

APPLICATION:

The GroundTrac system is designed with a minimum amount of installed footings at greatly reduced labor. The system integrates with ordinary 1-1/2" schedule #40 galvanized water pipe. This ground mount solution includes virtually everything needed to install modules with vertical posts up to 5' from rear footing, 30" from front footing. The installer will only need pipe, concrete and basic construction skills to complete the installation. This fully engineered system utilizes Professional Solar Products' patented Slide-n-Clamp[™] module clamps and support rail.



WARNING

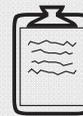
All Professional Solar Products (ProSolar) are engineered and tested to withstand stated specifications (as stated on published specification sheets) when installed properly. Failure to install properly may decrease the performance of the installation.



SAFETY

All regional safety requirements should be followed when installing Professional Solar Products. All equipment/tools should be properly maintained and inspected prior to use. This installation manual is intended for use by professional installers with a working knowledge of construction principles.

Symbol Legend



Explanation or Install Tip



Important product performance information



Critical for Safety

Tool List

- Post hole digger or powered auger
- ProSolar grade stake kit
- Cordless drill
- 1/2" wood drill bit
- 1/2" & 9/16" deep socket & ratchet (or impact gun)
- Sledge hammer (small-approx. 14")
- 3-1/2" (min) C-clamps
- String Line and line level OR builders/laser level
- Pipe wrenches (two required)
- Tape Measure
- 3/16" long-arm hex wrench
- Torque wrench with 3/16" hex bit socket
- Cordless reciprocating saw/ band saw
- Wheelbarrow or concrete pump
- 1/2" Irwin[®] #10 UniBit[™]
- Framing square
- Sharpie[™] marker

Installation steps overview

- | | | |
|------------------------------------------|-----------------------------------------|------------------------------------------------------|
| 1) Dig footings | 5) Insert pipe and center | 8) Pour concrete |
| 2) Assemble re-usable grade stake forms | 6) Fasten Drop-N-Lock / U-bolt Assembly | 9) Remove re-usable stakes and install solar modules |
| 3) Insert grade stakes / lay pipe & tees | 7) Attach rail spacers every 10' | 10) Completed installation |
| 4) Measure & cut vertical pipes | | |

Step 1: Dig footings

Dig footings.

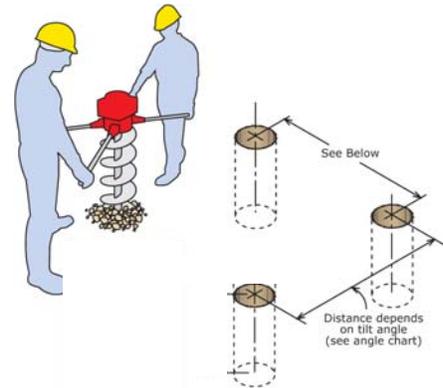
Lateral footing spans listed on page 6.

Front to rear footing spans listed in angle charts on page 6.

See engineering for general footing specifications.

(Footing depths may vary depending on site specific conditions such as sloped hillsides. Review site specific requirements with local building department as necessary.)

To speed up installation it is recommended to use a 12" power auger to dig your footings.



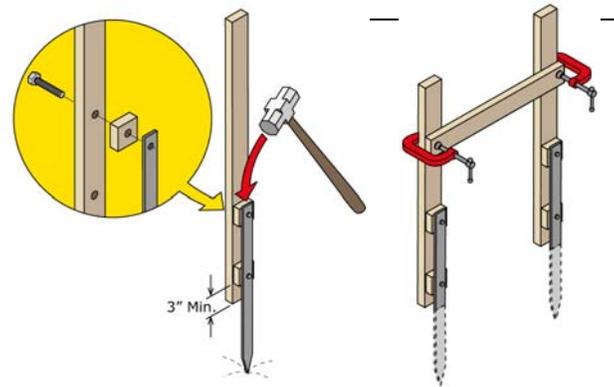
Step 2: Build grade stake forms

Assemble re-usable ProSolar grade stakes).

Recommend 2"x4" vertical support. Drill 2" x 4" with 1/2" drill bit using grade stake as hole template.

