

APPLICATION:

The GroundTrac® system is designed with a minimum amount of installed footings at greatly reduced labor. The system integrates with Professional Solar (ProSolar®) UL2703 listed and patented RoofTrac® “top-down” clamps and support rails. 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 ProSolar® products are engineered and tested to withstand stated specifications (as stated on published engineering documents) when installed properly. Failure to install properly may decrease the performance of installation.



SAFETY:

All regional safety requirements should be followed when installing ProSolar® products. All tools and equipment should be secured to avoid falling object hazards. All equipment/tools should be properly maintained and inspected prior to use. Any exposed studs should be protectively capped to avoid injury. This racking system may be used to ground and/or mount a PV module complying with UL 1703 only. 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
- 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
- Optional: GroundTrac® Drill Guide

Dig footings

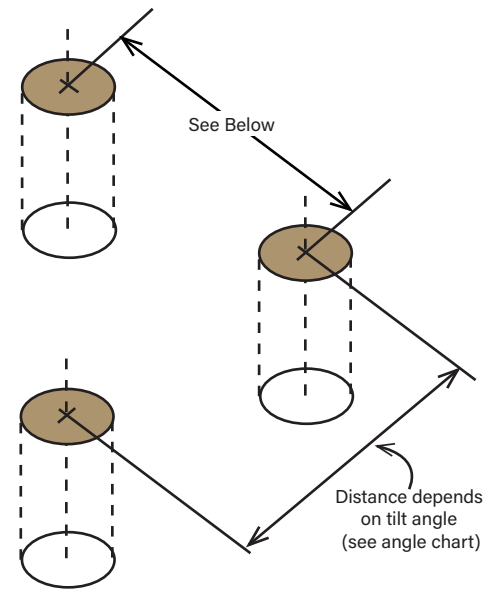
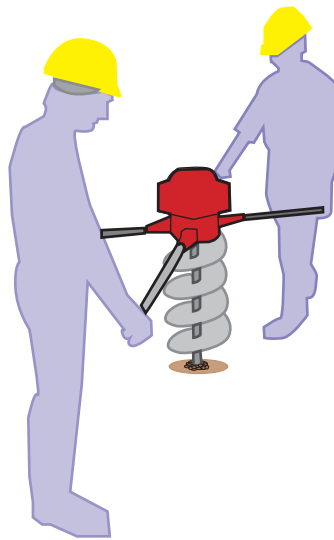
Dig footings.

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.)

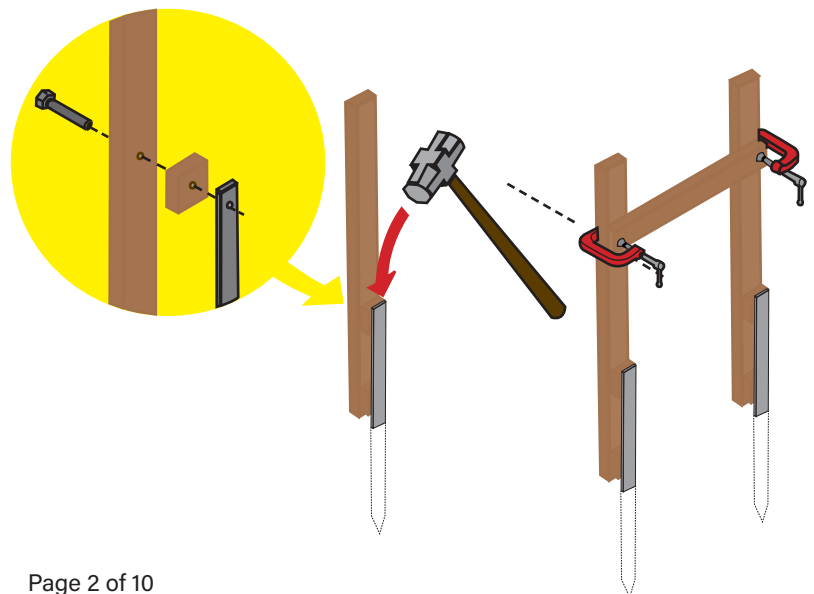


To speed up installation it is recommended to use a 12" power auger to dig your footings.

Build grade stake forms

Assemble re-usable ProSolar grade stakes). Recommend 2" x 4" 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.

