

AUSTRALIA / NEW ZEALAND

Installing RCDs on Enphase Microinverter Circuits

Overview

A residual current detection device (RCD) is also known as an earth leakage detection device. RCDs provide an added level of protection for microinverter arrays, and they have saved many lives since their introduction to Australia and New Zealand. In Australia, earth leakage detection devices have been mandatory on residential power circuits since 1991 and mandatory on lighting circuits since 2000. This document describes RCD specification and application.

RCDs shall be used in Enphase microinverter installations where the generation circuits are penetrating a wall without mechanical protection or are outside the minimum clearance requirements as set out in AS/NZS 3000:2018 Section 3.9.4.2.

AS/NZS 3000:2018 describes a specific 30mA RCD requirement for cables requiring protection.

RCD and RCBO Types

For effective operation, you must select the correct type and capacity of RCD. To protect a microinverter circuit, install an RCD in series with a single or multiple circuit breakers for overcurrent protection.

An RCBO is a single compact device that incorporates an (RCD) and a circuit breaker (CB). Having each circuit protected separately by an RCBO is the recommended option. A fault induced trip is then confined to one circuit only.

It's important to understand the current type, current capacity, and directional nature of the RCD/RCBO when specifying them.

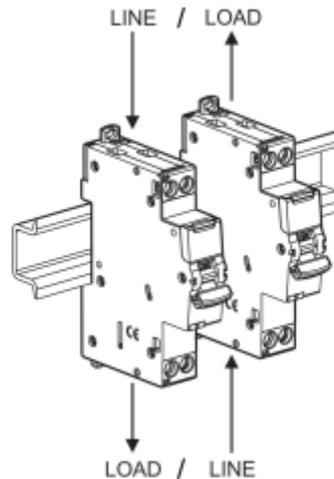
Current Type

RCD operation varies with the nature of the current they are monitoring. AS/NZS 3000:2018 2.6.2.2 provides a full list of RCD types. Enphase recommends type A for Australia and New Zealand.

Country	Current Type	Current Description
Australia, New Zealand	Type A 	Residential sinusoidal alternating currents and residential pulsating direct currents (30mA)

Directionality

Some RCBOs indicate LINE and LOAD on their connection terminals. These RCBOs may be uni-directional, monitoring current in one direction. Specify bidirectional RCBOs when the current flows to and from devices. This is the case for Enphase Microinverters. These bidirectional RCBOs will indicate they can be connected in either orientation. We recommended that you confirm this with the manufacturer.



Technical Data	
Approval:	
Rated current (In):	6A to 32A
Rated voltage (Un):	240V a.c.
Rated residual operating current:	30mA / 10mA
Curve Type:	C
Operating characteristic:	Type A
Rated Frequency:	50Hz
Rated short-circuit capacity (Icn):	6000A
IP rating:	IP2x terminals
Standard:	AS/NZS 61009
Busbar system:	Yes, prong type
Maximum service voltage:	250V
Minimum service voltage:	50V
Power supply (line side):	Top or Bottom
Operating temperature:	-25 C to +60 C
Storage temperature:	-25 C to +70 C
stripping length of wire:	12mm
Terminal torque (top/bottom):	Min: 1.2Nm Max: 2.8Nm Recommended: 1.6 to 2Nm

Reference images from http://www.legrand.com.au/uploads/tx_sbdownloader/HPML1370_Compact_RCBO_flyer_HR.pdf

Current Capacity

Select an RCBO with a suitable current capacity. Some RCBOs derate with temperature. Because of this, it is best to get a data sheet from the manufacturer and take installation conditions into account before selecting a suitable unit. C-curve circuit breakers are recommended.

30mA Tripping Current

The following table indicates the RCBO recommendations for Enphase Microinverters and associated products. Because you must specify 30mA leakage, you must also consider the type and amount of products supplied through the device.

For example the Enphase M-Series Microinverters have up to 1mA of leakage current, so we suggest that only 20 devices are installed on a single phase of a 30mA RCD or RCBO.

Australia / New Zealand		
Product	RCBO Requirements	Leakage
Enphase M-Series Microinverters (M215, M250)	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	0.5-1mA
Enphase S-Series Microinverters (S230, S270)	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	0.5-1mA
Enphase IQ Series Microinverters (IQ6,IQ7)	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	Not applicable as double insulated
Enphase AC Battery (B270,IQ7-B) <i>Note that the Enphase Microinverter inside the unit is NOT a multimode inverter, so RCDs can be used</i>	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	0.5-1mA
Enphase Envoy	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	
Enphase Envoy-S Standard, Metered, Metered + DRM	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	Not applicable as double insulated
Enphase Q Relay	230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional	Not applicable as double insulated

Conclusion

RCBOs can be used to supply Enphase products. For correct operation, you will need 230/400V or 240/415V 50Hz 30mA Type A, C Curve, Bi-directional units. Confirm with the RCBO data sheet or manufacturer that the chosen unit conforms to Enphase requirements.