

Magtron Residual Current Monitoring Unit(RCMU®)  
RCMU101SM1-2EI-K

Update: 2023.02.18 V1.1.2



### Features

- ◆ Self-check function
- ◆ Single Supply +5 V
- ◆ High and low level output
- ◆ Printed circuit board mounting

### Characteristics

- ◆ Stable accuracy
- ◆ Low hysteresis offset voltage
- ◆ Short response time
- ◆ Compact design

### Applications

- ◆ Ground fault detection
- ◆ Converter leakage current detection
- ◆ Electric vehicle charge station
- ◆ IC-CPD
- ◆ Wallbox

### Standards

- ◆ EN50178 IEC60950-1
- ◆ UL1741 UL508 UL94-V0
- ◆ IEC62752 IEC62955
- ◆ IEC61851

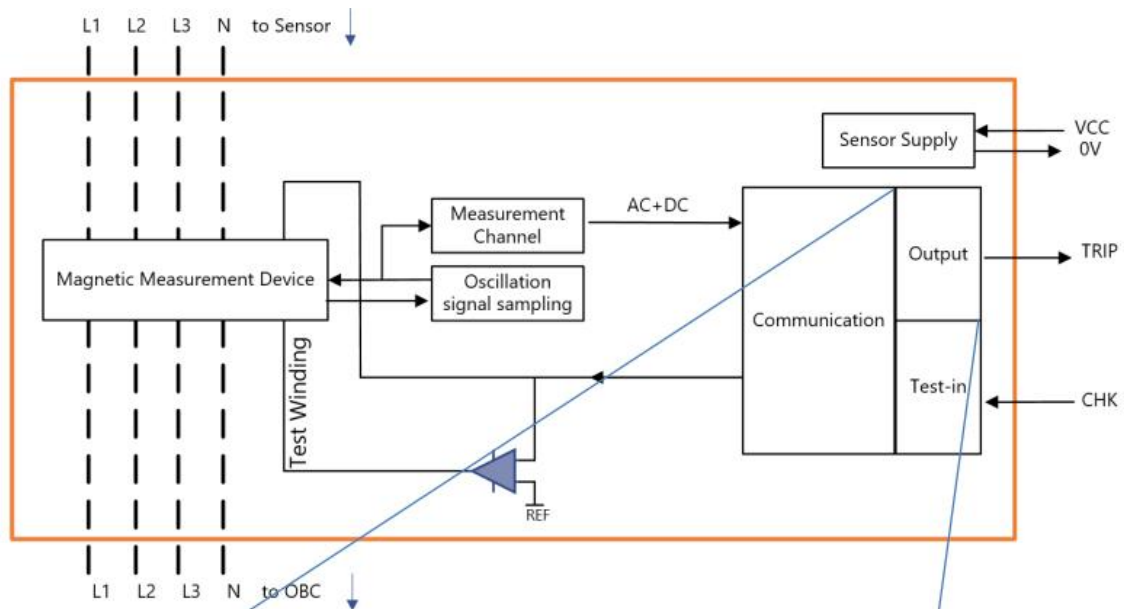
### Overview

An important safety function of these devices is monitor of the leakage current of the entire system from Power modules against earth. A defective system can become dangerous for people or cause fires. Before it comes so far, Power modules must be disconnect from the grid. The leakage current contains DC and AC components. Therefore an AC/DC-sensitive monitoring unit is necessary. The heart of the safety device is the Magtron RCMU®, whose value is evaluated by the control system of Power modules.