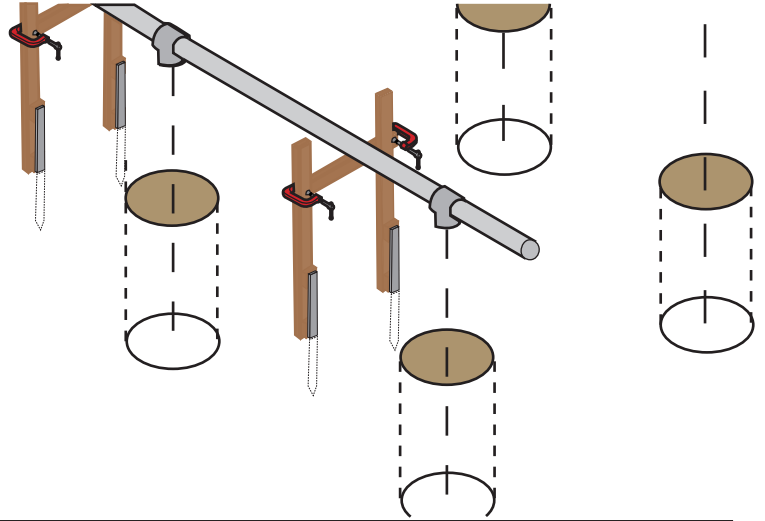


Insert grade stakes and lay horizontal pipe support

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.

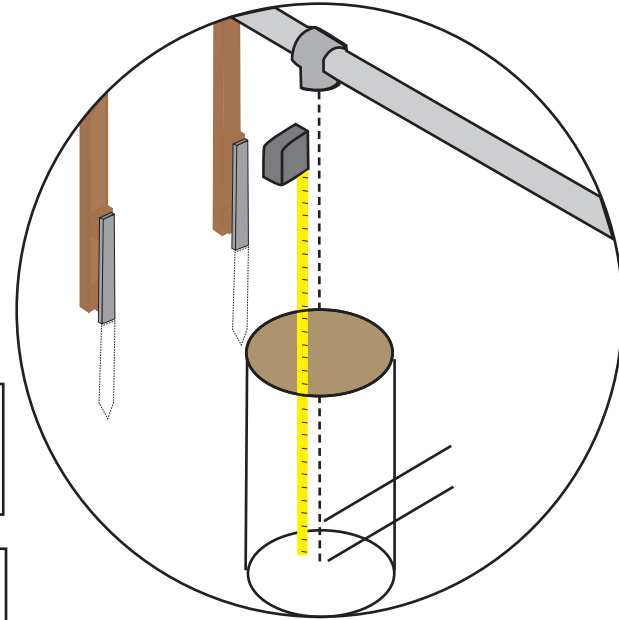
24" max. pipe overhang from end vertical support



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.



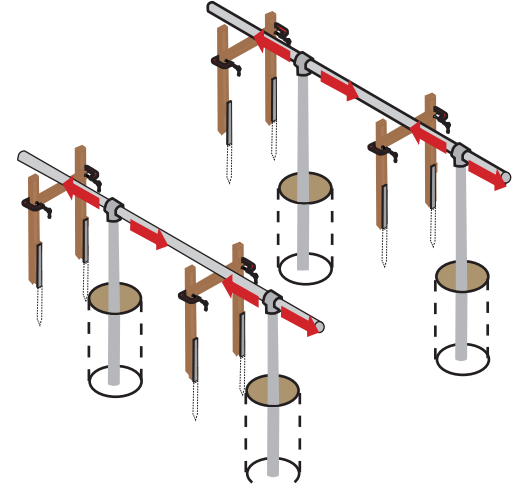
Standard 21' length water pipe with pre-attached couplers readily available at plumbing supply houses.

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.

Mark & drill rails (see online GroundTrac® Drill Guide video for tips and visual representation.)



