

# LINETRAXX® RCMB42...

AC/DC sensitive residual current monitor  
for electric vehicle charging systems





LINETRAXX® RCMB420



LINETRAXX® RCMB422

### Product description

The AC/DC sensitive residual current monitoring module RCMB42... is used for fault current monitoring in earthed systems, especially for the monitoring of AC charging stations for electric vehicles, in which DC or AC fault currents are likely to occur, the value of which is constantly greater than zero.

### Function

Residual current monitoring of the charging station takes place via an externally connected measuring current transformer. Here, the r.m.s. value is determined by the DC component contained in the residual current and the AC component that is below the cut-off frequency.

The alarm relays switch when the limit values  $I_{\Delta n} \geq 6 \text{ mA DC}$  and/or r.m.s. value  $I_{\Delta n} \geq 30 \text{ mA}$  (r.m.s.) are exceeded.

After actuation of the device's own test button or via the digital input (e.g. with an external test button or a control device), the device generates a test current. The level of the test current is designed so that when functioning correctly the threshold is exceeded triggering both alarm relays.

Before each charging process, the connected charge controller must check that the monitoring device functions correctly. The check focuses on safety-relevant residual current monitoring. Ensure that the charging process is disabled. The function increases the safety of the charging process and prevents long-term drift of the residual current measurement.

The fault memory can be selected with the integrated sliding switch S1.

### Standards

The LINETRAXX® RCMB42... series complies with the following device standard:

