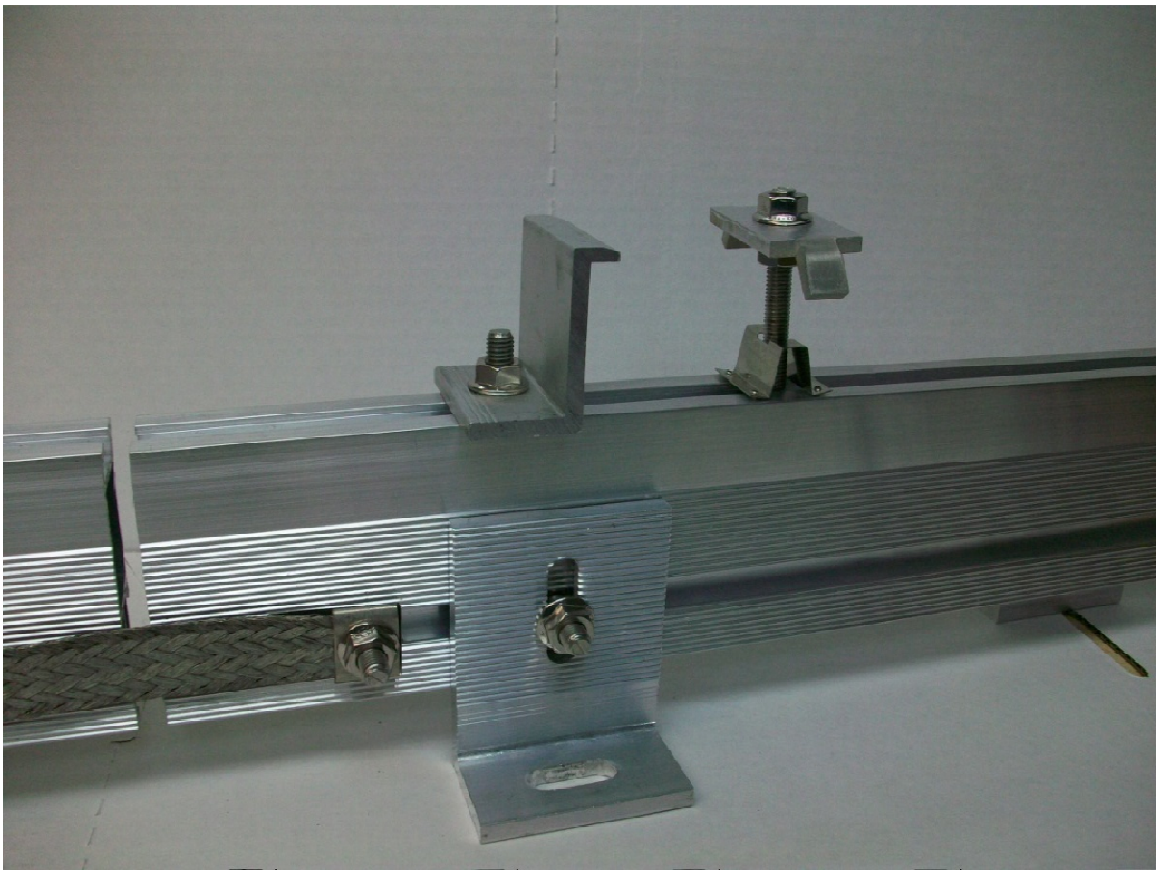
POWER HOUSE

A DIVISION OF HOME ENERGY SOLUTIONS

Fast Rack – Solar Panel Mounting System



Installation Manual 4.0

NOTE:

•It is the responsibility of the installer/owner to ensure the racking and solar system meets local building and electrical codes/local power distribution company.

•It is advised to seek a qualified structural engineer prior to installation of the system to verify your roofing structure is able to support the additional loading of the solar system.

•Please ensure installers use proper fall arrest gear and have proper training.

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Introduction

- The Power House Rack mounting system was developed to flat mount solar panels to a pitched metal or shingle rooftop.
- A series of clamps and hardware allow for top down module security.
- The Fast Rack Rail has a variety of different configurations to allow for mounting flexibility.

Features

- Top down mounting system for ease of assembly.
- Self sealing neoprene mounting screws eliminate the need for caulking.
- Flashing mounts for shingled rooftops.
- Adjustable mounting foot height minimizes the need for shims on uneven roof top surfaces. (+/- 1”).
- Corrosion resistant fasteners and components.
- Fast installation -use of ‘T’ bolt type fasteners allow for placement anywhere along the rail.
- Optional security hardware to deter panel theft.

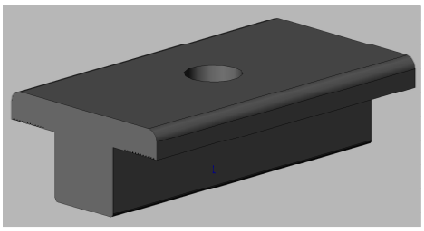
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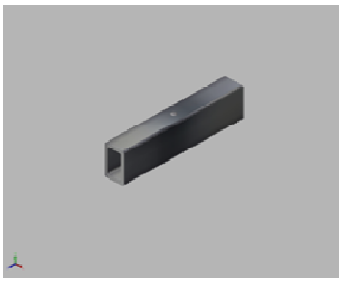
System Components



