



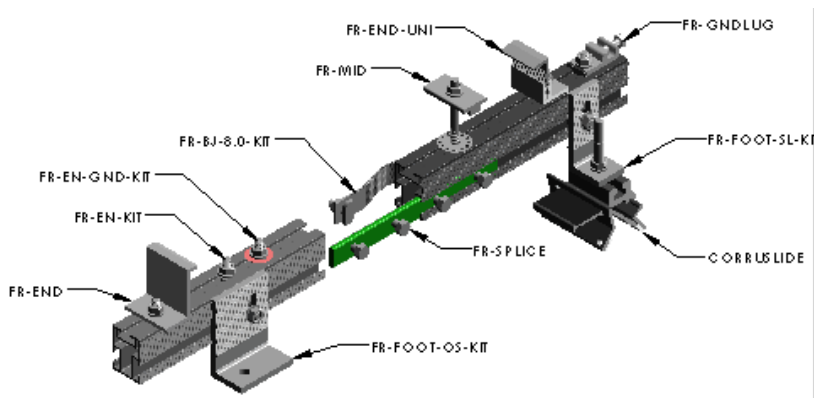
Simple systems applying a minimal distributed load and are parallel/flush to the slope of the existing mounting roof (without modification of the base structure) may utilize the structural mounting and flashing system.

Flush Roof Mount

Flush mounted solar Photovoltaic Panel Systems can be mounted to pre-existing structures without structural analysis and modification if the roof loading is low, under 5psf and manufactured to withstand typical wind loads.

Fast-Rack Mounting System for Attaching Panels to Roof Anchors

The image below shows the primary components used in conventional Flush Roof Mounts.



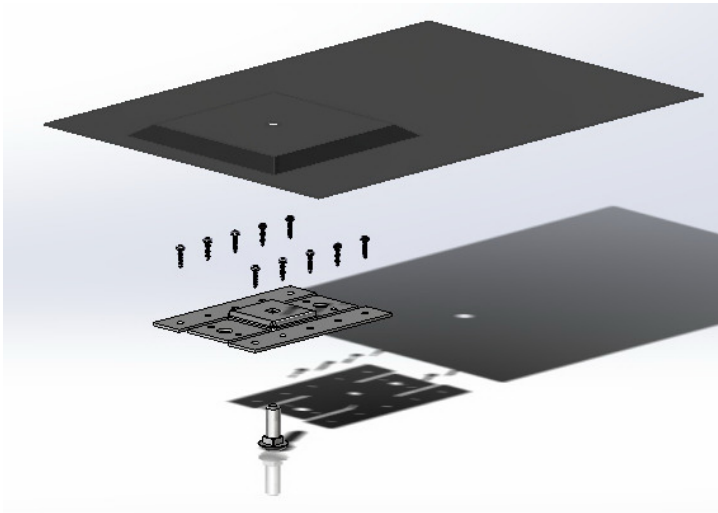
- FR-UL: Fast Rack Ultra Rail used for residential solar PV applications
- FR-END & FR-END-UNI: End clamps for holding outside modules to the racking system
- FR-MID: Intermodule clamp for anchoring adjacent modules to the racking system
- FR-FOOT-OS & FR-FOOT-SL: Foot for connecting to roof anchor component (Corruslide shown)
- FR-SPLICE and FR-BJ-8.0: Mechanical and Electrical bond between adjacent rails
- FR-EN & FR-EN-GND: Mechanical and Electrical bond between rails and accessories.

For Flush Roof Mounts these requirements typically include locations of rails with respect to the top and bottom of the solar module (reduce bending in module frames), torque values for all clamps (to adequately secure the modules, while preventing galling), and proper assembly/installation instructions (to ensure proper use of components).

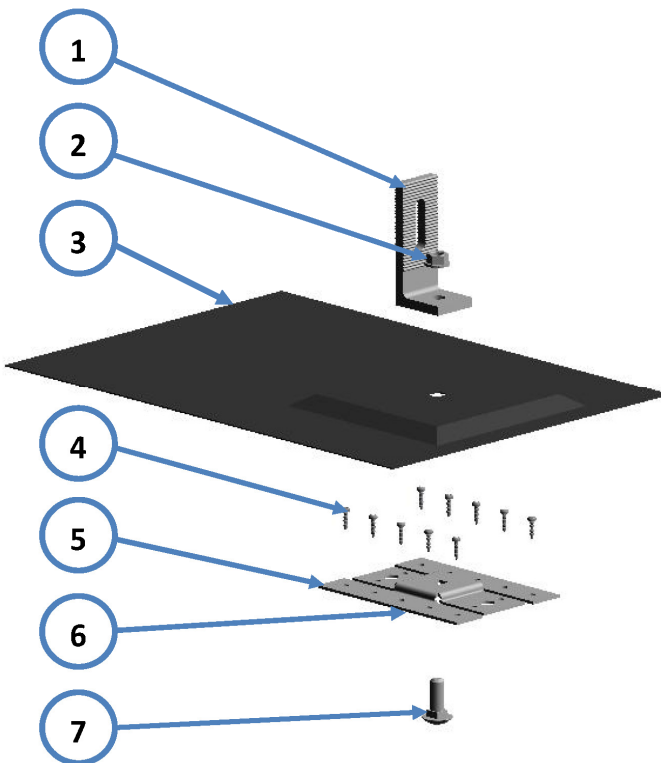
Roof Anchors for Shingle Roof Installation System

