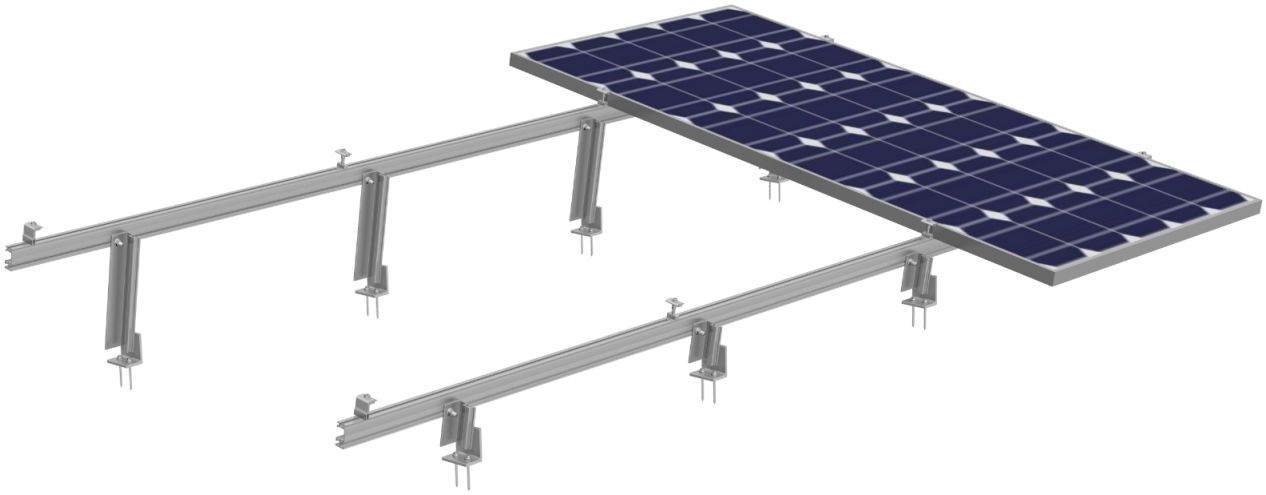

SunModo PV Rack Mounting System

UL2703 Compliant

Pub. D10061-V007

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Please read carefully before installing

Product is tested to and recognized to UL 2703 standards for safety grounding and bonding equipment and meets UL 1703 fire standards.

SunModo PV Rack Mount System can be used to mount photovoltaic (PV) panels in a wide variety of locations. All installations shall be in accordance with NEC requirements in the USA. The self-bonding system is for use with PV modules that have a maximum series fuse rating of 30A. Mechanical design loads per UL 2703: Downward Pressure: 33.42 psf (1600.2 Pa), Upward Pressure: 33.42 psf (1600.2 Pa), Down-Slope: 5 psf (239.4 Pa). Mechanical test loads per LTR AE 2012: Downward Pressure: 50.125 psf (2400 Pa), Upward Pressure: 50.125 psf (2400 Pa).

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Installer Responsibility

Before ordering and installing materials, all system layout dimensions should be confirmed by field measurements. SunModo reserves the right to alter, without notice, any details, proposals or plans. Any inquiries that you may have concerning installation of the PV system should be directed to your SunModo Sales representative. Consult SunModo Sales for any information not contained in this manual. This manual is intended to be used as a guide when installing SunModo EZ Tilt-Up systems. It is the responsibility of the installer to ensure the safe installation of this product as outline herein.

- Installer shall employ only SunModo products detail herein. The use of non SunModo components can void the warranty and cancel the letters of UL compliance.
- Installer shall guarantee that screws and anchors have adequate pullout strength and shear capacities.
- Installer shall adhere to the torque values specified in this Instruction Manual.
- Installer shall use anti-seize compound, such as Permatex anti-seize, lubricant is recommended for all threaded parts.
- Installer is responsible to install solar panels over a Fire Resistant roof covering rated for the application.
- Installer is responsible to determine that the roof, its rafters, connections, and other architectural support components can sustain the array under all code level loading conditions.
- Installer shall adhere to all relevant local or national building codes. This takes account of those that supplant this document's requirements.
- Installer shall guarantee the safe placement of all electrical details of the PV array.
- Installer shall comply with all applicable local, state and national building codes, including periodic re-inspection of the installation for loose components, loose fasteners and any corrosion, such that if found, the affected components are to be immediately replaced.
- Installer to ensure the structural support members or footings for mounting the array can withstand all code loading conditions. Consult with licensed professional engineer for the appropriate loading conditions.
- Installer to follow all regional safety requirements during installation.
- This racking system may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.
- Installer shall ensure bare copper grounding wire does not contact aluminum and zinc-plated steel components to prevent risk of galvanic corrosion.
- If loose components or loose fasteners are found during periodic inspection, re-tighten immediately. If corrosion is found, replace affected components immediately.

Safety

Review relevant OSHA and other safety standards before following these instructions. The installation of solar PV systems is a dangerous procedure and should be supervised by trained and experienced personnel.

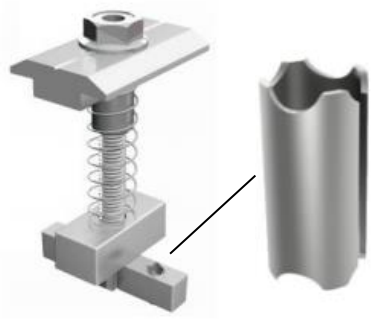
It is not possible for SunModo to be aware of all the possible job site situations that could cause an unsafe condition to exist. The installer of the ground system is responsible for reading these instructions and determining the safest way to install the ground system. These instructions are provided only as a guide to show a knowledgeable, trained erector the correct part placement one to another. If following any of the installation steps would endanger a worker, the erector should stop work and decide upon a corrective action.

SunModo Self-Bonding System

SunModo developed a proprietary grounding and bonding system that is built into the mounting hardware for the rails, clamps and splices. We provide further grounding through all of the SunBeam racking components including the Pipe Caps, Beams, Posts and Post Base Plates. All hardware meet UL 2703 Grounding and Fire Standards tested by ETL.