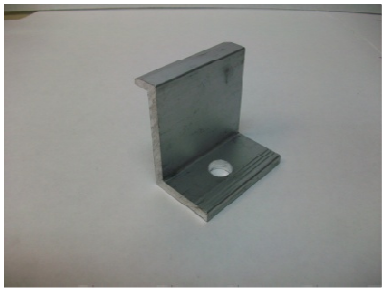
Extruded Rail



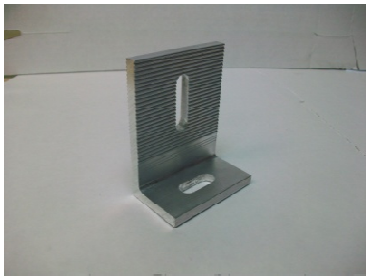
Module Mid Clamp



Rail Splice



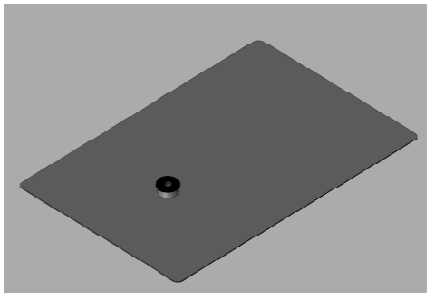
Module End Clamp



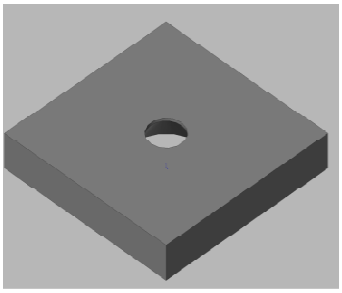
L - Bracket



Mounting Screw



Shingle Flashing



Compression Plate

POWER HOUSE

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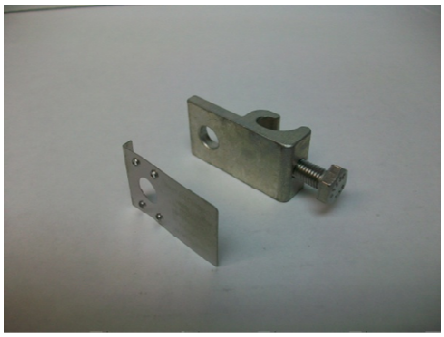
Grounding Clips



Splice Ground Strap/Washer



Solar Module Grounding Washer

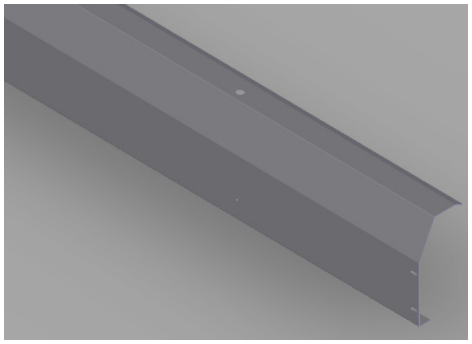


Rail Grounding Lug

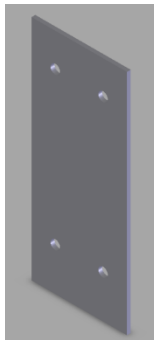


Inverter Grounding Washer

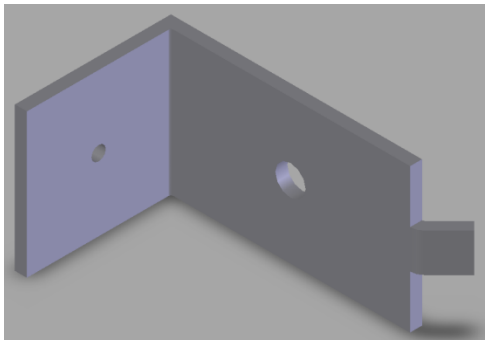
Flashing Components



Flashing



Joining Tab



Mounting Tab

POWER HOUSE

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Tools required

- Tape measure
- Marker pen / chalk
- Chalk line & string line
- Electric drill
- Drill bits HSS (high speed steel) – Ø7/32” (5.5mm) x 6” (152mm) long
- Electronic stud finder
- Socket set – 3/8” drive ratchet, 3” extension bar, 11mm, 13mm & 17mm hex socket, 17mm wrench, 5 mm hex bit socket
- Torque wrench (15 ft lbs) /(21 Nm) range

NOTE: Anti-seize Nickel lubricant is recommended for stainless steel fasteners to reduce the possibility of galling.

