

LINETRAXX® RCMB42...EC

AC/DC sensitive residual current monitor



LINETRAXX® RCMB42...EC



LINETRAXX® RCMB420EC



LINETRAXX® RCMB422EC

Device features

- AC/DC sensitive residual current monitoring module Type B in accordance with IEC 60364-7-722 (VDE 0100-722)
- Response value 2 AC/DC 30 mA: r.m.s. 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
- Shielded residual current transformer to prevent the effects of external disturbances
- Connection by means of push-wire terminals
- Variants: Single and two-channel residual current measurement

Product description

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

Function

Residual current monitoring is carried out using externally connected measuring current transformers. The r.m.s. value is calculated by summing the DC components included in the residual current and AC components that are below the cut-off frequency.

When the limit values of $I_{\Delta n} = DC \ge 6$ mA and/or $I_{\Delta n} = AC/DC \ge 30$ mA are exceeded, it will be indicated by alarm relays. Both indications are signalled via the same relay.

A test signal is generated by the microcontroller by pressing the test button "Test" on the front panel. This signal consists of an AC signal superimposed on a DC component. The value of the test current is designed in such a way as to exceed the response value so that both alarm relays are triggered. This indicates that both relays are functioning correctly.

Before charging, the monitoring device must perform a self test and offset measurement to prevent long-term drifts during residual current measurement. During this process safety relevant residual current monitoring is checked. The charging process has to be deactivated before starting this test.

Ordering information

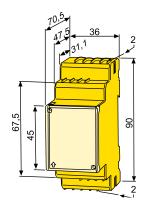
| Measuring range | | rrequency | Number of measuring current transformers (Ø 15 mm, 1,5 m Cable) | Channels | Туре | Art. No. |
|-----------------|-----------------|-----------|---|----------------------|-------------|-------------|
| 06 mA | 030 mA (rms) | 02000 Hz | 2 | 2 x residual current | RCMB420EC-2 | B 7404 2500 |
| | | | 1 | 1 x residual current | RCMB422EC-2 | B 7404 2502 |

Delivery incl. measuring current transformers.

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

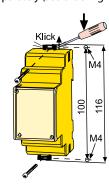
Dimension diagram XM420

Dimensions in mm



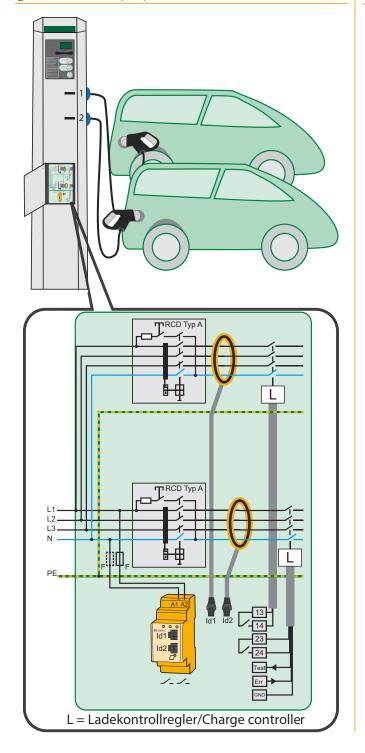
Screw mounting

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

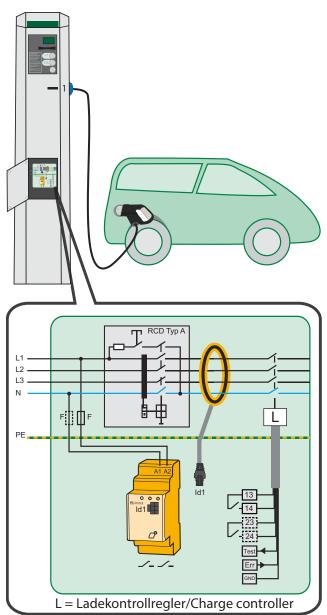




RCMB420EC with 2 channels with I_{Δ} = DC \geq 6 mA and I_{Δ} = AC/DC \geq 30 mA (rms)



RCMB422EC with 1 channel with $I_{\Delta} = DC \ge 6$ mA and $I_{\Delta} = AC/DC \ge 30$ mA (rms)



