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ETL LISTED US
Intertek
4007217
UL2703

MADE IN U.S.A
PRODUCT
Class A
Fire Rated

RoofTrac®
Installation Manual

APPLICATION:

The RoofTrac® mounting system consists of support rails and top-down clamping hardware which is integrated with either a TileTrac® or FastJack® attachment device. The RoofTrac® mounting system can be utilized on virtually all standard construction residential roof tops, to install UL1703 approved framed solar modules.

⚠ 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 installation.

✋ SAFETY:

All regional safety requirements should be followed when installing Professional Solar Products. All tools and equipment located on the roof 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 when the specific module frame has been evaluated for grounding and/or mounting compliance with the included instructions. 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

- Cordless impact wrench
- Cordless drill
- 1/2″ Irwin #10 Unibit
- 1/2″ deep socket

- Torque wrench
- RoofTrac® rail spreader (optional)
- Reciprocating saw
- Flashing

- 3/8″ Nut driver
- 3/16″ Carbide drill
- 5/52″ Hex L key

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Parts List

3"Rail, 2-1/2", 2", 1-1/2" RoofTrac® Rail	Universal Self-Bonding Splice Assembly	Ilsco® SGB-4 Grounding Lug	Decorative Front Skirt & Clamp Set
FastJack® : 3", 4.5", 6", and 7.5"	FastJack® E-Series: 2", 3", 4.5", 6",and 7.5"	FastJack® E-Series Flashing	Flashing stamped with "TileTrac® USA"
			TileTrac® 4"& 6" Stud
Self-Bonding Mid Clamp Assembly	End Clamp Assembly	Module Bonding Mid-Clamp Channel Nut	End Clamp Bonding Channel Nut
			Microinverter/ Optimizer Bonding Channel Nut Assembly

Torque Values

Clamps   180 in-lb (15 ft-lb)
 Rail to FastJack®   180 in-lb (15 ft-lb)
FastJack® Lag Screw: Fully Seat
TileTrac® Lag Screw: Fully seat
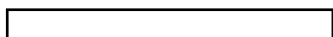TileTrac® Nut: 180 in-lb (15 ft-lb)

Skirt Clip to Module: 48 in-lb (4 ft-lb)
Clip to Skirt: 84 in-lb (7 ft-lb)
Splice: 180 in-lb (15 ft-lb)
Islco Ground Lug: 35 in-lb (conductor)/75 in-lb (frame)
Pipe Tee Set Screw: 17 ft-lb

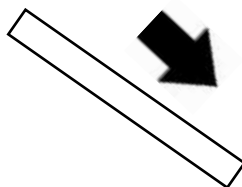professional SOLAR products inc™
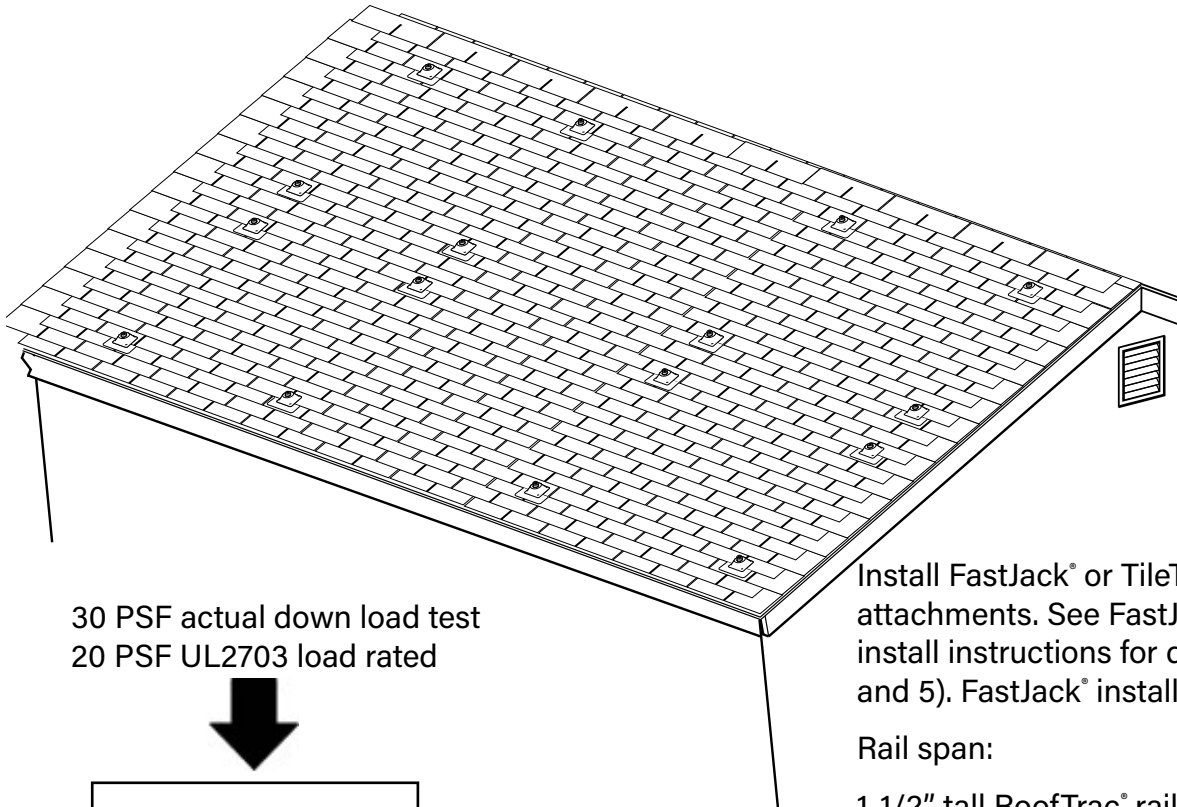
30 PSF actual down load test
20 PSF UL2703 load rated

7.5 PSF actual slope load test
5 PSF UL2703 load rated

30 PSF actual uplift load test
20 PSF UL2703 load rated

*Subject to local codes.

Install FastJack® or TileTrac® roof attachments. See FastJack® or TileTrac® install instructions for details (pages 4 and 5). FastJack® install shown.

Rail span:

1-1/2″ tall RoofTrac® rail: up to 4 foot on center.

2″, 2-1/2″ or 3″ tall RoofTrac® rail: up to 6 foot on center.*

Structural spans (including GroundTrac® and SolarWedge®) also stated in professional engineering reports.

UL1703 Class A fire rated for Type 1 and 2 solar modules (contingent on Class A roof surface rating) for steep-sloped roofs (greater than or equal to 2″ in 12″ [9.5°]). See SolarWedge® guide for Class A fire rating details for low-sloped roofs (less than 2″ in 12″ [9.5°]).
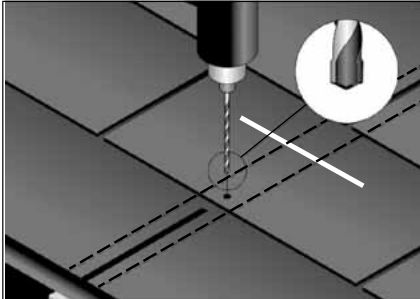
Note: Actual installation must comply with local fire department setbacks.
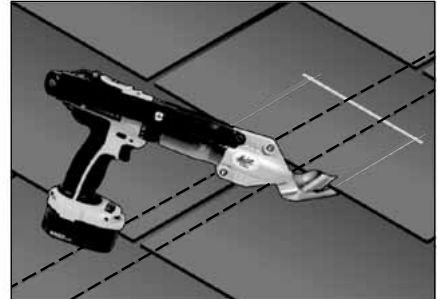
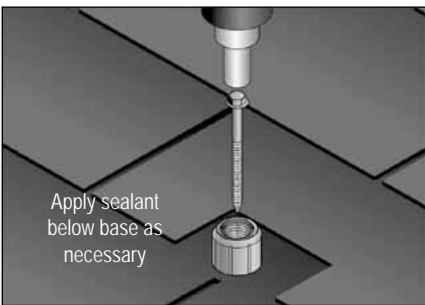**professional SOLAR products** inc.