Assemble bolt, washer, spacer block and grade stake and tighten using 9/16" socket. Attach 1"x 4" wooden horizontal support using 3-1/2" (min.) C-clamps.

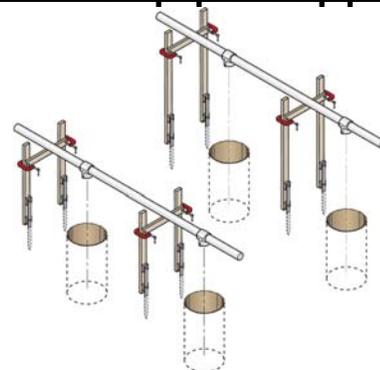
Grade stake kit includes: 24" threaded metal stakes, aluminum spacer blocks, bolts and washers.



Step 3: Insert grade stakes and lay horizontal pipe support

Drive grade stakes with sledgehammer beside each footing and level 1" x 4" supports using string line/line level or laser level.

Place horizontal 1-1/2" schedule 40 galvanized pipe with slip-on Hollaender® Tees along 1" x 4" supports. Adjust C-clamps as necessary to level pipe. Use pipe wrenches to couple pipe lengths as necessary.



Step 4: Measure pipe heights and cut

Measure vertical pipe lengths with measuring tape from bottom of footing to horizontal pipe. Deduct 2" from length to avoid pipe contact with bottom of footing moisture. Note measured lengths.

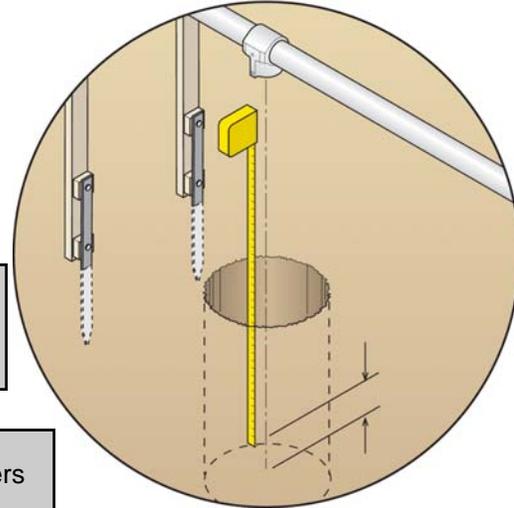
Cut pipe lengths using a chop saw, reciprocating saw, or portable band saw



Use only 1-1/2" Schedule #40 Galvanized water pipe (not fence tube) for your supports.



Standard 21' length water pipe with pre-attached couplers readily available at plumbing supply houses.



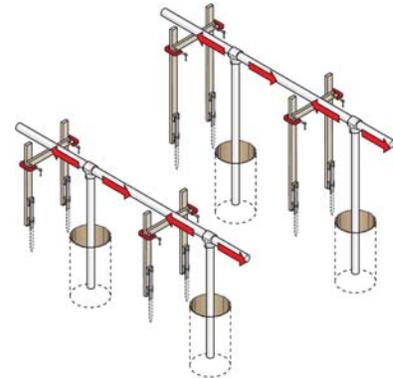
Step 5: Insert vertical support pipes and center

Insert vertical pipes into tees and fasten lower tee set screw with long-arm hex key.

Center vertical pipes in footings by sliding left or right.



1-1/2" Schedule 40 pipe max end overhang of 2 feet.

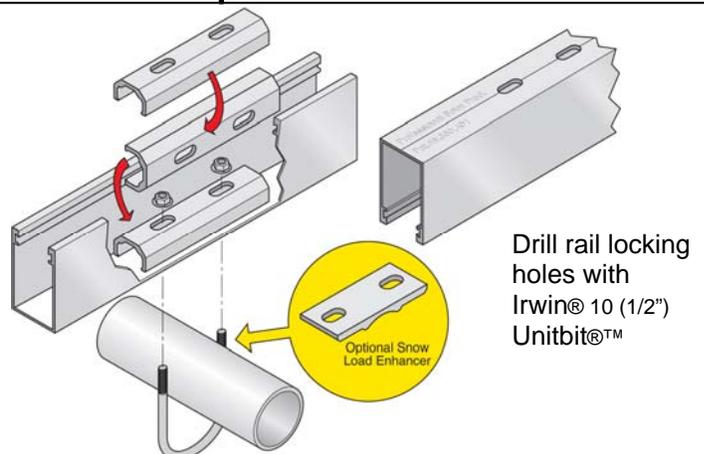


Step 6: Attach initial support rails with Drop-N-Lock U-bolt assembly

Rest pre-slotted rail on top of horizontal pipes and insert U-bolt. Place Drop-N-Lock support rail insert into the rail and align with U-bolt. Hand tighten nuts.