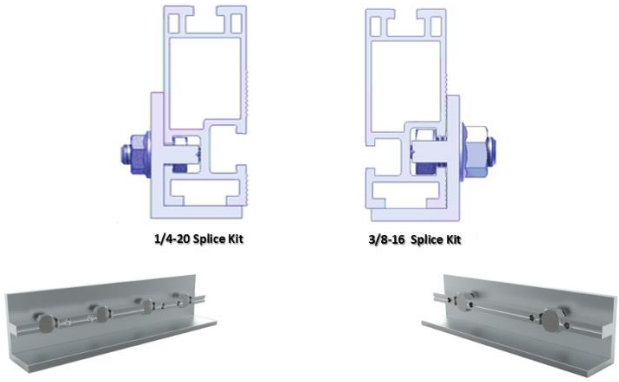
The basis of the system is our patented stainless steel floating grounding pin which is designed to be captive in the mounting components and provides a bonding path from the PV panel frames to the rails and rail splices, and finally to the ground lug. The self-grounding and bonding system is for use with PV modules that have a maximum series fuse rating of 30A. The maximum number of PV modules is limited by the system voltage, so if a system has multiple inverters, the SunModo racking system can theoretically go on forever.

Finally, we have added a spring and a threadlocker to our Mid Clamp assemblies. The spring keeps the Mid Clamp in the open position ready to receive the solar module. The threadlocker is a light bonding agent allowing the T-Bolt engagement into the Rail when the Collar Nut is turned from above. The threadlocker has the added benefit of being an anti-seize agent for stainless steel hardware in the area where it is applied. For additional anti-seize protection refer to the 'Tools Required for Installation' section of this document.



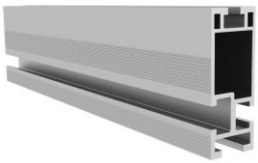
Mid Clamp with Ground Pins

Similarly, the rail splices the grounding pins, eliminating the need for extra bonding components.



EZ Tilt-Up System Components

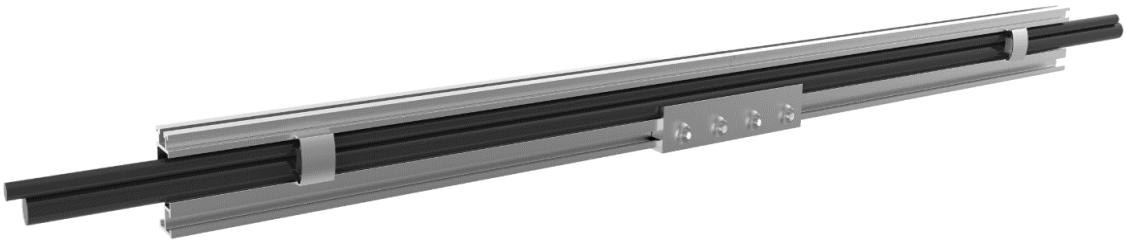
	End Clamp Kit, fits panel height from 31 to 50 mm. For last 3 digits, see table on last page.	K10224-1XX K10224-1XX-BK
	Adjustable End Clamp Kit, fits panel height from 33 to 50 mm. Adjustable End Clamp Kit, fits panel height from 30 to 46 mm.	K10299-001 K10299-BK1 K10299-002 K10299-BK2
	Grounding Mid Clamp Kit fits panel height from 31 to 50 mm. For last 3 digits, see table on last page. ***May be repositioned until torqued to final value.***	K10180-001 K10180-001-BK **For single-use only**
	Grounding End Clamp Kit with shared rail adaptor for standard rail; fits panel height from 31 to 50 mm. For last 3 digits, see table on last page. ***May be repositioned until torqued to final value.***	K10183-1XX K10183-1XX-BK **For single-use only**
	Grounding Mid Clamp Kit with shared rail adaptor for standard rail; fits panel height from 31 to 50 mm. For last 3 digits, see table on last page. ***May be repositioned until torqued to final value.***	K10182-001 K10182-001-BK **For single-use only**
	Grounding Lug Kit with Grounding Spacer and 1/4-20 T-Bolt. ***May be repositioned until torqued to final value.***	K10179-001 **For single-use only**

	3/8” Slot Rail Splice Kit with 2X 3/8-16 hex bolts and flange nuts with integral grounding. ***May be repositioned until torqued to final value.***	K10178-001 K10178-BK1 HR250/HR350 3/8” Splice **For single-use only**
	1/4” Slot Rail Splice Kit with 4X 1/4-20 Bolts and Flange Nuts with integral grounding**. *May be repositioned until torqued to final value.***	K10177-001 K10177-BK1 HR250/HR350 1/4” Splice **For single-use only**
	L-Foot Kit (Wood Rafter Option)	K10096-001
	Direct Attach L-Foot Kit (Metal Purlin Option) ***Self-tapping screws are not provided***	K10004-XXX
	Tilt-Up Kit with hardware is available in standard lengths: 8” (front leg), and 14” or 25” (rear leg). Last 3 digits denote rail length. A 120” full length Tilt-Up Rail is available for on-site cutting.	K10284-XXX (Clear)
	Helio Rail: Features both 1/4” and 3/8” side slots, and 1/4” top slot for clamping PV panels. Available in 84”, 124”, 164” and 206” lengths. Last 3 digits denote rail length. 4 stock sizes in clear and black.	A20144-XXX (Clear) A20144-XXX-BK (Black) HR250 (Standard Rail)

	Metal Rail End Caps available for Helio Standard and Heavy rails (optional)	A20284-001 A20284-BK1 (Black) HR250 (Helio Standard) A20285-001 HR350 (Helio Heavy) A20263-001 HR500 (Helio Super)
	Top Mount Standoff available 4”, 6” and 8” heights	A20055-004 A20055-006 A20055-008
	Side Mount Standoff available 5”, 7” and 9” heights	A20056-005 A20056-007 A20056-009
	HR150 (Open Rail): Features wire management channel and both 1/4” and 3/8” side slots, and 1/4” top slot for clamping PV panels. Available in 83”, 124” and 166” lengths. Last 3 digits denote rail length. 4 stock sizes in clear and black.	A20242-XXX (Clear) A20242-XXX-ML (Mill) A20242-XXX-BK (Black) HR150 (Open Rail)
	1/4” Slot Echo Rail Splice Kit with 4X 1/4-20 Bolts and Flange Nuts with integral grounding**. *May be repositioned until torqued to final value.***	K10236-001 HR150 Splice Kit **For single-use only**

Rail End Caps available for Echo rails (optional)

A20250-001 (Clear)
A20250-BK1 (Black)
HR150 Rail End Cover



The HR150 family of products are shown assembled above. Two HR150 Rails are spliced together with an HR150 Rail Splice. PV electrical wires are shown routed in the channels of the HR150 Rails, retained with two HR150 Channel Clips snapped into place.