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Fasteners

Ø8mm x 25mm stainless T-bolt

Ø8mm x 65mm stainless T-bolt



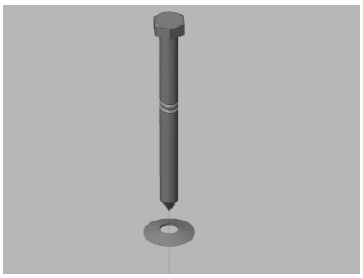
Ø8mm stainless serrated flange nut



Roof anchor bolt



Metal Rooftop



Shingled Rooftop

Security nut and driver- optional



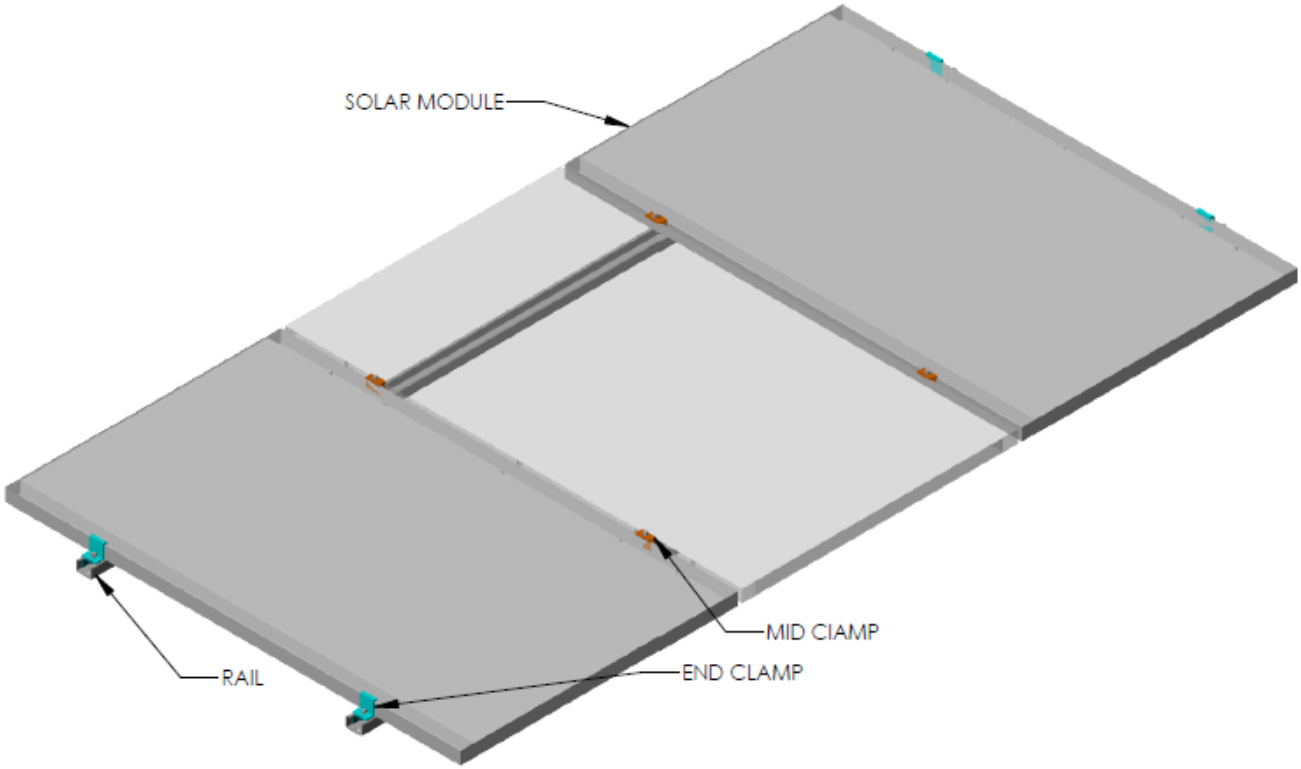
Tek #10 Self Drilling Screw



Racking System Overview

NOTE: For structural reasons, follow portrait layout design pattern. Longest side of solar panel must be perpendicular to rails.

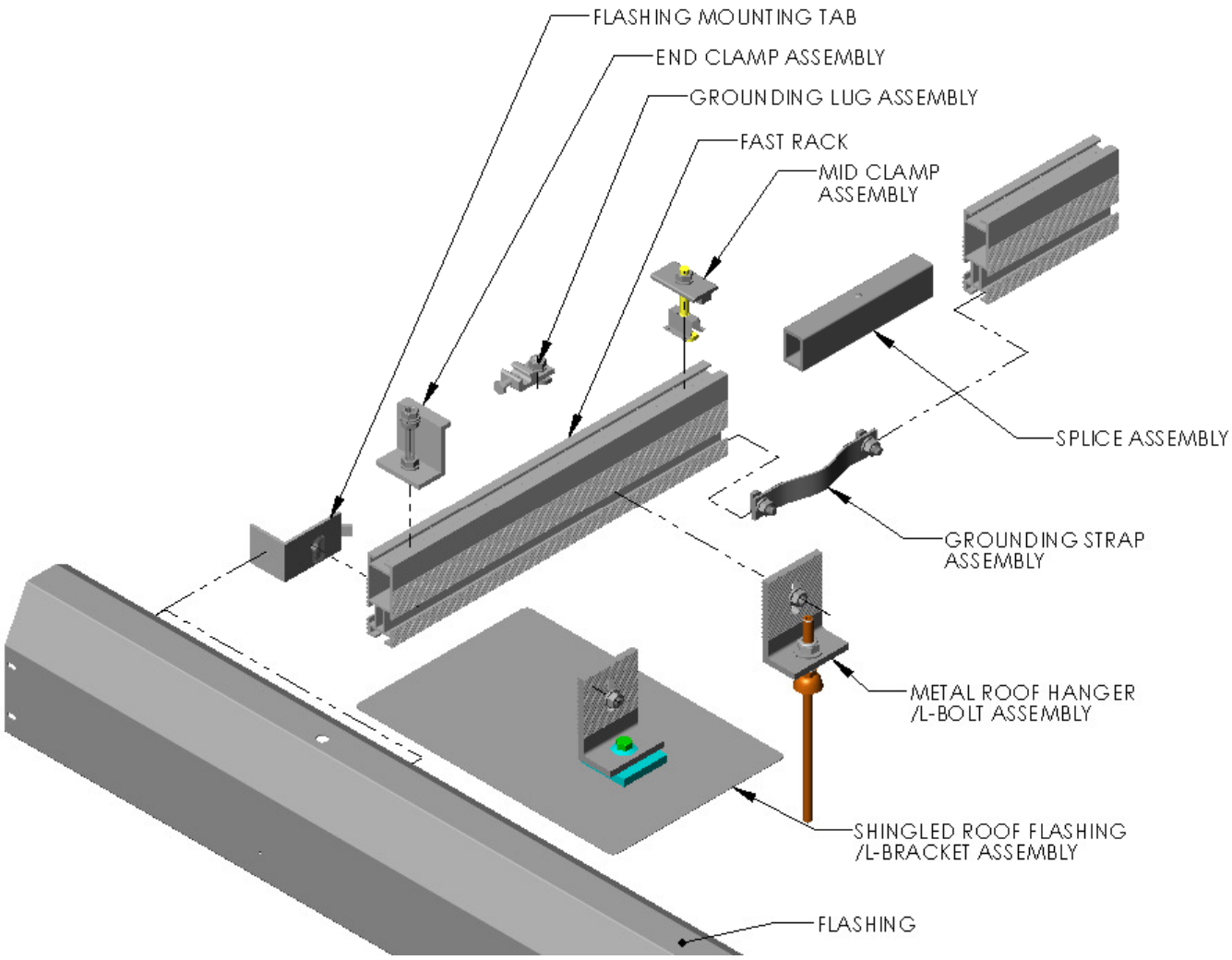
•Rails run East to West



LAYOUT DESIGN DWG # 101389-

NOTE: For structural reasons, the orientation of the L-Brackets on adjacent rails must either face away from each other or towards each other.