U-bolt nuts should be evenly tightened to avoid u-bolt misalignment.

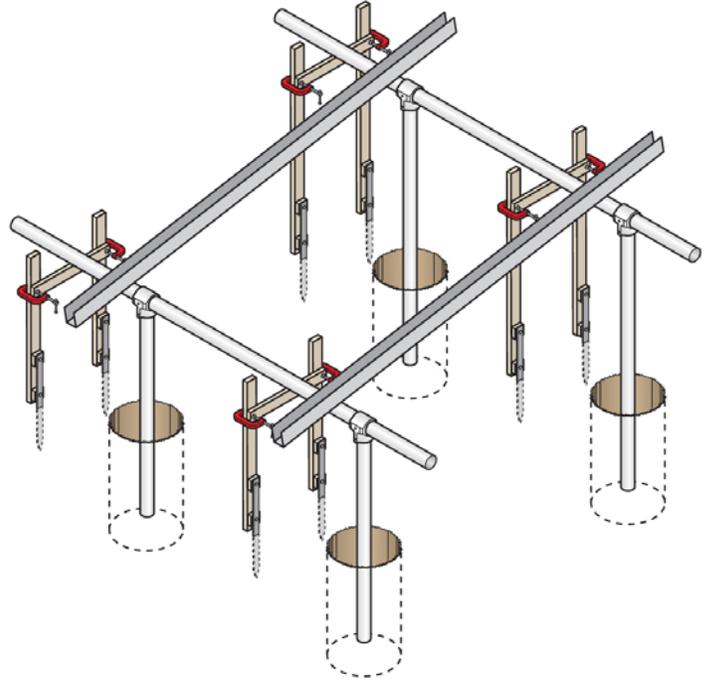


Drill rail locking holes with Irwin® 10 (1/2") Unitbit™

Step 7: Attach support rails (spacers) every 10'

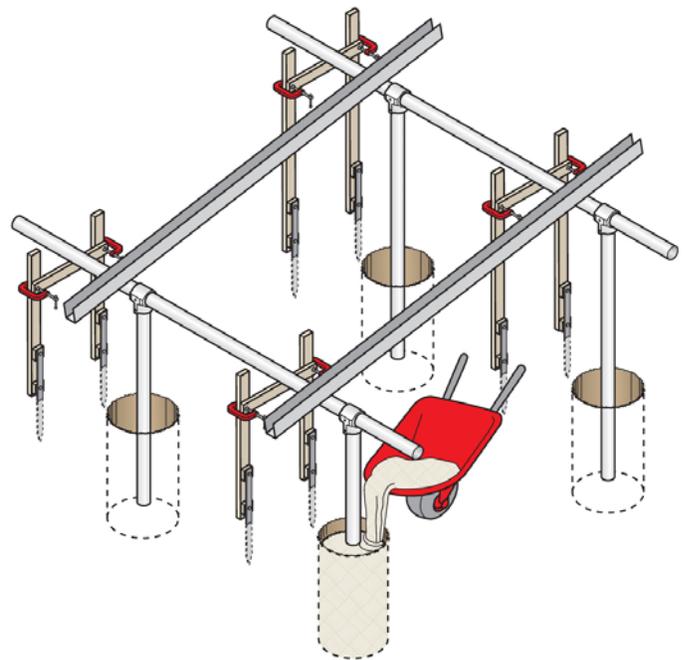
Install at least one rail approximately every 10' for proper pipe spacing.

If not using slotted rail, see page 7 for drilling rail locking holes.



Step 8: Pour concrete

Pour or pump mixed concrete into footings.
Let cure.



