# Product Solutions for EV Charging and Renewable Energy Applications – V1.1

February 2023

BROYCE CONTROL

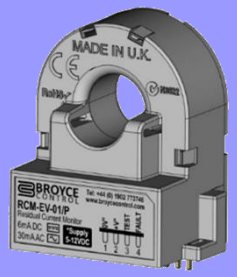
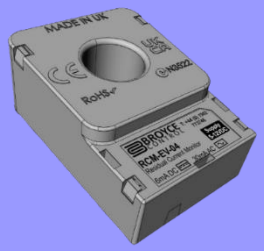
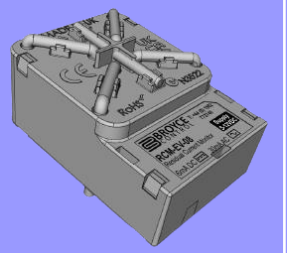
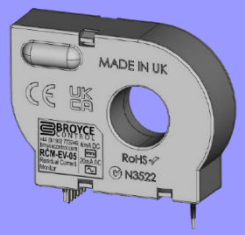
# Applications & Product Suitability

**EV Charging + Renewables**

| Application Type | | Residual Current Monitoring | Earth Leakage (Type A) | Earth Leakage (Type B) | Insulation Monitoring |
|---|---|---|---|---|---|
|  | Wall boxes/ IC-CPD's | • Monitoring of single or 3-phase outgoing circuits to EV's | • Monitoring of single or 3-phase AC circuits feeding chargers<br>• Power distribution boards | | |
|  | Rapid Charging | | • Monitoring of single or 3-phase AC circuits feeding chargers<br>• Power distribution boards | • Upstream DC protection | • Permanently monitors the insulation resistance<br>• For unearthed power supplies<br>• Connects to DC output from charger |
|  | Photovoltaics | | • Monitoring of AC circuits (earthed systems) | • Monitoring of circuits feeding UPS's, inverters | • Monitoring of various circuits (i.e. inverters with transformers) |
|  | Energy Plants | | • Monitoring of AC circuits feeding motors and other control elements (earthed systems) | • Monitoring of circuits feeding UPS's, inverters | • Monitoring of various circuits |
|  | Battery Storage | | • Monitoring of AC circuits (earthed systems) | • Monitoring of circuits feeding inverters<br>• Fault protection in Energy Management Systems, Energy Storage Modules | • Permanently monitors the insulation resistance (i.e. with Battery Management System) |

# Residual Current Monitors

EV Charging

| Enclosure style: |  | | |  | |  | |  | |
|---|---|---|---|---|---|---|---|---|---|
| Part No's. | RCM-EV-** | | | RCM-EV-** | | RCM-EV-** | | RCM-EV-** | |
| **Key features/Application** | **01** | **02** | **03**[3] | **04**[3] | **06** | **08**[3] | **09** | **05** | **07** |
| IC-CPD (In Charging Cables)[4] *Mode 2* | ▤ | | ▤ | ▤ | | ▤ | | ▤ | |
| Wall boxes/Charging Station[4] *Mode 3* | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ |
| 6mA DC detection | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ |
| 20mA AC detection | | | | | | | | ▤ | |
| 30mA AC detection | ▤ | | ▤ | ▤ | | ▤ | | | |
| PCB mounting | ▤[1] | ▤[1] | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ | ▤ |
| Direct to cable mounting | ▤[2] | ▤[2] | ▤ | | | | | | |
| Integrated load wires | | | | | | ▤ | ▤ | | |

[1] **/P** suffix added to part number (denotes pins exiting at the base of the housing)
[2] **/S** suffix added to part number (denotes pluggable/latching connector)

[3] UL 2231-2 compliant version also available of these variants providing both 6mA DC and 20mA AC detection. **/UL** suffix added to part number
[4] Suitable for both electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV)

# Earth Leakage Protection Type A

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## Key benefits:

- Selectable trip and time delay settings provide flexibility to suit various types of circuits and system ratings
- External toroid/zero current transformer available in choice of sizes
- Two model variants available with selectable trip/sensitivity settings
  - ELR01PN (6mA – 1A)
  - ELR30PN (30mA – 30A)
- Built-in NFC in conjunction with smartphone app extend product's flexibility
  - Simplifies product setting up and configuration
  - Allows for individual product interrogation and diagnostics – useful where several products installed in the same application
  - Passive settings (Can be configured without power)
  - Easy to replicate settings on additional units

## Technical:

- Programmable adjustments using NFC option
  - Frequency filtering
  - Tripping method (latch or automatic reset)
  - Output relay logic (pre-alarm, energise or de-energise on trip)
- Combined Test/Reset button with option to connect remote button
- LED indication of leakage current, device status and general status information
- 2 Relay outputs (SPDT) – Relay 1 and Relay 2 (User configurable)
- DIN rail mounting
- Key Standards: IEC 60947-2 (Annex M) and IEC 60755

## Product Advantages:

- *Protection of persons*
- *Protection against risk of fire*
- *Ensures continuity of supply*
- *Minimises risk of unexpected shutdown*