Attachment Method: FastJack®
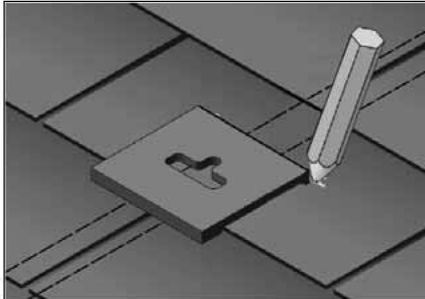
Step 1: Mark trim lines using template and lumber crayon

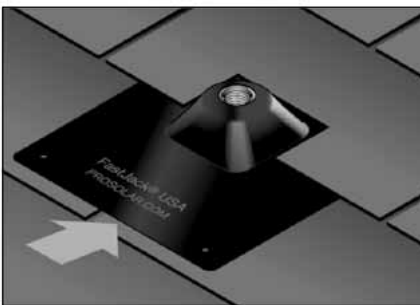Step 2: Drill rafter pilot hole with 3/16″ carbide bit

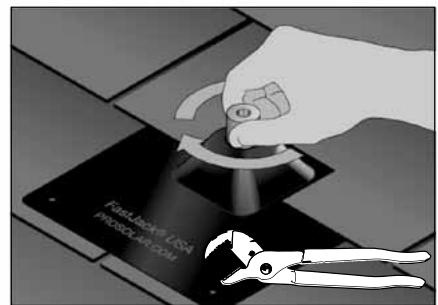Step 3: Trim and remove shingle. For high volume use Malco TurboShear Asphalt shingle cutter.
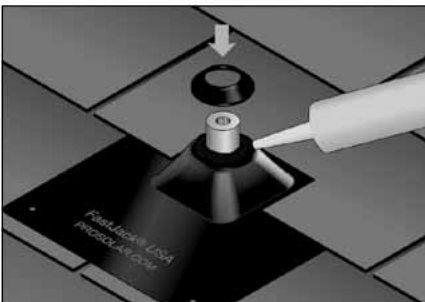
Apply sealant below base as necessary

Step 4: Using a 3/8″ nut setter drive lag screw through FastJack® base with cordless impact gun until seated

Step 5: Slide FastJack® flashing under shingle apply sealant on right and left side of flashing

Step 6: Hand tighten post into base. Fasten with pliers.

Step 7: Apply 1/4″ bead of sealant (Geocel 4500) and compress with aluminum collar
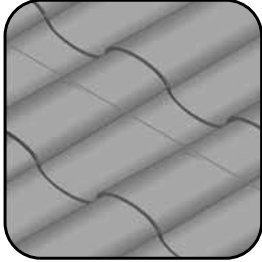
Step 8: Done

For use with 1 inch post diameter ProSolar FastJack® E-Series FastJack® E-Series and parts packaged separately.

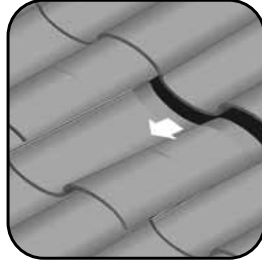See online installation guide for further details.

FastJack® patent #6,360,491

www.prosolar.com

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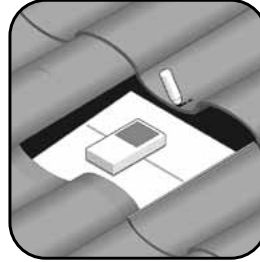
RoofTrac®
# Installation Manual

Attachment Method: TileTrac®

STEP 1: Select a tile in the area of the roof rafter and snap a line down the midsection of the tile.

STEP 2: Remove the tile by pushing and pulling. It is usually held in place by a small nail.

STEP 3: Using an electronic stud finder (recommended), or other means, locate the rafter center. Mark a reference point on the tile above.
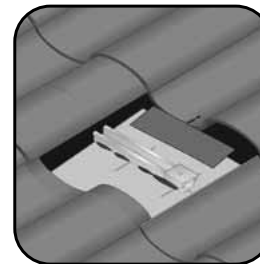
Drill 3/16" pilot hole.
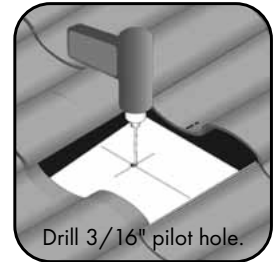
Step 4: Using a 3/16" drill bit, drill pilot hole along the rafter center

Step 5: Insert the lag bolt and washer through the TileTrac® and apply fresh compatible sealant to the base. Seal tile nail hole.

Tip: Use a cordless impact wrench
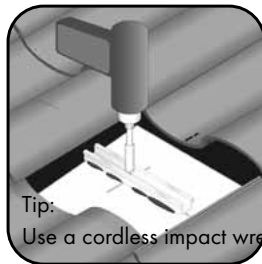
Step 6: Fasten lag screw until seated. Do not overtighten. The sealant should flow outward sealing any holes.

Step 7: Install subflashing and seal as needed if double flash is desired.

Step 8: After bolting the base to the roof, slide the upper carriage under any portion of the crown (high point) of the tile." For flat tile, slide the upper carriage near the middle of the tile.*

Step 9: Replace the tile by lining up the snap lines and mark the drill location accordingly.

Use a Rotary Hammer drill for 5 sec drill time.

Step 10: Using a 1/2" carbide drill bit and ROTARY HAMMER DRILL in hammer mode, drill through the tile. See online video at www.prosolar.com for details.

Tip: Bind (2) 3/8" nuts to top of stud prior to roof work
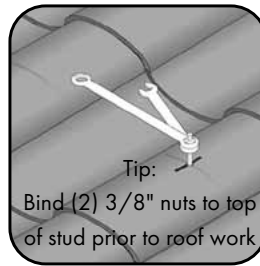
Step 11: Insert threaded stud through tile and hand-tighten to engage with base. Bind two 3/8" nuts (included) using 9/16" wrenches and tighten. and tighten to 15 ft-lbs. Tip: Pre-assemble studs and nuts before roofwork
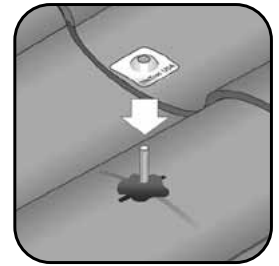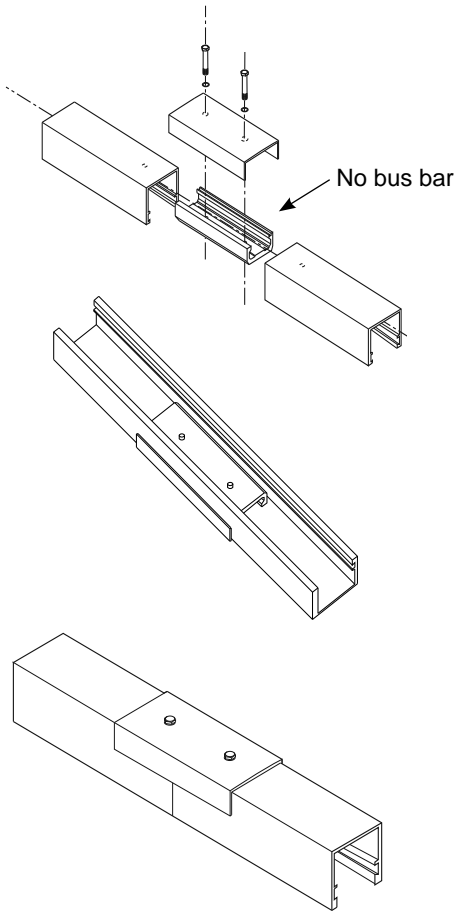
Step 12: Unbind nuts and remove from stud. Apply sealant around stud at tile opening and compress with Stainless Steel flashing (included) until seated.
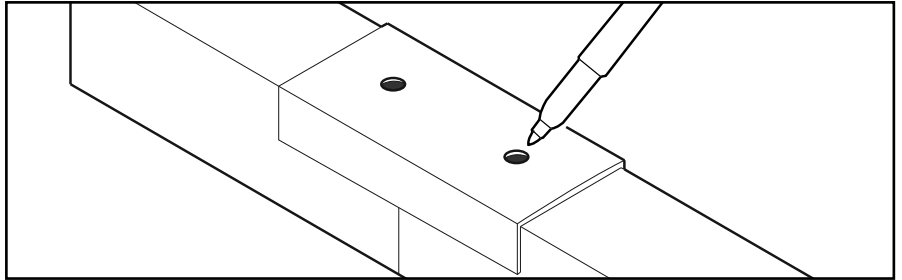
Step 13: Fasten rail with lower and upper 3/8" nuts/washers to 15 ft-lb as shown.