Technical data

| revoltage category/pollution degree ed impulse voltage 4 kV gree of Contamination tective separation between (A1, A2) - (Id1, Id2, Err, Test, GND) - (13, 14, 23, 24) ic insulation between (13, 14) - (23, 24) \leq 2000 m above NV gree of use \leq 2000 m above NV gree of use \leq 2000 m above NV greating range of the supply voltage U_S AC 110240 V, 50/60 Hz DC 150220 V greating range of the supply voltage AC 0.851.1 x U_S DC 0.81.2 x U_S derecting range residual current U_S assuring range residual current U_S assuring range U_S U_S defined assuring range U_S | nsulation coordination acc. to IEC 60664- | 1/IEC 60664-3 |
|---|---|---|
| ed impulse voltage 4 kV gree of Contamination tective separation between (A1, A2) - (Id1, Id2, Err, Test, GND) - (13, 14, 23, 24) (in insulation beetween (13, 14) - (23, 24) (in substitution get of use \$\leq 2000\$ m above NN wer supply minal supply voltage U_5 AC 110240 V, 50/60 Hz DC 150220 V arating range of the supply voltage AC 0.851.1 x U_5 assuring range residual current ed frequency 02000 Hz assuring range \$\frac{1}{2}\$ S ON \$\frac{1}{2}\$ S ON \$\frac{1}{2}\$ S ON \$\frac{1}{2}\$ AS ON \$\frac{1}{2} | Rated insulation voltage | AC 250 V |
| tective separation between (A1, A2) - (Id1, Id2, Err, Test, GND) - (13, 14, 23, 24) ic insulation beetween (13, 14) - (23, 24) ge of use $\leq 2000 \text{ m}$ above NN wer supply ninal supply voltage U_S | Overvoltage category/pollution degree | III/3 |
| tective separation between (A1, A2) - (Id1, Id2, Err, Test, GND) - (13, 14, 23, 24) ic insulation beetween (13, 14) - (23, 24) ge of use $\leq 2000 \text{ m}$ above NN ge of use ≤ 2 | Rated impulse voltage | 4 kV |
| ic insulation beetween (13, 14) - (23, 24) ege of use ege ege of use ege ege of use ege ege of use ege ege ege of use ege | Degree of Contamination | |
| ic insulation beetween (13, 14) - (23, 24) ege of use ege ege of use ege ege of use ege ege of use ege ege ege of use ege | Protective separation between (A1, A2) | - (Id1, Id2, Err, Test, GND) - (13, 14, 23, 24) |
| rate of use $≤ 2000 \text{ m above NN}$ wer supply minal supply voltage U_5 Poc 150220 V Poc 150220 V AC 0.851.1 × U_5 DC 0.81.2 × U_5 Poc 0.81.2 × U_5 Po | Basic insulation | |
| minal supply voltage U_5 AC 110240 V, 50/60 Hz DC 150220 V erating range of the supply voltage AC 0.851.1 $\times U_5$ DC 0.81.2 $\times U_5$ ver consumption assuring range residual current ed frequency assuring range $\pm 300 \text{ mA}$ sponse values idual current $I_{\Delta n_2}$ ponse tolerance $I_{\Delta n_2}$ $f \le 1 \text{ kHz}$ $f > 1 $ | Range of use | ≤ 2000 m above NN |
| Practing range of the supply voltage $AC 0.851.1 \times U_0$ $DC 0.81.2 \times U_0$ $DC 02000 Hz$ | Power supply | |
| erating range of the supply voltage $P(0.851.1 \times U_0)$ $P(0.81.2 \times U_0)$ $P(02000 Hz)$ $P(02000 $ | Nominal supply voltage $U_{\rm S}$ | AC 110240 V, 50/60 Hz |
| $\begin{array}{c} \text{DC } 0.81.2 \times U_{2} \\ \text{ver consumption} \\ \text{assuring range residual current} \\ \text{ed frequency} \\ \text{assuring range} \\ \text{assuring range} \\ \text{the ponse values} \\ \text{sidual current } I_{\Delta n 2} \\ \text{ponse tolerance } I_{\Delta n 2} \\ \text{ponse tolerance } I_{\Delta n 2} \\ \text{didual current } I_{\Delta n 1} \\ \text{ponse tolerance } I_{\Delta n 2} \\ \text{f} \leq 1 \text{kHz} \\ \text{f} > 20+100 \% \\ \text{tart sequence value} \\ \text{f} \text{ om A} \\ \text{DC } 30 \text{ mA (rms) for } \text{f} \leq 1 \text{ kHz} \\ \text{DC } 30 \text{ mA (rms) for } \text{f} > 1 \text{ kHz} \\ \text{varing time } t_{x} \text{ for } \\ I_{\Delta n} \\ I_{\Delta n} \\ I_{\Delta n} \\ \text{varing time } t_{x} \text{ for } \\ I_{\Delta n} \\ vari$ | , | DC 150220 V |