Racking System Overview



Exploded Overview DWG # 101135B

Step by step installation guide

NOTE: Solar panel to be mounted in portrait orientation

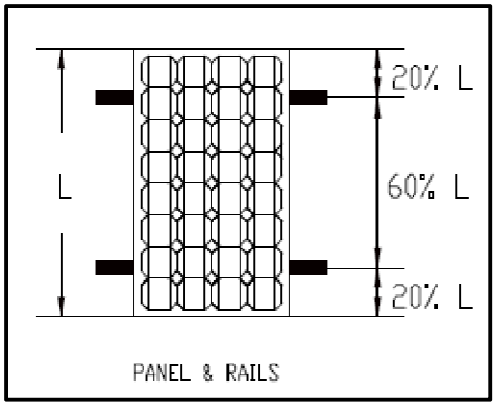


FIG. 1

Step 1: Overall mount layout

- Layout location of L-bracket mounting feet (see Fig. 2)
- Allow minimum 24 inches (610mm) from roof ridge
- Allow minimum 18 inches (457mm) at East and West roof edges
- Allow minimum 18 (457mm) inches at soffits
- Rail should be spaced at 20/60/20 on panels (see Fig. 1)
- Measure and mark roof truss locations for L-brackets and anchor bolts

NOTE: Max. east to west spacing of L-brackets is 48 inches. Individual rooftop applications may vary. Consult structural engineer for additional rooftop loading. Some jurisdictions may require building permits/approvals.

