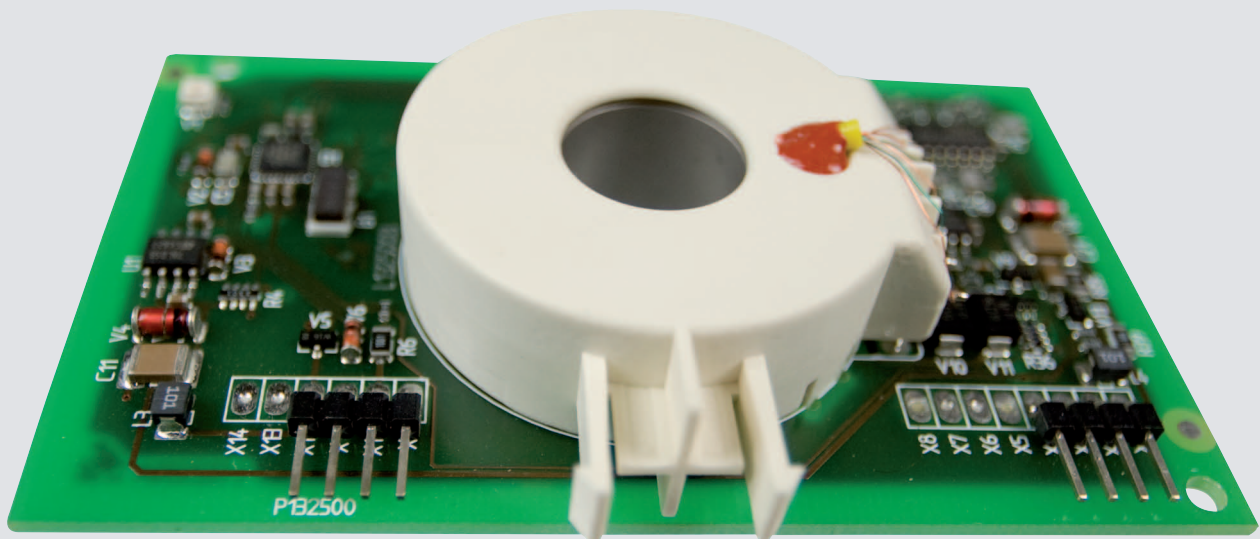
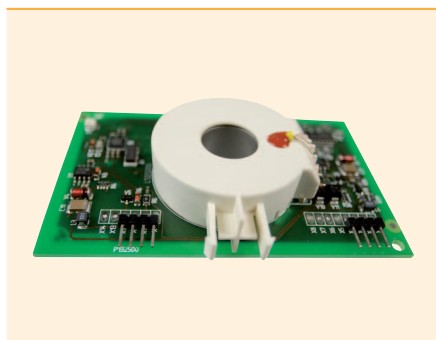


AC/DC sensitive Residual current monitoring module RCMB101





RCMB101

Device features

- AC/DC sensitive residual current monitoring module
- r.m.s. value measurement (AC+DC)
- Frequency range 0...500 Hz
- CT connection monitoring
- Completely shielded residual current transformer
- Mechanical locking on the baseplate
- RoHS-compliant

Approvals

ANSI/UL 1998



- * File # E193871, UL 2231-2, "Standard for personnel protection systems for electric vehicle (EV) supply circuits: Particular requirements for protection devices for use in charging systems"

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. In combination with an external relay it is able to fulfill the requirement of UL 2231-2 for CCID20 protection devices for use in electric vehicle charging stations.

Function

Residual current monitoring is carried out using an internal measuring current transformer. 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 the cut-off frequency. A signal in proportion to the residual current is available at the module analog output (X1). In addition, values outside the measuring range are signalled by a switching output (X12).

The control input (X10) will also be queried. Depending on the HIGH/LOW sequence, a reset of the RCMB101 will be activated with/without subsequent selftest with calibration and activation of the test winding.

Ordering information

Type	Measuring range	Frequency range	Art. No.
RCMB101	0... 20 mA	0...500 Hz	B 9404 2098

Technical data
Voltage supply

$U_S + (X11)$	+ 12 V (\pm 1 V)
$U_S - (X2)$	-12 V (\pm 1 V)
Ripple at U_S	\leq 100 mV
Power consumption	\leq 1 W

Measuring circuit

Operating characteristic acc. to IEC 60755	UL2231 and IEC 60755 Type B
Frequency range	0...500 Hz
Measuring range	0...50 mA
Relative uncertainty	0...-25 %
Max. nominal current	50 A/45...65 Hz

Response value

Rated residual operating current $I_{\Delta n}$	20 mA
Detection circuit acc. to UL2231	CCID 20

Inputs

Control input X10:	
High level	4.5...5.5 V
Low level	0...0.5 V

Outputs

Output voltage range	DC 0.15 V...4.85 V
Sensitivity analogue output	1 V/10 mA
Tolerance at 1.5...10 mA	0...-20 %/ \pm 1 mA
Tolerance at 10...50 mA	0...-20 %
Tolerance at 0.15 V	+50/- 0 mV
Tolerance at 4.85 V	-150/+ 50 mV
Output resistance at the measurement output X1	1 k Ω (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 22.4 mA after 800 ms	4.85 V
Output voltage at X1 with a test current of 11 mA/400 Hz	\geq 1.1 V

Specified time

Operating time on X12 tae for $I_{\Delta n}$	$<$ 990 ms
Operating time for choosen relay under nominal load	\leq 10 ms
Recovery time t_b	\leq 2 s

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
Long-time 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