- IEC 62752

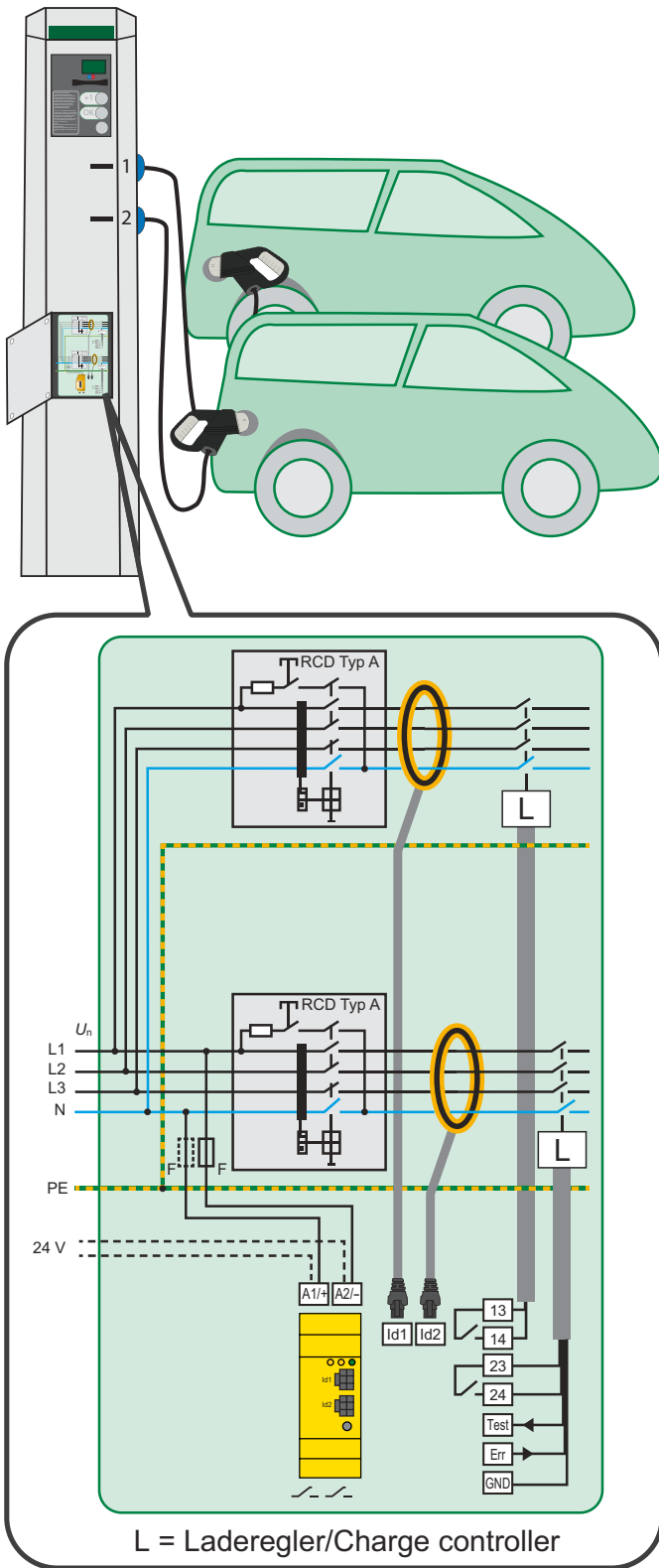
### Device features

- DC sensor with additional AC tripping (type B characteristic)
- Response value 2 – AC/DC 30 mA: r.m.s. value measurement
- Response value 1: DC 6 mA
- Frequency range residual current 0...2000 Hz
- Frequency range load current 45...65 Hz
- Monitoring of the connection to the measuring current transformer
- Fully shielded residual current transformer to avoid influences due to external disturbances
- Connection via push-wire terminals
- Variants: One-channel and two-channel residual current measurement