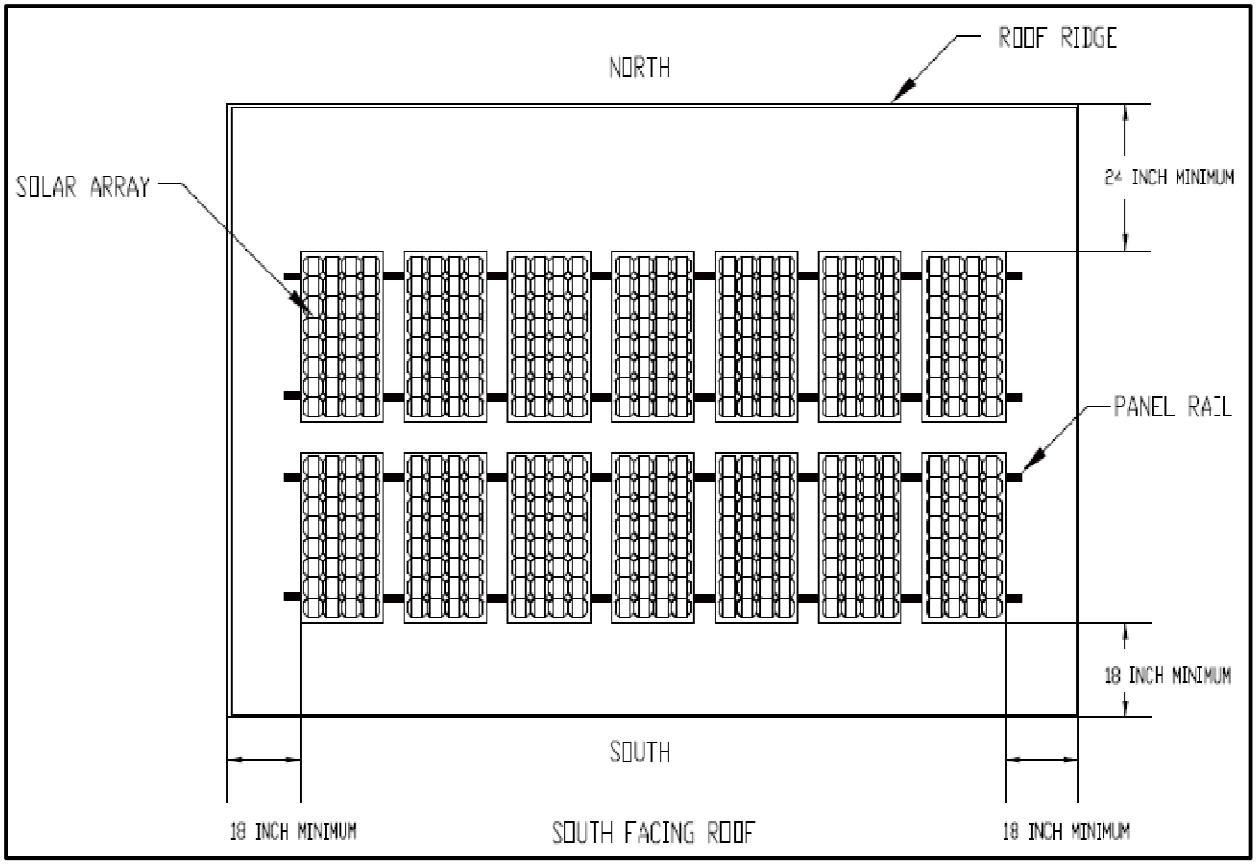


FIG. 2

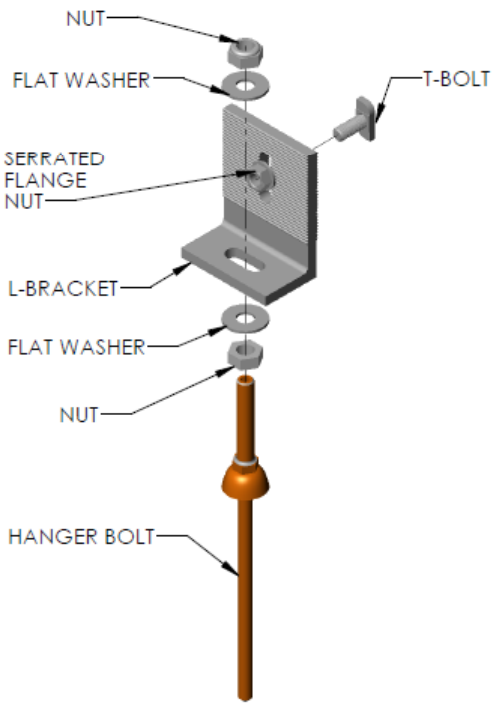
Step by step installation guide

Step 2: Hanger bolt installation

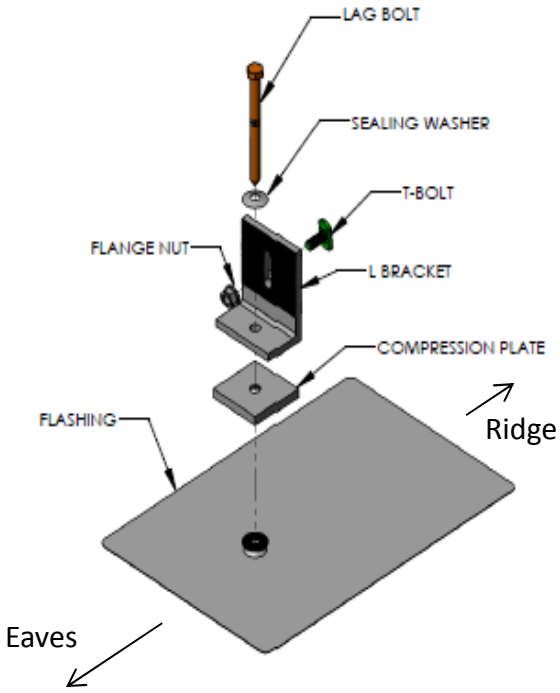
- Pre-drill pilot holes into roof truss using Ø5.5mm x 150mm bit (Ø7/32x6 inch).
- Bolt must hit roof strapping and truss or blocking (see Fig. 5).

- If installing on a metal rooftop install hanger bolt using 5 mm hex bit – seat neoprene seal to roof.
- Level the lower adjusting nuts on anchor bolts using string line (see Fig. 3).

- If installing on a shingled rooftop, slide top of flashing tightly between shingles aligning bottom edge of flashing with trailing edge of lower course of shingles.
- Install L-bracket on top of compression plate with 5/16'' lag bolt using a 13 mm hex socket (see Fig. 4 and 6).



