Application Note - Rapid Shutdown in SolarEdge Systems, Europe & APAC

Revision History

- Version 1.0, Feb. 2019 – Initial release
- Version 1.1, December 2021 – Updated Initiating Rapid Shutdown

Introduction

The SolarEdge system incorporates many safety mechanisms, ensuring safety for installers, maintenance works and firefighters. Rapid shutdown (RSD) is a safety mechanism which refers to the fast discharge of conductors to a safe voltage level.

In North America, the National Electrical Code (NEC), section 690.12, defines RSD requirements for PV systems on buildings. The requirements were first introduced in NEC 2014, and updated in NEC 2017. SolarEdge inverters installed in North America have complied with these requirements since they have come into effect. Specifically, NEC 2017 690.12 requires that in rooftop PV systems, controlled conductors beyond 1ft (30.5cm) of the array will be reduced to 30 volts or less within 30 seconds.

The SolarEdge SafeDC^{TM} feature ensures the DC voltage of a system is reduced to a safe level when the system is shut down, within up to 5 minutes. While in Europe and APAC there is currently no RSD standard, reducing the DC voltage within 30 seconds allows installers, maintenance works and firefighters to handle the system very soon after shutdown, which is of particular importance in case of an emergency. Therefore, adopting RSD is recommended, and may be required in the future by local regulation. To this end, SolarEdge inverters installed in Europe and APAC comply with the NEC 2017 rapid shutdown requirements as detailed below.

SolarEdge Rapid Shutdown Advantage

SolarEdge is among very few solar equipment manufacturers who provide **integrated** rapid shutdown functionality in compliance with NEC regulations. Other manufacturers offer this capability via external components (contactors, shunt trip breakers, or other remotely controlled switches), which may add complexity and increase the cost. The SolarEdge RSD solution advantages are:

- No additional components: 3rd party solutions typically need extra fuses or circuit breakers, adding cost, field work and potential quality issues that can increase time on site for troubleshooting
- No additional wiring: 3rd party solutions require additional wires for RSD, and they must have suitable voltage ratings in order to be placed in a conduit together with PV system conductors, otherwise they must be placed in a different conduit, increasing cost and labor

Rapid Shutdown in SolarEdge Systems

Supporting Inverters

The following SolarEdge inverters support rapid shutdown (no additional hardware installation required):

- Single Phase Inverters with HD-Wave Technology, SE2200H-SE6000H, with the following part number: SExx00H-RW**R**00**B**NN2
- Three Phase Inverters, SE27.6K-SE100K, with the following part numbers: SExxK-RWRxxxxxx, SExxK-INRxxxxxx

String Length

To comply with NEC rapid shutdown, each string must have no more than 30 optimizers per string. If longer strings are connected, their voltage will be reduced within 30 seconds upon rapid shutdown initiation, but the voltage will be >30V (it will be reduced to 1V * number of optimizers in the string).

Initiating Rapid Shutdown

Rapid Shutdown can be initiated by one of the following methods:

- The inverter AC breaker is turned OFF, or AC to the inverter is disconnected by another method (intentionally or as the result of a fault)
- The DC switch is turned OFF (applicable only to inverters with a DC safety Unit)