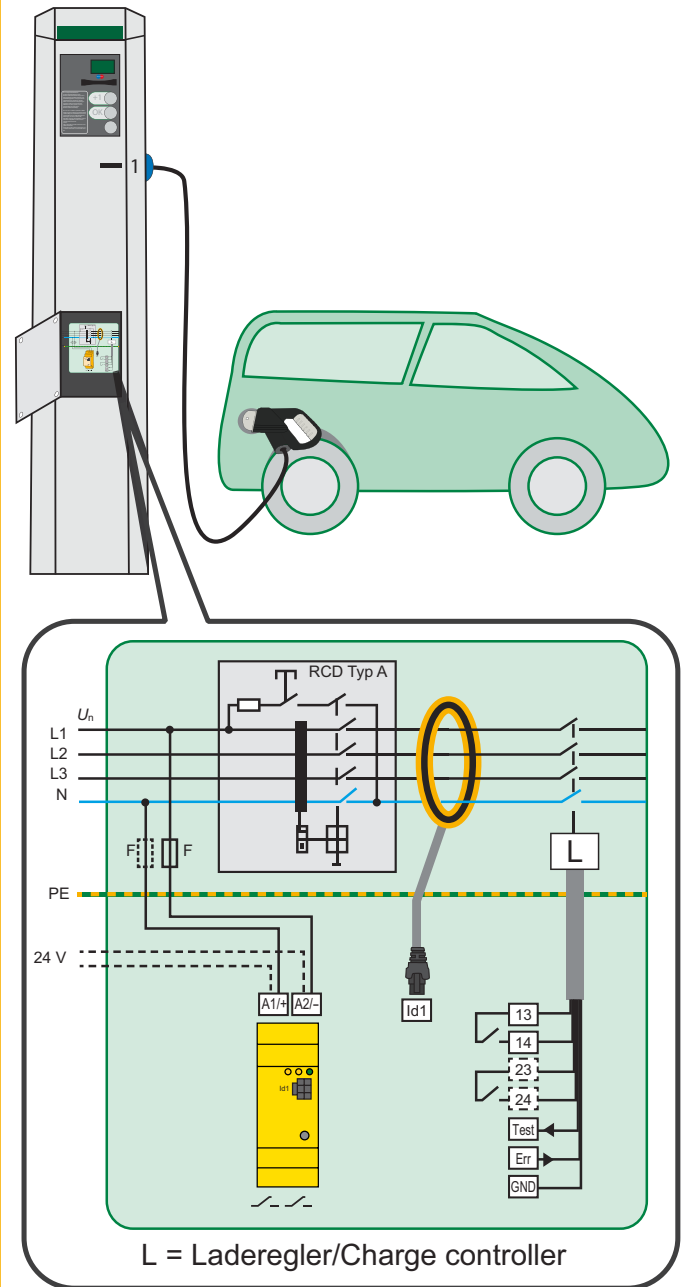
### Approvals



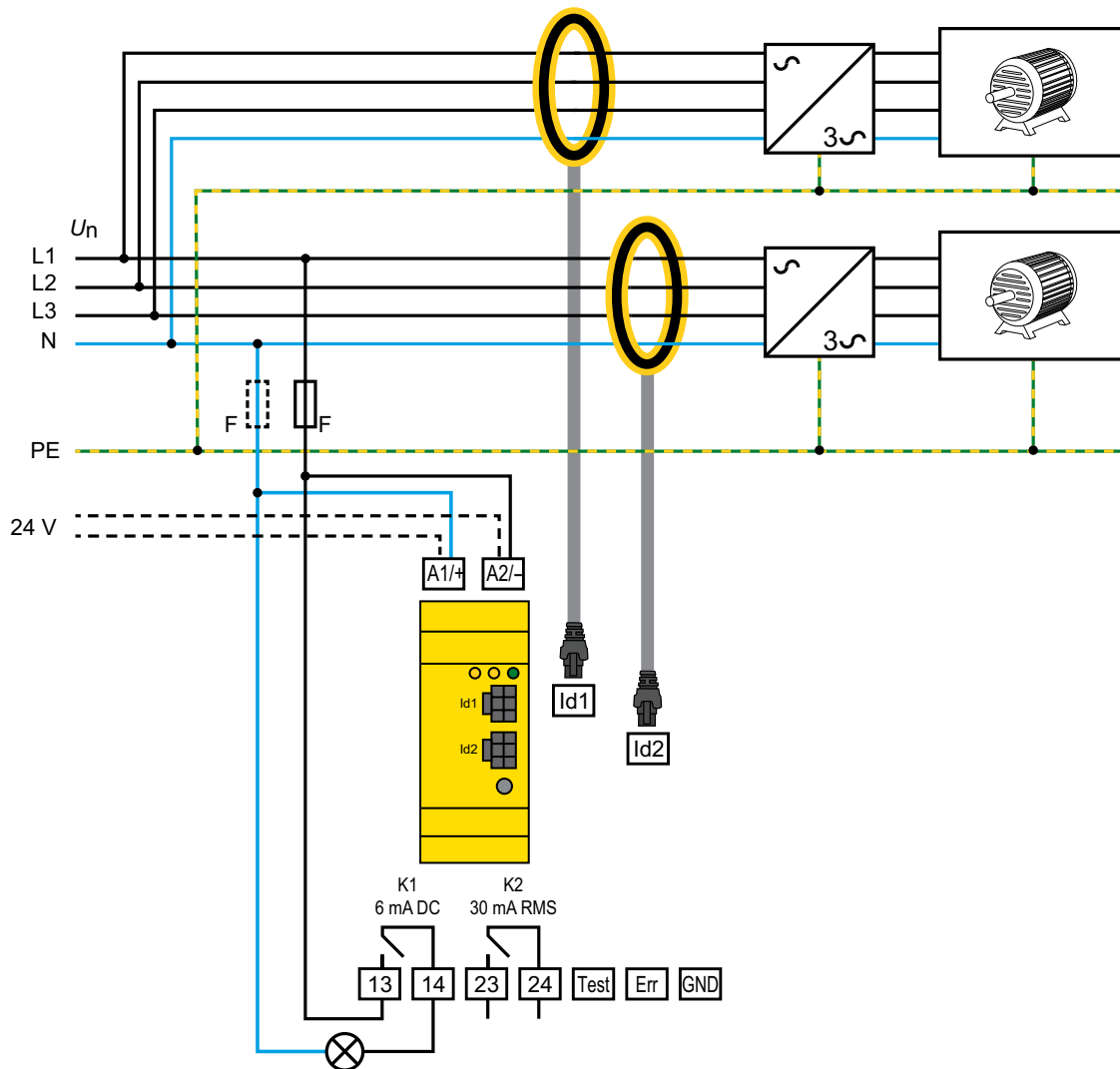
**RCMB420 with 2 channels with  $I_{\Delta n} \geq 6 \text{ mA DC}$  and  $I_{\Delta} \geq 30 \text{ mA (r.m.s.)}$  each**



**RCMB422 with 1 channel with  $I_{\Delta n} \geq 6 \text{ mA DC}$  and  $I_{\Delta} \geq 30 \text{ mA (r.m.s.)}$  each**