A. Proprietary Anchor System

1. The FR-Talon is designed to allow structural attachment directly to the roof sheathing. It is designed to provide adequate withdrawal capacity while anchored to the roof sheathing by using multiple small fasteners. Anchors may be fastened over existing shingles or directly to wood sheathing under shingles.
2. By using up to 14 (typically 10) #10 sheet metal screws, into 5/8" OSB/Plywood pull out capacity similar to a 5/16" lag screw into a truss can be achieved. The image below shows the exploded view of the FR-Talon assembly.

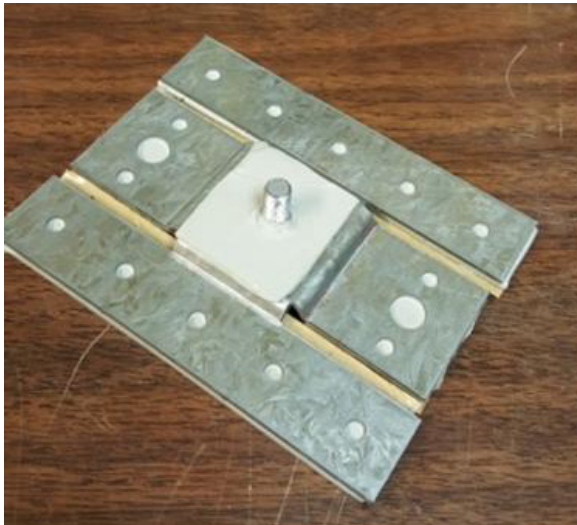


a) The list below includes the items provided with each FR-Talon Roof Anchor Kit.



PART	DESCRIPTION	QUANTITY
1	Mounting Bracket	1
2	M8 Hex Nut	1
3	FR-Talon Flashing	1
4	#10 x 1" Wood Screw	10
5	FR-Talon Base	1
6	Butyl Tape	Pre-installed
7	M8 Carriage Bolt	1

3. Align and insert Carriage Bolt through the underside of the square hole located in FR-Talon Base



4. Remove Butyl Tape cover from underside of FR-Talon Base and position at centerline of the top rail



5. Installation Secure in place with ten #10 Wood Screws (the FR-Talon has also been equipped with room for Two 5/16" lag screws for anchoring to trusses, as PV arrays are traditionally secured, if installers wish to use that anchoring method).



Common screw placement

- 6. Slide FR-Talon Flashing over Fr-Talon Base and secure FR-L-Foot (Offset or Slim) to Carriage bolt using the supplied M8 Hex Nut.



- a) Ensure flashing extends underneath two (2) races of shingles to prevent water seeping under the flashing.

- 7. Installation over shingles: Ensure FR-Talon Base fits completely on one (1) race of shingles.



Correct placement

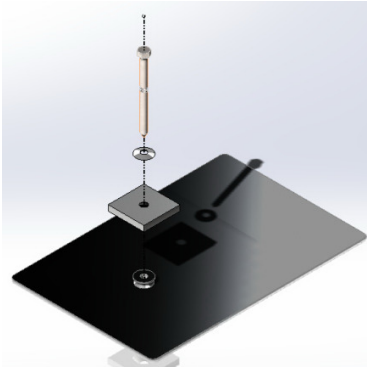


Incorrect placement

- 8. Once all FR-Talon Anchors have been installed continue installation attaching Fast-Rack to the anchors.

B. Simple Lag Screw Anchorage with Sealed Flashing (more commonly used method)

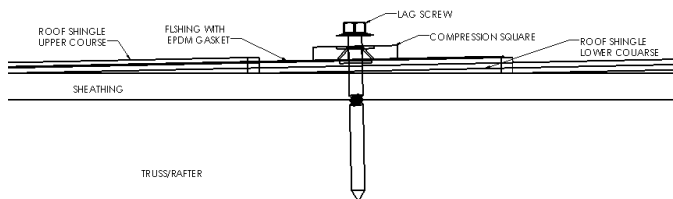
This method involves securing the racking components to the roof deck with a lag screw attaching to a rafter or truss and a sealing the installation with the following flashing system.



As shown in the adjacent image and installation instructions, this system covers concerns of penetrating into rafter and sealing around the penetration. Minimum pull out capacity for a 5/16" Lag Screw into SPF#2, typical building material, must be minimum 206 lbs. per inch of thread penetration. In a typical 4.0" with 3" of thread the pull out capacity would be approximately 618 lbs.