Extruded edges of the aluminum can be sharp. Treat any sharp edges as necessary to prevent injury.

Step 9: Remove re-usable forms and install modules

Remove grade stakes. Tighten all tee set screws, both upper and lower, to 17 ft-lbs with torque wrench and hex bit socket.

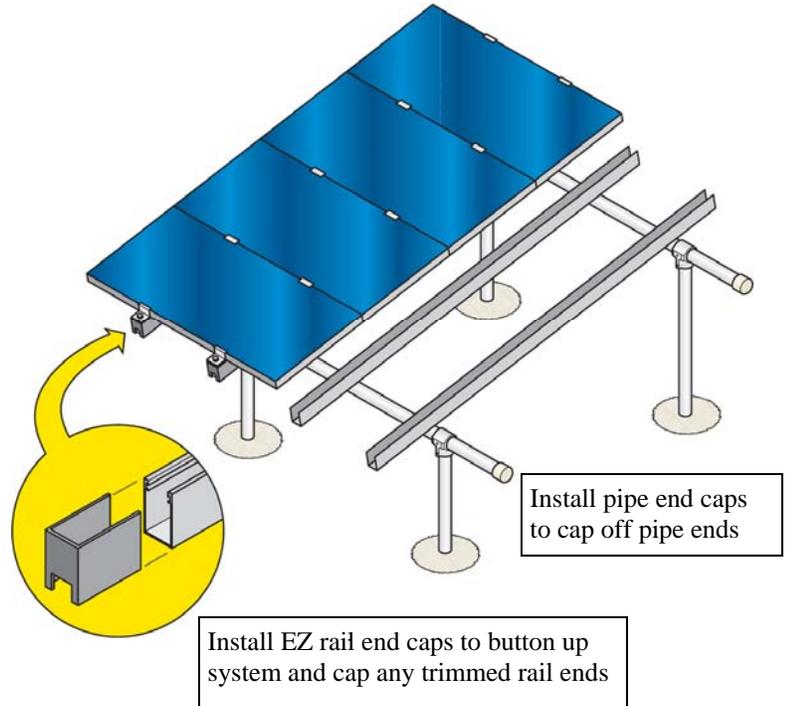
Adjust initial rails to final location. Install remaining rails.

Tighten all U-bolt nuts evenly with 1/2" socket or impact gun .

Install solar modules with pre-assembled ProSolar clamping hardware.

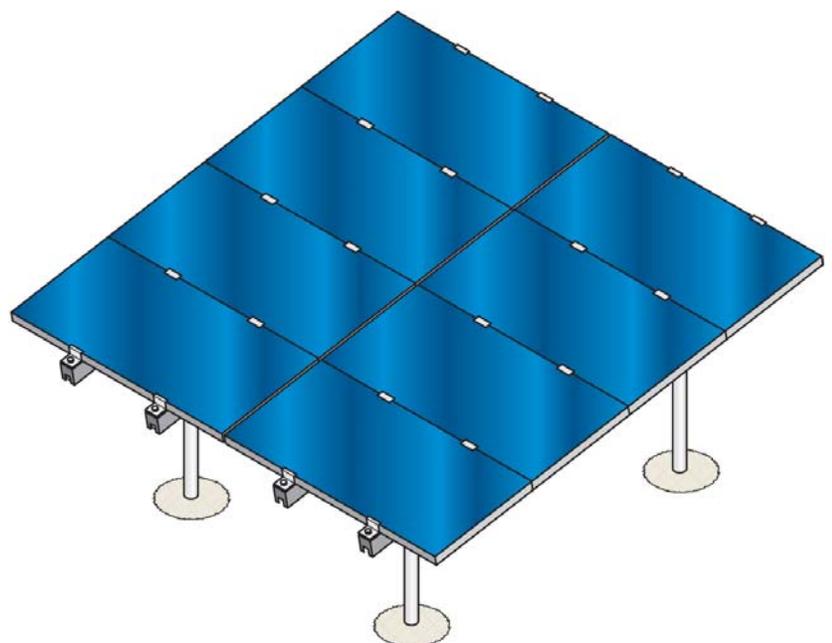
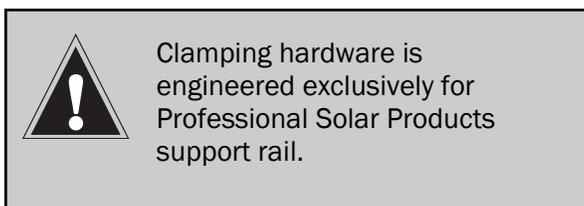
Install ProSolar EZ rail end caps with adhesive.