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

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

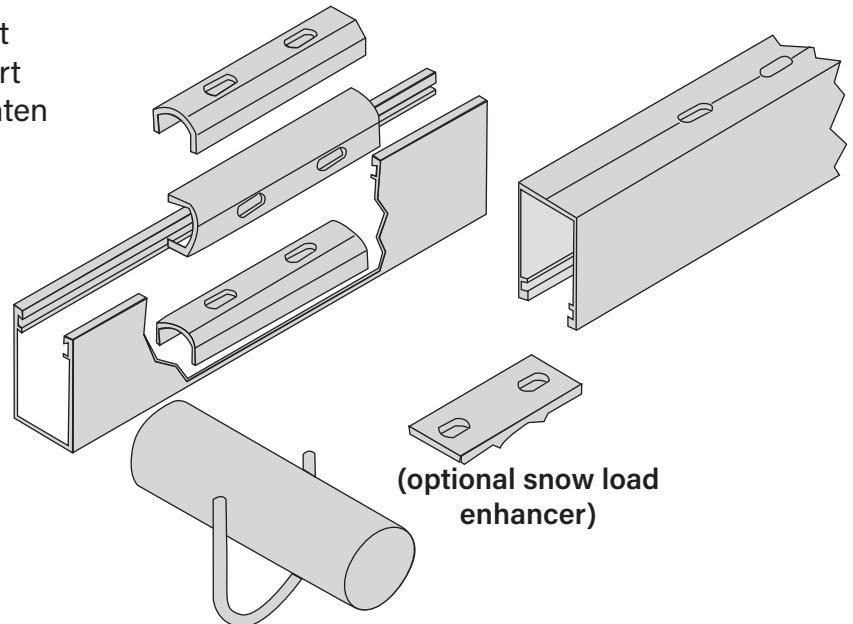
Rest rail on top of horizontal pipes and insert U-bolt. Place Drop-N-Lock support rail insert into the rail and align with U-bolt. Hand tighten nuts.



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

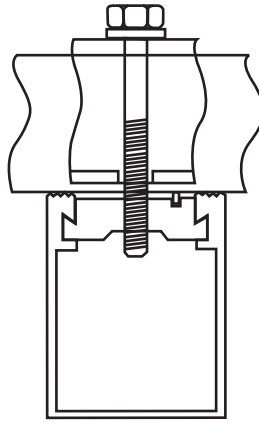
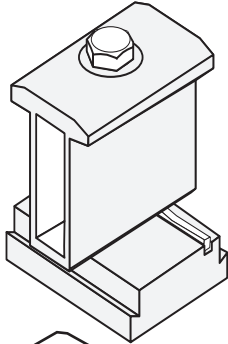


Drill rail locking holes with Irwin® 10 (1/2") Unitbit®™



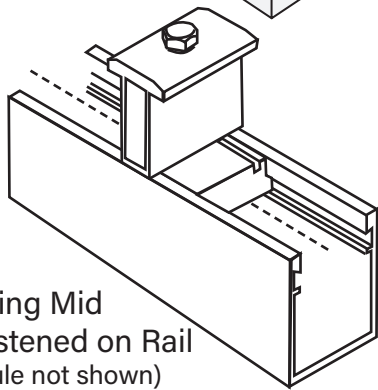
Bonding and Grounding (Patent Pending)

Assembled
Self-bonding
Mid Clamp With
SS Bus Bar



Side view of
Grounding

Self-bonding Mid
Clamp Fastened on Rail
(Solar Module not shown)



For bonding module frame and clamps to support rail
Fasten pre-assembled mid-clamp assembly to module frame, to 15 ft-lbs.

Grounding of module to RoofTrac® rail via ProSolar® rail channel nut using bus bar.

Bonding of RoofTrac® rail to RoofTrac® rail via ProSolar® UL2703 tested universal splice kit (splice insert and splice support).

Grounding of RoofTrac® rail or module via IlSCO SGB-4 lug.

System to be grounded per National Electrical Code (NEC), ANSI/NFPA 70. Grounding conductor shall be solid copper wire, 8 AWG minimum. See NEC and/or Authority Having Jurisdiction (AHJ) for site-specific grounding requirements prior to installation. See final run (racking to ground electrode) grounding equipment installation instructions for specific installation information.

