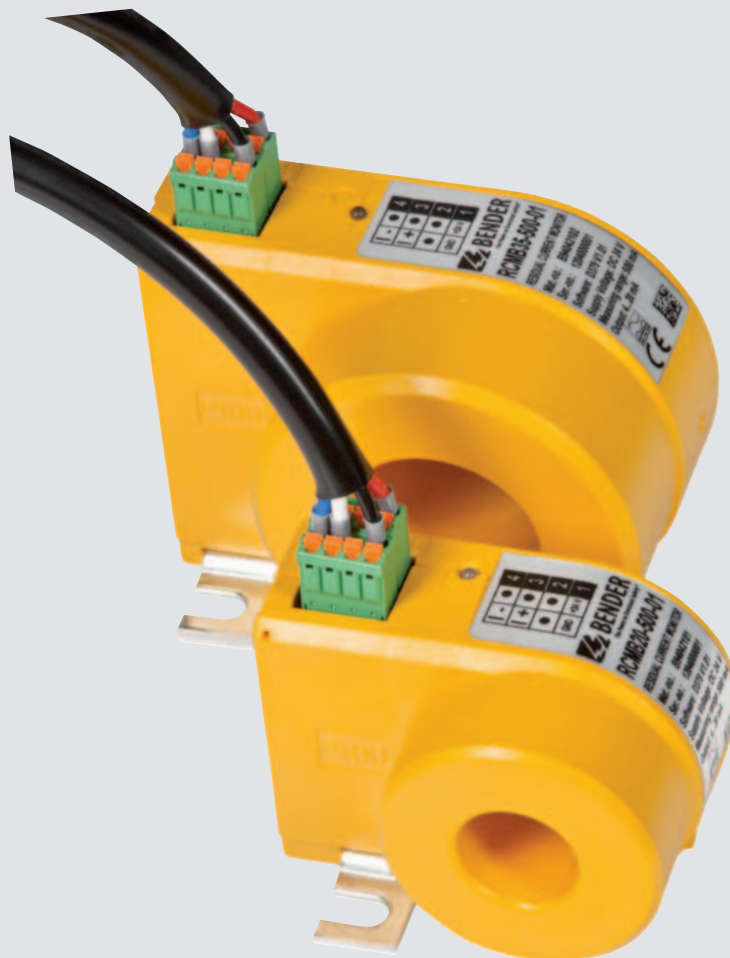


Residual current monitoring module RCMB20 / RCMB35-500-01



Residual current monitoring module

RCMB20 / RCMB35-500-01



RCMB20 / RCMB35-500-01

Device features

- AC/DC sensitive measured value acquisition
- Frequency range 0...500 Hz
- Measuring current transformer, inside diameter 20 mm / 35 mm
- Measuring range 500 mA
- Measuring time \leq 180 ms
- Supply voltage DC 24 V
- Analogue output current DC 4...20 mA
- Insensitive to load currents due to magnetic screen
- CT connection monitoring using cyclical test current
- Multicolour LED for operation and fault message display

Approvals



Product description

The AC/DC sensitive residual current monitoring modules RCMB20-500-01 and RCMB35-500-01 are used for fault current monitoring in systems with frequency converters where direct and / or alternating fault currents are likely to occur.

Each module has to be installed and connected in the cable connection compartment in front of the mains input of the frequency converter.

Both variants of the modules provide an output signal 4...20 mA proportional to the residual current.

Functional description

After switching the supply voltage on, the multi-colour LED shows a green light and the residual current monitoring module carries out a self test.

The residual current monitoring module measures both AC and DC currents. The r.m.s. value is calculated by summing up the DC components included in the residual current and the AC components that are below 500 Hz. A current signal of 4...20 mA in proportion to the r.m.s value is provided at the module output. The analogue value is updated at the latest every 20 ms.

Every two seconds, the residual current monitoring module cyclically tests the connection to the measuring current transformer and the correct functioning of the AC and DC measurement. In addition, the supply voltage is monitored continuously. If a fault occurs, the multi-colour LED flashes red and the analogue DC output current is 20 mA.