*Do not locate stud in valley of tile. Not recommended for clay or slate tiles. TileTrac® tested and approved for use only with the ProSolar® RoofTrac® rail mounting system. NOT APPROVED for non-Prosolar® RoofTrac® products.
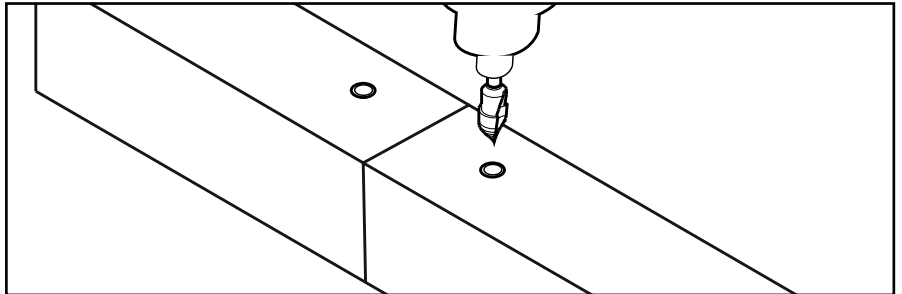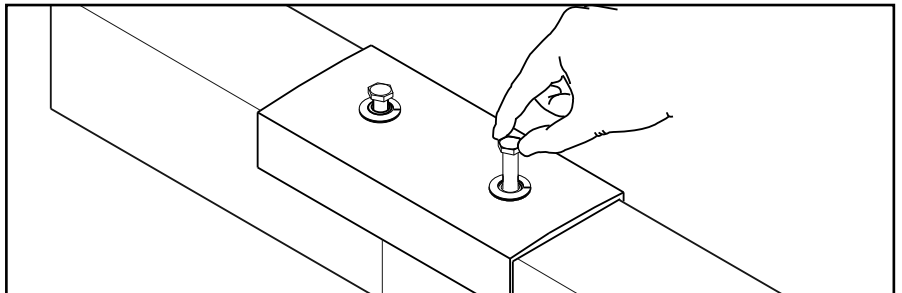
Self-bonding RoofTrac® Rail Splicing Connection

No bus bar

For RoofTrac® Rail Bonding Splice:

- Drill 1/2″ holes at bottom of rails with 1/2″ #10 Irwin Unibit® using the rail support as a hole location guide.

- Insert 5/16″ bolt through support holes and hand thread into threaded splice rail support insert. Fasten to 15 ft-lbs.

- Rail splice should not be further than 1/3 of rail span away from attachment.

- Rail should be supported by an attachment on both sides of a splice.

- Max three 136″ rails continuously spliced

1. Mark with a Sharpie®

2. Drill

3. Hand-Tighten

4. Fasten to 15 ft lb

2.0 Universal Rooftop Rail Splice

Marking Options: Mark 2" from each end (shown left) OR

Use optional splice drill guide with self-aligned hole locator to drill 1/2″ hole with a #10 Unibit stepped drill ends of Rail 1 and Rail 2.

Step 3: Slide splice insert into end of Rail 1 and loosely hand tighten the 5/1/6″ bolt
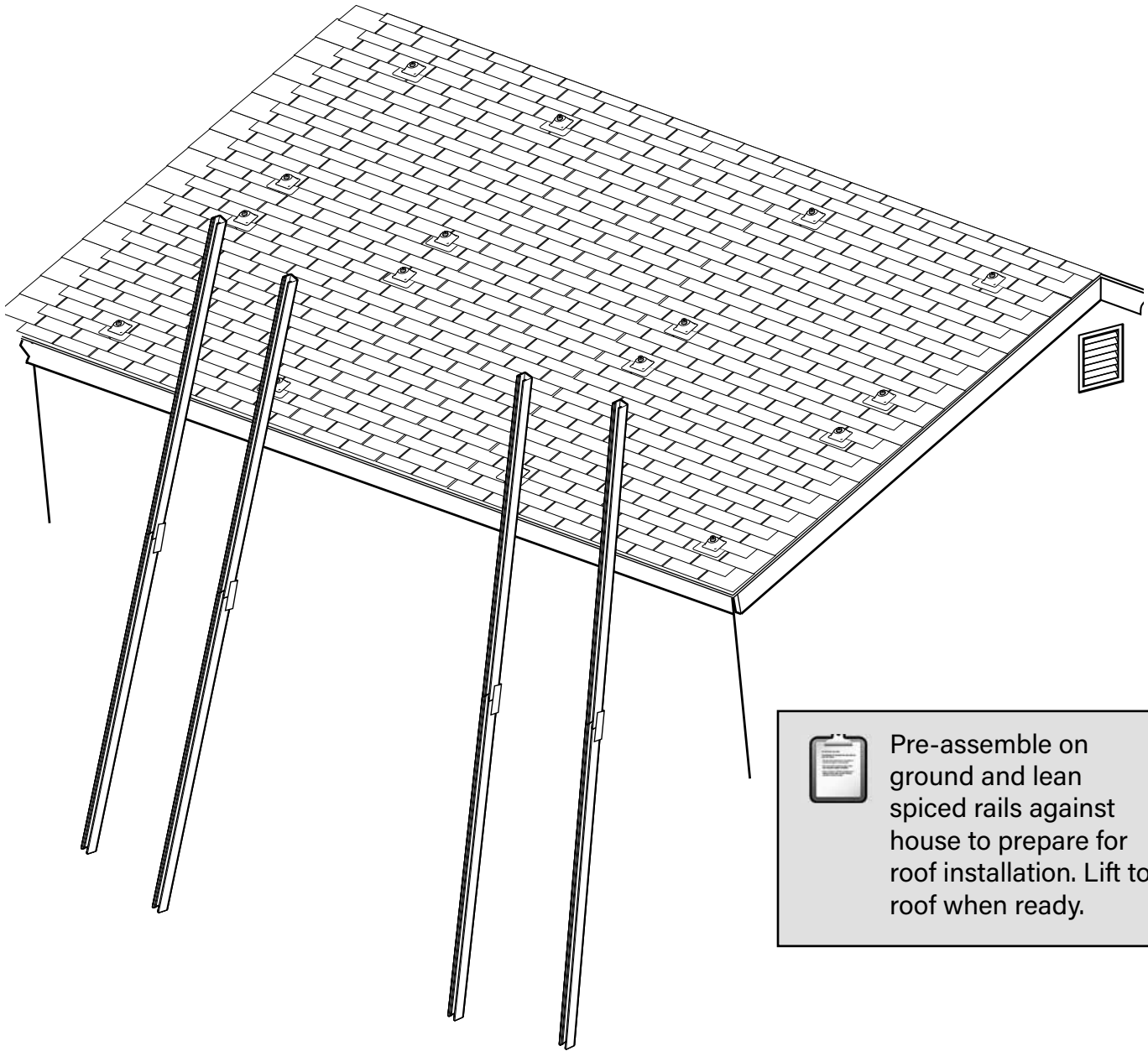
Step 4: Insert exposed splice insert into end of Rail 2 and hand tighten the 5/16″ bolt

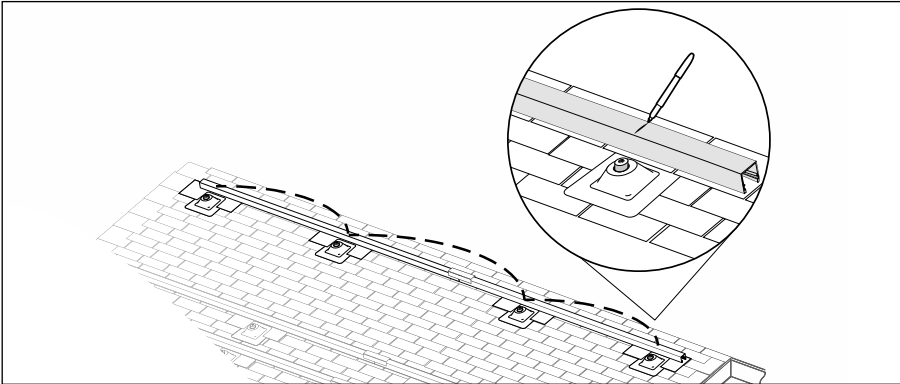**Step 5:** Torque both 5/16″ bolts to 15 ft-lbs.

