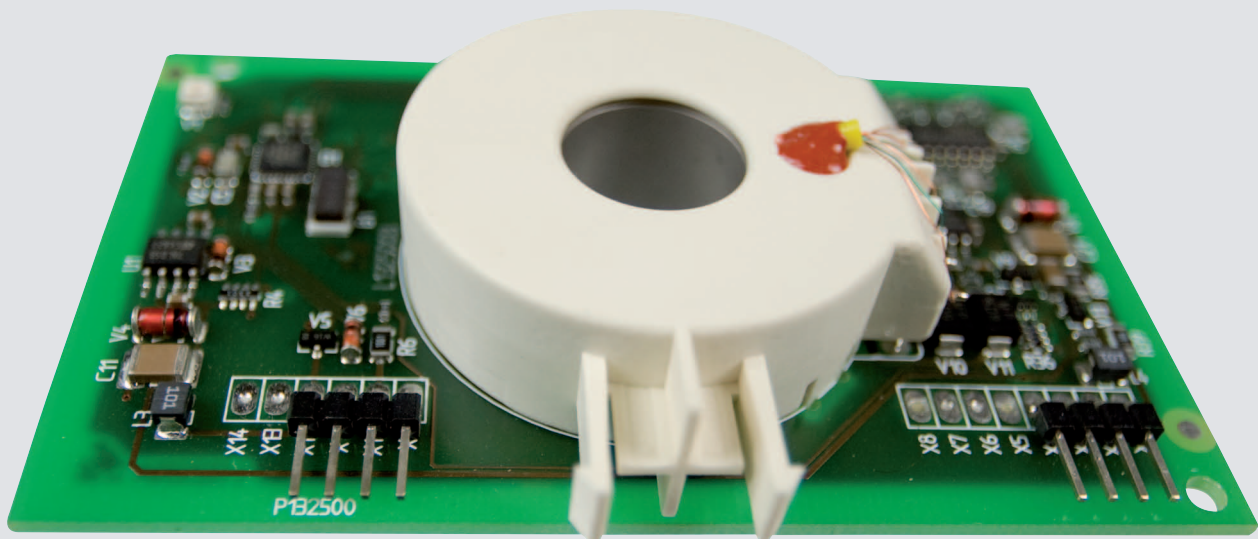


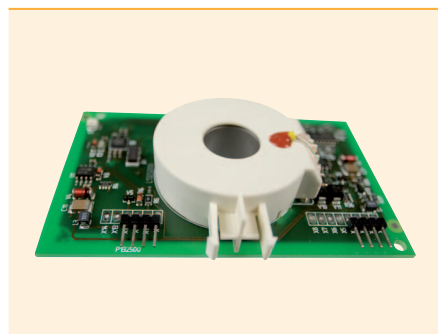
# AC/DC sensitive residual current monitoring module RCMB103

for installation into electric vehicle charging stations



## RCMB103

### AC/DC sensitive residual current monitoring module for installation into electric vehicle charging stations



RCMB103

#### Device features

- Suitable for electric vehicle charging stations
- AC/DC sensitive measured value acquisition 0...500 Hz
- Disconnection when the DC component of the residual current reaches a preset value
- Internal measuring current transformer with test winding and screening for electrical interference field reduction, inside diameter 15 mm
- Measuring range 0...6 mA, with analogue output voltage
- Switching signal at the output according to IEC 62752, tab. 2b
- Latch locks at the measuring current transformer allow easy installation of the module
- Monitoring of the connection to the measuring current transformer
- Reset via control input X10

#### Product description

The AC/DC sensitive residual current monitoring module is suitable for fault current monitoring in charging stations where direct and/or alternating fault currents are likely to occur the value of which is constantly greater than zero.

#### Function

The residual current monitoring module detects the residual current caused by leakage and residual currents in the conductors passed through the measuring current transformer. The residual current monitoring module measures AC and DC currents. Disconnection when the DC component of the residual current reaches a preset value.

A signal in proportion to the DC component is available at the analogue voltage output X1. The second output (X12) provides a switching signal when values are outside the permissible measuring range or in case of high or soaring residual currents.

The control input (X10) will also be queried. Depending on the sequence of the HIGH/LOW levels applied, the RCMB103 can be reset with or without a self test, calibration and activation of the test winding (test current supply).