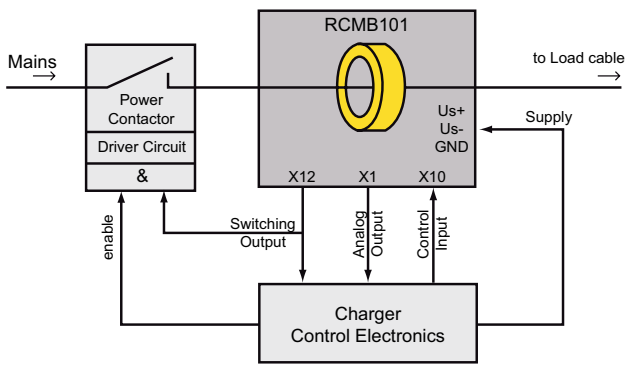
PCB plug connectors, single-row	0.65 x 0.65 mm
Possible counter piece for plug-in connector	Samtec: BCS-104-L-S-TE or 3M: 960104-6202-AR
Contact spacing	2.54 mm

Other

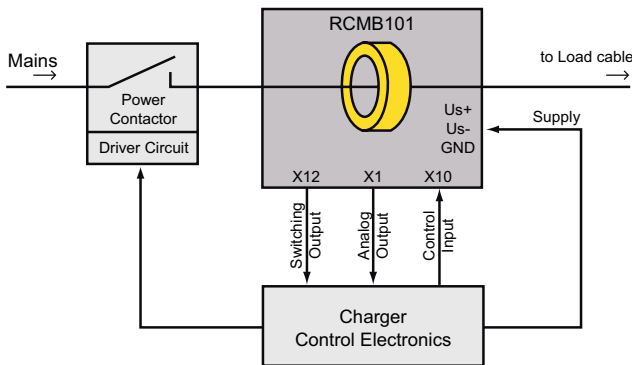
Operating mode	continuous operation
Position of normal use	any
Software version	D359 V2
Weight	\leq 65 g

Application information

- Switching output X12 is used as hardware enable signal for the power contactor. Contactor is controlled by charger electronics software. Switching output X12 and analog output X1 are monitored by charger to verify that X1 and X12 show consistent information and that the behaviour after a test (initiated with X10) is correct.



- Contactor controlled by charger electronics software. Switching output X12 and analog output X1 are monitored by charger to verify that X1 and X12 show consistent information and that the behaviour after a test (initiated with X10) is correct.



Important Note: Make sure to select a contactor and a driver circuit with a release time of less than 10 ms under nominal load condition of the charger.



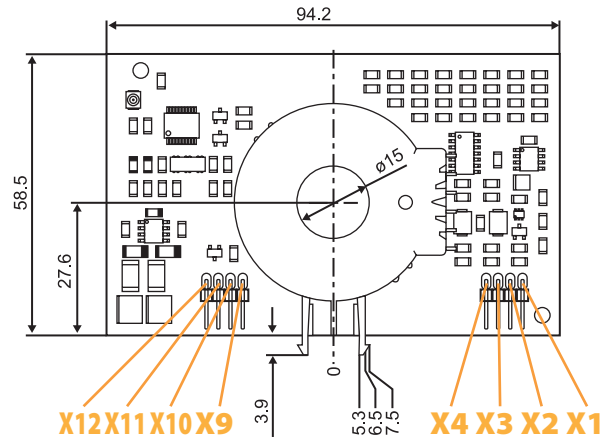
Bender GmbH & Co. KG

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

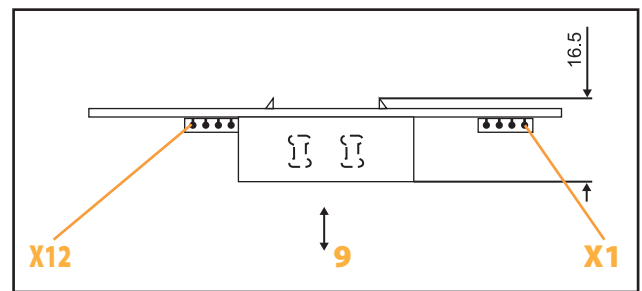
Dimension diagram

Dimensions in mm

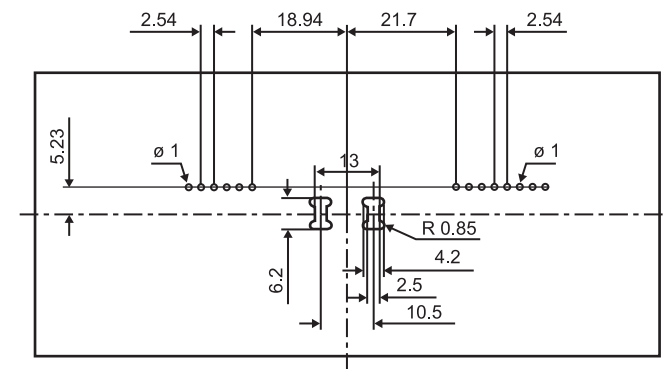
Bender p.c.b. RCMB101 of 1.5 mm thickness



Bender p.c.b. on a base plate



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



- X1 - M Analogue voltage output
- X2 - U2 - U_S Voltage supply -12 V via fuse 100 mA (recommended)
- X3 - GND Ground
- X4 - not connected
- X9 - GND Ground
- X10 - Control input 0...5 V
- X11 - U1 + U_S voltage supply +12 V via fuse 100 mA (recommended)
- X12 - Switching output/alarm output (transistor, open collector)
- 9 - Working space to unlatch the p.c.b.