

LINETRAXX® RCMB42...EC

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





LINETRAXX® RCMB420EC



LINETRAXX® RCMB422EC

Product description

The AC/DC sensitive residual current monitoring module RCMB42...EC is used for fault current 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.

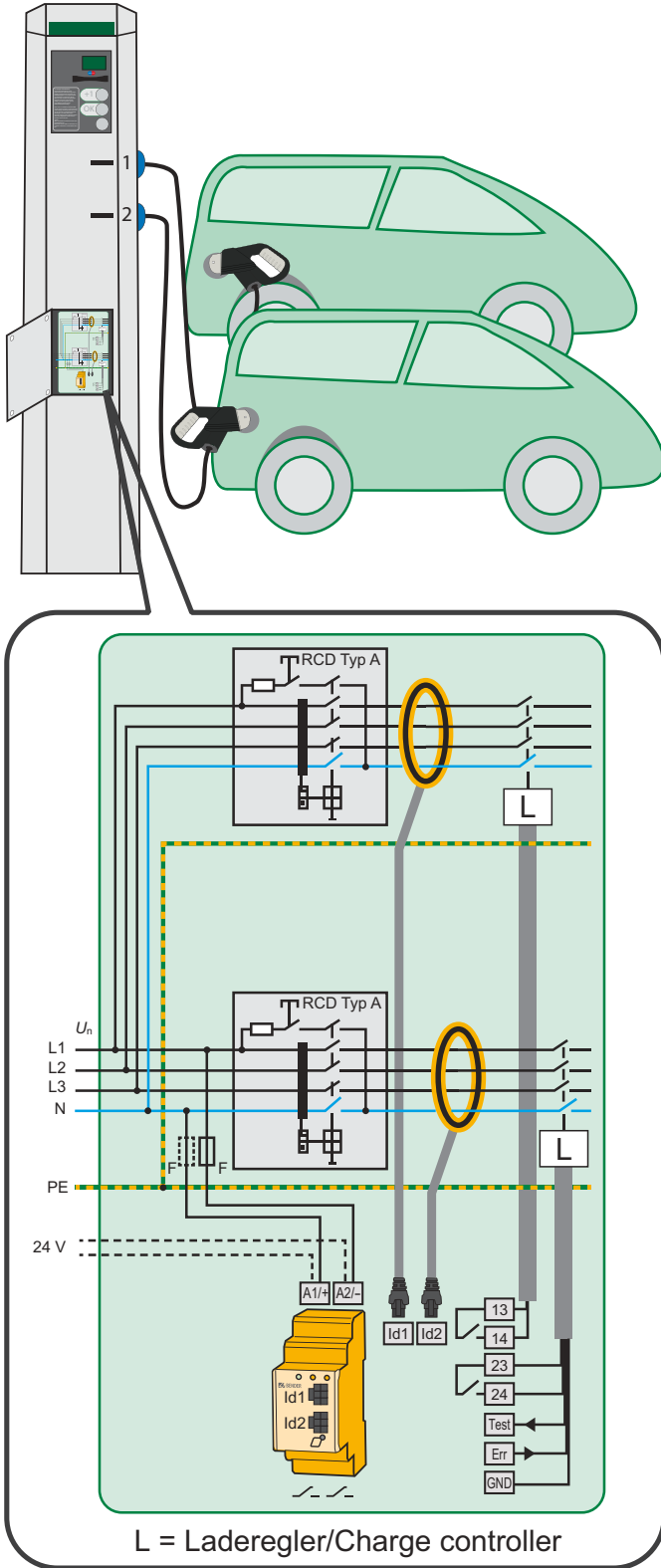
Standards

The LINETRAXX® RCMB42...EC series complies with the following device standards: IEC 60364-7-722, IEC 62752, E DIN VDE 0100-722 (VDE 0100-722)