Grounding Wire Installation

FOR GROUNDING CONNECTION

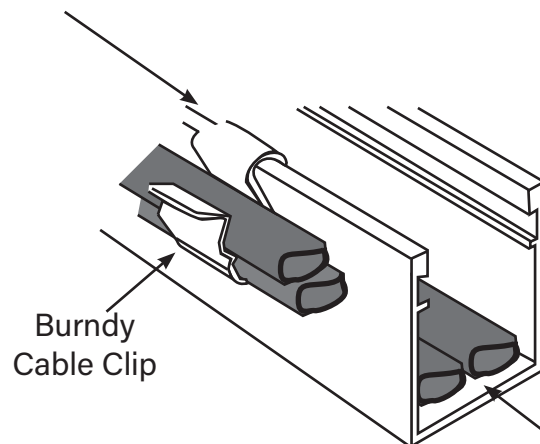
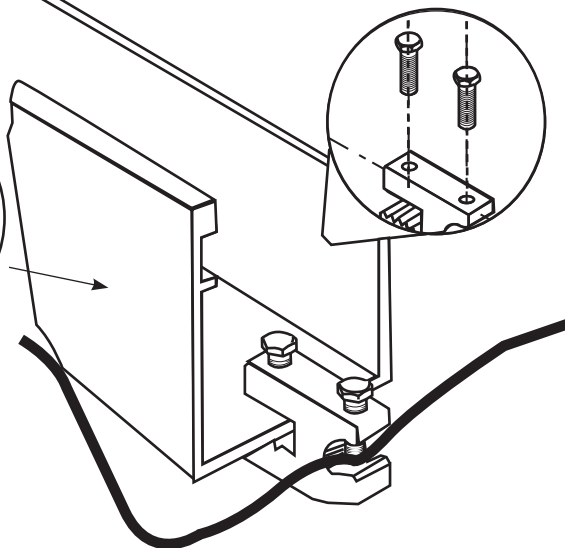
- ILSCO SGB-4 rail ground connection
- Fasten both terminals to 35 in-lbs
- Ensure that copper wire does not touch aluminum; Recommended 1/4" clearance.

Burndy Cable Clip: Cable Management

Outdoor rated, insulated wire, such as quick connect cables, can be nested inside the RoofTrac® support rail or held in place with approved cable clip such as Burndy ACC-R2 (for Microinverter trunk cable) and ACC-R4 (for PV wire) clips.

Uninsulated copper grounding wire must never be placed inside the aluminum rail – it should be kept at a distance of at least 1/4" away from the aluminum rail.

UL 2703 approved
label applied
within 12" of end
of rail.