Installation Preparation

Pre-assemble on ground and lean spiced rails against house to prepare for roof installation. Lift to roof when ready.

Fastening Support Rails

1. Mark rails with Sharpie®

Installation of the RoofTrac® support rails to the attachment (FastJack® shown)

After the attachment has been installed (refer to the attached installation guide for detail), lay the support rail upside down) next to the attachments. Mark the channel adjacent to the attachment devices. Align and mark the intersecting "V" groove on the rail and drill a 1/2" locking rail hole through the rail. After drilling the hole in the support rail, place the rail over the attachment feet and fasten.

Maximum cantilever approximately 20" for any rail height.

2. Drill 1/2" holes with #10 Irwin Unibit®
Note: Unibit provides for a deburred hole.
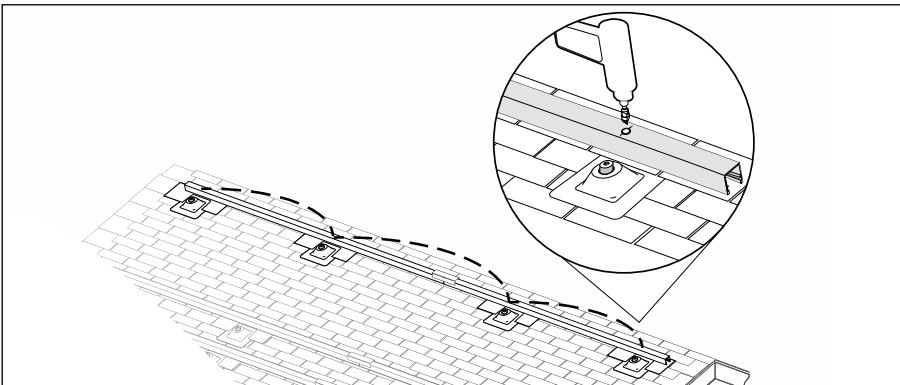
Use of a #10 (1/2") Unibit® will decrease drill time to approximately 3 seconds per hole.

3. Fasten with cordless impact gun until seated

Components Used for Installation

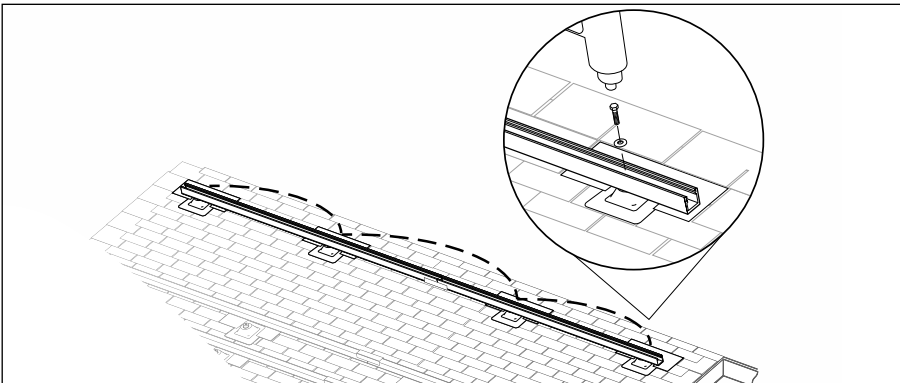For convenience, it is adviseable to **pre-assemble** the end clamp bolt, lock washer, and clamp into the sliding insert **prior** to bringing them up to the roof.

Self-bonding End
Clamp Assembly

Self-bonding Mid
Clamp Assembly
(factory pre-assembled)
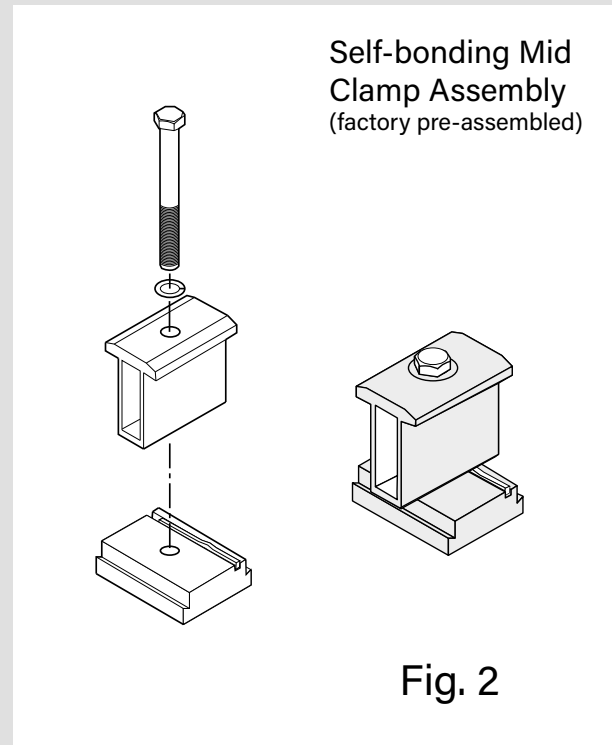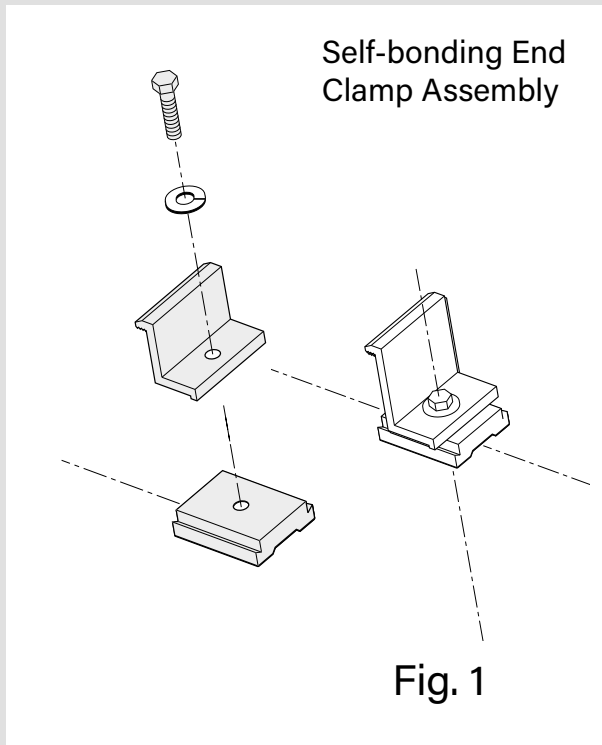
Fig. 1

Fig. 2

After the support rails have been fastened, you are ready to install the solar modules. There are two sets of clamps: the outside clamps (end clamp) (Fig. 1), and the inter-module clamps (mid clamp) shown (Fig. 2) that install between the modules.

NOTE: Clamping hardware is not engineered or intended for use on support rail other than the ProSolar® RoofTrac® rail.

RoofTrac® Rail Spreader

Allows clamp/nut to be easily removed or inserted (previously performed with pliers). Ideal for microinverter/power optimizers.
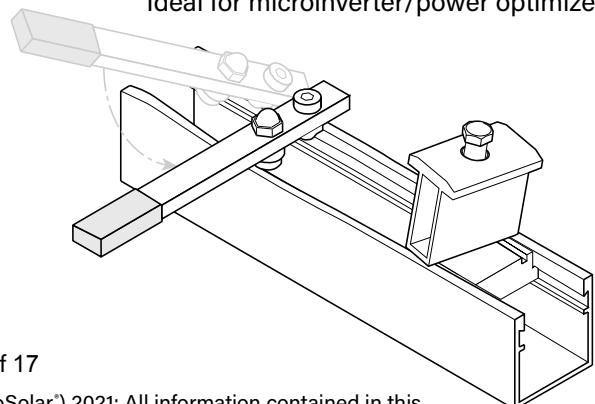
Installing Modules

1.