List of Compliant PV Modules

UL 2703 Qualified Modules for use with SunModo PV Racking Systems

Evaluated PV Modules	
Module manufacturer	**Model numbers**
Boviet Solar	BVM6610M-250, BVM6610M-255, BVM6610M-260, BVM6610M-265, BVM6610M-270, BVM6610M-275, BVM6610M-280, BVM6610-305, BVM6610-310, BVM6610-315, BVM6610-320, BVM6612M-325, BVM6612M-330, BVM6612M-335, BVM6612M-340, BVM6612M-345, BVM6612M-350, BVM6610P-250, BVM6610P-255, BVM6610P-260, BVM6610P-265, BVM6610P-270, BVM6610P-275, BVM6612P-310, BVM6612P-315, BVM6612P-320, BVM6612P-325, BVM6612P-330, BVM6612P-335, BVM6612P-340, BVM6612P-345, BVM6612P-350, BVM6612P-355
C-Sun	CSUN290-72P, CSUN295-72P, CSUN300-72P, CSUN305-72P, CSUN310-72P, CSUN285-72M, CSUN290-72M, CSUN295-72M, CSUN300-72M, CSUN305-72M, CSUN310-72M, CSUN315-72M, CSUN320-72M, CSUN235-60M, CSUN240-60M, CSUN245-60M, CSUN240-60P, CSUN245-60P, CSUN250-60P, CSUN255-60P, CSUN260-60P
Canadian Solar	CS6X-300P, CS6X-305P, CS6X-310P, CS6X-315P, CS6X-320P, CS6P-255P, CS6P-260P, CS6P-265P, CS6P-260M, CS6P-265M, CS6V-210P, CS6V-215P, CS6V-220M, CS6V-225M, CS6K-265M, CS6K-270M, CS6K-290MS, CS6K-295MS, CS6K-300MS, CS6K-305MS
ET Solar	ET-P672300WW, ET-P672305WW, ET-P672310WW, ET-P672315WW
Hansol	HS300SE-V01, HS305SE-V01, HS310SE-V01, HS315SE-V01, HS320SE-V01, HS325SE-V01, HS330SE-V01, HS335SE-V01, HS340SE-V01
Hanwha Q Cells	Q.PEAK DUO-L-G4.2 365W, Q.PEAK DUO-L-G4.2 370W, Q.PEAK DUO L-G5.2 380W, Q.PEAK DUO L-G5.2 385W, Q.PEAK DUO L-G5.2 390W, Q.PEAK DUO L-G5.2 395W, Q.PEAK DUO-G5-BLK 305W, Q.PEAK DUO-G5-BLK 310W, Q.PEAK DUO-G5-BLK 315W, Q.PEAK DUO-G5-BLK 320W, Q.PEAK DUO-G5 315W, Q.PEAK DUO-G5 320W, Q.PEAK DUO-G5 325W, Q.PEAK DUO-G5 330W, Q.PEAK DUO-G5 305W, Q.PEAK DUO-G5 310W, Q.PEAK DUO-G5 315W, Q.PEAK DUO-G5 320W, Q.PRO L-G2 305, Q.PRO L-G2 310, Q.PRO L-G2 315
Hareon	HR-280P-24/Ba, HR-285P-24/Ba, HR-290P-24/Ba, HR-295P-24/Ba, HR-300P-24/Ba, HR-305P-24/Ba, HR-310P-24/Ba
Heliene	72P-285, 72P-290, 72P-295, 72P-300, 72P-310, 72P-320, 72P-325, 72P-330, 72P-335, 72P-340, 72M-345, 72M-350, 72M-360, 72M-365, 72M-370, 72M-BLK-345, 72M-BLK-350, 72M-BLK-360, 72M-BLK-365, 72M-BLK-370
Hyundai	HiS-M300TI, HiS-M305TI, HiS-M310TI, HiS-M315TI, HiS-M320TI, HiS-M325TI HiS-S325TI, HiS-S330TI, HiS-S335TI, HiS-S340TI, HiS-S345TI, HiS-S350TI

Itek Energy	IT250HE, IT255HE, IT260HE, IT265HE, IT270HE, IT275HE, IT280HE, IT285HE, IT290HE, IT295HE, IT300HE, IT305HE, IT310HE, IT315HE, IT295SE, IT300SE, IT305SE, IT310SE, IT315SE, IT350SE, IT355SE, IT360SE, IT365SE, IT370SE
JA Solar	JAM60D00-300/BP, JAM60D00-305/BP, JAM60D00-310/BP, JAM60D00-315/BP, JAM60D00-320/BP, JAM72D00-355/BP, JAM72D00-360/BP, JAM72D00-365/BP, JAM72D00-370/BP, JAM72D00-375/BP, JAM72S09-375/PR, JAM72S09-380/PR, JAM72S09-385/PR, JAM72S09-390/PR, JAM72S09-395/PR, JAM72S10-390/PR, JAM72S10-395/PR, JAM72S10-400/PR, JAM72S10-405/PR, JAM72S10-410/PR, JAM72S01-365/PR, JAM72S01-370/PR, JAM72S01-375/PR, JAM72S01-380/PR, JAM72S01-385/PR, JAP6 72-280/3BB, JAP6 72-285/3BB, JAP6 72-290/3BB, JAP6 72-295/3BB, JAP6 72-300/3BB, JAP6 72-305/3BB, JAP6 72-310/3BB, JAP6 72-315/3BB, JAP6 72-320/3BB
Jinko	JKM315M-60HL, JKM320M-60HL, JKM325M-60HL, JKM330M-60HL, JKM335M-60HL, JKM340M-60HL, JKM345M-60HL, JKM305M-60L, JKM310M-60L, JKM315M-60L, JKM325M-60L, JKM370-72L-V, JKM375-72L-V, JKM380-72L-V, JKM385-72L-V, JKM390-72L-V, JKM380-72HL-V, JKM385-72HL-V, JKM390-72HL-V, JKM395-72HL-V, JKM400-72HL-V
Kyocera	KD315GX-LFB, KU260-6MCA, KU265-6MCA, KD255GX-LFB2, KD260GX-LFB2
LG	LG275S1C-G4, LG280S1C-G4, LG285S1C-G4, LG300N1C-G4, LG300N1K-G4, LG300N1T-G4, LG305N1C-G4, LG305N1K-G4, LG310N1C-G4, LG310N1K-G4, LG310N1T-G4, LG315N1C-G4, LG320N1C-G4, LG335S2W-G4, LG340S2W-G4, LG360N2W-B3, LG365N2W-B3, LG365N2W-G4, LG370N2W-G4, LG375N2W-G4, LG380N2W-G4, LG385N2W-G4, LG390N2W-A5, LG395N2W-A5, LG400N2W-A5, LG405N2W-A5, LG410N2W-A5, LG415N2W-A5, LG420N2W-A5, LG425N2W-A5
LONGi	LR6-60PE-BOW-310W, LR6-60HPH-BOB-310W, LR672HPH-SOW-380W
Mission Solar	MSE290SQ5T, MSE295SQ5T, MSE300SQ5T, MSE300SQ8T, MSE305SQ8T, MSE310SQ8T, MSE340SO9J, MSE345SO9J, MSE350SO9J, MSE365SQ9S, MSE370SQ9S, MSE375SQ9S
Mitsubishi	PV-MLE270HD, PV-MLE275HD, PV-MLE280HD
Panasonic	VBHN325SA16, VBHN330SA16
Phono Solar Tech	PS255M-20/U, PS260M-20/U, PS265M-20/U, PS270M-20/U, PS275M-20/U, PS280M-20/U, PS300P-24T, PS305P-24T, PS310P-24T, PS315P-24T, PS320P-24T, PS325P-24T
REC Solar	REC310NP, REC315NP, REC320NP, REC325NP, REC330NP, REC275TP2, REC280TP2, REC285TP2, REC290TP2, REC295TP2, REC300TP2, REC275TP2 BLK2, REC280TP2 BLK2, REC285TP2 BLK2, REC330TP2S 72, REC335TP2S 72, REC340TP2S 72, REC345TP2S 72, REC350TP2S 72, REC355TP2S 72
Renesola	JC 255 M-24/Bbs, JC 260 M-24/Bbs, JC 265 M-24/Bbs, JC 270 M-24/Bbs, JC 250 M-24/Bb, JC 255 M-24/Bb, JC 260 M-24/Bb, JC 305 M-24/Abs, JC 310 M-24/Abs, JC 315 M-24/Abs, JC 320 M-24/Abs, JC 325 M-24/Abs, JC 330 M-24/Abs, JC 335 M-24/Abs, JC 330 S-24/Abs, JC 335 S-24/Abs, JC 340 S-24/Abs, JC 345 S-24/Abs, JC 270 S-24/Bbs, JC 280 S-24/Bbs, JC 285 S-24/Bbs