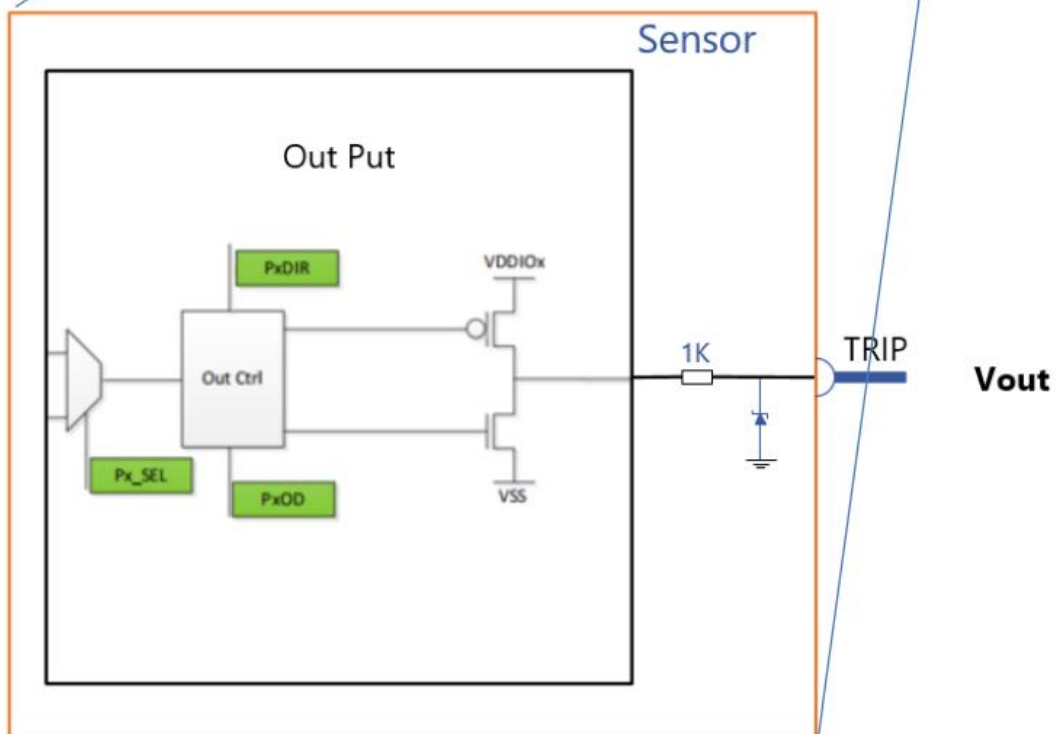
Generally protection devices with AC/DC-sensitive differential current sensors can be used everywhere, where flat or pulsating DC can develop, whose amount is permanently greater than zero.