#### Ordering information

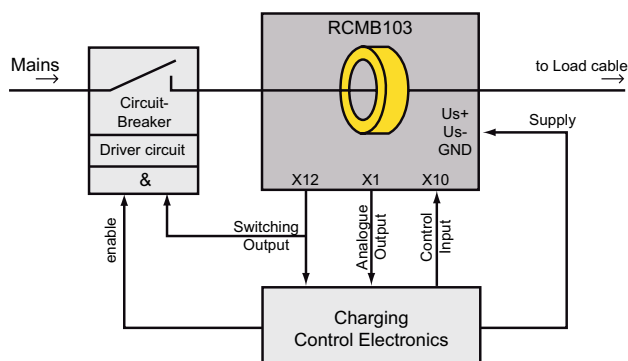
Measuring range	Frequency range	Type	Art. No.
0...6 mA DC	0...500 Hz	RCMB103	B 9404 2105

**Example applications**

**1. The circuit-breaker is controlled by the charging control electronics and the switching output X12**

The switching output X12 uses the circuit-breaker as a signalling device which is controlled by the charging control electronics software.

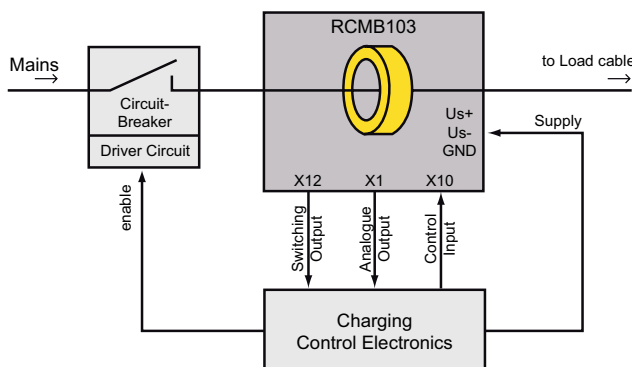
The switching output X12 and the analogue output X1 are monitored by the charging system to ensure that the outputs always provide consistent information. Furthermore, it is checked that the behaviour after a test triggered by control input X10 is correct.



**2. The circuit-breaker is controlled by the charging control electronics**

The circuit-breaker is controlled by the charging control electronics software.

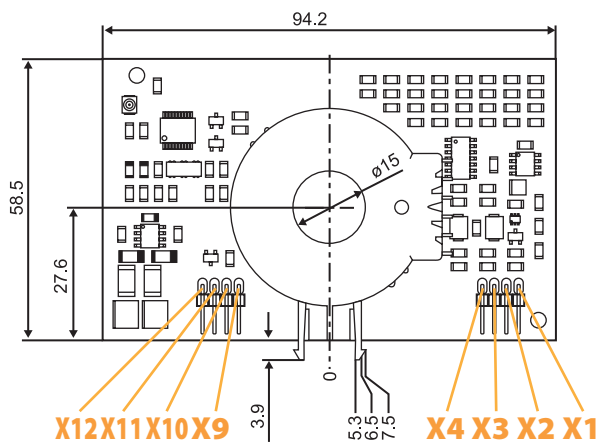
The switching output X12 and the analogue output X1 are monitored by the charging system to ensure that the outputs always provide consistent information. Furthermore, it is checked that the behaviour after a test triggered by control input X10 is correct.