Ordering details

Type	Supply voltage U_s	Inside diameter	Art. NO.
RCMB20-500-01	DC 20,4...28,8 V*	\varnothing 20 mm	B 9404 2103
RCMB35-500-01	DC 20,4...28,8 V	\varnothing 35 mm	B 9404 2104

* Absolute values of the voltage ranges

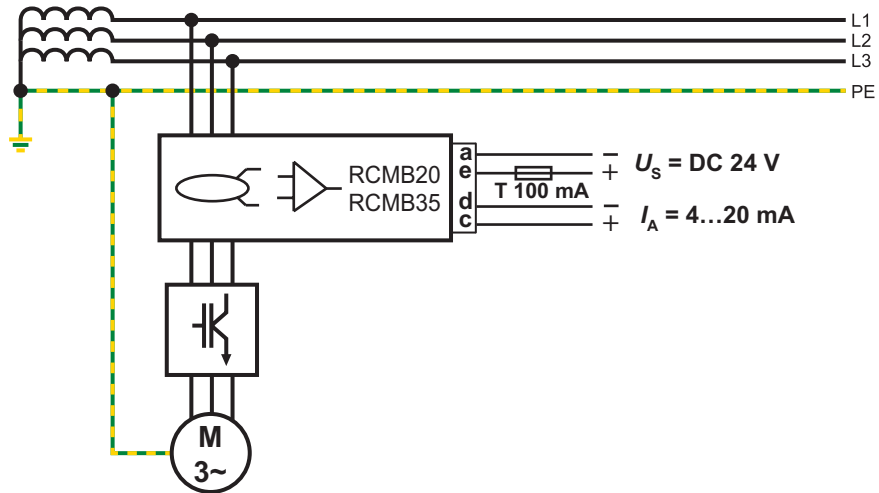
Accessories

The connecting kit included in the scope of supply comprises the following individual components:

Standard Accessory	Dimension	Piece
RCMB20-500-01:		
Single conductor with integrally moulded ferrule (black, white, red, blue)	45 cm	4
PVC insulating tube	45 cm	1
RCMB35-500-01:		
Single conductor with integrally moulded ferrule (black, white, red, blue)	80 cm	4
PVC insulating tube	80 cm	1
RCMB20-500-01, RCMB35-500-01:		
Push-wire plug, 4-pole, coded	–	2
Assembly bracket for current transformer	–	1
Ferrule (mm ² x mm)	0,5 x 6	4
wire strap (mm x mm)	100 x 2,5	2
Lens head screw	M6 x 12	2
Spring washer	M6	2

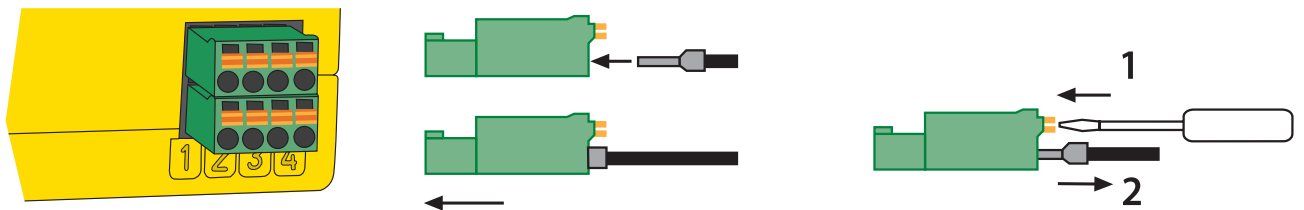
Wiring diagram

Connect the residual current monitoring module according to the wiring diagram. The output current in proportion to the residual current I_A must be made available to the frequency converter.



Connection

Position of the terminals, connecting and disconnecting of the conductors



Wiring the plug-in terminal XK1

Socket coding	Pluggable push-wire terminal	Terminal	Color	RCMB20 / RCMB35
		a	black	GND (U_S)
		b	–	–
		c	white	DC 4...20 mA
		d	blue	GND (DC 4...20 mA)
		e	red	+24 V (U_S)
		f	–	–
		g	–	–
		h	–	–

Technical data

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

Rated insulation voltage	AC 800 V
Rated impulse voltage/pollution degree	12 kV / 2
Overvoltage category	CAT III
Protective separation (reinforced insulation) between primary conductor and the measurement electronics	
Voltage tests according to IEC 61010-1	6.88 kV

Supply voltage

Supply voltage U_S	DC 24 V
Operating range of U_S	20.4...28.8 V
Ripple U_S	$\leq 1\%$
Power consumption	≤ 2.5 VA

Measuring circuit

Measuring current transformers RCMB20 / RCMB35, inside diameter	20 mm / 35 mm
Rated insulation voltage (measuring current transformer)	800 V
Operating characteristics according to IEC 62020 and IEC/TR 60755	AC/DC sensitive, Type B
Rated frequency	0...500 Hz
Measuring range $I_{\Delta n}$ AC/DC	AC/DC 0...500 mA
Nominal current at 3 N AC (RCMB20 / RCMB35)	≤ 32 A / 80 A
Relative uncertainty for DC	$\pm 4\%$ *
Relative uncertainty for 10...30 Hz	+3 %...-15 % *
Relative uncertainty for 30...400 Hz	$\pm 3\%$ *
Relative uncertainty for 400...500 Hz	$\pm 10\%$ *
Resolution measuring circuit	2 mA
Test winding	yes