Sanyo	HIP-190BA3, HIP-195BA3, HIP-200BA3, HIP-205BA3, HIT-N215A01, HIT-N220A01, HIT-N225A01
Seraphim	SRP-335-6MA, SRP-340-6MA, SRP-345-6MA, SRP-350-6MA, SRP-360-6MA, SRP-365-6MA, SRP-370-6MA, SRP-375-6MA, SRP-330-6MA-DG, SRP-335-6MA-DG, SRP-340-6MA-DG, SRP-345-6MA-DG, SRP-355-6MA-DG, SRP-360-6MA-DG, SRP-365-6MA-DG, SRP-370-6MA-DG, SRP-280-6MB, SRP-285-6MB, SRP-290-6MB, SRP-295-6MB, SRP-300-6MB, SRP-305-6MB, SRP-310-6MB, SRP-315-6MB, SRP-275-6MB-DG, SRP-280-6MB-DG, SRP-285-6MB-DG, SRP-290-6MB-DG, SRP-295-6MB-DG, SRP-300-6MB-DG, SRP-305-6MB-DG, SRP-310-6MB-DG, SRP-315-6MB-DG, SRP-280-6MB-HV, SRP-285- SRP-280-6MB, SRP-285-6MB, SRP-290-6MB, SRP-295-6MB 6MB-HV, SRP-290-6MB-HV, SRP-295-6MB-HV, SRP-300-6MB-HV, SRP-305-6MB-HV, SRP-310-6MB-HV, SRP-315-6MB-HV, SRP-325-6PA, SRP-330-6PA, SRP-335-6PA, SRP-340-6PA, SRP-320-6PA-DG, SRP-330-6PA-DG, SRP-335-6PA-DG, SRP-340-6PA-DG, SRP-325-6PA-HV, SRP-330-6PA-HV, SRP-335-6PA-HV, SRP-340-6PA-HV, SRP-270-6PB, SRP-275-6PB, SRP-280-6PB, SRP-285-6PB, SRP-265-6PB-DG, SRP-270-6PB-DG, SRP-275-6PB-DG, SRP-280-6PB-DG, SRP-270-6PB-HV, SRP-275-6PB-HV, SRP-280-6PB-HV, SRP-285-6PB-HV
Silfab	SLA280M, SLA285M, SLA290M, SLA295M, SLA300M, SLA310M, SLA315M, SLA320M, SLG335M, SLG340M, SLG345M, SLG350M, SLG355M, SLG360M, SLG370M, SLG380M, SLA320MCH, SLA320MWT
Solaria	PowerXT-350R-AC, PowerXT-355R-AC, PowerXT-360R-AC, PowerXT-320R-BX, PowerXT-325R-BX, PowerXT-325R-PX, PowerXT-330R-PX, PowerXT-340R-BD, PowerXT-345R-BD, PowerXT-345R-PD, PowerXT-350R-PD, PowerXT-355R-PD, PowerXT-360R-PD, PowerXT-410C-PD, PowerXT-420C-PD, PowerXT-430C-PD
SolarWorld (V2.5 frame)	Sunmodule SW series: SW 220 mono and poly, SW 225 poly, SW 230 poly, SW 235 poly, SW 240 mono and poly, SW 245 mono and poly, SW 250 mono, SW 255 mono, SW 260 mono, SW 265 mono, SW 270 mono Sunmodule Plus series: 285W mono, 280W mono, 275W mono, 270W mono, 265W mono, 260W mono, 255W mono, 250W mono, Sunmodule Protect 275W mono, Sunmodule Protect 270W mono, Sunmodule Protect 265W mono, Sunmodule SW 245 - 255 poly / Pro-Series
SolarWorld (33mm frame)	Sunmodule Pro-Series: 250W poly, 255W poly, 260W poly, 315W XL mono, 320W XL mono, 325W XL mono, 330W XL mono, 335W XL mono, 340W XL mono, 345W XL mono, 350W XL mono Sunmodule Plus: 260W mono, 270W mono, 275W mono, 280W mono, 285W mono
Stion	STO-135A, STO-140A, STO-145A, STO-150A
SunEdison	F310EzD, F315EzD, F320EzD, F325EzD, F330EzD, F335EzD, F310EzC, F315EzC, F320EzC, F325EzC, F330EzC, F335EzC, R330EzC, R335EzC, R340EzC, R345EzC, R350EzC, R355EzC