METAL ROOF APPLICATION
FIG. 3 DWG# 101121A



SHINGLE ROOF APPLICATION
FIG. 4 DWG# 101347-

Step by step installation guide

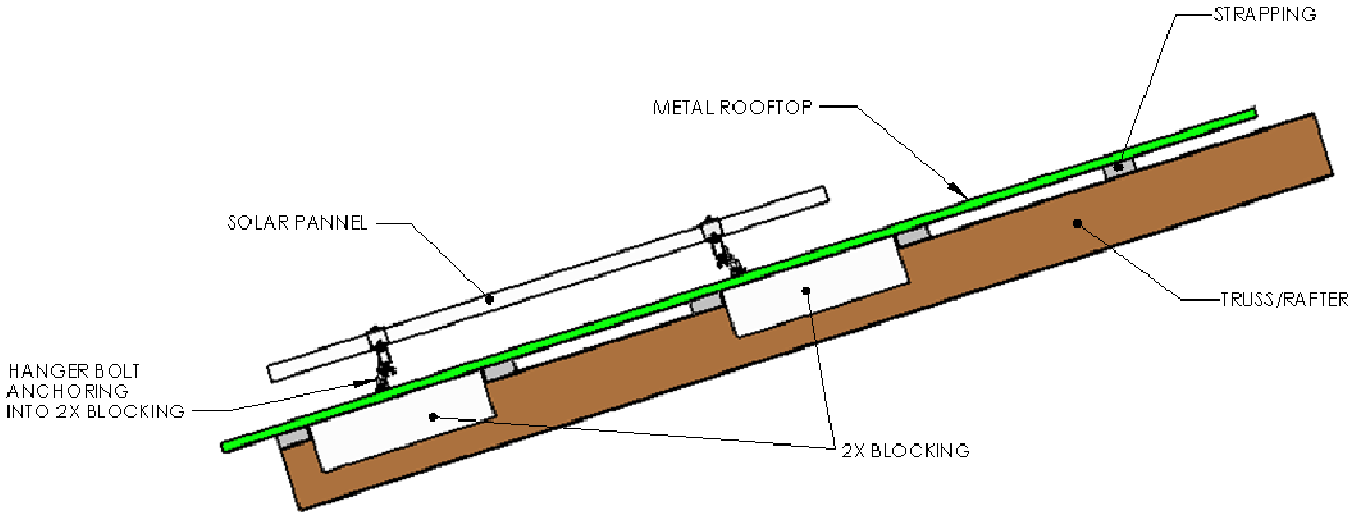


Fig. 5 DWG # 101449-

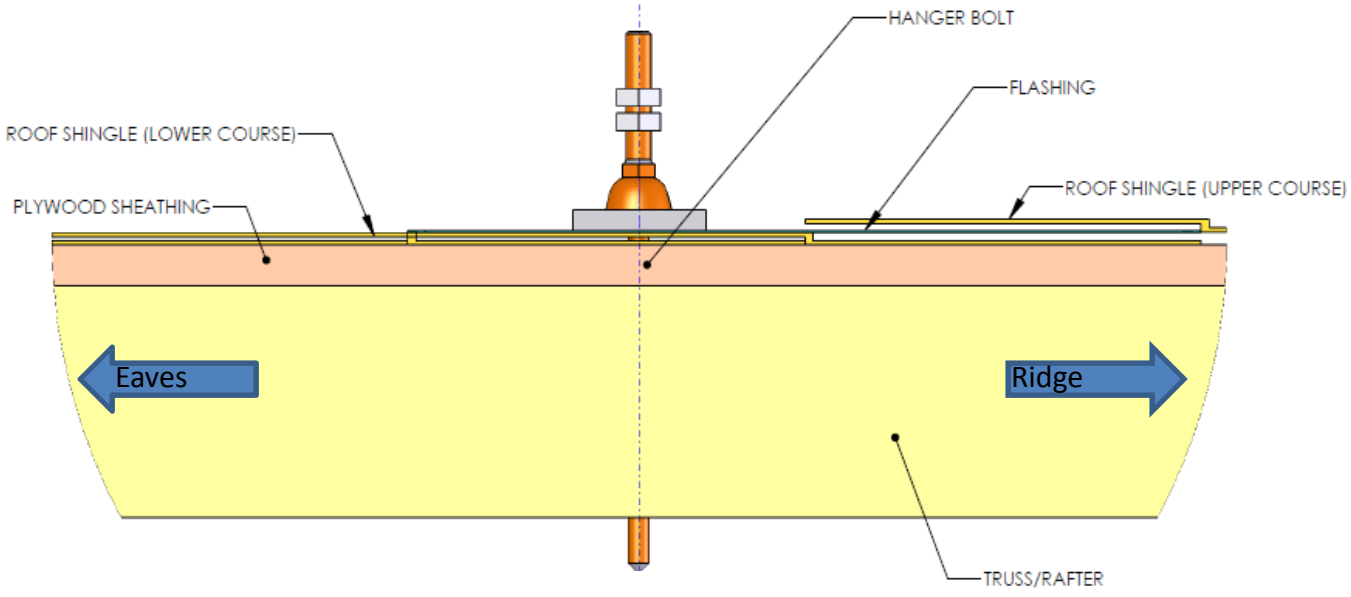
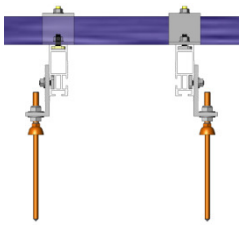


Fig.6 DWG # 101450-

Step by step installation guide

Step 3: L-bracket installation

•Install L-bracket followed by the upper nut onto anchor bolt using 17 mm socket & wrench -*use anti-seize lubricant. (See Fig. 3)



•Ensure L-bracket on adjacent rails oppose each other.

Step 4: Prepare rail for installation

•Cut rail to length if required using appropriate saw and metal cutting blade.

•Lay rails at desired install locations - **Do not install rail onto L brackets until splices are installed** (See Step 5).

Step 5: Splice installation

•If more than 1 rail needs to be joined: insert splice into end of each rail leaving a minimum 1” (13 mm) gap between rails. (See Fig. 7)

•Attach grounding strap between lengths of rails to complete grounding connections. (See Fig. 8)

•Provide some slack in the ground strap to allow for rail expansion and contraction.

•You will require a 13mm socket.-*use anti-seize lubricant.

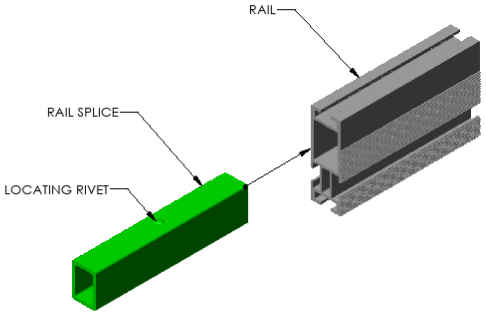


FIG. 7 DWG # 101135A

Step by step installation guide

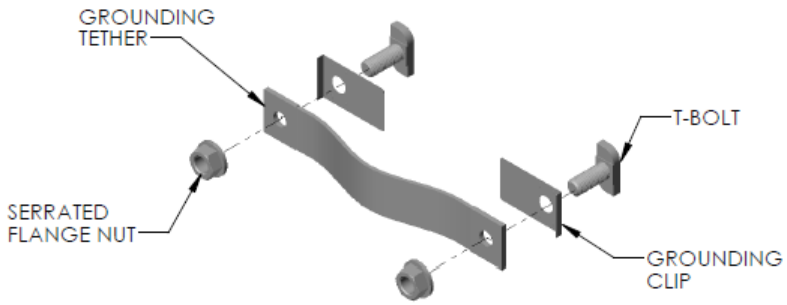


FIG. 8 DWG # 101097-

Step 6: Rail installation

•Install rail onto L-brackets using ϕ8mm x25mm T-bolts & serrated flange nuts.

•Note: Ribs on rail and L-bracket can be used for height adjustment - along with Hanger bolt bottom adjusting nut on metal roof applications (see Step 2).

•Turn T-bolt **CLOCKWISE** a ¼ turn in slot of rail. (see Fig. 9)

•Tighten to 15 ft lb (21 Nm) using torque wrench – *use anti-seize lubricant.

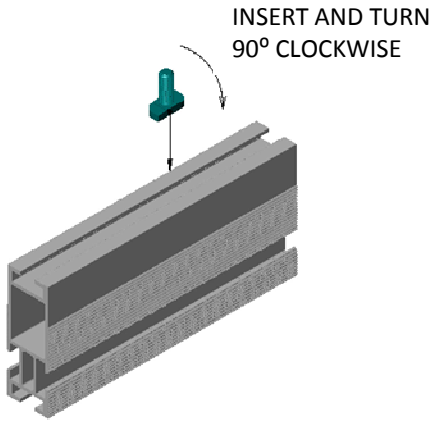


FIG. 9 DWG # 101179-

Step by step installation guide

Step 7: End clamp installation

- Install end clamp assembly onto rail (See Fig. 10) using ϕ8mmx25mm T-bolt and serrated flange nut.*use anti-seize lubricant. - **Do not tighten until solar panel is installed and aligned. (Step 10)**
- Note: install end clamp assembly 3/4” (19mm) or less away from the rail end.

