

LINETRAXX® RCM410R-1/-2

Single-channel AC and pulsed DC sensitive residual current monitor for AC systems





LINETRAXX® RCM410R

Device features

- AC and pulsed DC sensitive residual current monitor type A according to IEC 62020
- r.m.s. value measurement
- Up to 247 monitors in the system
- Residual operating current $I_{\Delta n}$ adjustable: 10 mA...30 A (42...70 Hz)
- Supply voltage DC 24 V (-1) or AC/DC 100...240 V (-2)
- LED strip measured value display
- Adjustable response delay
- One alarm relay (changeover contact)
- N/C or N/O operation and fault memory behaviour selectable
- RS-485 with Modbus RTU
- Continuous measuring current transformer connection monitoring

Product description

The AC and pulsed DC sensitive residual current monitor RCM410R is used for residual current monitoring in earthed systems (TN/TT), in which an alarm should be issued in the event of a fault, but no shutdown may take place. It can also be used to monitor single conductors, e.g. PE conductors, N-PE bridges or PE-PAS bridges.

Two separately adjustable response values allow a distinction to be made between prewarning and main alarm (prewarning = 50...100 % of the set residual operating current $I_{\Delta n}$).

Functional description

Once the supply voltage U_s is applied, the start-up delay t starts. During this period, exceeding the residual operating current has no influence on the switching state of the alarm relay. The residual current measurement is carried out via an external measuring current transformer. If the measured value exceeds the value of the prewarning and/or the residual operating current, the set response delay t_{on} starts.

After t_{on} has elapsed, the alarm relay switches and the corresponding alarm LED lights up. If the value falls below the release value before t_{on} has elapsed, no alarm is signalled: The LEDs AL1, AL2 do not light and the alarm relay does not switch. The set release time t_{off} starts when the measured value falls below the release value again after the alarm relay has switched. Once t_{off} has elapsed, the alarm relay switches back to its initial position. When the fault memory is enabled, the alarm relay remains switched until the T/R button is pressed > 1 s and < 3 s.

The T/R button can also be used to test the device and set the Modbus device address.

Standards

Devices of the RCM410R series have been developed according to the following standards:

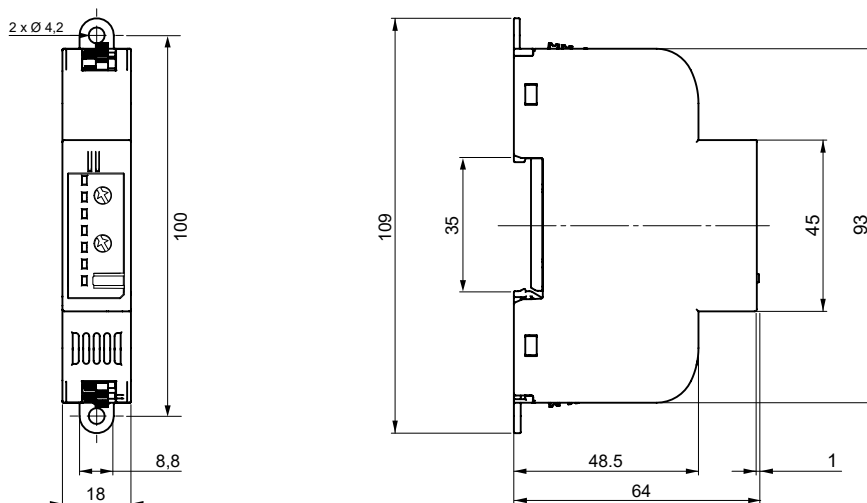
- IEC 62020

Ordering information

Supply voltage U_s		Type	Art. No.
AC/DC	DC		
–	24 V	RCM410R-1	B74602000
100...240 V	24 V	RCM410R-2	B74603000