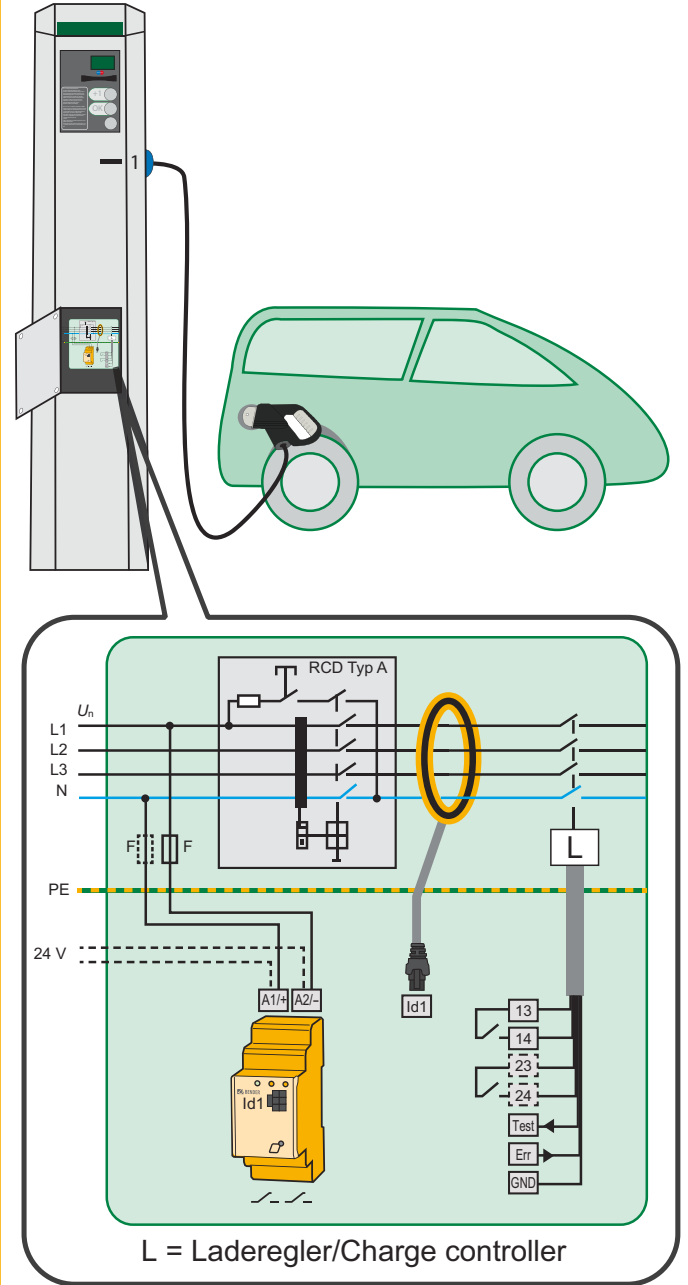
Device features

- DC sensor acc. to IEC 60364-7-722 (VDE 0100-722) 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

RCMB420EC with 2 channels with $I_{\Delta n} \geq 6 \text{ mA DC}$ and $I_{\Delta} \geq 30 \text{ mA (r.m.s.)}$ each



RCMB422EC with 1 channel with $I_{\Delta n} \geq 6 \text{ mA DC}$ and $I_{\Delta} \geq 30 \text{ mA (r.m.s.)}$ each



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)	U_n
Rated voltage	250 V
Overvoltage category (OVC)	III
Pollution degree	2

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

IC1/IC2	DC 1 kV 60 s
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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
Rated insulation voltage IC2/(IC3-IC5)	250 V
Rated insulation voltage IC3/IC4-IC5	250 V
Rated insulation voltage IC4/IC5	250 V
Rated impulse voltage IC1/(IC2-IC5)	4 kV
Rated impulse voltage IC2/(IC3-IC5)	4 kV
Rated impulse voltage IC3/IC4-IC5	4 kV
Rated impulse voltage 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
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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

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Nominal voltage U_s	DC 24 V
Nominal voltage range U_s	DC 18...36 V
Nominal current	110 mA (RCMB420EC-25) 70 mA (RCMB422EC-25)
Internal protection against reverse polarity and short circuit	

RCMB42...EC-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} (at DC or > 15 Hz) 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 ≥ 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)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K2
Long-term storage (IEC 60721-3-1)	1K2
Classification of mechanical conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-term storage (IEC 60721-3-1)	1M3

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

Measuring current transformer

Diameter cable gland measuring current transformer	15 mm
Cable length	1.5 m
Max. cable cross section	4 x 6 mm ²
Mounting	with cable ties
Connection to RCMB42...EC	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

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

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	RCMB420EC-2	B 7404 2500
					–	18...36 V	RCMB420EC-25	B 7404 2503
			1	1 x residual current	110...240 V, 50/60 Hz	150...220 V	RCMB422EC-2	B 7404 2502
					–	18...36 V	RCMB422EC-25	B 7404 2504

Delivery incl. measuring current transformers.

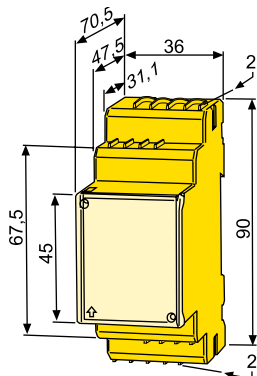
Measuring current transformers available with shorter cable on request (minimum order quantity 250 pcs.)

Accessories

Description	Art. No.
Mounting clip for screw mounting (1 piece per device)	B 9806 0008

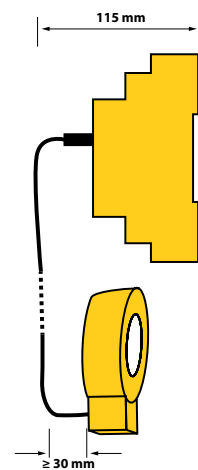
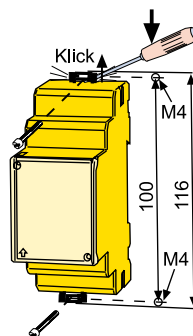
Dimension diagram XM420

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



Screw mounting

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





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