Time response

Response delay t_{on}	0 s
Delay on release t_{off} (if outside the measurement range)	≤ 1 s
Operating time t_{ae} at I_{Δ}	≤ 180 ms
Response time t_{an}	$= t_{ae} + t_{on}$
Recovery time t_b	≤ 1 s
Displays	
LED constantly illuminated in green = operation indicator	
flashes red = fault (output current > 20 mA)	

Outputs

Current output, proportional to the residual current	DC 4...20 mA
Current output, resolution	$I_{\Delta n} = 31.25 \times (\text{analogue output current} - 4 \text{ mA})$
Load	$\leq 300 \Omega$

Environment / EMC

EMC	IEC 60947-2
Operating temperature	25...70 °C

For UL application:

Max. surrounding air temperature	70 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Long-term storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M3
Storage (IEC 60721-3-1)	1M3
Chemical stresses acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3C4

Connection

Primary conductor:	
RCMB20	$\leq 4 \times 6 \text{ mm}^2$ or $3 \times 10 \text{ mm}^2$
RCMB35	$\leq 4 \times 35 \text{ mm}^2$ or $3 \times 50 \text{ mm}^2$
Connector XK1:	
Connection type	pluggable push-wire terminals 2 x four-pole

For UL application:

Use min. 60 °C / 75 °C copper conductors only!

Connection properties

Rigid	0.2...2.5 mm ² (AWG 24...14)
Flexible without ferrules	0.2...2.5 mm ² (AWG 24...14)
Flexible with ferrules	0.2...1.5 mm ² (AWG 24...16)
Stripping length	10 mm
Opening force	50 N

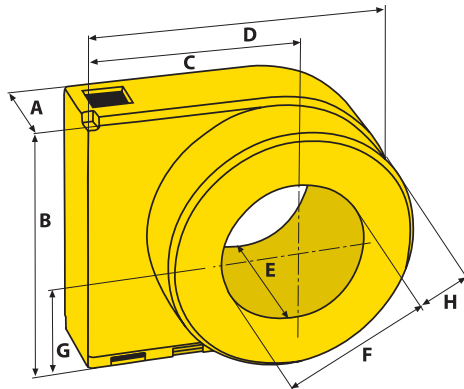
General data

Operating mode	continuous operation
Position	any position
Degree of protection, internal components (DIN EN 60529)	IP40
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonate
Flammability class	UL94 V-0
Screw mounting	M5 with mounting brackets
DIN rail mounting acc. to	IEC 60715
Software version RCMB20-500-01	D378V1.0
Software version RCMB35-500-01	D379 V1.0
Weight RCMB20	200 g
Weight RCMB35	250 g

* of upper range value

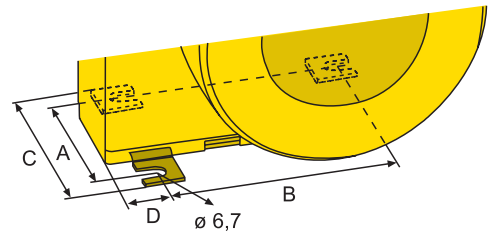
Dimension diagram

Dimensions in mm



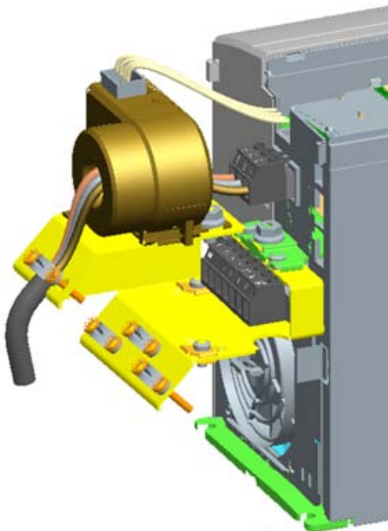
Dimensions								
Type	A	B	C	D	E	F	G	H
RCMB20	30	56.3	50	76.4	48.5	∅ 20	29.8	16.4
RCMB35	30	79.2	62	99.5	55	∅ 35	41.7	20

Screw mounting



Dimensions screw mounting				
Typ	A	B	C	D
RCMB20 (mounting with 2 mounting brackets diagonal)	47	29	63	20.35
RCMB35 (mounting with 2 mounting brackets diagonal)	47	48.5	63	12.85

Installation examples





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