Slide the two end clamps near the end of the support rail and install your end module first. Carefully square the module to the frame and tighten the clamps using a 1/2″ deep socket.

2.

After the first module is secured, slide two mid clamp sets onto the first module side frame. They are designed to stay in place, allowing you to slide and align the next module into place. Repeat this procedure until all modules are installed onto support rail.

3.

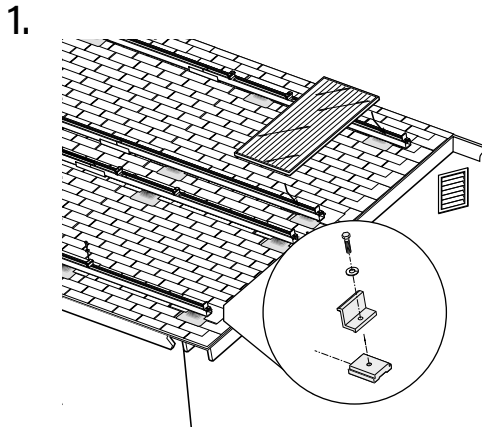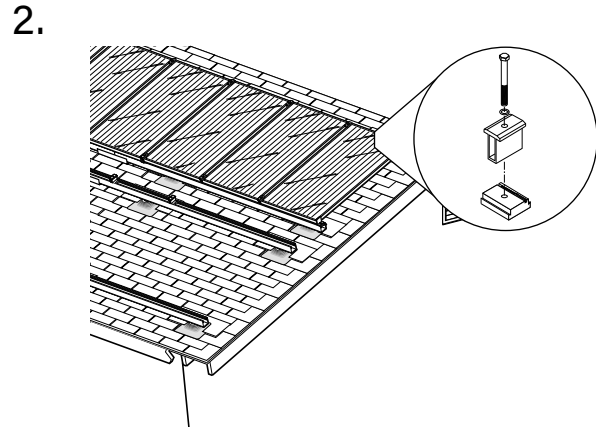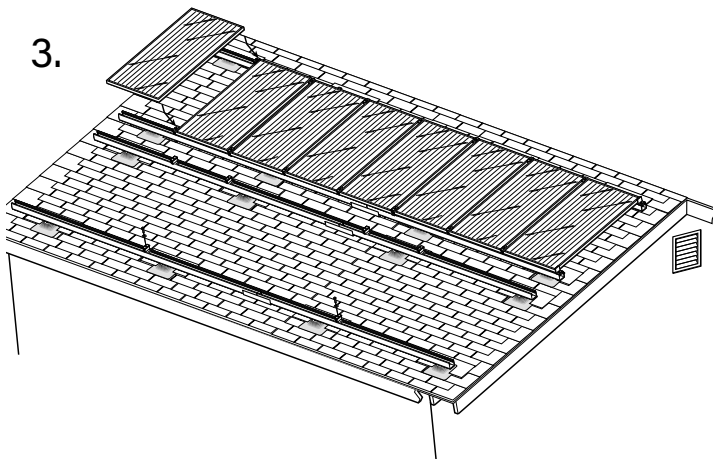Upon installation of the last module in the panel, install the module end clamp to the end of the last module. We recommend a torque of 15 foot pounds after the last module has been installed and the array has been adjusted/squared. Fully torque mid-clamps before end clamps.

4.
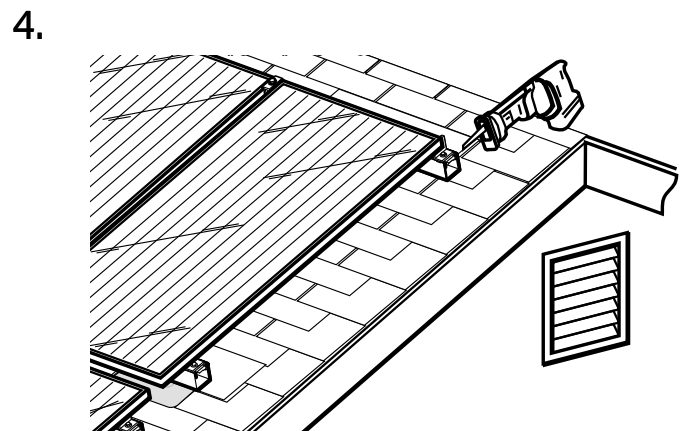
To complete the installation, cut off any excess support rail not being used with a reciprocating saw. Use a file to remove any sharp edges. Per UL2703, it is recommended to periodically re-inspect systems for any loose components or corrosion. Retighten or replace components as necessary.

Bonding and Grounding

**Assembled
Self-bonding
Mid Clamp
With
SS Bus Bar**

Side view of Grounding
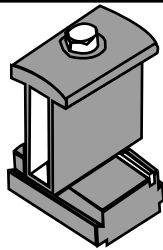
**Self-bonding Mid Clamp
Fastened on Rail
(Solar Module not shown)**
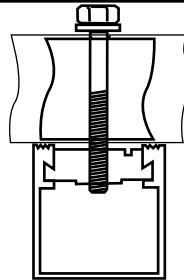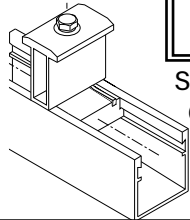
Fasten pre-assembled mid-clamp assembly to module frame, to 15 ft-lbs.

Bonding of module to RoofTrac® rail via ProSolar® multi-use rated mid-clamp assembly.

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

Grounding of the RoofTrac® rail via Ilsco SGB-4 ground lug. Grounding of module (alternative to self-bonding mid-clamp) via Ilsco SGB—4 ground 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.