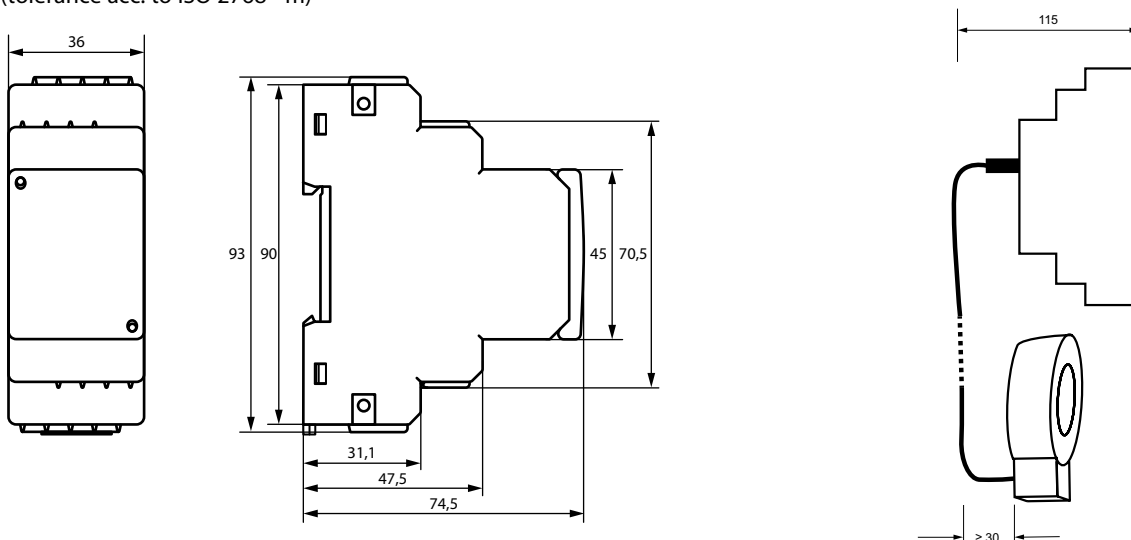


**General wiring diagram for applications in earthed systems**



**Dimension diagram XM420**

Dimensions in mm  
(tolerance acc. to ISO 2768 - m)



**Technical data**
**Insulation coordination according to IEC 60664-1**

Definitions	
Supply circuit (IC1)	A1, A2
Measuring circuit (IC2)	Id1, Id2 Err, Test, GND
Output circuit 1 (IC3)	13, 14
Output circuit 2 (IC4)	23, 24
Monitored current circuit (IC5)	Un
Rated voltage	250 V
Overvoltage category (OVC)	III
Pollution degree	2

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Rated insulation voltage	
IC1/IC2	40 V
(IC1-IC2)/(IC3-IC5)	250 V
IC3/(IC4-IC5)	250 V
IC4/IC5	250 V
Rated impulse voltage	
IC1/IC2	800 V
(IC1-IC2)/(IC3-IC5)	4 kV
IC3/(IC4-IC5)	4 kV
IC4/IC5	4 kV

Safe isolation (reinforced insulation) between	
(IC1-IC2)/(IC3-IC5)	OVC III, 250 V
(IC3-IC4)-IC5	OVC III, 250 V

Basic insulation between	
IC3/IC4	OVC III, 250 V

Functional insulation between	
IC1/IC2	DC 1 kV 60 s

Voltage tests (routine test) acc. to IEC 61010-1	
(IC1-IC2)/(IC3-IC4)	AC 2.2 kV
IC2-IC5	AC 2.2 kV
IC3/IC4	AC 2.2 kV

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Rated insulation voltage	
IC1/(IC2-IC5)	250 V
IC2/(IC3-IC5)	250 V
IC3/IC4-IC5	250 V
IC4/IC5	250 V
Rated impulse voltage	
IC1/(IC2-IC5)	4 kV
IC2/(IC3-IC5)	4 kV
IC3/IC4-IC5	4 kV
IC4/IC5	4 kV

Safe isolation (reinforced insulation) between	
IC1/(IC2-IC5)	OVC III, 250 V
IC2-(IC3-IC5)	OVC III, 250 V
IC3-(IC4-IC5)	OVC III, 250 V
(IC3-IC4)-IC5	OVC III, 250 V
Basic insulation between	
IC3/IC4	OVC III, 250 V