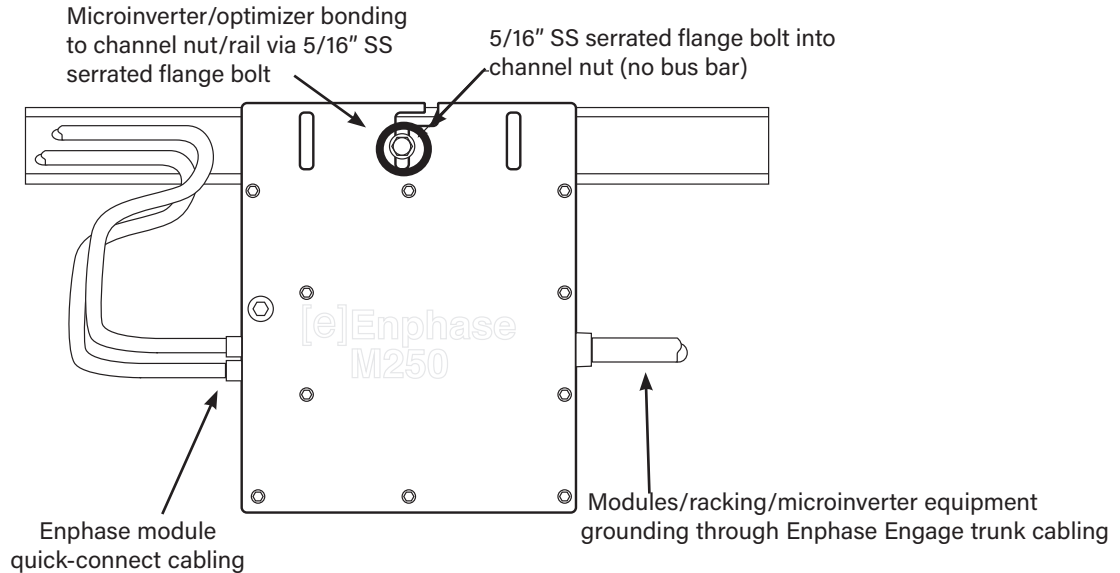
Burndy
Cable Clip

Wire
Nesting

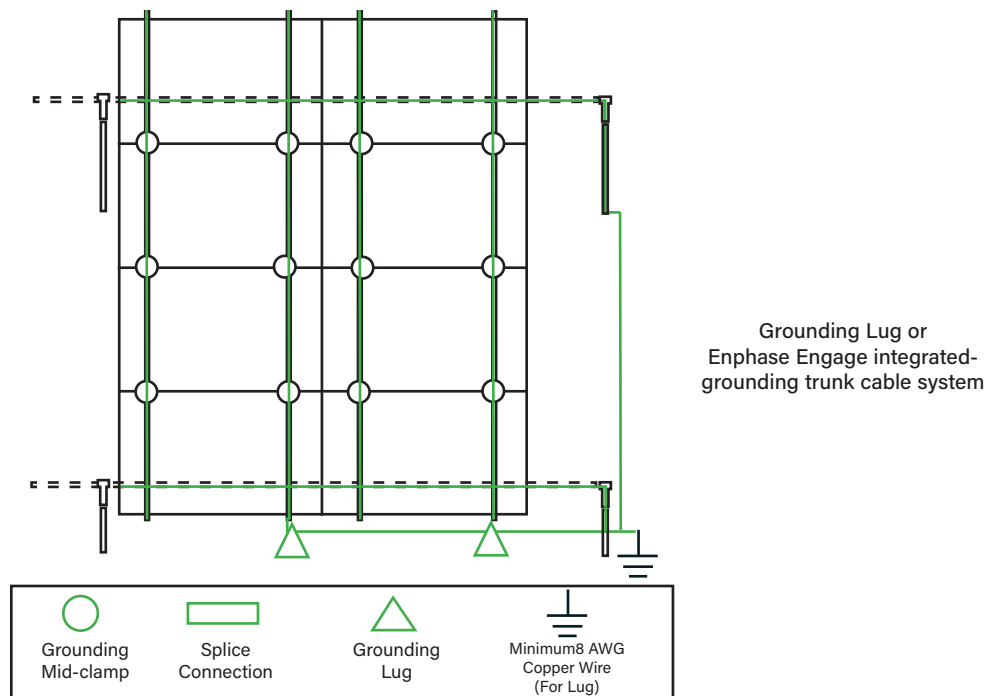
Microinverter and Optimizer (Self-Bonding Connector)

FOR GROUNDING USING ENPHASE ENAGAGE CABLE

- No copper wire or lug required. Equipment grounding conductor (EGC) built into Enphase engage quick-connect cabling.
- Minimum of 2 microinverters to same Enphase engage trunk cable within continuous module row
- Modules in module row must be installed and grounded per install guide requirements and must share the same two rails.



BASIC BONDING/GROUNDING CONNECTION DIAGRAM

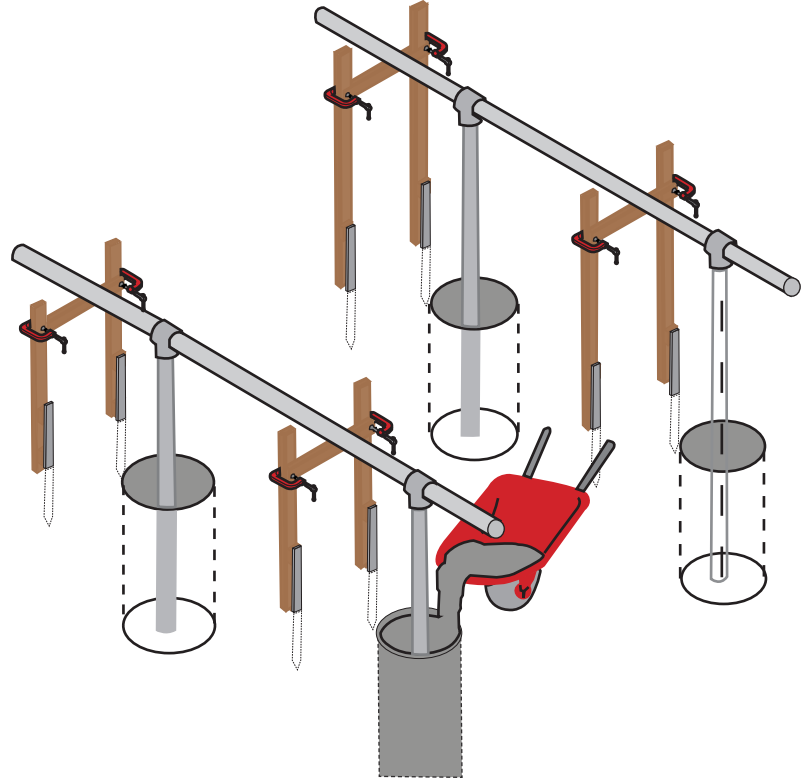


Pour concrete

Pour or pump mixed concrete into footings. Let cure.