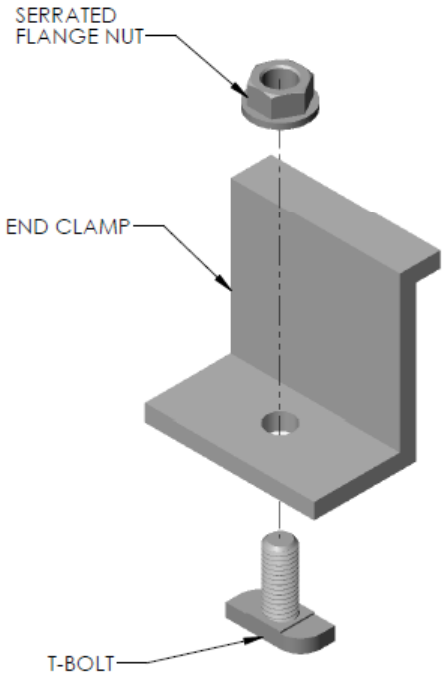


FIG. 10 DWG # 101120-

Step by step installation guide

Step 8: Enphase Micro Inverter Option: Grounding clips

•Install 2 x (ϕ8mm x 25mm) T bolts onto rail, followed by a single inverter grounding washer onto rail. (see Fig. 11)

•Position inverter onto rail and T-bolts. Fasten inverter using 2 x serrated flange nuts.

•Tighten nuts – 15ft-lbs (21Nm) *Use anti-seize lubricant.

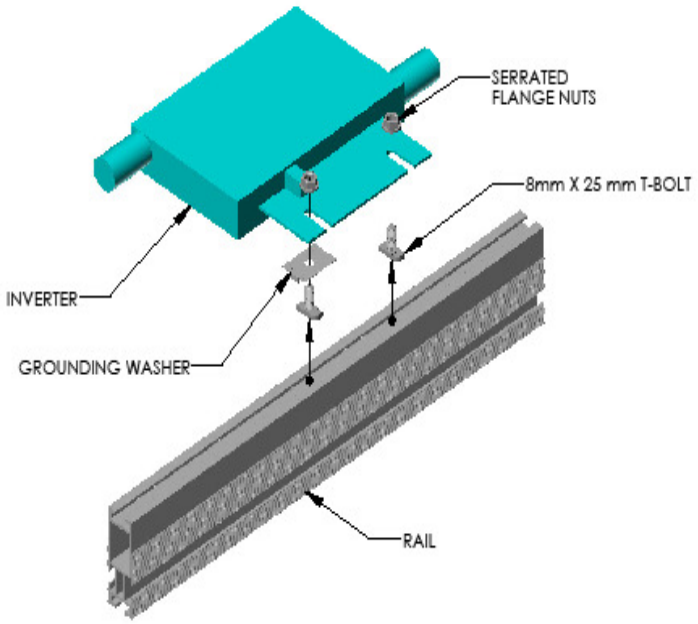


FIG. 11 DWG # 101178-

Step by step installation guide

Step 9: Grounding Components Installation

•Install grounding lug assembly using ϕ8mm x 25mm T-bolt and serrated flange nut. (See Fig. 12)

•You will require a 13mm socket for the T-Bolt and an 11mm socket for the setscrew.

•You will require a single lug assembly for each length of continuous rail –* use anti-seize lubricant.

Ensure grounding lug assembly is placed under solar panel (i.e. between end clamps)

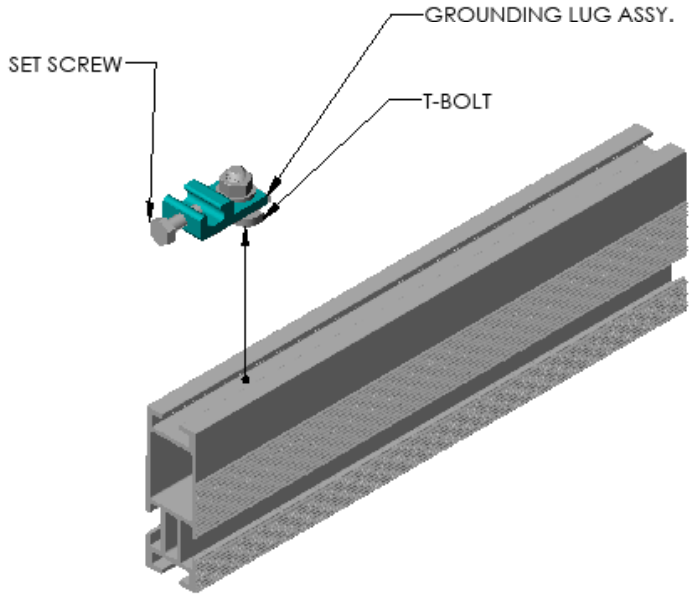


FIG. 12 DWG # 101135

Step by step installation guide

Step 10: Solar panel installation

•Install solar panels square to roof perimeter/rail.

•Provide 1/4“ (6mm) – 3/8” (10mm) gap between vertical rows of panels.

•Tighten end clamps to 15 ft lb (21 Nm) using torque wrench – *use anti-seize lubricant.

Step 11: Mid clamp installation

•Install mid clamp assembly using ϕ8mm x 65mm T-bolt and serrated flange nut (See Fig. 12)

•Align grounding clip beneath adjacent solar panels.

•You will require a 13mm socket for the flange nut.

•Tighten mid clamps to 15 ft lb (21Nm) using torque wrench –* use anti-seize lubricant.