| ver consumption $< 5 \text{ VA}$ assuring range residual current ed frequency 02000 Hz assuring range $\pm 300 \text{ mA}$ sponse values idual current $I_{\Delta n 2}$ 6 mA ponse tolerance $I_{\Delta n 2}$ 050% idual current $I_{\Delta n 1}$ 30 mA ponse tolerance $I_{\Delta n 2}$ $f \le 1 \text{ kHz}$ 020% $f \le 1 \text{ kHz}$ 020% $f > 1 \text{ kHz}$ 020% tart sequence value 6 mA 020% 6 mA 020 | perating range of the supply voltage | AC 0.851.1 x <i>U</i> _S |
| asuring range residual current ed frequency 02000Hz asuring range $\pm 300 \text{mA}$ isponse values idual current $I_{\Delta n2}$ 6mA ponse tolerance $I_{\Delta n2}$ 050% idual current $I_{\Delta n1}$ 30mA ponse tolerance $I_{\Delta n2}$ $f \leq 1 \text{kHz}$ 020% $f \leq 1 \text{kHz}$ 020% $f \leq 1 \text{kHz}$ 020% tart sequence value 6mA $< 3 \text{mA}$ DC 30mA (rms) for $f \leq 1 \text{kHz}$ $< 12 \text{mA}$ DC 30mA (rms) for $f > 1 \text{kHz}$ $< 22 \text{mA}$ retarting time t_{∞} for $I_{\Delta n}$ $< 70 \text{ms}$ $I_{\Delta n}$ $< 70 \text{ms}$ tuts and operation t button on front side internal/external le lenght Test/Err, GND 010m nsformer connection external device function green alarm channel 1 yellow | | DC 0.81.2 x U _S |
| the differency 02000Hz as uring range $\pm 300 \text{mA}$ is ponse values sidual current $I_{\Delta n2}$ 6mA ponse tolerance $I_{\Delta n2}$ 050% idual current $I_{\Delta n1}$ 30mA ponse tolerance $I_{\Delta n2}$ $f \le 1 \text{kHz}$ 020% $f \le 1 \text{kHz}$ 020% $f \le 1 \text{kHz}$ $f \ge 1 $ | ower consumption | < 5 VA |
| sponse values idual current $I_{\Delta n2}$ 6 mA ponse tolerance $I_{\Delta n2}$ 050 % idual current $I_{\Delta n1}$ 30 mA ponse tolerance $I_{\Delta n2}$ 6. mA ponse tolerance $I_{\Delta n2}$ 7+100 % $f \le 1 \text{kHz}$ 7+100 % tart sequence value $f = 1 \text{kHz}$ 2+100 % tart sequence value $f = 1 \text{kHz}$ 2+100 % tart sequence $f = 1 \text{kHz}$ 2+100 % $f = 1 \text{kHz}$ 2+100 % $f = 1 \text{kHz}$ 2+100 % tart sequence value $f = 1 \text{kHz}$ 2+100 % $f = 1 \text{kHz}$ 3+100 | Measuring range residual current | |
| sponse values idual current $I_{\Delta n2}$ 6 mA ponse tolerance $I_{\Delta n2}$ 050 % idual current $I_{\Delta n1}$ 30 mA ponse tolerance $I_{\Delta n2}$ 6. mA ponse tolerance $I_{\Delta n2}$ 7+100 % $f \le 1 \text{kHz}$ 7+100 % tart sequence value $f = 1 \text{kHz}$ 2+100 % tart sequence value $f = 1 \text{kHz}$ 2+100 % tart sequence $f = 1 \text{kHz}$ 2+100 % $f = 1 \text{kHz}$ 2+100 % $f = 1 \text{kHz}$ 2+100 % tart sequence value $f = 1 \text{kHz}$ 2+100 % $f = 1 \text{kHz}$ 3+100 | Rated frequency | 02000 Hz |
| idual current $I_{\Delta n2}$ 6 mA ponse tolerance $I_{\Delta n2}$ 050 % idual current $I_{\Delta n1}$ 30 mA ponse tolerance $I_{\Delta n2}$ 020 % $f \le 1$ kHz 020 % $f \le 1$ kHz 2+100 % tart sequence value 6 mA $f \ge 1$ kHz 2+100 % $f \ge 1$ kHz 3+100 mA (rms) for $f \ge $ | Measuring range | ± 300 mA |
| idual current $I_{\Delta n2}$ 6 mA ponse tolerance $I_{\Delta n2}$ 050 % idual current $I_{\Delta n1}$ 30 mA ponse tolerance $I_{\Delta n2}$ 020 % $f \le 1$ kHz 020 % $f \le 1$ kHz 2+100 % tart sequence value 6 mA $f \ge 1$ kHz 2+100 % $f \ge 1$ kHz 3+100 mA (rms) for $f \ge $ | Response values | |
| ponse tolerance $I_{\Delta n2}$ 050 % idual current $I_{\Delta n1}$ 30 mA ponse tolerance $I_{\Delta n2}$ $f \le 1$ kHz 020 % $f \le 1$ kHz 020 % $f \le 1$ kHz 2+100 % tart sequence value 6 mA $f \ge 1$ kHz 2+100 % $f \ge 1$ kHz 3+100 % $f \ge 1$ kHz 3. | Residual current I _{An2} | 6 mA |
