BENDER
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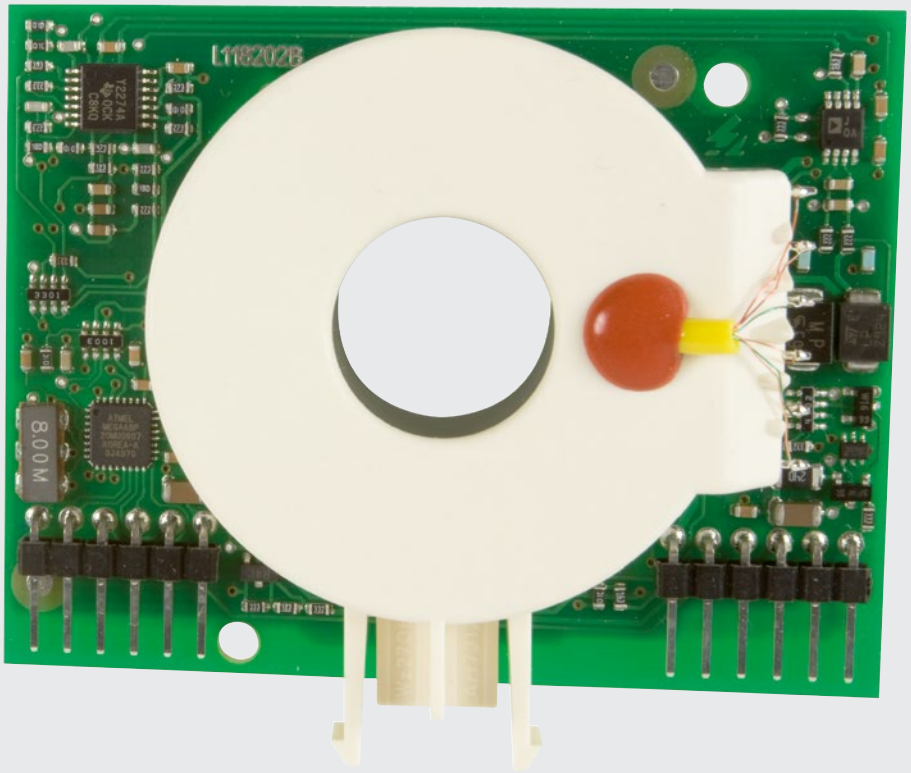
AC/DC sensitive
Residual current monitoring module
RCMA126P1-S

for installation into photovoltaic converters



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RCMA126P1-S

AC/DC sensitive residual current monitoring module

RCMA126P1-S

Device features

- AC/DC sensitive residual current monitoring module Type B
- r.m.s. value measurement (AC + DC)
- Frequency range 0…500 Hz
- CT connection monitoring

Approvals

Product description

The AC/DC sensitive residual current monitoring module RCMA126P1-S is suitable for fault current monitoring in transformerless photovoltaic inverters where direct and/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 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 PWM signal in proportion to the residual current is available at the module output (X1). If values are outside the permissible measuring range, the signal will be available for 1 s after disconnection. The PWM frequency is 8 kHz.

The measuring range 0…30/100 mA equates to 3…97 % PWM. Measured values < 3 % and > 97 % signal that the residual current monitoring module is inactive resp. defective. The residual current monitoring module is operated as a slave on a SPI interface. The master is a controller incorporated in the inverter. The measuring range can be changed via the interface. In addition, the software version and the statuses can be queried and a functional test can be carried out.

The monitoring module can be tested via the test winding at the module output (X11) using an actual fault current (X11). For this purpose, a voltage of + 3.3 V is applied at the connection k of the test winding. Connection l of the test winding is connected to the module output X11.

Technical data

Voltage supply

U1	+ 15 V (± 5 %)
U2	+ 5 V (+ 12 %/- 5 %)
U3	- 5 V (+ 12 %/- 5 %)
U4	+ 3.3 V (+ 10 %/- 5 %)
Ripple max.	60 mV
Power consumption	≤ 0.5

Measuring circuit

Operating characteristic acc. to IEC 60755	Type B
Frequency range	0…500 Hz
Measuring range	0…30/100 mA
Relative uncertainty	+ 0…- 20 %
Max. nominal current	50 A/50…60 Hz

Outputs

PWM frequency	8 kHz
Tolerance of PWM frequency	± 1 %
Sensitivity measured value output:	
Measuring range 0…100 mA	100 mA/97 %
Measuring range 0…30 mA	30 mA/97 %
Resolution of setting	
100 mA range	0.76 %
30 mA range	0.76 %
Interface	SPI
Clock frequency	200 kHz