**Connection assignment and Dimension diagrams**

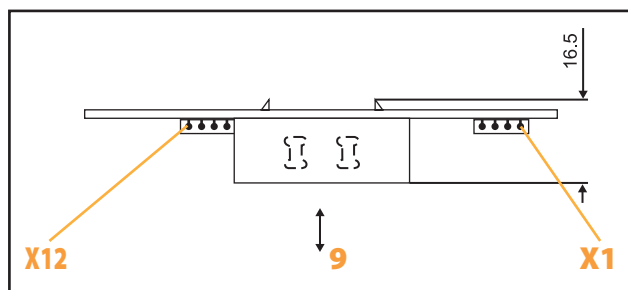
Dimensions in mm

**Bender p.c.b. RCMB103 of 1.5 mm thickness**

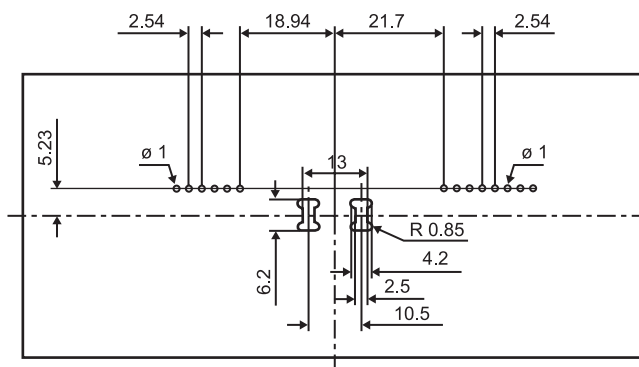


- X1 - Analogue voltage output
- X2 -  $-U_s$ : Voltage supply -12 V via current limiting or 100 mA fuse recommended
- X3 - GND: ground
- X4 - not connected
- X9 - GND: ground
- X10 - Control input: 0...5 V
- X11 -  $+U_s$ : Voltage supply +12 V via current limiting or 100 mA fuse recommended
- X12 - Switching output/alarm output (transistor, open collector)
- 9 - Working space to unlatch the p.c.b.

**Bender p.c.b. on a base plate**



**Base plate of 1.7 mm thickness, tolerance: + 0.1/- 0 mm**



## Technical data

### Voltage supply

+U <sub>S</sub> (X11)	12 V (± 1 V)
-U <sub>S</sub> (X2)	-12 V (± 1 V)
Ripple U <sub>S</sub>	≤ 100 mV
Power consumption	≤ 1 W

### Measuring circuit

Operating characteristic acc. to	IEC 62752, tab. 2b
Frequency range	0...500 Hz
Measuring range	0...6 mA DC
Relative uncertainty	±25 %
Max. nominal current	50 A/45...65 Hz

### Response value

Rated residual operating current I <sub>Δn</sub>	6 mA
--	------

### Inputs

Control input X10:	
HIGH level	4.5...5.5 V
LOW level	0...0.5 V

### Outputs

Output voltage range	DC 0.15...4.85 V
Sensitivity analogue output	1 V/2 mA
Tolerance at 1.5...6 mA	±25 %
Tolerance at 0.15 V	+50/- 0 mV
Tolerance at 4.85 V	-150/+ 50 mV
Output resistance at the measurement output X1	1 kΩ (short-circuit proof)
Switching behaviour switching output X12 (Open Collector)	
LOW:	values within the permissible measuring range
HIGH:	values outside the permissible measuring range
Max. switching voltage X12	+ 24 V
Max. switching current X12	DC 10 mA

### Test winding

Output voltage at X1 with a test current of 10 mA after 200 ms	4.85 V
Output voltage at X1 with a test current of 3,5 mA	≥ 1.1 V

### Time response

Operating time t <sub>ae</sub> at X12 for I <sub>Δn</sub>	< 480ms
Recovery time t <sub>b</sub>	≤ 2s

### Environmental conditions

Without solar radiation, precipitation, water, icing. Condensation possible temporarily:	
Classification of climatic conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3K5
Transport (IEC 60721-3-2)	2K3
Long-time storage (IEC 60721-3-1)	1K4
Classification of mechanical conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3M6
Transport (IEC 60721-3-2)	2M2
Storage (IEC 60721-3-1)	1M3
Deviation from the classification of climatic conditions:	
Ambient temperature, during operation	-25...+80 °C
Ambient temperature, during transport	-40...+80 °C
Ambient temperature, during long-time storage	-25...+80 °C
Relative humidity	10...90 %
Air pressure	70...106 kPa

### Connection

Plug-in connectors for PCBs, single-row	0.65 x 0.65 mm
Possible counterpiece for plug-in connector	Samtec: BCS-104-L-S-TE 3M: 960104-6202-AR
Modular dimensions	2.54 mm

### Other

Operating mode	continuous operation
Position of normal use	any
Software version	D396 V1
Weight	≤ 65 g



## Bender GmbH & Co. KG

P.O. Box 1161 • 35301 Grünberg • Germany  
Londorfer Straße 65 • 35305 Grünberg • Germany  
Tel.: +49 6401 807-0 • Fax: +49 6401 807-259  
E-Mail: info@bender-de.com • www.bender-emobility.com

**BENDER Group**