| ponse tolerance $I_{\Delta n 2}$ $f \le 1 \text{kHz}$ $0 \dots -20 \%$ $f > 1 \text{kHz}$ $0 \dots +100 \%$ tart sequence value 6 mA 0 mB $0 $ | Response tolerance $I_{\Lambda n2}$ | 050 % |
| $f \le 1 \text{kHz}$ $0 \dots -20 \%$ $f > 1 \text{kHz}$ $-20 \dots +100 \%$ $f > 1 \text{kHz}$ $-20 \dots +100 \%$ $f > 1 \text{kHz}$ $f > 1 \text{kHz}$ $f > 1 \text{kHz}$ $f > 1 \text{kHz}$ $f > 2 \text{mA}$ $f > 2 \text{mB}$ $f > 3 \text{mB}$ $f > 2 \text{mB}$ $f > 4 \text{mB}$ $f > 2 \text{mB}$ $f > 3 \text{mB}$ $f > 2 \text{mB}$ $f > 4 \text$ | esidual current $I_{\Lambda n1}$ | 30 mA |
| $f > 1 \text{ kHz}$ $-20 \ldots + 100 \%$ t tart sequence value 6 mA $< 3 \text{ mA}$ 6 mA $< 3 \text{ mA}$ $DC 30 \text{ mA}$ (rms) for $f \le 1 \text{ kHz}$ $< 12 \text{ mA}$ $DC 30 \text{ mA}$ (rms) for $f > 1 \text{ kHz}$ $< 22 \text{ mA}$ $C 30 \text{ mA}$ (rms) for $C > 1 \text{ kHz}$ $< 22 \text{ mA}$ $C 30 \text{ mA}$ (rms) for $C > 1 \text{ kHz}$ $< 180 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 70 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) for $C > 1 \text{ kHz}$ $< 20 \text{ mB}$ $C 30 \text{ mB}$ (rms) fo | lesponse tolerance $I_{\Delta n2}$ | |
| tart sequence value $6 \text{ mA} \qquad < 3 \text{ mA}$ $6 \text{ mA} \qquad < 3 \text{ mA}$ $6 \text{ mA} \qquad < 3 \text{ mA}$ $6 \text{ mA} \qquad < 12 \text{ mA}$ $6 \text{ mA} \qquad < 12 \text{ mA}$ $6 \text{ mA} \qquad < 12 \text{ mA}$ $6 \text{ mA} \qquad < 22 \text{ mA}$ $6 \text{ mA} \qquad < 22 \text{ mA}$ $6 \text{ mB} \qquad < 22 \text{ mA}$ $6 \text{ mB} \qquad < 22 \text{ mA}$ $6 \text{ mB} \qquad < 20 \text{ mB}$ $6 $ | or f ≤ 1kHz | 020 % |
| 6 mA < 3 mA < 3 mA < 2 mA < 3 mA < 3 mA < 3 mA < 3 mA (rms) for $f \le 1$ kHz < 2 mA < 3 mA (rms) for $f > 1$ kHz < 2 mA < 3 mA < 4 mB < 4 mA < 4 mB < 4 m | or f > 1kHz | -20+100 % |
| DC 30 mA (rms) for $f \le 1$ kHz < 12 mA DC 30 mA (rms) for $f > 1$ kHz < 22 mA derating time t_{∞} for $t \ge 1$ kHz < 22 mA derating time t_{∞} for $t \ge 1$ kHz < 20 mA $t \ge 1$ mAn $t \ge 1$ | estart sequence value | |
| DC 30 mA (rms) for $f > 1$ kHz < 22 mA erating time $t_{\rm ex}$ for $t_{\rm ex}$ | C 6 mA | < 3 mA |
| retaing time $t_{\rm æ}$ for $J_{\rm dn}$ < 180 ms $J_{\rm dn}$ < 70 ms $J_{\rm dn}$ < 20 ms $J_{\rm dn}$ < 180 ms $J_{\rm dn}$ < 20 ms $J_{\rm dn}$ < 21 ms $J_{\rm dn}$ < 22 ms $J_{\rm dn}$ < 22 ms $J_{\rm dn}$ < 23 ms $J_{\rm dn}$ < 24 ms $J_{\rm dn}$ < 25 ms $J_{\rm dn}$ < 26 ms $J_{\rm dn}$ < 27 ms $J_{\rm dn}$ < 28 ms $J_{\rm dn}$ < 29 ms $J_{\rm dn}$ < 20 ms J | | : := :::: |
| √An < 180 ms | | < 22 mA |
| An < 70 ms An < 20 ms **uts and operation** **t button | | . 100 |
| I button on front side internal/external le lenght Test/Err, GND o10 m external device function green alarm channel 1 yellow | 5.11 | |
| t button on front side t internal/external le lenght Test/Err, GND 010 m nsformer connection external device function green alarm channel 1 yellow | x / _{Δn} | |
| t button on front side t internal/external le lenght Test/Err, GND 010 m nsformer connection external device function green alarm channel 1 yellow | | ₹ 20 III3 |
| t internal/external le lenght Test/Err, GND 010 m nsformer connection external device function green alarm channel 1 yellow | · · · · · · · · · · · · · · · · · · · | |
| le lenght Test/Err, GND 010 m nsformer connection external device function green alarm channel 1 yellow | est button | on front side |
| nsformer connection external device function green alarm channel 1 yellow | est CND | |
| device function green alarm channel 1 yellow | - | |
| alarm channel 1 yellow | | |
| 7 | | |
| yellow | | |
| | EV AIAIIII CIIAIIIIEI Z | yellow |

