

Grounding SolarEdge Power Optimizers

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, provides guidelines on how to properly ground SolarEdge power optimizers and supplies a list of racking models and their appropriate grounding method.

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

- 1) **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.
- 2) **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 (for full details refer to the SolarEdge Installation Guide):

- **When mounting 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. The star washer is approved as a Listed grounding means in accordance with the requirements of NEC Article 690.43(C). The stainless steel star washer is Listed for attachment of the power optimizer to galvanized steel, stainless steel and anodized aluminum structures. The stainless steel grounding washer penetrates the galvanized or anodized coating of the structure to ensure a low-resistance connection. Apply torque of 9.5 N*m / 7 lb*ft.
- **For mounting on rails with sliding nut fasteners or non-metallic structures:** A separate equipment grounding conductor is required for power optimizers mounted on non-metallic structures and structures utilizing sliding nut fasteners (unless specifically Listed as a grounding means). Older SolarEdge power optimizers were supplied with a grounding lug for this purpose. Power optimizers currently in production are supplied without the optional lugs, but lugs may be purchased in bulk from SolarEdge (part number SE-GNDLUG-100). The grounding lug kit consists of four parts, all made of stainless steel to prevent corrosion of the copper grounding conductor and of the aluminum housing of the power optimizer. 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. After connecting the lug to the power optimizer, connect an 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 N*m / 7 lb*ft.

* All Code references are to NFPA 70, NEC 2011 Edition.

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USA	3347 Gateway Boulevard, Fremont, CA, 94538
Germany	Bretonischer Ring 18, 85630 Grasbrunn (Munich)
Italy	VISMUNDA SRL, Corso Del Popolo 50/A, Treviso
Japan	B-9 Ariake Frontier Building, 3-7-26 Ariake, Koto-Ku, Tokyo 135-0063
Israel	6 HeHarash St. P.O.Box 7349, Neve Neeman, Hod Hasharon 45240
China	City Center, 100 Zunyi Road, Building A, Unit 1204, Shanghai 200051

Racking models and the corresponding grounding method of SolarEdge power optimizers:

Manufacturer	Model	Fastener	Grounding Method
A.E.T (Applied Energy Technologies)	Rayport P (for pitched roofs)	Accessory Hardware Kit 80677	Supplied SST Star Washer
	Rayport B (ballasted)	Accessory Hardware Kit 80672 / 80612	Supplied SST Star Washer
	Rayport T6 (ground-mount)	Accessory Hardware Kit 80235	Supplied SST Star Washer
Conergy	Suntop IV	Quickstone slide nut with M8 socket head cap screw	Grounding lug and conductor
Creotecc	Creomount (flush-mount)		Grounding lug and conductor
	Base Rail	Drilled and tapped with ¼" inch hardware	Supplied SST Star Washer
DPW Solar (Direct Power and Water)	Power Rail	0.25 inch hex head bolt, washer, nut, for top rail mount	Supplied SST Star Washer
Ecolibrium Solar	Ecofoot 2 for flat roofs	Rocker Bracket, Nut, Serrated Flange Hex, 5/16", Bolt, Serrated Flange Hex, 5/16"	Supplied SST Star Washer
Haticon	Haticon Rail		Supplied SST Star Washer
IronRidge	Light Rail XRL	0.25 inch hex head bolt, washer, nut, for top rail mount (#29-5003-005)	Supplied SST Star Washer
	Standard Rail XRS	0.25 inch hex head bolt, washer, nut, for top rail mount	Supplied SST Star Washer
Krannich Solar	K2 Systems	Slide nut with M8 socket head cap screw	Grounding lug and conductor
Mage	Systemtec	T-bolt and hardware	Supplied SST Star Washer
mounts4solar	Rail 6.0	M8 SS hammer head bolt	Supplied SST Star Washer
NCP Solar	Flush Mount Racking System Ballasted Roof Racking System	Slide nut with 5/16" socket head cap screw	Grounding lug and conductor
ProSolar	Rooftrac	Channel nut with 5/16" hardware	Supplied SST Star Washer

	Groundtrac Rail	Channel nut with 5/16" hardware	Supplied SST Star Washer
Renusol	Renusol VS	T-bolt and hardware	Supplied SST Star Washer
Schuco	SolarEZ	ezUniversal Screws (M8x14) ezAnchor Blocks	Supplied SST Star Washer
SnapNRack	S100 Mounting system	Series 100 attachment kit, including: 50In X 0.328 in X 0.187 in SS Fender Washer; Snaprack Channel Nut 5/16In-18; 5/16In - 18 X 1In Ss Hcs Bolt; 5/16In Ss Split Lock Washer; Wiley WEEB-PMC Grounding Washer For Snaprack Rail	Weeb-PMC (see the fastener section)
	Standard Rail	Slide nut	Grounding lug and conductor
Sollega	InstaRack	Top spring nut with 5/16" hex head bolt	Supplied SST Star Washer
Sunlink	Core-RMS 490-000000	5/16" hardware; 09-00010-01 screw, 09-0002-01 nut, 09-00154-01 washer	Supplied SST Star Washer
	Precision-RMS 690-000010	5/16" hardware; 09-00010-01 screw, 09-0002-01 nut, 09-00154-01 washer	Supplied SST Star Washer
	Sunlink-RMS	Drilled and tapped with 5/16" inch hardware	Supplied SST Star Washer
Unirac	SunFrame	Drilled and tapped with ¼" inch hardware	Supplied SST Star Washer
	Solarmount Light	¼" hex head bolt, washer, nut, for top rail mount	Supplied SST Star Washer
	Solarmount Standard	¼" hex head bolt, washer, nut, for top rail mount	Supplied SST Star Washer
	Solarmount HD	¼" hex head bolt, washer, nut, for top rail mount	Supplied SST Star Washer

	SolarMount-I	¼" hex head bolt, washer, nut, for top rail mount	Supplied SST Star Washer
	SolarMount-E (Evolution)	Drilled and tapped with 5/16" inch hardware	Supplied SST Star Washer