Electrical Safety for Electric Vehicle Charging
Smart Electrical Safety from Western Automation

Western Automation is a leading designer and provider of RCD technology to OEMs worldwide. Working with global OEM customers we provide cutting edge technology to protect against electric shock and electrical faults.

At WA we Optimise Solutions to Meet Your Needs
Our Services

- Design support for implementation of WA technology into OEM products
- Technical support during product lifetime
- Upgrades of technology during lifetime of products
- Advanced notice of regulatory changes/requirements
- Patent support

IEC Requirements for RCD Protection in EV Charging Installations

- According to IEC 60364-7-72 every connection point (plug/socket) must be fitted with its own residual current operated protective device (RCD) with rated residual current $I_{\Delta n} \leq 30$ mA
- Measures must also be taken to ensure protection in the case of smooth DC residual currents that are higher than 6 mA
- This DC protection may be provided by a B Type RCD, or provide protection in the event of a DC fault current $\geq 6$ mA DC flowing in the installation

Our Technology + Your Product = Success
Electric Vehicle Charging Solutions

Residual Current Monitor Series 14 – AC & DC Range

The RCM14 range of residual current monitors is intended for the detection of DC and/or AC residual currents in AC or DC installations. These RCMs are ideally suited for use with Electric Vehicle charging cables (Mode 2 Protection) and EV charging stations (Mode 3 Protection), and for fault current monitoring on AC or DC installations.

EV RCD Options

- 6mA DC RCM
- 6mA DC and Type A (30mA AC) RCM
- 6mA/20mA Type EV RCD
- 6mA EV RCCB rated up to 63A (2 pole & 4 pole)
- 30mA Type B RCCB Rated up to 63A (2 pole & 4 pole)

RCM14 Features

- Operates from a 12V DC supply
- External test facility
- Self test and calibration on power up
- Power ON LED
- “Fault” signal output
- For use with 1, 2 or 3 phase loads rated up to 100A/400V
- ROHS compliant
- Complies with the DC protection requirements of IEC62752
- Mode 2, IEC62752, Mode 3 & UL2231
- 3000A surge current withstand
- 14mm aperture
6mA DC Residual Current Detection Module (RCM)

6mA DC Detector with Relay or Contactor

Lowest cost solution
- Can accommodate charging current of up to 40A
- Single or multi-phase options
- Requires associated Type A or Type F RCD
- Fitted directly to the electrical vehicle charging circuit

This 6mA RCD module detects DC currents flowing in an AC system. For example, in electric vehicle charging stations or from solar panels. DC currents flowing in an AC system may cause a Type A RCD or a Type F RCD to be blinded.

This RCD module can be used to detect any DC current level above 6mA and its output can be used to operate a relay or a contactor to disconnect the AC supply and prevent blinding of the upstream A or F Type RCD.
Application

The RCM module is connected in series with the AC supply to the EV and will provide an output if a DC current $\geq 6$mA DC flows in the circuit. This output can be used to operate a circuit breaker or a contactor to remove the supply to the EV.

Advantages

- Simple, compact, low cost
- Can be integrated into charging station
- May be adapted for in-cable protection
- Maximum conductor rating of 40A

6mA DC Residual Current Device (RCD) Single

The 6mA RCD has its own circuit breaker and will open automatically if a current up to in $> 6$mA DC flows through it. The RCD is rated at 240V/20A/50 – 60Hz.
6mA/20A Rated DC RCD

6mA DC RCD with own contacts rated 20A

- Low cost solution with no wiring or external relay contactor
- Requires associated Type A or Type F RCD
- EV charging current limited to 20A
- Fitted directly into the EV charging unit

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**AC Supply**

- Type A or Type F RCD

**RCD blinding avoided**

- 6mA DC RCD

**Protection maintained to downstream installation**

- DC fault current interrupted

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*Fig 2 - 6mA DC Detector with 20A Rated Contacts*
6mA/63A Rated EV RCD

6mA DC RCD with 63A rated contacts
- 63A capacity for EV charging current
- Single or multi-phase options
- Easy to retrofit

AC Supply

Type F or Type A RCD
63A/30mA

RCD blinding avoided

6mA/63A Type B RCD with rated contacts

DC Current flow interrupted by 6mA DC RCD

Protection maintained to downstream installation

EARTH

Fig 3 - 6mA DC RCD with 63A Rated Contacts
30mA/63A Type B RCD

6mA/63A 6mA DC Type RCCB with rated contacts

- 63A capacity for EV charging current
- Single or multi-phase options
- Easy to retrofit
<table>
<thead>
<tr>
<th>Year</th>
<th>Protection Features</th>
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<tbody>
<tr>
<td>1980s</td>
<td>AC Protection</td>
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<tr>
<td>2000s</td>
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<td>2010</td>
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<tr>
<td>2015+</td>
<td>AC, Pulsating DC and DC Protection, EV and PV Protection</td>
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Western Automation - Leading The Way in Electrical Safety & Protection
Our Technologies

- Type A RCDs (detection of AC & pulsating DC fault currents)
- Type A+ (higher immunity than Type A)
- Type F RCDs (detection of AC and pulsating DC currents from 10 – 1000Hz)
- Type B RCDs (detection of AC up to 1000Hz, pulsating DC and pure DC fault currents)
- Type B+ RCDs (detection of AC up to 100KHz, pulsating DC and pure DC fault currents)
- Type EV RCD for use in EV charging (detection of 6mA DC)
- Type EV RCM module (RCM14) for use in EV charging (detection of 6mA DC)
- SRCDs
- AC & DC leakage current detection
- Auto-reclosing RCDs
- Arc fault detection