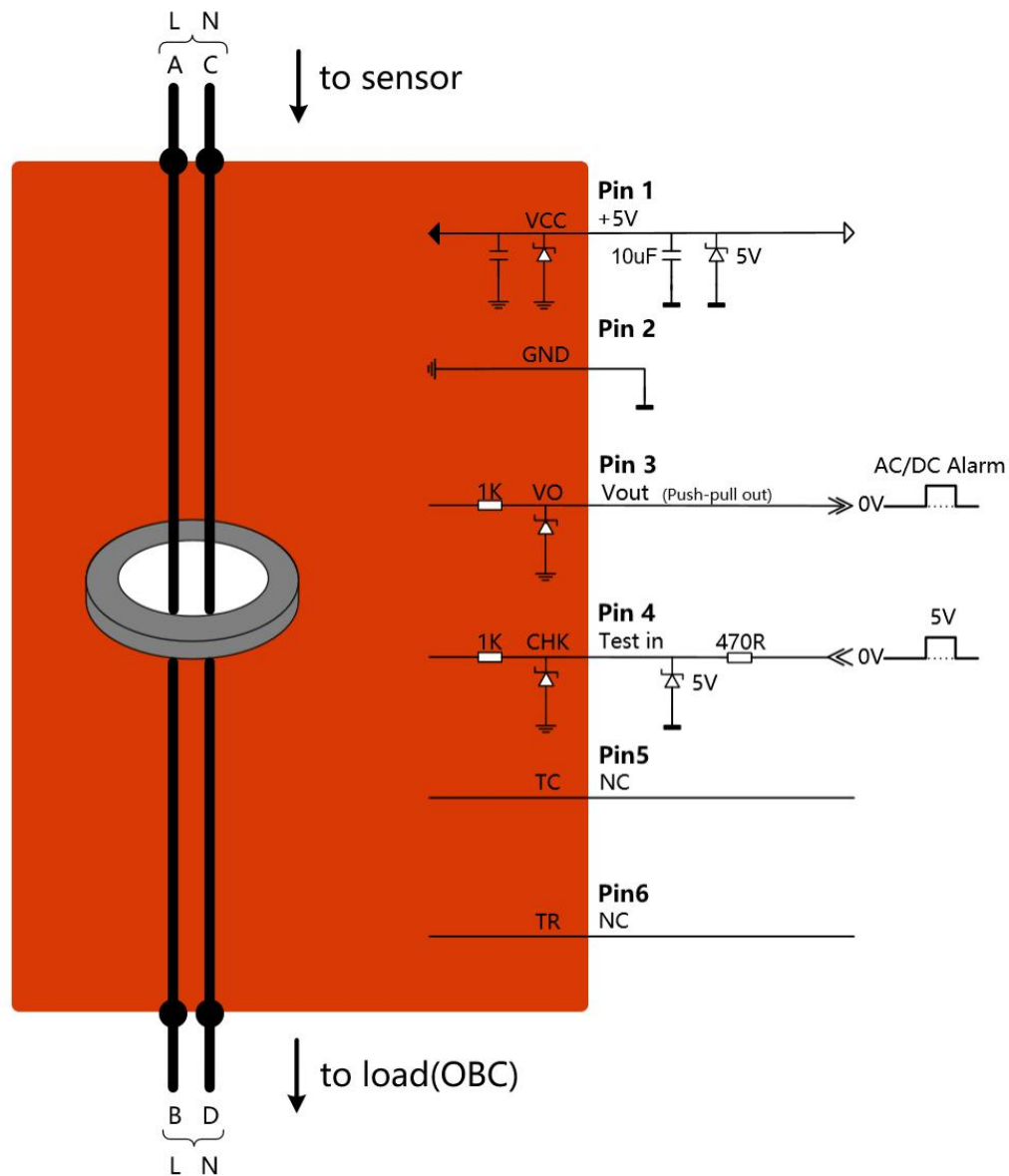
Instruction of installation in a Pollution Degree 2 environment is available on the table below(or equivalent statement).

## Application circuit



Functional block diagram

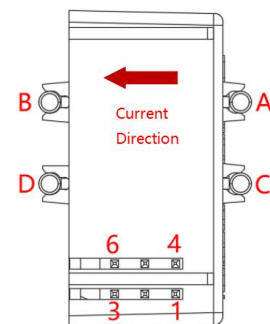




Application circuit

**Pin Definition**

No.	Symbol	Description
1	VCC	Power supply
2	GND	Power GND
3	VO	High and low level output
4	CHK	Product Self-Check input
5	TC	NC-Float
6	TR	NC-Float
A~D	IP	Primary Current



Assembly Pin

### Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage(not operating)	V <sub>CC</sub>			5.5	V
Ambient operating temperature	T <sub>A</sub>	-40		85	°C
Ambient storage temperature	T <sub>A</sub>	-40		105	°C

### High Voltage Characteristics

At Ta=25°C,Vc=5V, RH<70% , unless otherwise noted

Parameter	Symbol	Value	Unit
Voltage for AC/rms insulation test, 50 Hz, 1 min	U <sub>d</sub>	3	kV
Impulse withstand voltage @1.2/50 μs	U <sub>w</sub>	7	kV
Lightning surge current @8/20us	I <sub>LS</sub>	5	kA
System working voltage (rms)	V <sub>s</sub>	300	V
Comparative Tracking Index(Group 2 @UL)	CTI	250-400	V
Clearance (See drawing in page 7)	DCI	5	mm
Creepage distance (See drawing in page 7)	DCP	6	mm
Application example	-	600 , CAT III, PD2	V