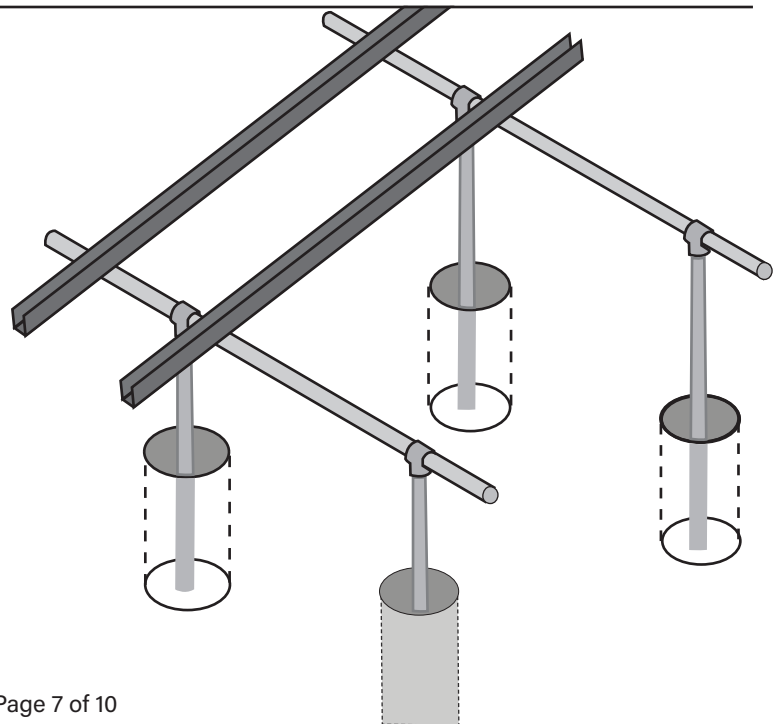


Extruded edges of the aluminum can be sharp. Treat any sharp edges as necessary to prevent injury.



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.



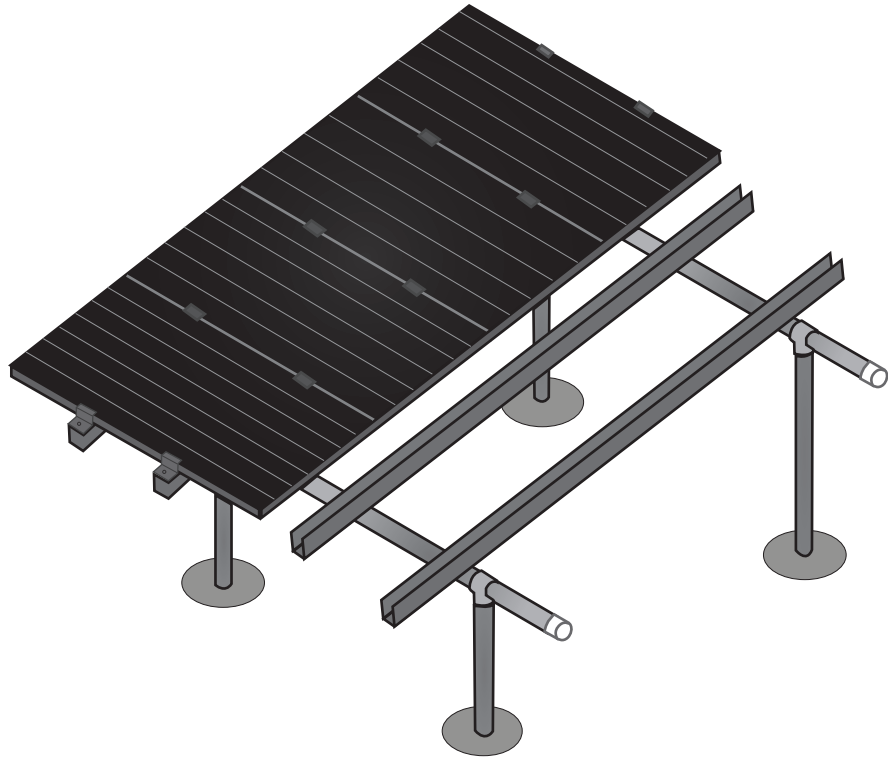
Remove re-usable forms and install modules

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.