# Insulation Monitoring

EV Charging
+ Renewables


Key benefits:

- Primarily intended for integration into **Mode 4**, high-voltage DC charging stations for electric vehicles and voltages up to 1000VDC
- Ability to detect both symmetrical and asymmetrical insulation faults
- Cost effective solution
- Product developed in compliance with BS EN/IEC 61557-8

Product Advantages:

- *Provides early warning of system deterioration*
- *Avoids unwanted circuit disconnection*
- *Preventive fire protection caused by insulation breakdown*
- *Ensures continuity of supply*

Technical:

- Settings in accordance with IEC 61851-23
- Suitable for network voltages up to 1000VDC
- Capacitance Max. 1µF (according to IEC 61518-23, paragraph CC.4.7)
- Fixed measurement levels:
- Fault 100KΩ (according to IEC 61557-8, based on 1000VDC)
- Warning 500KΩ
- Measurement accuracy ±15% minimum (meets IEC 61557-8 requirements)
- Response time <10s
- Aux. power supply 12VDC
- 2 Relay outputs: 1 x SPCO (Fault state), 1 x SPNO (Warning state)
- Local Test and Reset buttons with option to connect external buttons
- LED indication for Status, Warning and Fault (plus system status and diagnostics)

*Preliminary Information*

# Earth Leakage Protection Type B

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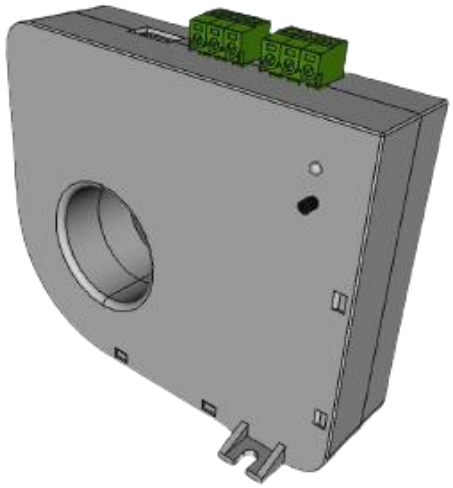


## Key benefits:

- Integrated solution with both sensing element and switching output(s) in one product
- More cost effective when compared to standard Type B RCD
- Full control/monitoring via RS-485 comms (Modbus RTU)
- Built-in NFC in conjunction with smartphone app extend product's flexibility
  - Simplifies product setting up and configuration
  - Allows for individual product interrogation and diagnostics – useful where several products installed in the same application
  - Passive settings (Can be configured without power)
  - No actual user adjustments on product therefore:
    - Product virtually tamperproof
    - Zero risk of unauthorised parameter changes
  - Easy to replicate settings on additional units

## Technical:

- 35mm ∅ cable aperture
- Programmable user settings/adjustments (trip level, time delay, alarms, frequency filtering)
- Option to change tripping method (latch or automatic reset), output relay logic (pre-alarm, energise or de-energise on trip)
- Combined Test/Reset button with option to connect remote button
- Multi-colour LED providing operation, error and general status information
- 2 Relay outputs (SPDT) – Relay 1 and Relay 2 (User configurable)
- Universal mounting options – DIN rail or surface mounting
- Pluggable connections
- Key Standards: IEC 60947-2 (Annex M) and IEC 60755

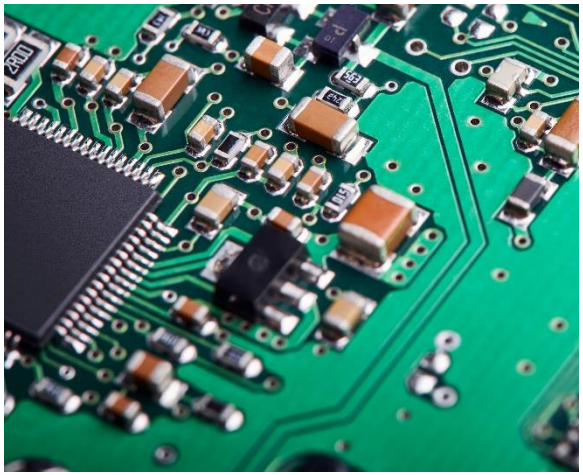
## Product Advantages:

- *Protection of persons*
- *Protection against risk of fire*
- *Ensures continuity of supply*
- *Minimises risk of unexpected shutdown*

*Preliminary Information*

# Green PHY Module

EV Charging



Key benefits:

- Allows for smart grid applications to use the powerline as the communication medium
- Provides the ability to offer intelligent data transmission between the EV and charger
- Guaranteed long range transmission using powerline
- Decreases the time required to fully charge the EV battery
- Expandable functionality allows for implementation in to other application such as smart energy
- Low energy consumption compared to traditional PLC's
- Provides several integrated hardware interfaces

Advantages:

- *Utilises existing application wiring*
- *High reliability – robust data transmission*
- *Cost efficient solution*

*Preliminary Information*

# Thank you

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*Passionate about protection and control*