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.

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

Symbol Legend

<table>
<thead>
<tr>
<th>Explanation or Install Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important product performance information</td>
</tr>
<tr>
<td>Critical for Safety</td>
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</table>

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Foot note: See engineering for general footing specifications.
**Installation steps overview**

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

---

**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.

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**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 incudes: 24” threaded metal stakes, aluminum spacer blocks, bolts and washers.

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**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.

![Warning]
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.

![Warning]
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.

![Warning]
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.

Clamping hardware is engineered exclusively for Professional Solar Products support rail.
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

GroundTrac® Rail Sizes

<table>
<thead>
<tr>
<th>Number of Modules</th>
<th>124” x 2-1/2”</th>
<th>136” x 2-1/2”</th>
<th>164” x 3”</th>
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</thead>
<tbody>
<tr>
<td>(3) 39.5” wide modules</td>
<td>10’</td>
<td>10’</td>
<td>8’</td>
</tr>
<tr>
<td>Lateral footing span (max) non-snow load</td>
<td>10’</td>
<td>10’</td>
<td>8’</td>
</tr>
<tr>
<td>Lateral footing span (max) 30 lb/ft² snowload</td>
<td>6’</td>
<td>6’</td>
<td>Not snowload rated</td>
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<tr>
<td>Front to back footing spacing</td>
<td>See Angle Chart</td>
<td>See Angle Chart</td>
<td>See Angle Chart</td>
</tr>
<tr>
<td>Pre-slotted rails at:</td>
<td>84” on Center</td>
<td>84” on Center</td>
<td>108” on Center</td>
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</table>
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.
## 1.0 Reference and Address

<table>
<thead>
<tr>
<th>Report Number</th>
<th>Original Issued:</th>
<th>Revised:</th>
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<table>
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<tr>
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<tr>
<td>USA</td>
<td>Stan Ullman</td>
<td>(805) 486-4700</td>
<td>(805) 486-4799</td>
<td><a href="mailto:s@prosolar.com">s@prosolar.com</a></td>
</tr>
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### 2.0 Product Description

<table>
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<tr>
<th>Product</th>
<th>Photovoltaic Racking System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand name</td>
<td>ProSolar</td>
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</table>

#### Description

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.

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.

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)

Issuance of this report is based on testing to PV module frames with a height of 1 1/4 inch to 2 inches.

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.

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.

<table>
<thead>
<tr>
<th>Models</th>
<th>RoofTrac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Similarity</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### 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.