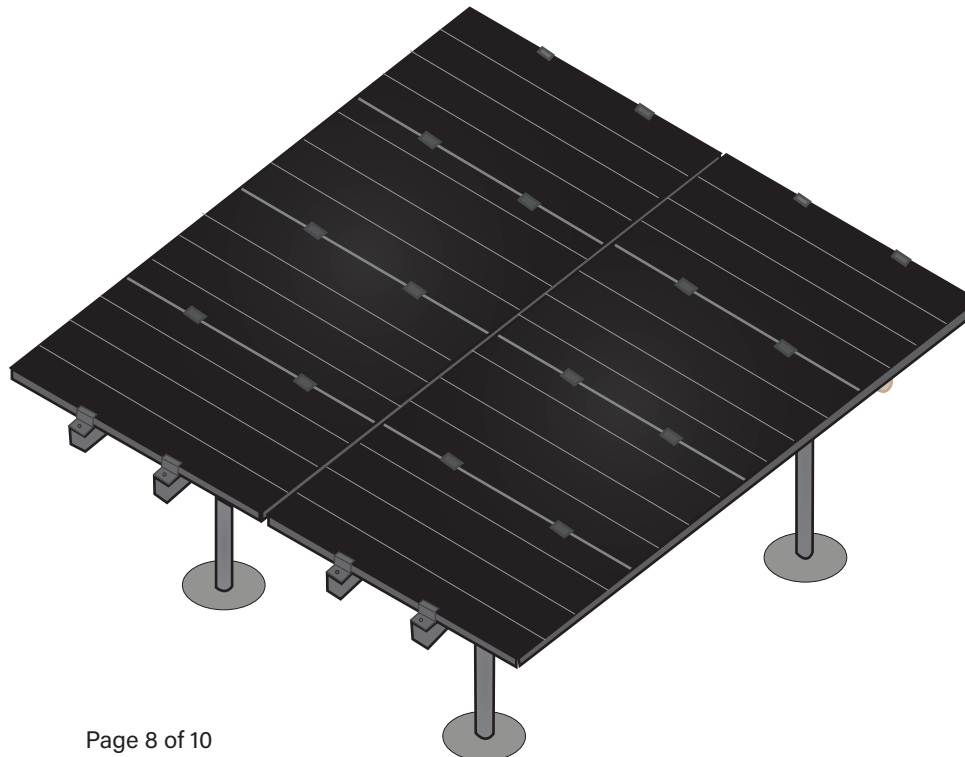


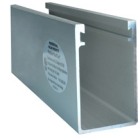
Remove re-usable forms and install modules

Completed GroundTrac® Installation.