Voltage tests (routine test) acc. to IEC 61010-1	
IC1/(IC2-IC5)	AC 2.2 kV
IC2/(IC3-IC5)	AC 2.2 kV
IC2/(IC3-IC4)	AC 2.2 kV
IC4-IC5	AC 2.2 kV

**Supply voltage**
**RCMB42...-25**

Nominal voltage $U_S$	DC 24 V
Nominal voltage range $U_S$	DC 18...36 V
Nominal current	110 mA (RCMB420-25) 70 mA (RCMB422-25)

Internal protection against reverse polarity and short circuit

**RCMB42...-2**

Nominal voltage range $U_S$	AC 110...240 V, 50/60 Hz DC 150...220 V
Tolerance of the nominal voltage range of $U_S$	-5...+15 %
Nominal current	30 mA

**Residual current measuring range**

Rated frequency	0...2000 Hz
Measuring range	±300 mA

**Response values**

Residual current $I_{\Delta n1}$	6 mA
Response tolerance $I_{\Delta n1}$	-50...0 %
Residual current $I_{\Delta n2}$	30 mA (r.m.s.)
Response tolerance $I_{\Delta n2}$	
for $f \leq 1$ kHz	-20...0 %
for $f > 1$ kHz	-20...+100 %
Restart sequence value	
DC 6 mA	< 3 mA
AC/DC 30 mA (r.m.s.) for $f \leq 1$ kHz	< 12 mA
AC/DC 30 mA (r.m.s.) for $f > 1$ kHz	< 22 mA
Operating time $t_{ae1}$ for $1 \times I_{\Delta n1}$	< 600 ms
Operating time $t_{ae2}$ for	
$1 \times I_{\Delta n2}$	< 180 ms
$2 \times I_{\Delta n2}$	< 70 ms
$5 \times I_{\Delta n2}$	< 20 ms

**Inputs and operation**

Test button	on front side
Test	internal/external
Cable length Test/Err, GND	< 10 m
Transformer connection	external
LED device function	green
LED alarm channel 1	yellow
LED alarm channel 2	yellow

**Output**

Common alarm signal Err	Open-Collector (npn)
No error	0...0.6 V
Error	11.4...12.6 V

**Switching elements**

Alarm relays K1, K2	$I_{\Delta n} \geq 6$ mA DC; $I_{\Delta n} \geq 30$ mA r.m.s.
Switching elements	2 x 1 N/O contacts
Operating principle	N/C operation
Electrical endurance, number of cycles	10,000

**Contact data according to IEC 60947-5-1**

Utilisation category	AC-14/DC-13
Rated operational voltage $U_e$	250 V
Rated operational current $I_e$	5 A
Minimum contact rating	1 mA at AC/DC $\geq 10$ V

## Environment/EMC

EMC	IEC 61851-1, IEC 61851-22
Operating temperature	-30...+75 °C

## Classification of climatic conditions acc. to IEC 60721

Stationary use (IEC 60721-3-3)	3K22 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K11
Long-term storage (IEC 60721-3-1)	1K21

## 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 <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
Degree of protection, internal components	IP 30
Degree of protection, terminals	IP 20
Area of application	≤ 2000 m AMSL
Quick DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Documentation number	D00167

## Measuring current transformer

Diameter cable gland measuring current transformer	15 mm
Cable length	1.5 m
Max. cable cross section	4 x 6 mm <sup>2</sup>
Mounting	with cable ties
Connection to RCMB42...	plug-in connector with 6 poles
Rated voltage $U_n$	3/(N) AC 400/230 V
Rated current $I_n$	3x32 A
Rated impulse withstand voltage $U_{imp}$	4 kV

## Ordering details

Measuring range		Frequency range	Number of measuring current transformers (Ø 15 mm, 1.5 m cable)	Channels	Supply voltage $U_s$		Type	Art. No.
DC	r.m.s.				AC	DC		
0...6 mA	0...30 mA	0...2000 Hz	2	2 x residual current	110...240 V, 50/60 Hz	150...220 V	RCMB420-2	B74042500
					–	18...36 V	RCMB420-25	B74042503
			1	1 x residual current	110...240 V, 50/60 Hz	150...220 V	RCMB422-2	B74042502
					–	18...36 V	RCMB422-25	B74042504

Delivery incl. measuring current transformers.

Measuring current transformers available with shorter cable on request (minimum order quantity 250 pcs.)

## Accessories

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



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