Install 1-1/2" plastic pipe end caps for schedule 40 pipe as necessary.

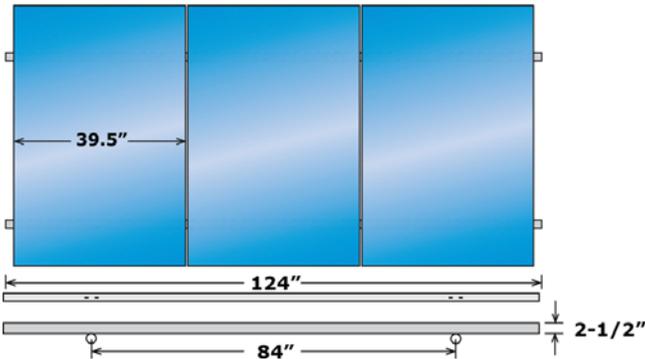


Step 10: Completed GroundTrac® Installation

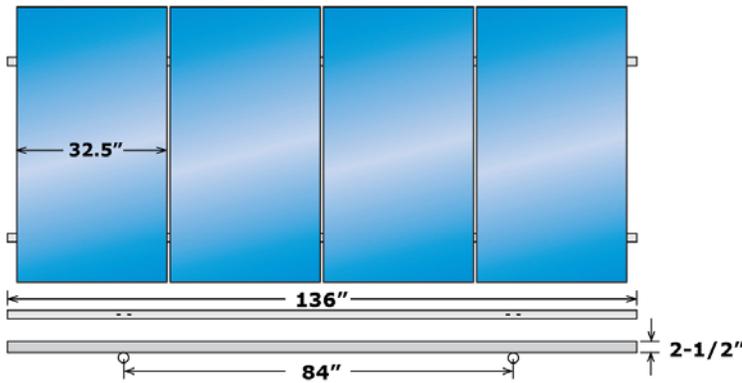
Completed GroundTrac® Installation.



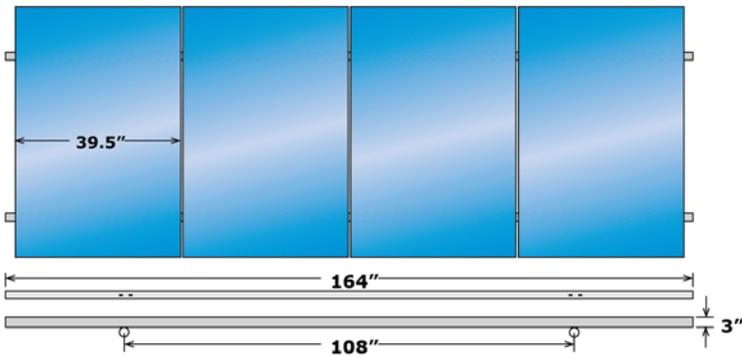
124" x 2-1/2" Support Rail
Supports up to (3) 39.5" Wide Modules