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





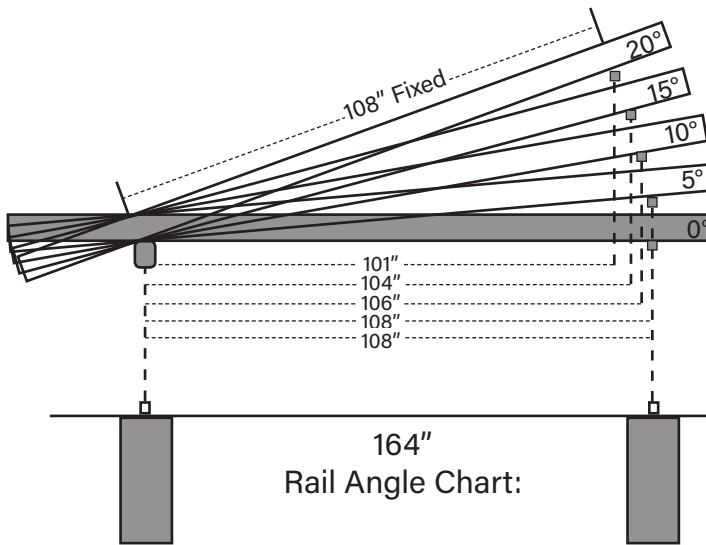
136" Deep (2-1/2") Rail

4 Modules 10' Lateral Span 84" On Center



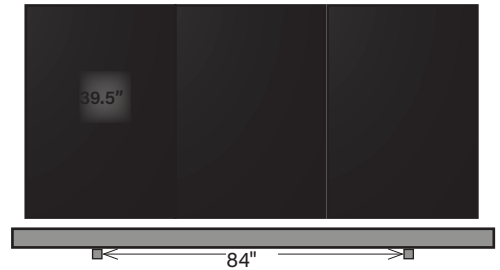
164" Extra-Deep (3") Rail

4 Modules 8' Lateral Span 108" On Center



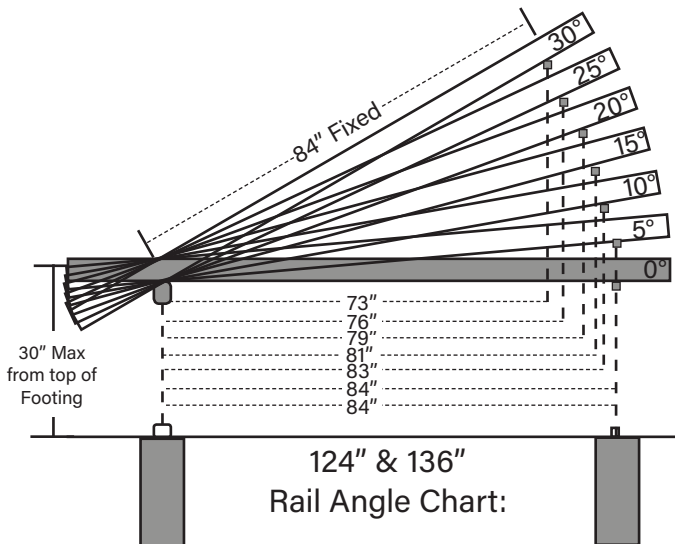
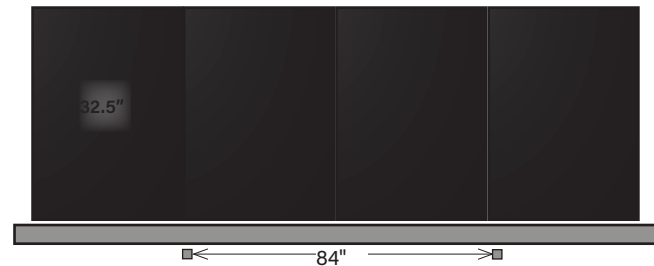
124" x 2-1/2" Rail:

Supports up to
(3) 39.5" Wide
Modules
84" On Center



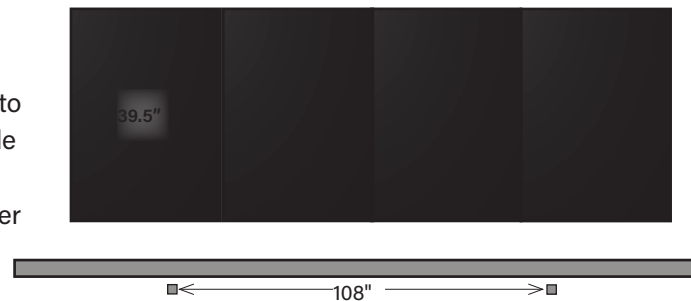
136" x 2-1/2" Rail:

Supports up to
(4) 32.5" Wide
Modules
84" On Center

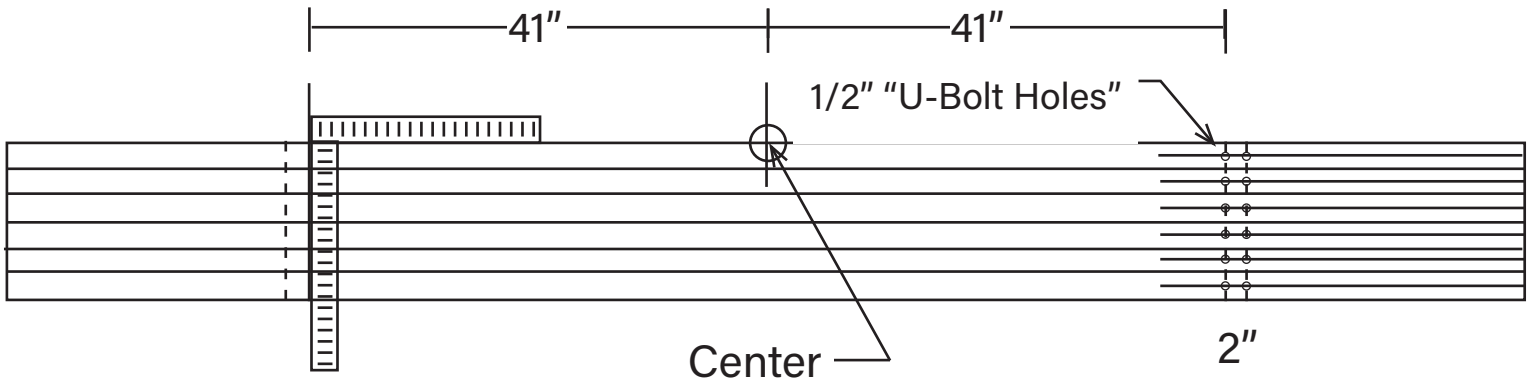


164" x 3" Rail:

Supports up to
(4) 39.5" Wide
Modules
108" On Center



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



The 1/2"* (#10) Irwin® Uni-Bit™ drill bit decreases rail locking hole drill time to 3 seconds.