Manufacturer	Model/ Type*
Advance Power	API-PXXX, APIXXX
Astronergy/Chint	CHSM6612M, CHSM6612M/HV, CHSM6612P
Auxin	AXN6P610TXXX, AXN6M610TXXX, AXN6M612TXXX, AXN6P612TXXX
Axitec	AC-xxx M/72V, AC-xxx M/72S, AC-xxx M/72XV, AC-xxx M/72X, AC-xxx MH/144S, AC-xxx MH/144V, AC-xxx M/60V, AC-xxx M/60S, AC-xxx M/60XV, AC-xxx M/60X,AC-xxx MH/120S,AC-xxx MH/120V, AC-xxx P/72V, AC-xxx P/72S, AC-xxx P/72XV, AC-xxx P/72X, AC-xxx P/60V, AC-xxx P/60S, AC-xxx P/60XV, AC-xxx P/60X
Canadian Solar	CS6X-P, CS6K-M, CS6P-P, CS6P-P-SD. CS6K-XXXP, CS6K-XXXM, CS6K-XXXM 5BB, CS6K-XXXMS, CS6K-XXXMS-SD, CS6U-XXXP, CS6U-XXXM, CS3U-XXX-MS, CS3U-XXX-P, CS3K-XXX-MS, CS3K-XXX-P, CS1H-XXXMS, CS1U-XXXMS, CS3U-XXXPB-AG, CS3U-XXXMB-AG, CS3L-P, CS3L-MS, CS3W-P, CS3W-MS, CS3W-PG-AG, CS3W-MB-AG
Heliene	144HC-XXX, 144HC-XXX Bifacial
Hyundai	HiS-MXXXMG, HiS-SXXXMG, HiS-MXXXRG, HiS-SXXXRG, HiS-XXXRG(BK), HiA-SXXXHI, HiA-SXXXGI, HiA-SXXXPI, HiA-SXXXYI , HiS-SXXXKI
Jinko	JKM XXXYY-60-YYY, JKMXXXYY-72-YYY
Kyocera	KUXXX6MCA
LG	XXXN2W-B3, XXXS1C-G4, XXXN1K-G4, XXXN1C-G4, XXXN2W-A5, XXXS2W-A5, XXXS1C-A5, XXXN1C-A5, XXXN1K-A5, XXXQ1C-A5, XXXQ1K-A5, XXXN2W-G4, XXXS2W-G4, XXXN2TA5, XXXN1C-V5, XXXN1K-V5, XXXN2C-V5, XXXQ1C-V5, XXXN2T-J5, XXXN2T-V5, XXXN1T-V5, XXXQ1K-V5, XXXN2W-V5, XXXN1W-V5, XXXN1C-N5, XXXN1K-L5,XXXA1C-V5, XXXN2W-L5, XXXN1C-A6, N1K-A6, M1C-N5, XXXQ1K-A6, XXXM1K-A6, XXXN1K-B6, XXXQ1C-A6, XXXQAC-A6, XXXQAK-A6, XXXM1C-A6, XXXN2W-E6, XXXN2T-E6, XXXN1K-E6, XXXA1C-A6, XXXN3K-V6
Mission	MSEXXXSYXY
Mitsubishi	PV-MLEXXX, PV-MJEXXX, PV-MJEBXXX
NSP/Peach	D6MXXXE4Y, D6MXXXH4A, D7KXXXH8A
Panasonic	VBHNXXXSA16, VBHNXXXSA11, VBHNXXXSA17, VBHNXXXKA03, VBHNXXXKA01, VBHNXXXSA17E, VBHXXXRA18N, VBHNXXXRA18N, VBHNXXXRA03K, VBHNXXXRA18E, VBHNXXXRA03F, VBHNXXXRA18G, EVPVXXX, EVPVXXXK
Qcells	**B.LINE PLUS:** BFR G4.1,L G4.2;B.LINE PRO:BFR G4.1,L G4.1,L G4.2;**Q.PEAK:**G3,G4.1,G4.1/MAX,G4.1/TAA,L G4.1,L G4.2**Q.PEAK:**BLK G3,BLK G4.1,BLK G4.1/TAA; **Q.PEAK DUO:** G5,BLK-G5,BLK-G6,BLK-G6+,BLK-G6+/AC,BLK-G7,L-G5.2,L-G5.3,L-G5.3/BF,L-G6,L-G6.1,L-G6.2,L-6.3,L-G7,L-G7.1,L-G7.2,L-G7.3,L-G7.4,L-G7.7,L-G8,L-G8.1,L-G8.2,L-G8.3,L-G8.3/ BFF,L-G8.3/BFG,L-G9,L-G9.1,L-G9.2,L-G9.3,G6,G6+,G6+/AC,G7,G8,G8+,ML BLK-G9,ML G9,BLK-G8,BLK-G8+,BLK-G6+/TS,ML-G9+,ML BLK-G9+,XL-G9.2,XL-G9.3,G10,G10 +,BLK DUO-G10,BLK DUO-G10+,ML-G10,ML-G10+,ML-G10.a+,BLK ML-G10,BLK ML-G10+,BLK ML-G10.a,BLK ML-G10.a+,XL-G10.2,XL-G10.3,XL-G10.c,XL-G10.d,XL-G10.3 BFG,XL-G10.d BFG**Q.PLUS:** BFR G4.1,BFR G4.1/TAA,L-G5.2,L-G5.3,G3,G4,L G4.1,L G4.2,L G4.2/TZZ;**Q.PRO:**BFR G3,BFRG4,BFR G4.1,BFR G4.3,G3,G4,LG4,L G4.1,L G4.2
REC	RECxxxTP2S 72, RECxxxTP2S 72 XV, RECxxxTP2SM 72, RECxxxTP2S 72 XV, RECxxxNP, REC xxx NP Black, RECxxxAA, RECxxxAA Black, RECxxxAA 72, RECxxxAA72B
Seraphim	SRP-XXX-6MA, SRP-XXX-6PA, SRP-XXX-6MB. SRP-XXX-6PB
Silfab	SIL-XXX NL, SIL-XXXNL-W, SIL-XXXHL, SIL-XXXHL-W, SIL-XXXBL, SIL-XXXMT, SIL-XXXML, SIL-XXXNU, SIL-XXXHU, SIL-XXXNT, SLA-XXXM, SLG-XXXM
Solaria	PowerXT-XXXR-YY, PowerXT-XXXC-YY
Sunedison	FXXX YYY, RXXX YYY, HXXX
SolarWorld	Sunmodule Plus SW XXX, Sunmodule Plus SW XXX mono, Sunmodule Plus XXX mono black, Sunmodule Protect SW XXX, Sunmodule Protect SW XXX mono, Sunmodule Protect SW XXX mono black, Sunmodule Pro-Series SW XXX Poly, Sunmodule SW XXX XL mono
Sunpower	Y21-XXX-YYY, Y20-XXX-YYY, Y22-XXX-YYY, X21-XXX-BLK, E21-XXX-C-AC, X21-XXX-BLK-D-AC, X22-XXX-C-AC, X22-XXX-D-AC
Talesun	TP6F72M
Trina	TSM-PD05.08, TSM-PD05.05, TSM-DD05A.05, TSM-DD05A.08
VSUN	VSUNxxx-60MH, VSUNxxx-60M-BB, VSUNxxx-72MH, VSUNxxx-72M-BB, VSUNxxx-120MH, VSUNxxx-120M-BB, VSUNxxx-144MH, VSUNxxx-144M-BB, VSUNxxx-60BMH-DG, VSUNxxx-72BMH-DG, VSUNxxx-144BMH-DG, VSUNxxx-120MH, VSUNxxx-120M-BB, VSUNxxx-144MH, VSUNxxx-144M-BB, VSUNxxx-144BMH-DG
Chilicon	CP-250E
Enphase	MXXX, IQ6, IQ6+, IQ7, IQ7+, IQ7A, IQ 7X, 8, 8+, 8M, 8A, 8H
SolarEdge	PXXX

XXX: Any number combination, Y: Any letter

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Grounding Wire Installation

FOR GROUNDING CONNECTION

- ILSCO SGB-4 rail ground connection
- Fasten both terminals to 35 in-lbs
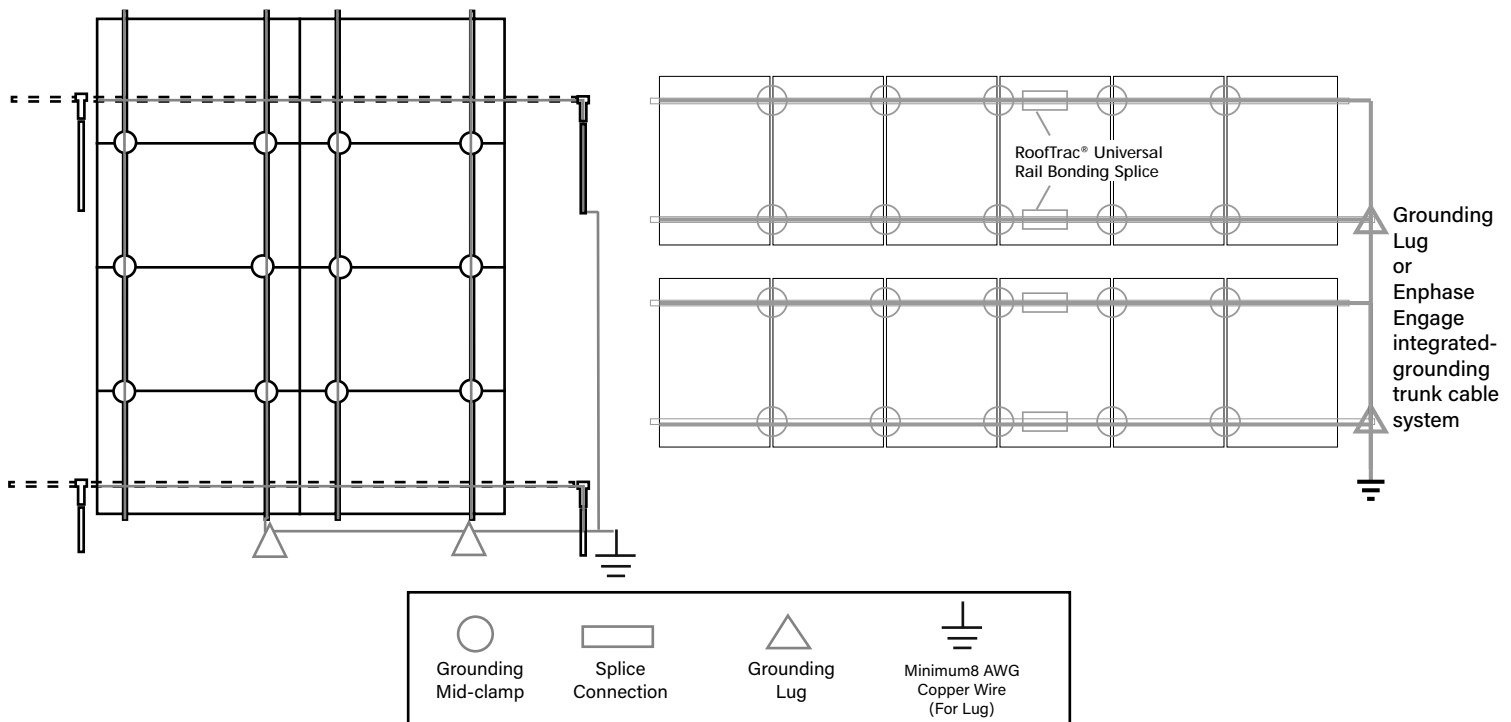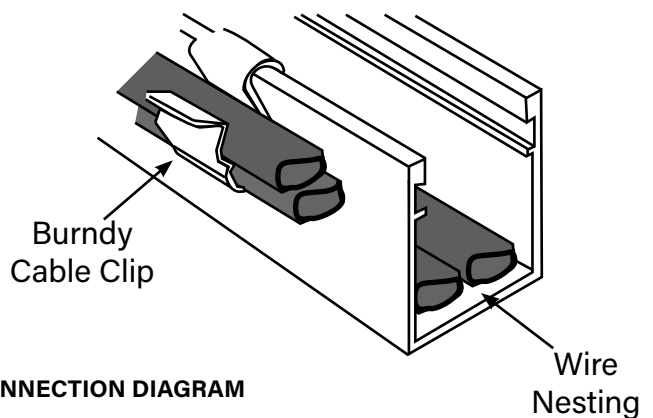- Ensure that copper wire does not touch aluminum; Recommended ¼" clearance.