SunPower	SPR-318E-WHT-D, SPR-A400, SPR-A415, SPR-A425, SPR-E19-235, SPR-E19-310-COM, SPR-E19-320, SPR-E20-245, SPR-E20-327, SPR-E20-320-COM, SPR-E20-327-COM, SPR-E20-435-COM, SPR-E20-327-D-AC, SPR-P17-330-COM, SPR-P17-335-COM. SPR-P17-340-COM, SPR-P17-345-COM, SPR-P17-350-COM, SPR-P17-355-COM, SPR-P17-360-COM, SPR-X20-250-BLK, SPR-X20-250-BLK-B-AC, SPR-X20-327-C-AC, SPR-X21-335-BLK, SPR-X21-335-BLK-D-AC, SPR-X21-335-D-AC, SPR-X21-345, SPR-X21-345-COM, SPR-X21-345-D-AC, SPR-X21-350-BLK, SPR-X21-350-BLK-D-AC, SPR-X21-355-BLK, SPR-X21-445-COM, SPR-X21-460-COM, SPR-X21-460-COM, SPR-X21-470-COM, SPR-X22-360, SPR-X22-370, SPR-X22-360-COM, SPR-X22-360-D-AC, SPR-X22-370-D-AC
Trina	TSM-225 PC/PA05, TSM-230 PC/PA05, TSM-235 PC/PA05, TSM-240 PC/PA05, TSM-245 PC/PA05
Yingli	YL230P-29b, YL235P-29b, YL240P-29b, YL245P-29b

Tools Required for Installation

Electric Drill or impact driver. *Note that the use of an impact driver is strongly discouraged for all stainless nut and bolt hardware.*	
3/8” Socket wrench	
Sockets for 3/8” drive sockets, 7/16”, 1/2”, 9/16” and 1-1/16”	
Torque Wrench 3/8” drive, 0 to 35 ft. lbs.	
Anti-seize compound (Permatex 80071 or equivalent).	
Tape measure	
Saws for cutting aluminum posts and rails as necessary	

Torque Values for EZ Tilt-Up Components

These maximum torque values must be adhered to, both for mechanical strength and to insure the performance of the integral grounding and bonding features. It is recommended that anti-seize compound be applied to the screw threads and a torque wrench be used to measure the bolt torque during final assembly.

Hardware	Torque lbs.
1/4-20 Bolts and Hex Flange Nut	7.5 ft. lbs.
1/4-20 Ground Lug, Flange Nut with 7/16 Hex Head	7.5 ft. lbs.
1/4-20 Ground Lug, Setscrew with 1/8 Allen drive.	4.2 ft. lbs. (50 in. lbs.)
1/4-20 Mid or End Clamp, Female Standoff with 7/16" Hex Head Collar Nut	7.5 ft. lbs.
5/16 Lag Bolt	25 ft. lbs.
3/8-16 Bolts and Hex Flange Nuts	15 ft. lbs.
3/8-16 T-Bolts and Hex Flange Nuts	15 ft. lbs.
3/8-16 Setscrew with 3/16" Allen	10 ft. lbs.

EZ Tilt-Up System Overview

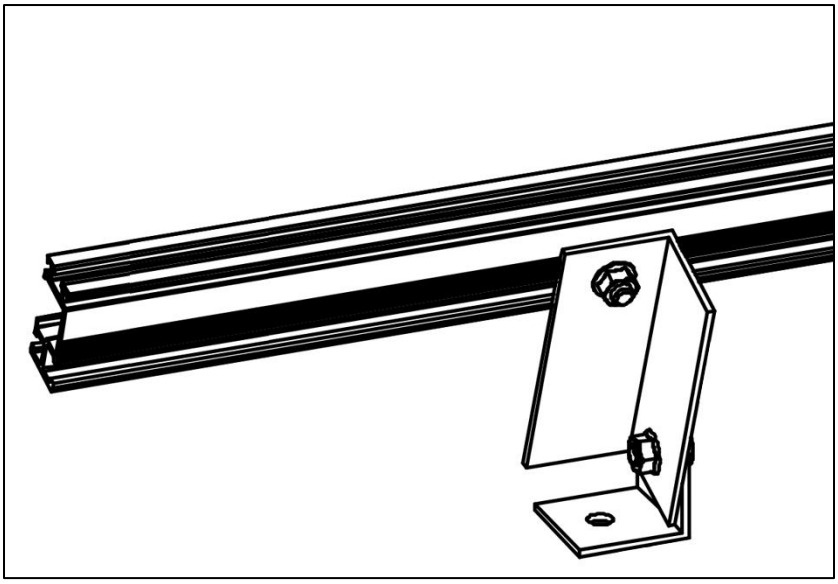
The EZ Tilt-Up System is an adjustable single module row and low point load system that is ideal for light roof structure application. The design has an adjustable tilt leg that offers maximum flexibility and tilt degree options that maximize power output production. The installation is easy and quick which saves labor cost.

Flat Roof Mounting L-Foot combined with a Tilt-Up Rail can give the system any pitch required.

SunModo offers three standard Tilt-Up Rail lengths 8 inch (front leg), and 14 or 25 inch (rear legs) in order to achieve tilt angles of 10 and 20 degrees. A 9-foot full length Tilt-Up Rail is available for on-site cutting.

Alternative Construction

The L-Foot, Front and Rear Tilt-Legs can be fabricated from 2 X 2 X 1/8 inch thick aluminum angle channel. After fabricating these parts follow the instructions below to complete the assembly.