| Switching elements | |
|---|---|
| Alarm relay K1, K2 | $I_{\Delta n}$ DC $>$ 6 mA; |
| | $I_{\Delta n}$ AC/DC \geq 30 mA (rms) |
| Contact elements | 2 x 1 N/O contacts |
| Operating principle | N/C operation |
| Electrical service life | 10,000 switching cycles |
| Contact data to IEC 60947-5-1 | |
| Utilisation category | AC-14/DC-13 |
| Rated operational voltage | 250 V |
| Rated operational current | 5 A |
| Minimum contact rating | 1 mA at AC/DC \geq 10 V |
| Environment/EMC | |
| EMC | IEC 61543 |
| Operating temperature | -25+75 ℃ |
| Climatic class acc. to IEC 60721 | |
| Stationary use (IEC 60271-3-3) | 3K5 |
| Transport (IEC 60721-3-2) | 2K5 |
| Long-time storage (IEC 60721-3-1) | 1K4 |
| Classification of mechanical conditions IEC 60271 | |
| Stationary use (IEC 60721-3-3) 3M4 (excep | t condensation and formation of ice) |
| Transport (IEC 60721-3-2) | 2M3 |
| Long-time storage (IEC 60271-3-1) | 1M3 |
| Connection | |
| Connection type | push-wire terminal |
| Connection properties | · |
| rigid | 0.22.5 mm ² (AWG 2414) |
| flexible without ferrule | 0.752.5 mm ² (AWG 1914) |
| flexible with ferrule | 0.21.5 mm ² (AWG 2416) |
| Stripping length | 10 mm |
| Opening force | 50 N |
| Test opening, diameter | 2.1 mm |
| Other | |
| Operating mode | continuous operation |
| Degree of protection | IP 30 |
| Degree of protection terminals | IP 20 |
| DIN rail mounting | IEC 60715 |
| Screw mounting | 2 x M4 with mounting clip |
| Measuring current transformers | |
| Diameter cable gland residual current transformer | 15 mm |
| Cable length | 1.5 m |
| Mounting | with cable ties |
| Connection type | connector |
| Connection to the main device | connector with 6 poles |
| Mary Israel summent | 222 1 (4 6 |

Max. load current



Bender GmbH & Co. KG

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3 x 32 A (4 x 6 mm²)