UL 2703 approved label applied within 12" of end of rail.
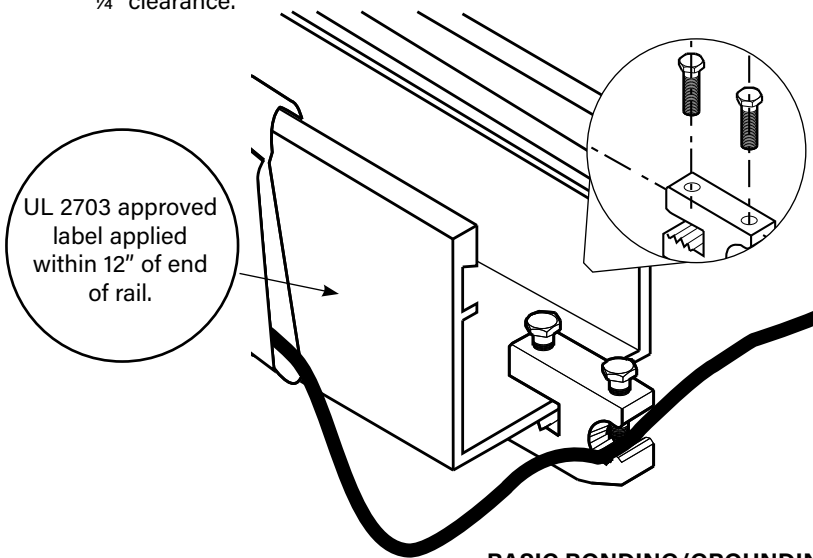
BASIC BONDING/GROUNDING CONNECTION DIAGRAM

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.
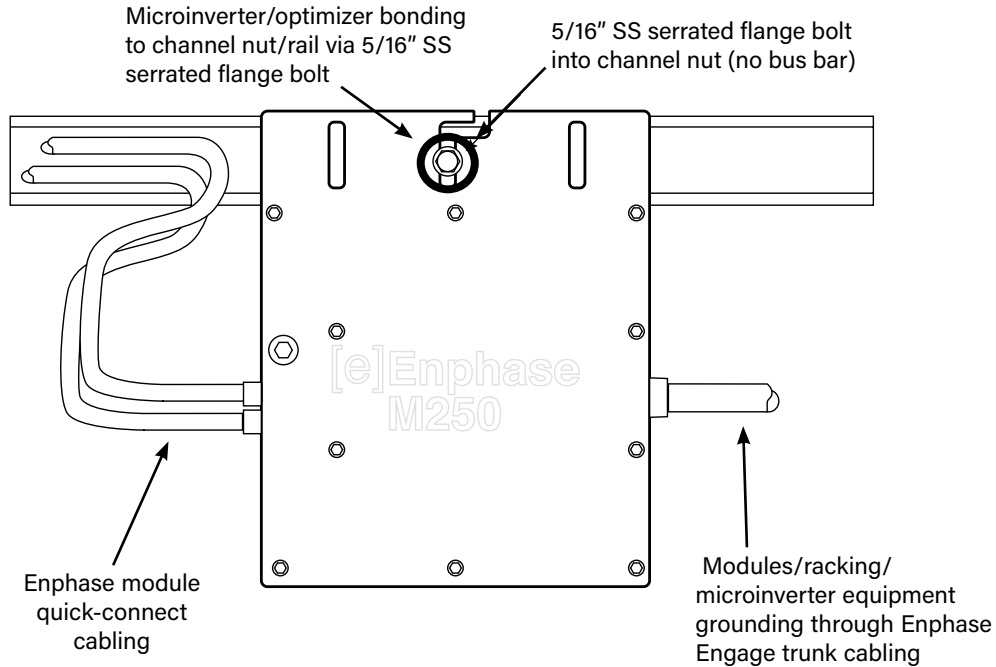
Uninsulated copper grounding wire must never be placed inside the aluminum rail – it should be kept at a distance of at least ¼" away from the aluminum rail.

Burndy Cable Clip

Wire Nesting

RoofTrac® Universal Rail Bonding Splice

Grounding Lug or Enphase Engage integrated-grounding trunk cable system

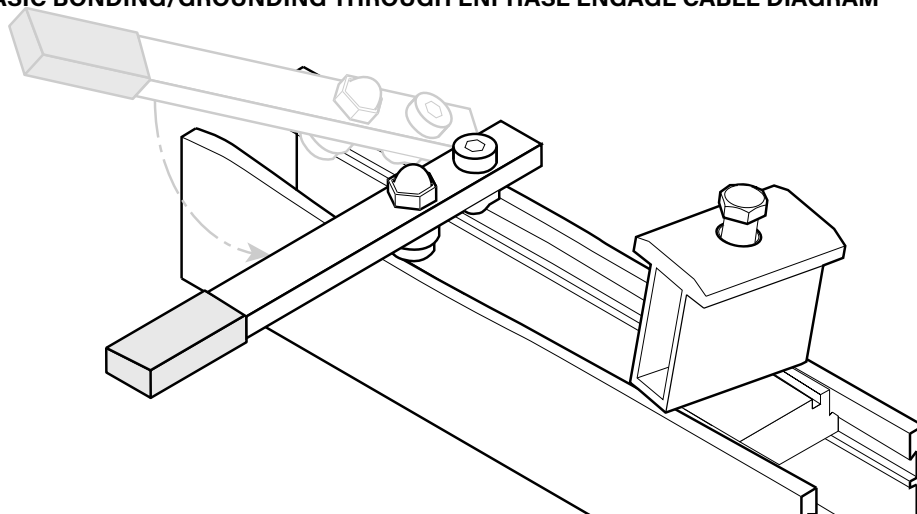| Grounding Mid-clamp	Splice Connection	Grounding Lug	Minimum 8 AWG Copper Wire (For Lug)

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Microinverter and Optimizer (Self-Bonding Connector)
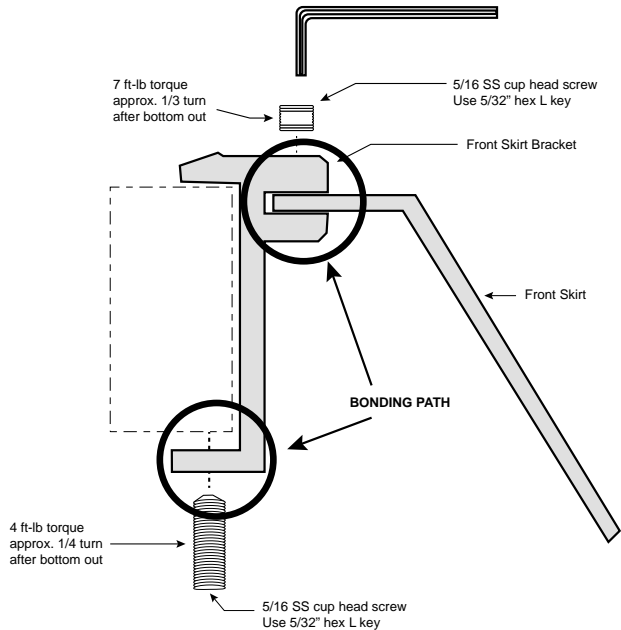
FOR GROUNDING USING ENPHASE ENAGAGE CABLE

- 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.