Installation Instructions:

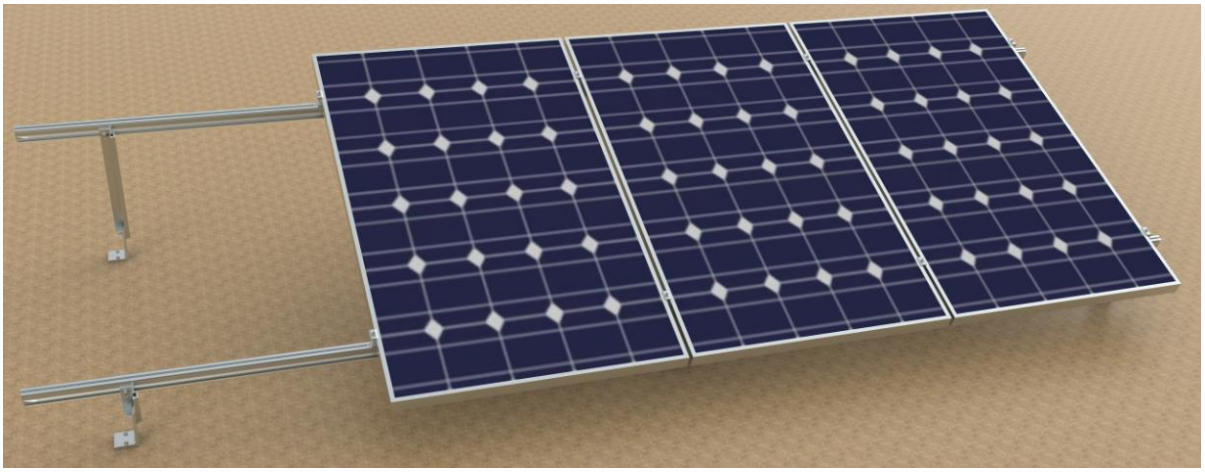
Penetration Sealant System

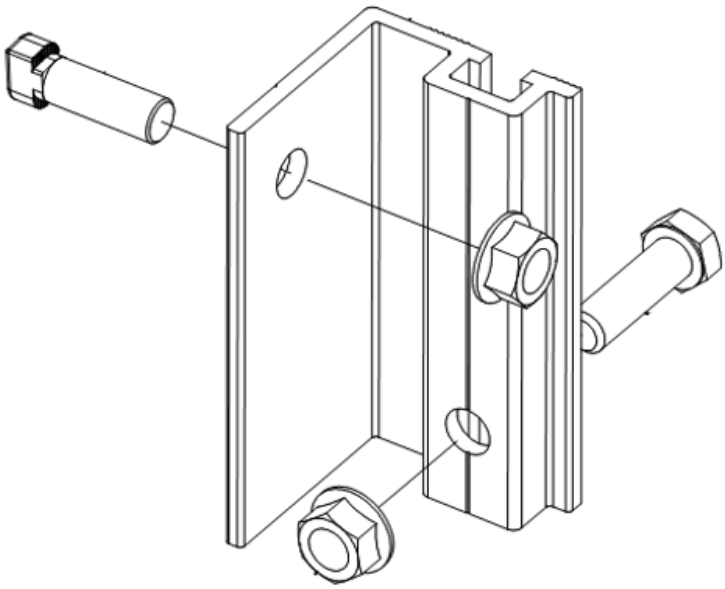
There are a variety of penetration sealing options, your roof installer should specify the type of penetration sealant to be used.

A structural engineer should specify the type of fastener to be used. Follow the manufacturer's recommendation on the installation and torque to be used with a particular fastener type.

EZ Tilt-Up Assembly Example

The EZ Tilt-Up shown below is just one example of the many ways the system can be configured.





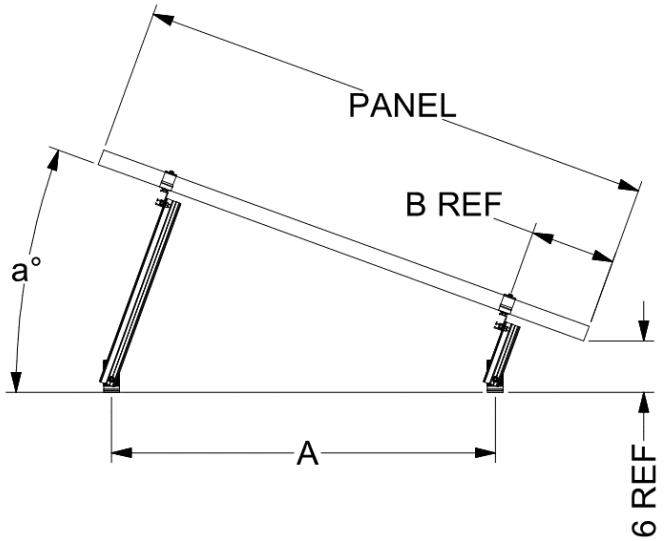
Tilt-Up Kit with hardware: K10284-XXX

EZ Tilt-Up Tilt Angle Selection

The EZ Tilt-Up chart shown below has been provided to help you selected your desired tilt angle. With standard Front Leg length of 8” (K10284-008) select the desired Rear Leg length using the chart below:

Rear Leg Selection Chart

XX CELL PANEL	K10284-0XX	A	B	a°
60 CELL PANEL	K10284-014	39in	13in	10°
60 CELL PANEL	K10284-025	48in	11in	20°
72 CELL PANEL	K10284-014	44in	17in	10°
72 CELL PANEL	K10284-025	48in	15in	20°



As viewed from E-W
Dimensions are reference only

Direct L-Foot Attachment

Secure the L-Foot to the roof using self-tapping anchors. Follow the manufacturer's recommendation on the installation and torque to be used with a particular fastener type. *Self-tapping anchors shown are not provided.*	

Front Rail Attachment

Attach the Front Leg to the L-Foot using 3/8-16 x 1" Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs. Attach the HR150 or HR250 Rail to the Front Leg using 3/8-16 x 1" T-Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs.	

Rear Rail Attachment

Attach the Rear Leg to the L-Foot using 3/8-16 x 1" Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs. Attach the HR150 or HR250 Rail to the Front Leg using 3/8-16 x 1" T-Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs.	

Top Mount Standoff L-Foot Attachment

Secure the Top Mount Standoff to the roof structure using 5/16 Lag Screws.	

Front Rail Attachment

Attach the L-Foot to the Top Mount Standoff. Torque to 15 ft. lbs. Attach the Front Leg to the L-Foot using 3/8-16 x 1” Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs. Attach the HR150 or HR250 Rail to the Front Leg using 3/8-16 x 1” T-Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs.	

Rear Rail Attachment

Attach the L-Foot to the Top Mount Standoff. Torque to 15 ft. lbs. Attach the Rear Leg to the L-Foot using 3/8-16 x 1” Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs. Attach the HR150 or HR250 Rail to the Front Leg using 3/8-16 x 1” T-Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs.	

Side Mount Standoff L-Foot Attachment

Secure the Side Mount Standoff to the roof structure using 5/16 Lag Screws.	

