Grounding SolarEdge Power Optimizers – Application Note North America

Version History
1.0 - initial version
1.1 - deleted information about racking grounding methods

Introduction
PV Systems with module-level electronics (DC-DC power optimizers or micro-inverters) introduce another PV system component which must be grounded to meet NEC requirements. This paper outlines the differing requirements and provides guidelines on how to properly ground SolarEdge power optimizers.

There are two types of grounding connections used in PV systems:

- **Equipment grounding** – Equipment grounding is required for all electrical devices with exposed metal surfaces, as outlined in 690.43-690.46 and, by reference, Table 250.122. Methods for equipment grounding of SolarEdge power optimizers are detailed in the examples below.

- **Grounding Electrode Conductor / System Bonding Jumper** – not required in SolarEdge systems.
  - In a system utilizing a grounded array the Grounding Electrode Conductor is required by NEC 690.47-690.48 and 250.168. This conductor provides the bonding between the grounding system and one of the PV circuit conductors (PV negative or PV positive), and is required to be contiguous or irreversibly spliced. SolarEdge systems utilize ungrounded PV arrays as permitted under Article 690.35.
  - When properly installed SolarEdge systems meet the requirements of 690.35, and therefore no Grounding Electrode Conductor/System Bonding Jumper is required.

**Equipment Grounding of SolarEdge Power Optimizers**

Use the following power optimizer grounding methods depending on the mounting structures used for the PV system installation.

For full details refer to the *SolarEdge Installation Guide*.

1. For power optimizers mounted on a grounded metal structure, use the 5/16” stainless steel grounding star washer (provided with the power optimizer) between the railing and the flat side of the optimizer mounting bracket. Apply torque of 9.5 Nm / 7 ft lb. The star washer is used for attachment of the power optimizer to galvanized steel, stainless steel and anodized aluminum structures. It penetrates the galvanized or anodized coating of the structure to ensure a low-resistance connection. The star washer is approved as a listed grounding means in accordance with the requirements of NEC Article 690.43(C).

![Figure 1: Star washer](image-url)

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All Code references are to NFPA 70, NEC 2014 Edition.
2. If the star washer cannot be used, such as when mounting on some grounded rails with sliding nut fasteners, use the SolarEdge grounding plate between the railing and the flat side of the optimizer mounting bracket. Apply torque of 9.5 Nm / 7 ft lb. The plate penetrates the galvanized or anodized coating of the structure to ensure a low-resistance connection and compliance with the ground impedance requirements per the UL1741 certification for SolarEdge power optimizers. The grounding plate may be purchased in bulk from SolarEdge (part number SE-GNDPLATE-100).

3. For power optimizers mounted on un-grounded (non-metallic) structures, or in case the star washer or the grounding plate cannot be used: Use the SolarEdge grounding lug with an equipment-grounding conductor. After connecting the lug to the power optimizer, connect the equipment-grounding conductor to the grounding terminal. Tighten the screws connecting the power optimizer to the rack and the grounding terminal screw with a torque of 9.5 Nm / 7 ft lb. The grounding terminal will accept a wire size of 6-14 AWG and must be sized for equipment in accordance with NEC Table 250.122. The grounding lugs may be purchased in bulk from SolarEdge (part number SE-GNDLUG-100). The lug kit includes four stainless steel parts to prevent corrosion of the copper grounding conductor and of the aluminum housing of the power optimizer.