136" x 2-1/2" Support Rail
Supports up to (4) 32.5" Wide Modules

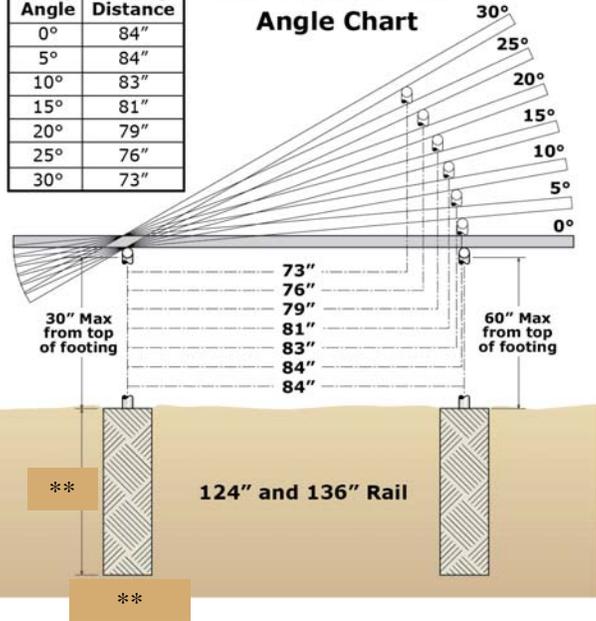


164" x 3" Support Rail
Supports up to (4) 39.5" Wide Modules



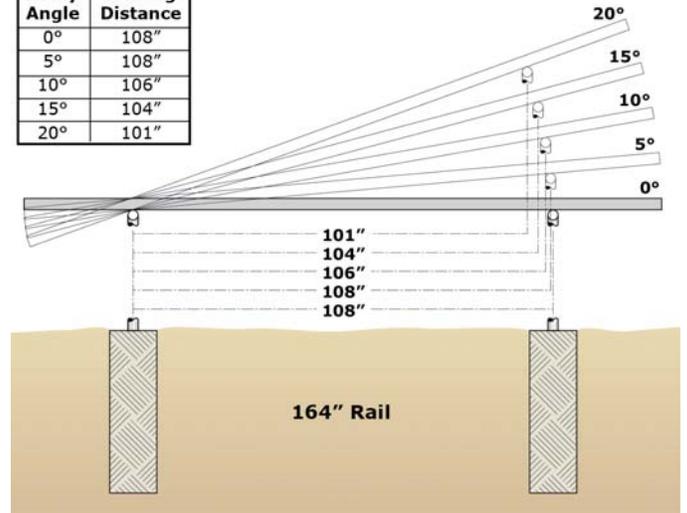
Array Angle	Footing Distance
0°	84"
5°	84"
10°	83"
15°	81"
20°	79"
25°	76"
30°	73"

**124" and 136" Rail
Angle Chart**



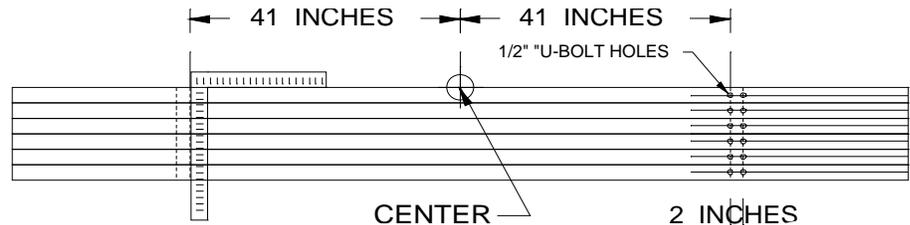
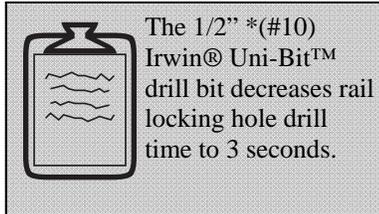
**164" Rail
Angle Chart**

Array Angle	Footing Distance
0°	108"
5°	108"
10°	106"
15°	104"
20°	101"



GroundTrac® Rail Sizes	124" x 2-1/2"	136" x 2-1/2"	164" x 3"
Number of Modules	(3) 39.5" wide modules	(4) 32.5" wide modules	(4) 39.5" wide modules
Lateral footing span (max) non-snow load	10'	10'	8'
Lateral footing span (max) 30 lb/ft² snowload	6'	6'	Not snowload rated
Front to back footing spacing	See Angle Chart	See Angle Chart	See Angle Chart
Pre-slotted rails at:	84" on Center	84" on Center	108" on Center

Step 11: Drilling holes for rails



If not using pre-slotted rails, use the 1/2" diameter Irwin™ Uni-Bit® (#10) short nose drill bit to drill U-bolt assembly rail locking holes.