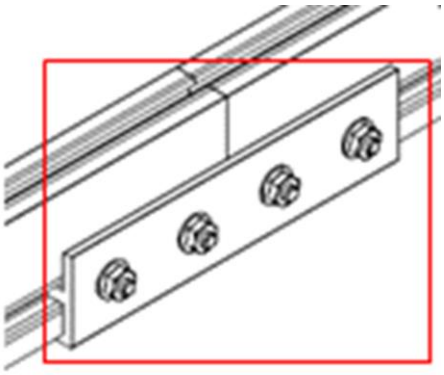
Front Rail Attachment

Attach the Front Leg to the Side Mount Standoff using 3/8-16 x 1” Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs. Attach the HR150 or HR250 Rail to the Front Leg using 3/8-16 x 1” T-Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs.	

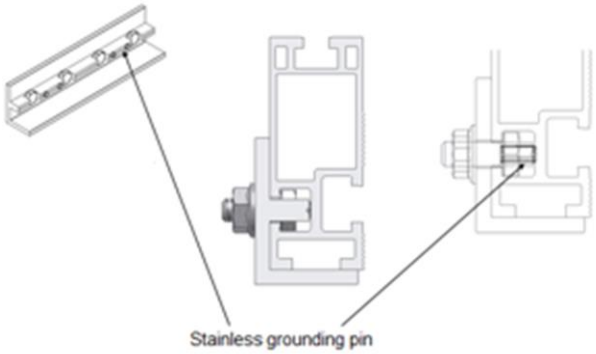
Rear Rail Attachment

Attach the Rear Leg to the Side Mount Standoff using 3/8-16 x 1” Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs. Attach the HR150 or HR250 Rail to the Front Leg using 3/8-16 x 1” T-Bolt and 3/8-16 Flange Nut. Torque to 15 ft. lbs.	

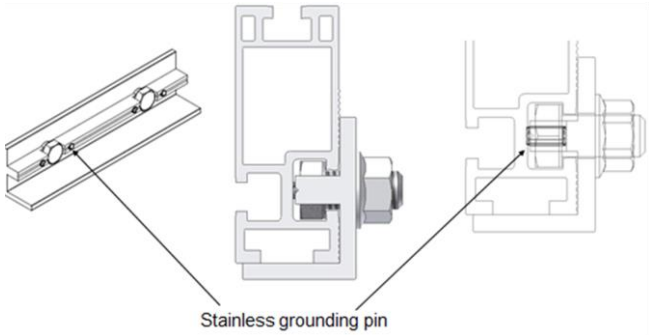
Rail Splice Installation – 1/4 or 3/8

Where rail splicing is required, either the 2 bolts for the 3/8” rail slot or the 4 bolts for the 1/4” rail slots can be used. Shown is the 4 bolts for the 1/4” rail slot version.	

1/4 Rail Splice to Rail Sections

Where a splice is required for the Rail, the splice should be inserted before the Rail is fastened in place. Slide the Rail Splice onto the end of the Rails and center. Torque 1/4” Flange Nuts to 7.5 ft. lbs.	

3/8 Rail Splice to Rail Sections

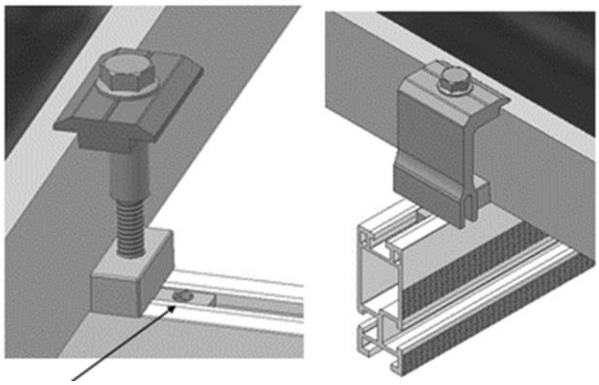
Where a splice is required for the Rail, the splice should be inserted before the Rail is fastened in place. Slide the Rail Splice onto the end of the Rails and center. Torque 3/8” Flange Nuts to 15 ft. lbs.	

Clamp Installation – Portrait Orientation

Proceed with the mounting of the PV panels using the mid and end clamps. Specific mounting instructions are shown in the following sections for Portrait and Landscape mounting.

Installing Mid Clamps: A mid clamp is used between PV panels. It will produce 1/2" spacing between PV panel frames.

An End Clamp is used to secure PV panels at the ends of a row.

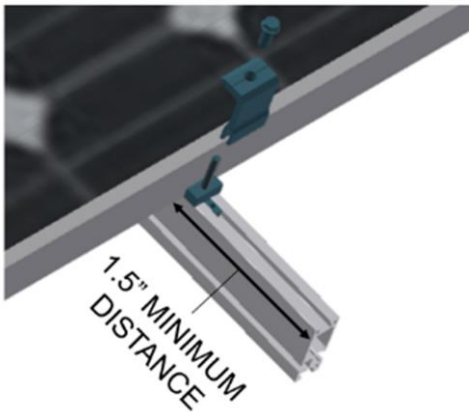


End Clamp Installation

There must be a minimum of 1.5 inches of Rail extending beyond the PV panel frame.

Clamp the PV panel frame by inserting the T-Bolt into the Rail slot. Position the End Clamp firmly against the PV panel frame and secure using the 1/4-20 Collar Bolt. Using a 7/16" socket, torque to 7.5 ft. lbs.

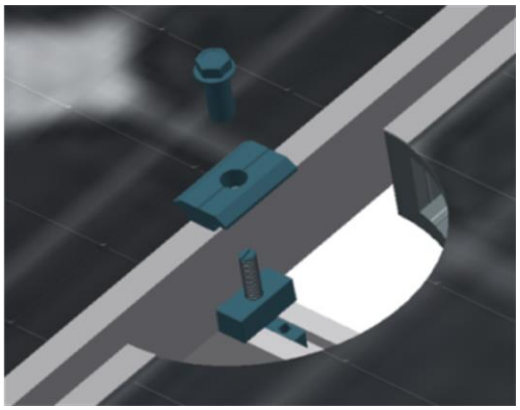
Note: When two or more PV panels are installed grounding via the End Clamp is optional. For a single panel configuration (shown), insert the T-Bolt into a T-Bolt Holder for grounding the panel to the Rails.



Mid Clamp Attachment

Insert the T-Bolt in the Rail slot and turn clockwise 90° to engage the head into the slot. Insert Grounding T-Bolt Holder to lock T-Bolt in place.