Microinverter/optimizer bonding
to channel nut/rail via 5/16″ SS
serrated flange bolt

5/16″ SS serrated flange bolt
into channel nut (no bus bar)

[e]Enphase
M250

Enphase module
quick-connect
cabling

Modules/racking/
microinverter equipment
grounding through Enphase
Engage trunk cabling

BASIC BONDING/GROUNDING THROUGH ENPHASE ENGAGE CABLE DIAGRAM

Skirt Installation

7 ft-lb torque
approx. 1/3 turn
after bottom out

5/16 SS cup head screw
Use 5/32" hex L key

Front Skirt Bracket

Front Skirt

BONDING PATH

4 ft-lb torque
approx. 1/4 turn
after bottom out

5/16 SS cup head screw
Use 5/32" hex L key

Skirt NOT required for class A sloped roof fire rating.
Type 1 and 2 modules.

Required**:** 5/32" hex L key, compund sliding miter saw with
aluminum cutting blade or rafter angle square and portable
circular saw with aluminum cutting blade.

Attach skirt bracket, approximately 5" from end of module, by
placing around module frame and fastening bottom set screw
with a 5/32" hex L key. Tighten to 4 ft-lb (approximately 1/4
turn after bottom out). Bracket not rated for snow load.

1. Slide skirt into slot opening and fasten top set screw with
   5/32" hex L key. Tighten to 7 ft-lb (approximately 1/3 turn
   after bottoming out).

2. Use at least (2) brackets per module and at least (2)
   brackets per skirt. (See system overview on next page).
   Use cutoff saw with material holding clamp to trim skirt.
   Use a file to remove any sharp edges.

65"

5"

Skirt Bracket location
2 brackets per module
2 brackets per skirt

Front

40"

5"

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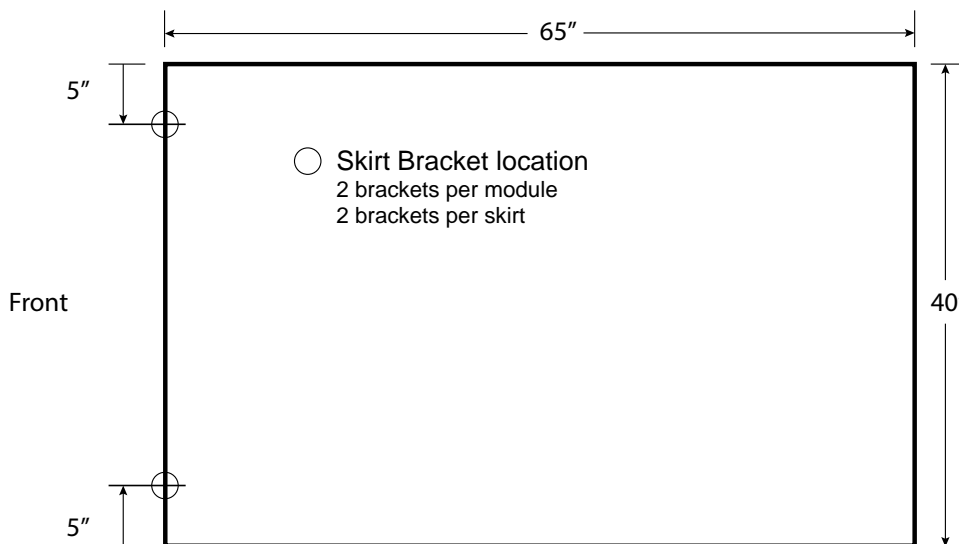
Skirt NOT required for class A sloped roof fire rating for Type 1 and 2 modules

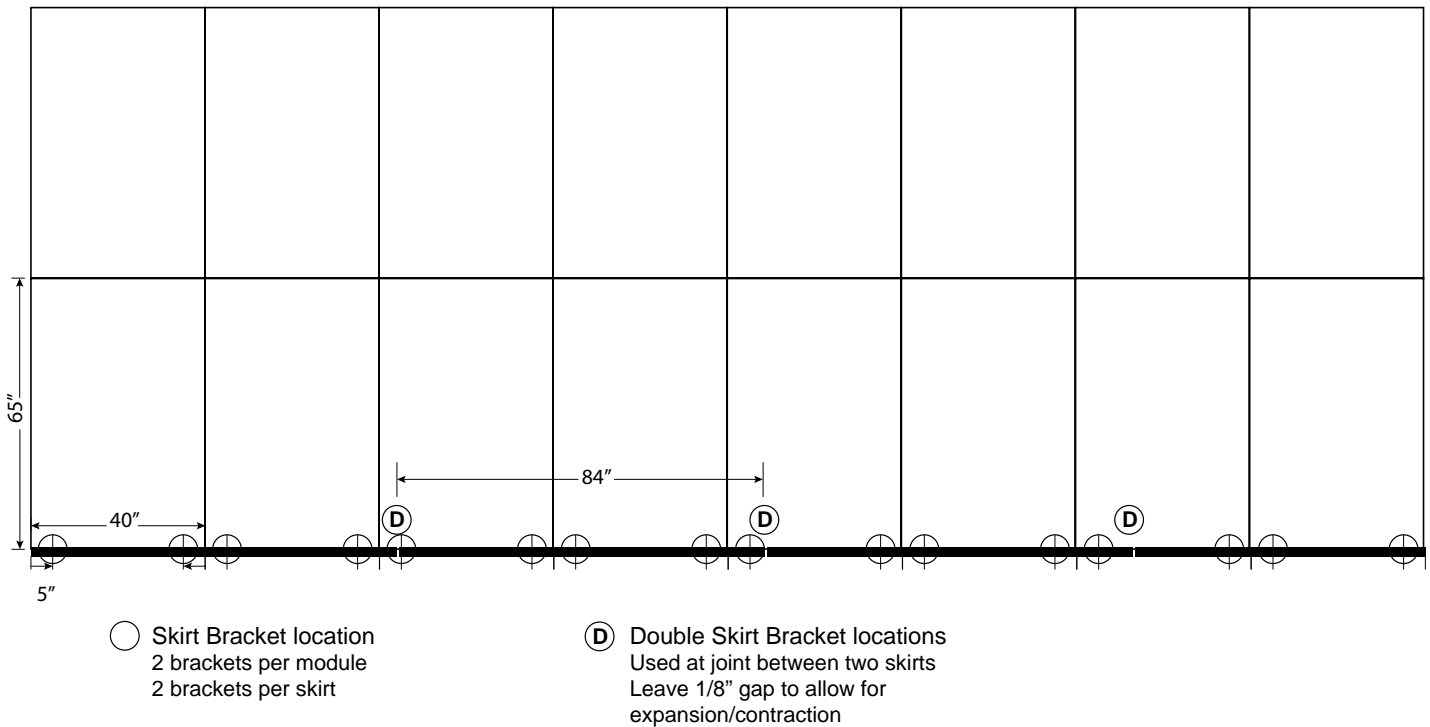## 18 Module System Overview 84″ long skirt

Front skirt material list:

(4) 84″ long skirts

2.75″ tall skirt (ProSolar PN: A-FS275-84-6) for 1-1/2″ min module bottom to roof clearance

(13) Single skirt brackets (ProSolar PN: A-FSB-SINGLE-24)

(3) Double skirt brackets (ProSolar PN: A-FSB-DOUBLE-24)

65″   84″   40″   5″

◯ Skirt Bracket location
2 brackets per module
2 brackets per skirt

Ⓓ Double Skirt Bracket locations
Used at joint between two skirts
Leave 1/8" gap to allow for
expansion/contraction

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