124" & 136" Support Rail Lengths (see page 6 for span illustration)

Upper pipe to lower pipe span (distance between U-bolts): 84" on center
U-bolt locking holes 41" from center (see above illustration)

164" Support Rail Length (see page 6 for span illustration)

Upper pipe to lower pipe span (distance between U-bolts): 108" on center
U-bolt locking holes 53" from center (not shown)

Align several rails side by side, as shown.

Using a square and Sharpie™ marker, mark hole locations along integrated rail bottom drill guide.

Drill marked locations with cordless drill and Uni-Bit® speed drill bit



Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	100779407LAX-003	Original Issued: 14-Sep-2012	Revised: 28-Apr-2015
Standard(s)	UL Subject 2703 - Outline of Investigation Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels. Issue #2: 2012/11/13		
Applicant	Professional Solar Products, Inc.	Manufacturer	Professional Solar Products, Inc.
Address	1551 S. Rose Avenue Oxnard, CA 93033	Address	1551 S. Rose Avenue Oxnard, CA 93033
Country	USA	Country	USA
Contact	Stan Ullman	Contact	Stan Ullman
Phone	(805) 486-4700	Phone	(805) 486-4700
FAX	(805) 486-4799	FAX	(805) 486-4799
Email	s@prosolar.com	Email	s@prosolar.com

2.0 Product Description	
Product	Photovoltaic Racking System
Brand name	ProSolar
Description	<p>The product covered by this listing report is a rack mounting system. It is designed to be installed on a roof. It will be secured by means of Fast Jack or Tile Trac attachments, depending on the type of roof it is intended to be installed upon. The Rooftrac mounting system is comprised of support rails and top-down clamping hardware. This device can be used on most standard construction residential roof-tops.</p> <p>This system is in compliance with the mounting, bonding and grounding portions of UL Subject 2703. This system has the following fire class resistance ratings: Class A for Steep Slope Applications when using Type 1 or Type 2, Listed Photovoltaic Modules. Class A for Steep Slope Applications when using Type 2, Listed Photovoltaic Modules with or without the wind skirt. Class A for Low Slope Applications when using Type 1, Listed Photovoltaic Modules when a minimum of 12" gap between the roof surface and the bottom of the module is maintained. Class A for Low Slope Applications when using Type 2, Listed Photovoltaic Modules when a minimum of 14" gap between the roof surface and the bottom of the module is maintained.</p> <p>RoofTrac has different types of bonding and grounding, below is a list of them: Bonding of module-to-Roof Trac rail via Weeb PMC Bonding of module-to-RoofTrac rail via ProSolar rail channel nut using buss bar Bonding of module-to-Roof Trac rail via IlSCO SGB-4 lugs Bonding of Roof Trac rail-to-Roof Trac rail via Weeb Bonding Jumper-6.7 Bonding of Roof Trac rail-to-Roof Trac rail via IlSCO SGB-4 Lugs Bonding of RoofTrac rail-to-RoofTrac rail via ProSolar UL 467 tested universal splice kit (Splice Insert and Splice Support)</p> <p>Issuance of this report is based on testing to PV module frames with a height of 1 1/4 inch to 2 inches</p> <p>The grounding of the entire system is intended to be in accordance with the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems. Any local electrical codes must be adhered in addition to the national electrical codes.</p> <p>This product investigation was performed only with respect to specific properties, a limited range of hazards, or suitability for use under limited or special conditions. The following risks and other properties of this product have not been evaluated: electric shock, Ultraviolet light exposure.</p>
Models	RoofTrac
Model Similarity	N/A
Ratings	Fuse rating: 20 A Mechanical Load: 30 PSF Fire Class Resistance Rating: Class A for Steep Slope Applications when using Type 1 and Type 2, Listed Photovoltaic Modules. Class A for Low Slope Applications when using Type 1 and Type 2, Listed Photovoltaic Modules
Other Ratings	Mechanical load was tested using 60 Cell Canadian Solar Modules model CS6P with 40mm frame height and maximum span of 48 inches using 4 inch and 6 inch TileTrac or FastJack posts with 1-1/2 inch tall RoofTrac rail. And maximum span of 72 inches using 4 inch and 6 inch TileTrac or FastJack with 2-1/2 inch tall RoofTrac rail.