Thread the 1/4-20 Collar Bolt onto the top of the T-Bolt as shown. After positioning the Mid Clamp firmly against the PV panel frame, using a 7/16" socket, tighten to 7.5 ft. lbs.

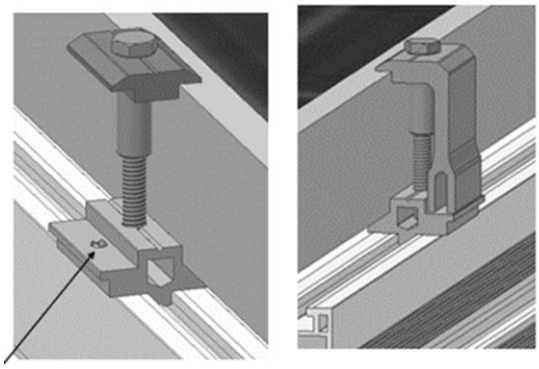


Clamp Installation – Landscape Orientation

Proceed with the mounting of the PV panels using the mid and end clamps. Specific mounting instructions are shown in the following sections for Portrait and Landscape mounting.

Installing Mid Clamps: A mid clamp is used between PV panels. It will produce 1/2" spacing between PV panel frames.

An End Clamp is used to secure PV panels at the ends of a row.

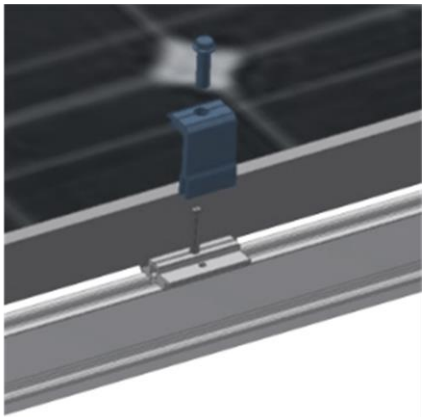


Landscape End Clamp Installation

End Clamps are used at the ends of a row of PV panels.

Insert the T-Bolt in the Rail slot and turn clockwise 90° to engage the head into the slot. Insert Grounding T-Bolt Holder to lock T-Bolt in place.

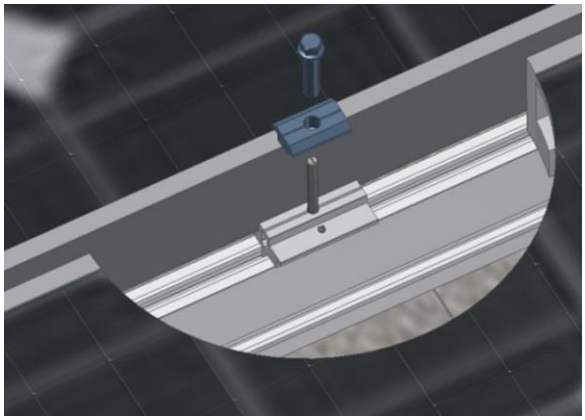
Thread the 1/4" Collar Bolt onto the top of the T-Bolt as shown. After positioning the End Clamp firmly against the PV panel frame, using a 7/16" socket, tighten to 7.5 ft. lbs.



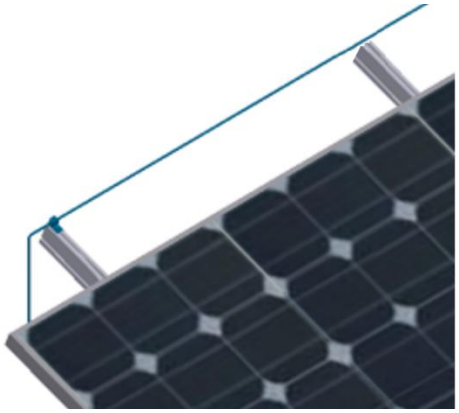
Mid Clamp Installation

Insert the T-Bolt in the Rail slot and turn clockwise 90° to engage the head into the slot. Insert Grounding T-Bolt Holder to lock T-Bolt in place.

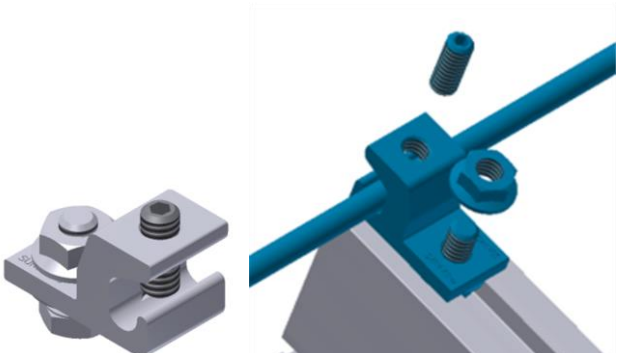
Thread the 1/4" Collar Bolt onto the top of the T-Bolt as shown. After positioning the Mid Clamp firmly against the PV panel frame, using a 7/16" socket, tighten to 7.5 ft. lbs.



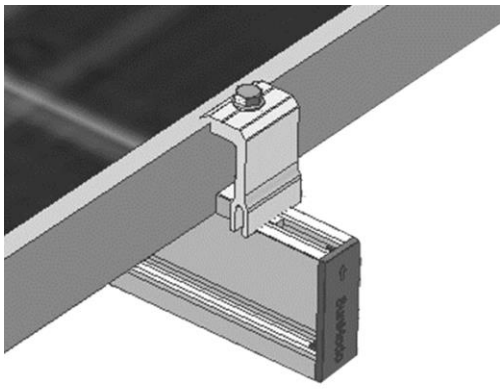
Ground Wire Attachment

The picture shows a grounding lug mounted on one Rail per row of panels, and a #6 solid copper grounding wire connecting the Ground Lugs to the building ground per NEC 690.47.	

Ground Lug Installation

One Rail per row of panels should have a Ground Lug for fastening the ground conductor to the array. The Ground Lug is mounted on the top or side of the Rail using a special 1/4” T-Bolt, Grounding Spacer, and Flange Nut. Grounding Lugs K10179-001, and detailed installation document D10003 are available from SunModo separately.	

Rail End Covers

Rail End Covers can be attached to the mounting rails as shown.	

UL 2703 Label Placement

When requested the UL 2703 Label can be located on East-West running Rail or Beam.

See www.sunmodo.com for current warranty documents and information.

SunModo Corporation
14800 NE 65th Street
Vancouver, WA 98682
Ph: 360-844-0048