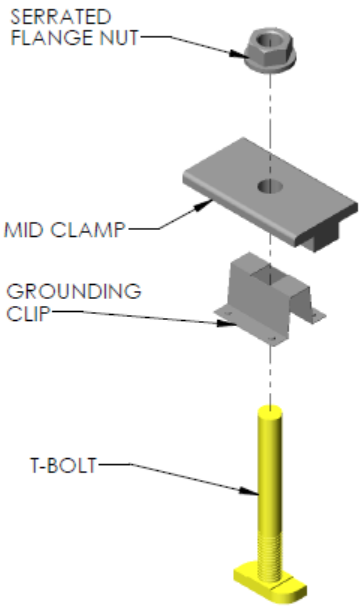


FIG. 12 DWG # 101093-

Step by step installation guide

Step 12: Flashing installation

•Ensure fast rack rail extends 2in or less from panel side (Ref. Fig. 12). Cut to size with reciprocating saw if required

•Insert T-bolt (M8x25mm) into exterior side of fast rack

•Place mounting tab over T-bolt (Ref. Figs. 11 & 13)

•Slide mounting tab until 90° surface is 2in [50mm] from panel side (Ref. Fig. 12)

•Torque hex nut onto t-bolt using 15ft-lbs [21Nm]

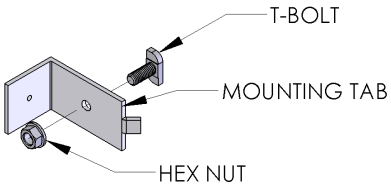


FIG. 11 DWG # 101788-

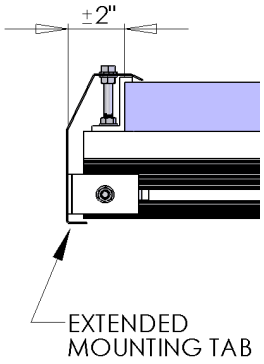


FIG. 12 DWG # 101782-

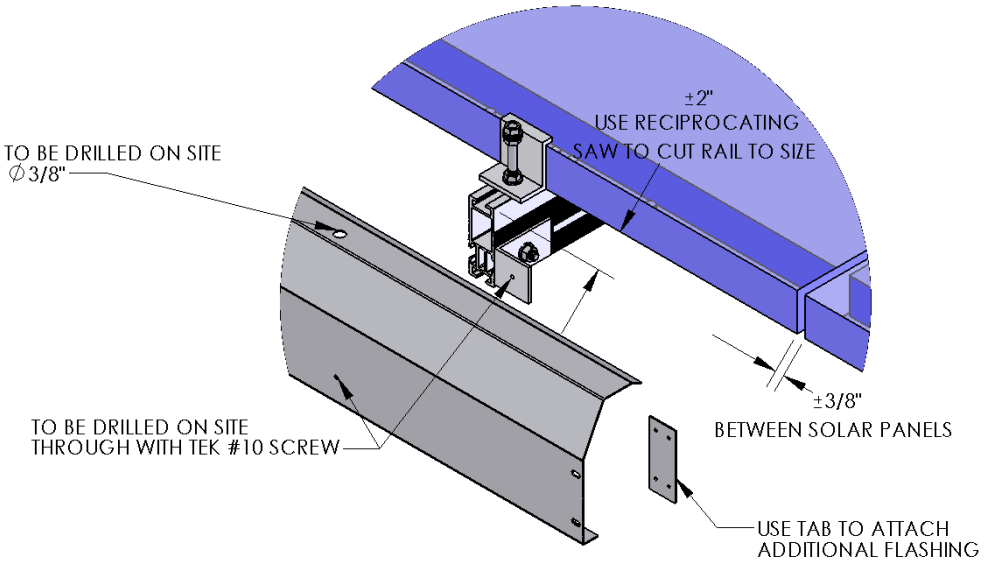


FIG. 13 DWG # 101782-

Step by step installation guide

Step 12: Flashing installation (continued)

•Screw a second hex nut (washer side up) onto each end clamp T-bolt (M8x65mm) until flush with end clamp top (Ref. Fig. 14)

•Align flashing with rails and mark drill locations

•Drill holes (Ø3/8”) in flashing on top (Typ.) (Ref. Fig. 13, page 15)

•Place end clamp T-bolt ends through drilled holes. Screw a third hex nut onto top of flashing until flashing is clamped, then tighten second hex nut (Ref. Fig. 14)

•Make flashing flush with 90º surface of mounting tab

•Drill tek #10 screws through flashing and mounting tab, roughly centered on 90º surface of mounting tab (Ref. Fig. 13)

•Space Ø3/8” between panels when adding new row of panels

•To add another length of flashing, coincide edge of existing flashing to new flashing

•Place flashing tab over holes and drill tek #10 screws through each hole (Ref. Fig 15)

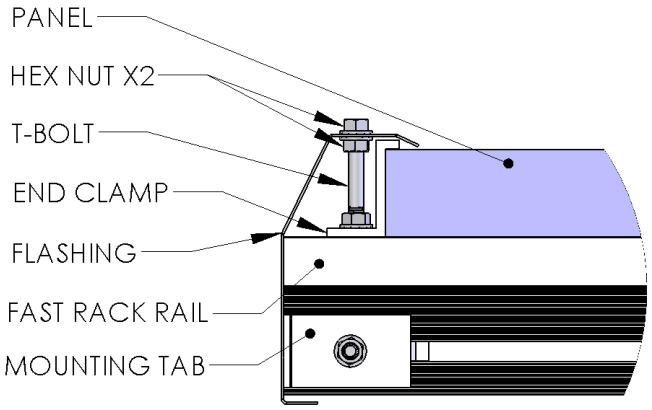


FIG. 14 DWG # 101782-

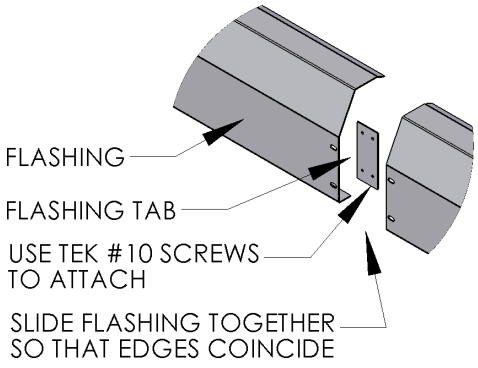


FIG. 15 DWG # 101782-

NOTE:

•It is the responsibility of the installer/owner to ensure the racking and solar system meets local building and electrical codes/local power distribution company.

•It is advised to seek a qualified structural engineer prior to installation of the system to verify your roofing structure is able to support the additional loading of the solar system.

•Please ensure installers use proper fall arrest gear and have proper training.