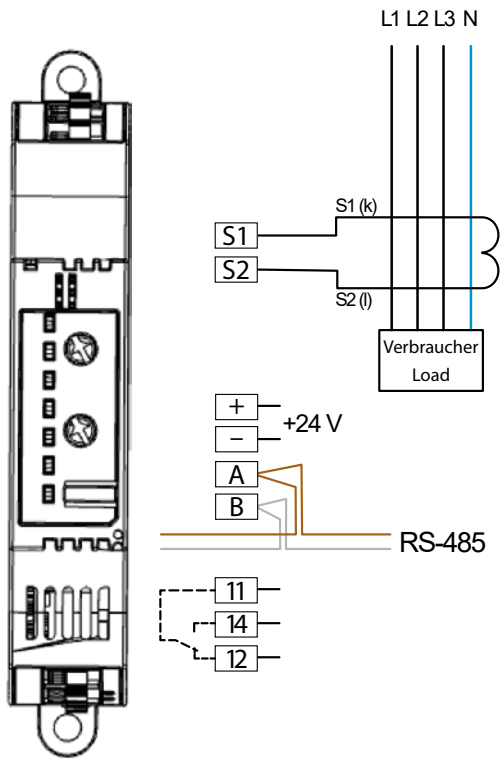
Dimension diagram

All dimensions in mm

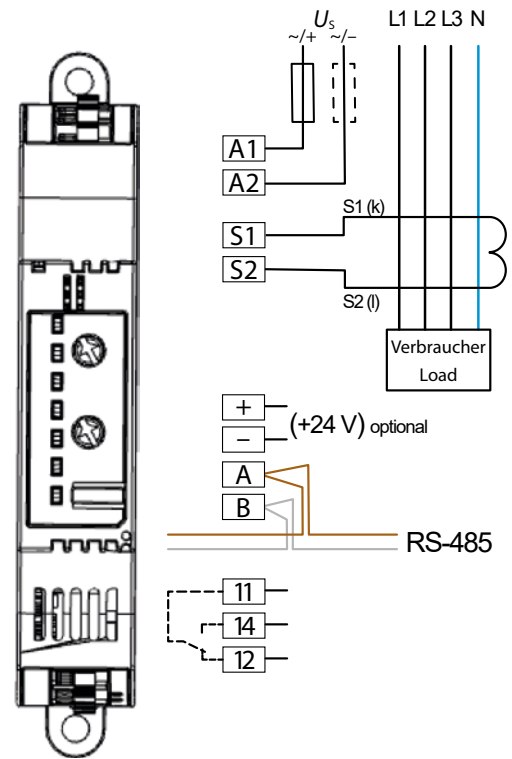


Wiring diagrams

RCM410R-1

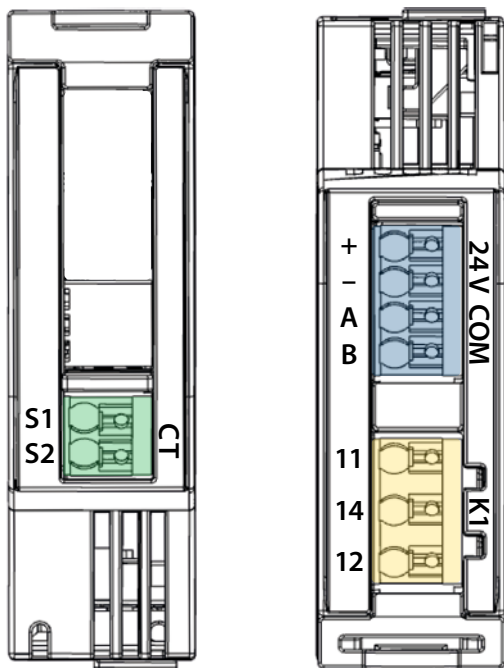


RCM410R-2

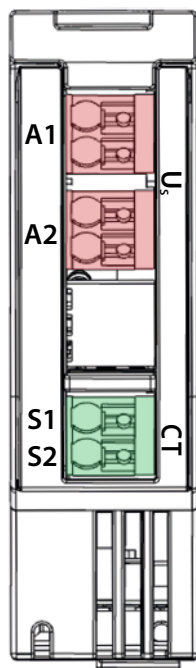


Connections

RCM410R-1



RCM410R-2



Terminal	Connection
A1, A2	Supply voltage U_s
S1, S2	Measuring current transformer
11, 14, 12	Alarm relay K1
+	+24V
-	Ground
A	RS-485 A
B	RS-485 B

Technical data

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

RCM410R-1:

Definitions:	
Measuring & control circuit (IC1)	S1, S2, +, -, A, B
Output circuit (IC2)	11, 14, 12
Rated voltage	250 V
Overvoltage category	III
Operating altitude	≤ 2000 m AMSL
Rated impulse voltage:	
IC1/IC2	4 kV
Rated insulation voltage:	
IC1/IC2	250 V
Pollution degree	2
Protective separation (reinforced insulation) between:	
IC1/IC2	Overvoltage category III, 300 V
Voltage test (routine test) acc. to IEC 61010-1:	
IC1/IC2	AC 2.2 kV

RCM410R-2:

Definitions:	
Supply circuit (IC1)	A1, A2
Output circuit (IC2)	11, 14, 12
Measuring & control circuit (IC3)	S1, S2, +, -, A, B
Rated voltage	250 V
Overvoltage category	III
Operating altitude	≤ 2000 m AMSL
Rated impulse voltage:	
IC1/(IC2-3)	4 kV
IC2/IC3	4 kV
Rated insulation voltage:	
IC1/(IC2-3)	250 V
IC2/IC3	250 V
Pollution degree	2
Protective separation (reinforced insulation) between:	
IC1/(IC2-3)	Overvoltage category III, 300 V
IC2/IC3	Overvoltage category III, 300 V
Voltage test (routine test) acc. to IEC 61010-1:	
IC1/(IC2-3)	AC 2.2 kV
IC2/IC3	AC 2.2 kV

Supply voltage

RCM410R-1:

Supply voltage U_S	DC 24 V
Tolerance of U_S	-30...+25 %
Power consumption	≤ 2 W
Inrush current (< 5 ms)	< 10 A

RCM410R-2:

Supply voltage U_S	AC/DC 100...240 V (47...63 Hz)
Tolerance of U_S	±15 %
Power consumption	≤ 2 W / ≤ 3.5 VA
Inrush current (< 2 ms)	< 1.8 A

Measuring circuit

External measuring current transformer (type A)	CTAC..., W..., WR..., WS... series
Measuring current transformer monitoring ¹⁾	on*/off
Load	33 Ω
Rated voltage U_n	see datasheet measuring current transformer
Operating characteristics	type A
Frequency range	42...70 Hz
Measuring range (Peak)	2 mA...70 A
Measuring range (RMS)	2 mA...50 A
Rated residual operating current	30 A
Residual operating current $I_{\Delta n}$ (AL2)	10 mA...30 A (10 mA)*
Prewarning (AL1) ¹⁾	50...100 % $\times I_{\Delta n}$ (50 %)*
Operating uncertainty	±10 % (at 0.5...5 $\times I_{\Delta n}$)
Relative uncertainty	0...-20 %
Hysteresis ¹⁾	10...25 % (15 %)*

Time response

Start-up delay t^1	0...999 s (0 s)*
Response delay t_{on}	0...10 s (0 s)*
Delay on release t_{off}^1	0...999 s (0 s)*
Operating time	
t_{ae} at $I_{\Delta n} = 1 \times I_{\Delta n}$	≤ 250 ms
t_{ae} at $I_{\Delta n} = 5 \times I_{\Delta n}$	≤ 100 ms
Recovery time $t_b^4)$	≤ 3 s
Response time for measuring current transformer monitoring	≤ 10 s

Displays, memory

Display	status LED incl. LED bar graph
Display range measured value	0...100 %
Fault memory alarm messages	on/off (off)*

Cable lengths for measuring current transformers

Single wire $\geq 0.75 \text{ mm}^2$	0...1 m
Single wire, twisted $\geq 0.75 \text{ mm}^2$	0...10 m
Shielded cable $\geq 0.75 \text{ mm}^2$	0...40 m

RS-485 interface

Protocol	Modbus RTU
Baud rate	max 115.2 kbits/s (19.2 kbits/s)*
Parity	even, no, odd (even)*
Stop bits	1/2/auto (auto)*
Cable length (at 9.6 kbits/s)	≤ 1200 m
Cable: twisted pair	min. J-Y(St)Y 2 \times 0.6 mm ²
Required terminating resistor	120 Ω (0.25 W)
Device address ³⁾	1...247 (100+SN)*

Switching elements

Switching elements	1 changeover contact
Operating principle	N/C or N/O operation (N/C operation)*
Electrical endurance, number of cycles	10000

Connection

Connection type	push-in
Connection properties	
rigid	0.2...1.5 mm ² (AWG 24...16)
flexible	0.2...1.5 mm ² (AWG 24...16)
with ferrule	0.25...0.75 mm ²
with ferrule	1.0...1.5 mm ² **

Contact data acc. to IEC 60947-5-1:

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	5 A	3 A	1 A	0.2 A	0.1 A
Minimum contact rating ²⁾	1 mA at AC/DC \geq 10 V				

Environment/EMC

EMC	IEC 62020
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Ambient temperatures

Operation	-25...+55 °C
Transport	-40...+85 °C
Storage	-40...+70 °C

**Classification of climatic conditions acc. to IEC 60721
(except condensation and 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

Other

Operating mode	continuous operation
Mounting	vertical
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94 V-0
Documentation number	D00403
Weight	≤ 100 g

* Factory setting

** Use crimping pliers similar to CRIMPFOX 6 / Weidmüller PZ6/PZ6/5 only.

- ¹⁾ Can only be configured via RS-485
- ²⁾ Refers to relays that have not been operated with high contact currents
- ³⁾ Factory setting: 100 + last two digits of serial number
- ⁴⁾ See chapter 2.2.5.1 in the manual

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