

# Canadian Electrical Code 2015 — Enphase System Code Compliance

This technical brief discusses new Canadian Electrical (CE) Code 2015 requirements that apply to Enphase Microinverter Systems. It is useful for installers, electricians, and electrical inspectors or authorities having jurisdiction (AHJs) in understanding how code-compliance is handled where CE Code 2015 is adopted.

## Introduction

The following sections show how Enphase Microinverter Systems meet the requirements of new Canadian code. The topics discussed in this document include:

- CE Code 2015 Section 64-218 Rapid Shutdown of PV Systems on Buildings
- CE Code 2015 Section 64-216 DC Arc-Fault Circuit Protection

## CE Code 2015 Section 64-218 Rapid Shutdown of PV Systems on Buildings

Enphase Microinverter Systems fully meet the rapid shutdown requirement without the need to install additional electrical equipment. Properly labeling the PV system power source and rapid shutdown ability is required per CE Code Section 64-200 (2).

Solar electric PV systems with Enphase Microinverters have one utility-interactive inverter directly underneath each solar module that converts low voltage DC to utility grid-compliant AC. When the utility grid is available and the sun is shining, each microinverter verifies that the utility grid is operating within IEEE 1547 requirements. Only then does it export AC power into the electric service for use by loads onsite or export power to the utility grid for others to use. When the utility grid has a failure, or the PV system AC circuits are disconnected from the utility service via an AC breaker, AC disconnect, or removal of the solar or main utility service meter, the microinverters stop producing AC power in fewer than six AC cycles. Enphase Microinverters are not capable of operating as an AC voltage source. This means that without an AC grid source, Enphase Microinverters are not able to energize connected wiring and no AC voltage or current can be injected into the inverter output circuits or the grid.

When the AC grid source is removed from the inverter output circuits via any means, such as an AC breaker, AC disconnect or removal of the solar or main utility service meter, this equipment performs the rapid shutdown function per 64-218. With an Enphase Microinverter System this shutdown occurs well within the 64-218 required 10 seconds, and there are no other conductors energized more than 1.5 m (5 feet) in length inside a building or more than 3 m (10 feet) from a PV array.

## Code Reference

### 64-218 Photovoltaic system rapid shutdown

“(1) A photovoltaic system rapid shutdown device shall be provided for a photovoltaic system installed on buildings or structures where the photovoltaic source or output circuit conductors installed on or in buildings are more than 1.5 m in length or more than 3 m from a photovoltaic array.

(2) A photovoltaic system rapid shutdown device shall limit photovoltaic source or output circuits to not more than 30 V and 240 V•A within 10 s of rapid shutdown initiation.”

## CE Code 2015 Section 64-216 DC Arc-Fault Circuit Protection

This requirement is for direct current (DC) Arc-Fault Circuit protection and only applies to systems with DC voltages above 80 VDC. Enphase Microinverter systems are exempted from this requirement as they always operate well below 80 VDC. The requirement is basically unchanged from the CE Code 2012, and it is unnecessary to add DC AFCI to an Enphase Microinverter System installation.

### 64-216 Photovoltaic dc arc-fault circuit protection

- “(1) Photovoltaic systems with dc source circuits or output circuits, or both, and operating at a maximum system voltage of 80 V or greater, shall be protected by
- (a) a dc arc-fault circuit interrupter; or
  - (b) other system equipment approved to provide equivalent protection.
- (2) The arc-fault protection system required in Subrule (1)(b) shall
- (a) detect and interrupt arcing faults resulting from a failure in the intended continuity of a conductor, connection, photovoltaic module, or other system component in the dc photovoltaic source and output circuits;
  - (b) not have the capability of being automatically restarted;
  - (c) have annunciation, without an automatic reset, that provides a visual indication that the circuit interrupter has operated; and
  - (d) disable or disconnect
    - (i) inverters or charge controllers connected to the faulted circuit when the fault is detected; or
    - (ii) the system components within the arcing circuit.”