Time response

Changes in residual current I_Δ = 30 mA (output X1)	≤ 150 ms
minimum output value after reaching the measuring time: ≥ 30 mA	
Changes in residual current I_Δ= 60 mA (output X1)	≤ 100 ms
minimum output value after reaching the measuring time: ≥ 40 mA	
Changes in residual current I_Δ = 150 mA (output X1)	≤ 20 ms
minimum output value after reaching the measuring time: 100 mA (limit of measuring range)	

Environmental conditions

Classification of mechanical conditions

Operating conditions in acc. with EN 60721-3-3	Class 3M6
Shock resistance	25 g/6 ms
Vibration resistance	2…9 Hz/7 mm, 9…200 Hz/2 g

Environmental conditions

Climatic class acc. to IEC 60721-3-4	4K4H
Ambient temperature, during operation	- 25…+ 80 °C
Ambient temperature, during transport	- 40…+ 80 °C
Rel. humidity	10…90 %, 100 % max. 48 hours
Air pressure	70…106 kPa
Condensation, ice formation	possible temporarily

Connection

Plug-in connectors for PCBs, single-row	0.65 x 0.65 mm
Modular dimensions	2.54 mm

Other

Operating mode	continuous operation
Position of normal use	any
Operating manual	TGH1423
Weight	≤ 55 g

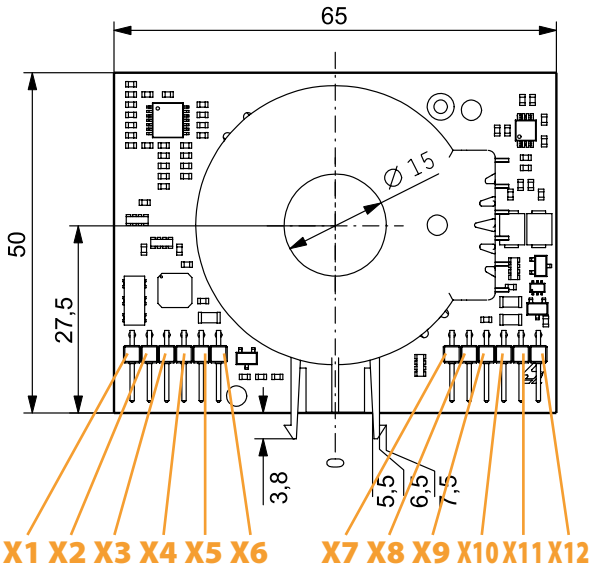
Ordering information

Measuring range	Frequency range	Type	Art. No.
0…30/100 mA	0…500 Hz	RCMA126P1-S	B 9404 2085

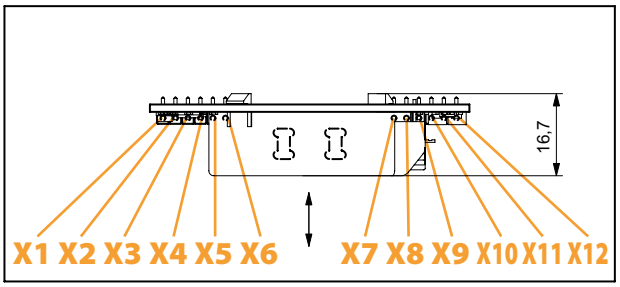
Dimension diagram

Dimensions in mm

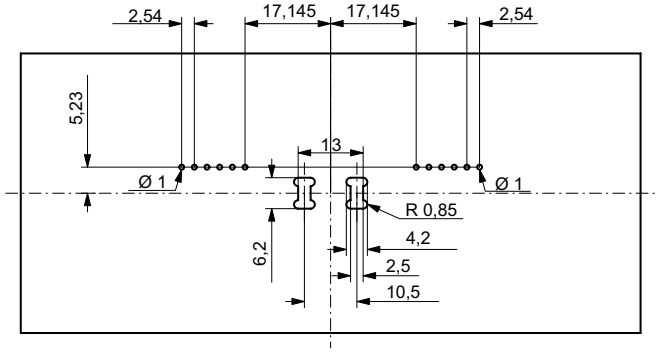
Bender p.c.b. RCMA126P1-S of 1.5 mm thickness



Bender p.c.b. on base plate



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



X1 - PWM (measured value output PWM)
X2 - CS (ChipSelect interface)
X3 - SCK (CLOCK interface)
X4 - MISO (data output interface)
X5 - MOSI (data input interface)
X6 - U4 (voltage supply + 3.3 V)
X7 - U2 (voltage supply + 5 V)
X8 - AGND (ground)
X9 - U3 (voltage supply - 5 V)
X10 - U1 (voltage supply + 15 V)
X11 - T (test winding)
X12 - DGND (ground)

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