### Electrical data

At Ta=25°C,Vc=5V, unless otherwise noted

Parameter	Symbol	Min	Typ	Max	Unit	Comment
Power Supply voltage	V <sub>CC</sub>	4.9	5	5.3	V	
Current consumption	I <sub>c</sub>		25	30	mA	
Output voltage (Check function)	V <sub>(CK)</sub>		V <sub>CC</sub>		V	
Check enable voltage	V <sub>CE</sub>	0.7V <sub>CC</sub>		V <sub>CC</sub>	V	
Check disabled voltage	V <sub>CD</sub>		<0.2		V	
Self-Check current	I <sub>ck</sub>			30	mA	
Power on initialization time	t <sub>on</sub>			60	mS	
Primary nominal RMS current	I <sub>M</sub>		20		A	

### Application information

#### Self-check Function

When the main circuit is not working, the system leakage current is 0, the Vout = Low level ( 0V ).

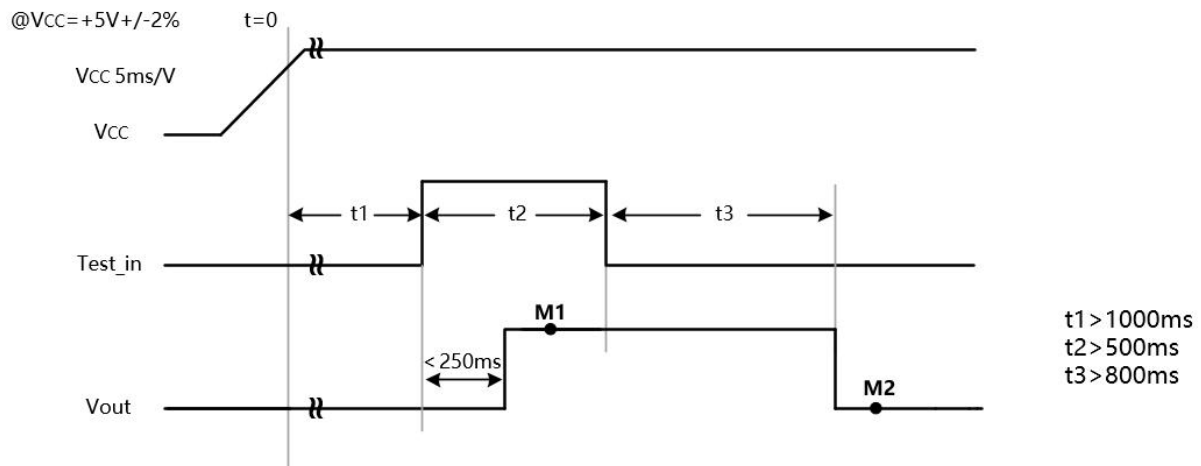
(a) .when the CHK PIN is placed at high level (0.7V<sub>CC</sub>~V<sub>CC</sub>), Vout rises from Low level to high level ( V<sub>CC</sub> );

(b) .when the CHK PIN is placed at low level (< 0.2V), the self-generated the Vout drops to Low level ( 0V ).

When the above (a) and( b) are completed, the leakage current sensor is judged to have normal function.

When the self-check function is not used, add a 0 Ω resistance to the CHK PIN and ground it.

