

# Current Sensor

## RCM20-03 Series

Residual Current Monitor • Mode 2 • 12-24 V dc



REACH



### Description

The RCM20-03 is a compact, panel-mounted residual current monitor designed to detect ac and dc residual currents in 50 Hz / 60 Hz single-phase and multiphase ac installations. It features a JST connector for streamlined installation and integration.

Optimized for use in Mode 2 Electric Vehicle In-Cable Control and Protection Devices (IC-CPDs), the RCM20-03 ensures safe disconnection of power in the event of a residual current fault.

Compliant with IEC 62752.

### Features & Benefits

FEATURES	BENEFITS
<b>JST XH 2.5 mm Pitch Connector JST:B4B-XH-A (LF)(SN)</b>	Provides easy installation
<b>“Fault” Signal Output</b>	Offloads fault detection from the main control system, simplifying and reducing development time
<b>Large 20 mm ID Aperture</b>	Flexibility to support single or multiphase supply cables

### Applications

- Mode 2 EV Charging Stations

### Ordering Information

CATALOG #	DESCRIPTION
90155	12 to 24 V dc residual current monitor

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### Specifications

<b>Relevant Product Standard</b>	IEC 62752 / 62955
<b>Rated Residual Operating Current (I<math>\Delta</math>n)</b>	6 mA dc / 30 mA ac
<b>Rated Non-operating Residual Current (I<math>\Delta</math>no)</b>	3 mA dc / 15 mA ac
<b>Response Time to residual current fault (time between appearance of fault to output going high)</b>	According to IEC 62752
<b>DC Supply Voltage (V<sub>cc</sub>)</b>	12 to 24 V dc $\pm$ 10%
<b>Test Current limit for 12 – 24 V (Externally applied) Test Current Limits</b>	0.8 mA dc
<b>Fault Signal Output</b>	Active High Open Drain
<b>Drain Current</b>	100 mA maximum
<b>Pull up Voltage</b>	+24 V dc maximum (Derated below -25 °C)
<b>Environmental Operating Conditions Absolute Temperature</b>	-40 °C to +85 °C (Derated below -25 °C)
<b>Weight</b>	45 g
<b>Recommended screw type</b>	M3 x 6 (2 pcs.)
<b>Conditional Residual Short-Circuit Current</b>	10 kA
<b>Surge Current Withstand</b>	3000 A

### Environmental Conditions

PARAMETER	MIN.	TYP.	MAX.	UNIT
Operating temperature	-40	-	85	°C
Storage temperature	-40	-	85	°C
Altitude	-	-	3000	m

### Electrical Specifications

PARAMETER	MIN.	TYP.	MAX.	UNIT
Supply voltage	10.8	12/24	26.4	V
Supply current with no fault current @ 24 V <sup>1</sup>	-	-	2.2	mA
Supply current, peak >200mA DC fault current @ 24 V <sup>1</sup>	-	-	14.5	mA
DC trip threshold	3	-	6	mA
AC trip threshold	15	-	30	mA ac
Fault Out drain current	-	-	100	mA
Fault Out pull up voltage	-	-	26.4	V
Test input current @12 V	-	0.8	-	mA
Rated load current, 1 phase / 3 phase <sup>2</sup>	-	-	100/40	A

<sup>1</sup>Output external pull up current not included.

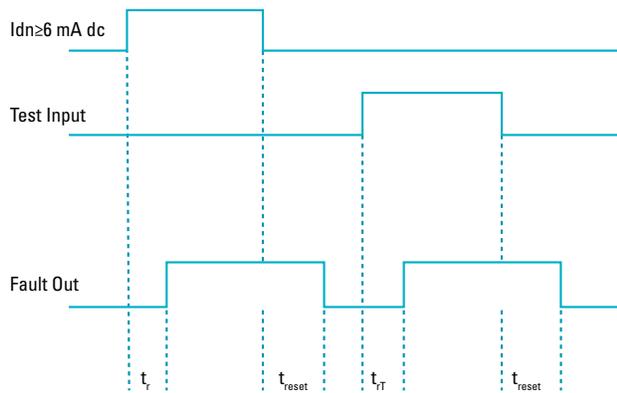
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### Timing Specifications

PARAMETER	MIN.	TYP.	MAX.	UNIT
Fault Out response time @ 6 mA dc $t_{r(6mA)}$	-	-	250	ms
Fault Out reset time <sup>3</sup> $t_{reset}$	-	-	260	ms
Fault Out response time with test) $t_{rT}$	-	-	300	ms
Fault Out reset time with test <sup>3</sup> $t_{resetT}$	-	-	200	ms
Maximum switching time of external switching device including processing time	-	-	20	ms

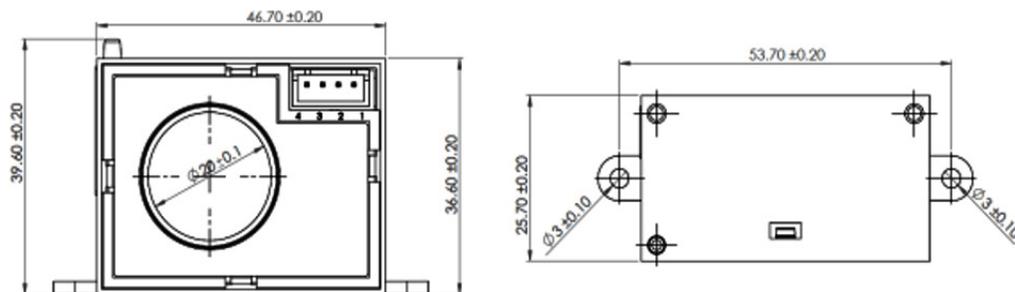
<sup>3</sup>Time taken for Fault out to return from Hi-Z state after fault removed.



