm relay K2

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

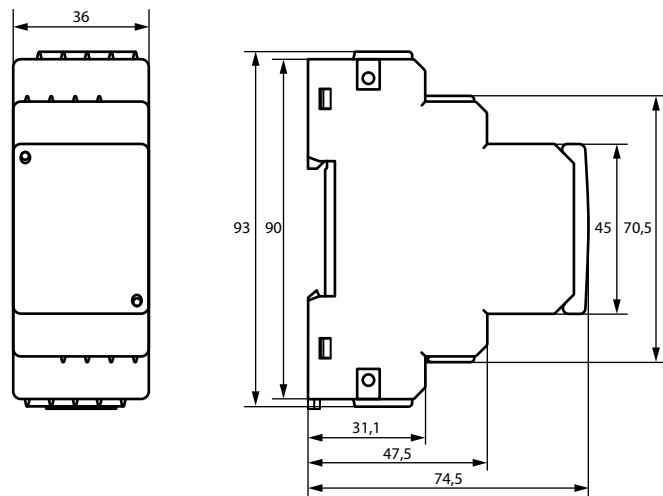
Connection of measuring current transformers



Connection to the RCMA423AS 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



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

RCMA423-D-1	
Rated insulation voltage	100 V
Overtoltage category/ pollution degree	III/3
Rated impulse voltage	2.5 kV
RCMA423-D-2	
Rated insulation voltage	250 V
Overtoltage category/ pollution degree	III/3
Rated impulse voltage	4 kV

Supply voltage

RCMA423-D-1	
Supply voltage range U_s (acc. AS/NZS 2081:2011)	AC 32...60 V / DC 19.2...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 140...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/I, T/R) - (11, 12, 14) - (21, 22, 24)	
Voltage test according to IEC 61010-1	2.5 kV/1 Min.
Power consumption	≤ 6.5 VA

Measuring circuit

External measuring current transformer	CTUB101-CTBC20...210P series
Rated insulation voltage (measuring current transformer)	800 V
Operating characteristic acc. to DIN EN 60202 and IEC 60755	Type B
Rated frequency	0...1000 Hz
Relative uncertainty for f	
≤ 2 Hz	0...-35 %
> 2...< 16 Hz	-35 %...+100 %
≥ 16...≤ 1000 Hz	0...-35 %
> 1000...≤ 2000 Hz	± 35 %
Operating uncertainty	±17.5%

Response values¹⁾

Rated residual operating current $I_{\Delta n1}$ (prewarning, AL1)	50...100 % of $I_{\Delta n2}$ (50 %)*
Rated residual operating current $I_{\Delta n2}$ (main alarm, AL2)	100 mA...5 A (100 mA)*
Hysteresis	10...25 % (15%)*

Specified time

Start-up 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)*
The actuating times depend on the rated frequency:	
Operating time t_{ae} for $I_{\Delta n} = 1 \times I_{\Delta n1/2}$ ($\geq 50... \leq 1000$ Hz)	≤ 50 ms
Operating time t_{ae} for $I_{\Delta n} = 2 \times I_{\Delta n1/2}$ (< 50 Hz)	≤ 50 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/DC	0...9.6 A
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
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Cable lengths for measuring current transformers

Connection CTX... (see ordering information)	1 m/2.5 m/5 m/10 m
or alternatively: single wire 6 x 0.75 mm ²	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 endurance, number of cycles	10000

Contact data acc. to IAS/NZS 2081:2011

Utilisation 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 current	1 A	0.6 A	0.2 A	40 mA	20 mA
Minimum contact load (relay manufacturer's reference)	10 mA/5 V DC				

Environment / EMC

EMC	DIN EN 62020:2005-11, AS/NZS 2081:2011
Operating temperature	-25...+55 °C

Classification of climatic conditions acc. to IEC 60721 (no condensation, no formation of ice)

Stationary use (IEC 60721-3-3)	3K23
Transport (IEC 60721-3-2)	2K11
Long-term storage (IEC 60721-3-1)	1K22

Classification of mechanical conditions acc. to IEC 60721

Stationary use (IEC 60721-3-3)	3M11
Transport (IEC 60721-3-2)	2M4
Long-term storage (IEC 60721-3-1)	1M12

Connection

Connection type		push-wire terminals
Connection properties		
Rigid		0.2...2.5 mm ² (AWG 24...14)
Flexible without ferrules		0.75...2.5 mm ² (AWG 19...14)
Flexible with ferrules		0.2...1.5 mm ² (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 mounting	2 x M4 with mounting clip
Software version	D441 V1.1x
Documentation number	D00157
Weight	≤ 150 g

(*) = factory setting

¹⁾ Disturbances according to IEC 61000-4-10 can influence the response value so that the RCMA423AS trips up to 20 % earlier.

Ordering information

Rated frequency	Response range $I_{\Delta n}$	Supply voltage ¹⁾ U_S		Type	Art. No.
		AC	DC		Push-wire terminal
0...1000 Hz	100 mA...5 A	16...72 V, 42...460 Hz	9,6...94 V	RCMA423AS-D-1	B74043045
		70...300 V, 42...460 Hz	70...300 V	RCMA423AS-D-2	B74043046

¹⁾ Absolute values

Accessories

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

Suitable system components

External measuring current transformers

Internal diameter (mm)	Shielded	Type	Art. No.
ø 20	■	CTUB101-CTBC20P	B78120020
ø 35	■	CTUB101-CTBC35P	B78120022
ø 60	■	CTUB101-CTBC60P	B78120024
ø 120	■	CTUB101-CTBC120P	B78120026
ø 210	■	CTUB101-CTBC210P	B78120028

Measuring current transformer connecting cable

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



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