## Self-check Timing Diagram



Self-test mode: voltage enable self-test function

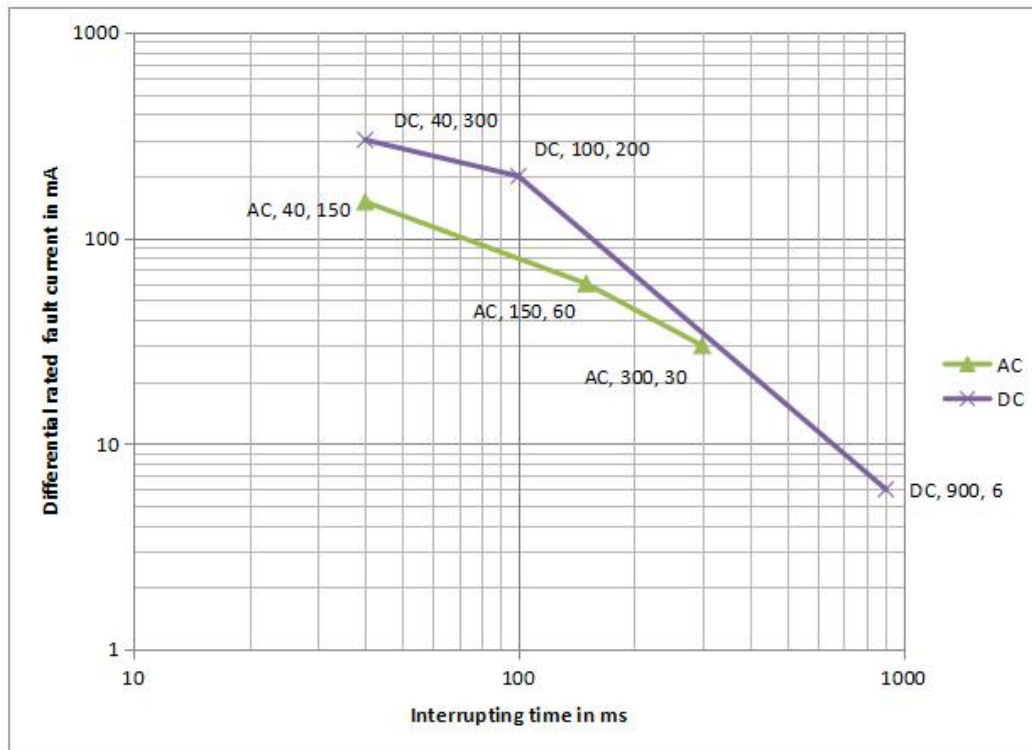
When the CHK pin continuously applies a voltage signal of >0.7VCC, the RCD-Vout pin outputs a high-level signal

When entering the test program, the corresponding test points should be checked within the specified test time

**M1:** Check whether the output state of this test point is set to high level

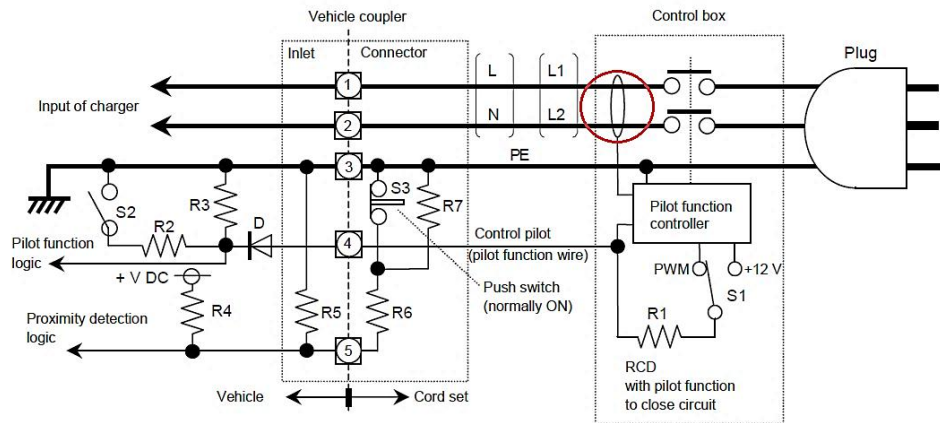
**M2:** Check whether the output state of this test point is set to low level

## Interrupting Time according to IEC62752 & IEC62955



### Example:

### IEC/EN 62752, In-Cable Control and Protection Device for mode 2 charging of electric vehicles (IC-CPD)



In order to meet the new standards including IEC 62752 and IEC 62955, the charging of electric vehicles requires a residual current sensor to avoid hazardous situations where the vehicle battery (DC) is connected to a household power supply (AC). RCMU can be used where direct current and alternating current circuits are directly connected (AC/DC leakage currents may occur).

### Dimensions

Mechanical Characteristics ( Unit : mm, Tolerance in  $\pm 0.2$ )

	DCI	DCP
A-C	5	6