### Other

PARAMETER	MIN.	TYP.	MAX.
Overvoltage category		III	
IP Rating		IP20	2600

### Dimensional Drawings (Millimeters)



### Handling Instructions

Care should be taken to ensure the correct connection of the RCM20-03. Miswiring the product may cause permanent damage.

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### Wiring Diagrams

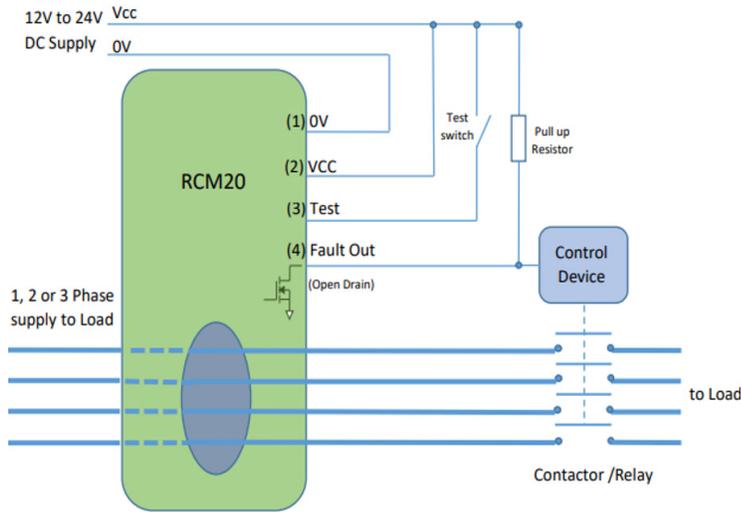


Figure 1. RCM20 Product Connections

PIN NO.	NAME	DESCRIPTION
1	0 V dc	Ground
2	Vcc	<b>Power Supply Input:</b> Positive input voltage 12 V to 24 V dc. Performance may be affected if the supply voltage falls outside this range.
3	External	<b>Test Function:</b> Apply Vcc to this pin to activate the test function. If successful, Pin 4 (Fault Out) goes HIGH. Once Vcc is removed, Fault Out returns LOW. Keep the pin disconnected when not in use. The test input can be triggered manually or by a control device. The switch shown in <b>Figure 1</b> is illustrative only.
4	Fault Signal Output (Active High Open Drain)	Open-drain output requiring an external pull-up resistor to the desired signal level (e.g., Vcc). <b>*LOW State (low impedance):</b> Indicates no fault and test function inactive. <b>*HIGH State (high impedance):</b> Triggered when residual fault current exceeds 6 mA or test function is active. *The pin resets to LOW once the fault is cleared and test is inactive. *To prevent contactor/relay chatter, direct control is not recommended. *Use hardware or software latching in the control system to capture fault signals reliably.

Note:

RCM20 product connector: JST XH 2.5mm Pitch Connector: B4B-XH-A (LF)(SN)

Recommended Mating connector: The mating connector is assembled from a housing and 4 x crimps with suitable wires.

Recommended Mating connector housing: JST XHP-4

Recommended Crimps: JST SXH-001T-P0.6

Pre-crimped wires are also available from JST for ease of assembly.

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### Standards Conformity & Certifications

#### Product Safety Certifications

Products tested, compliant and certified to the following standards that states the requirements for electrical products to ensure they are safe for consumers to use.

CERTIFICATION BODY MARK	CERTIFICATION BODY NAME	CERTIFICATION DESCRIPTION	STANDARDS COVERED BY THE CERTIFICATION
	IEC	Conformity with the European safety, health, and environmental protection requirements for residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicles.	<b>IEC 62955</b>
	IEC	Conformity with requirements for In-Cable Control and Protection Devices (IC-CPDs) used in Mode 2 electric vehicle (EV) charging systems.	<b>IEC 62752</b>

#### Environmental Compliance

Products comply to the following environmental standard requirements for electrical products to ensure they are safe for consumers to use.

-	STANDARD NAME	STANDARD DESCRIPTION	STANDARD NUMBER
	RoHS	Conformity with the European Restriction of Hazardous Substances in electrical and electronic products	European Union RoHS 2 Directive 2011/65/EU
	REACH	Conformity with the Registration, Evaluation, Authorization and Restriction of Chemicals regulation to ensure safe use of chemicals	European Directive 1907/2006

#### Intended Use

The RCM20-03 is designed to be integrated with the appropriate switching device, e.g. relay or contactor, to provide the 6 mA dc and 30 mA ac detection requirements defined by IEC 62752 for use in Mode 2 electric vehicle charging.

No special start-up procedures or calibration is required for the RCM20-03. Once powered the system is ready to detect residual faults to IEC 62752.

#### Related Products

**RCM20-01:** 6 mA dc Detection to IEC 62955, 20 mm CT Aperture

**RCM14-03:** 6 mA dc / 30 mA ac Detection to IEC 62752, 14 mm CT Aperture

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