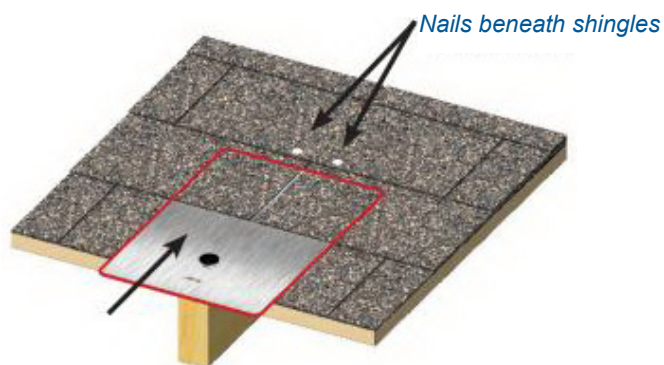
The flashing system diverts water away from the penetration using two sealing elements, EPDM gasket on flashing and EPDM washer above the compression square in order to prevent water from entering into the roof. Best-practices also recommend applying a bead of sealant around the underside of the flashing to further aid in water displacement.

The image below provides a cutaway view of this penetration method.

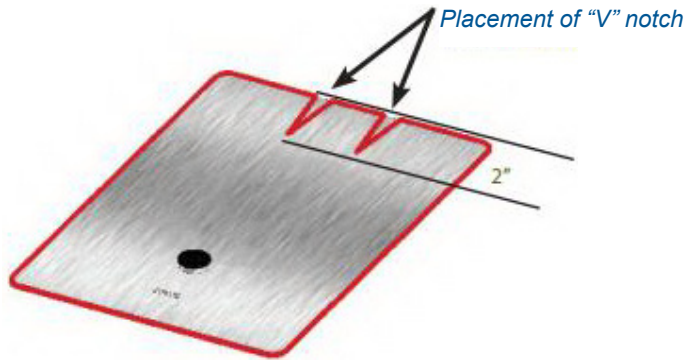


Installation of Flashing Kit

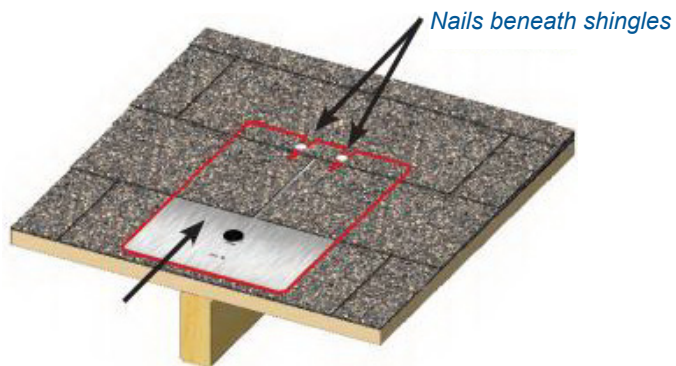
1. Drill a 7/32" diameter pilot hole into the roof and truss for the lag bolt. Backfill the hole with sealant. It is recommended that EPDM mastic sealant be used.
2. Slide the flashing under the upper shingle far enough so that it prevents water from entering the gap between the shingles. To employ further water resistance, apply sealant to the underside of the flashing, going in a circular pattern around the hole. If the flashing encounters nails follow the below procedure:
 - a) Slide the flashing in until the leading edge engages the nails and measure the distance to the nails.



- b) Remove the flashing from under the shingle and cut two V-shaped notches where the flashing came in contact with the nails. The cuts should not exceed two inches in depth.



- c) Reinstall the flashing under the upslope shingle with the nails placed in the notches.



- 3. Line up the Flashing hole with the pilot hole then insert the lag bolt through the stainless steel washer, the third-party bracket, the EPDM bonded washer, the CP-SQ-Slotted compression bracket and the gasketed hole in the flashing and into the rafter/truss.
- 4. Tighten the lag bolt to 100–140 in-lb (11.3–15.8Nm) or until the EPDM on the underside of the bonded washer begins to push out the sides as the washer is compressed. Be careful to not over torque if using an impact wrench.
- 5. Use two layers of butyl tape, one at the penetration points and one at the connection between base plate and the flashing to resist water ingress.

C. Standing Seam Anchor System



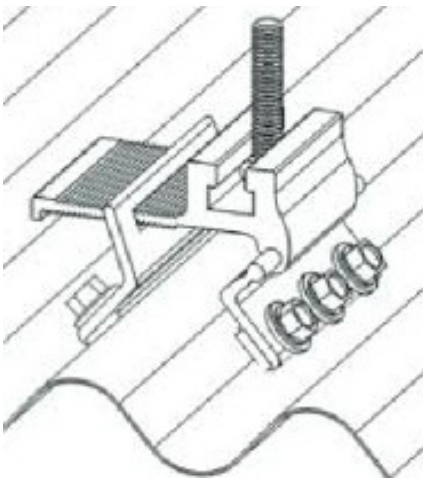
This anchoring method secures solar PV modules to standing seam metal roofs without penetrating the roof deck. The standing seam profile typically provides a strong and secure location to anchor mounts to standing seam roofs. The installation method for anchoring to standing seam profiles uses clamps secured to the standing seam by set screws which deform the profile without penetrating it.

Due to the expansive number of profiles of various thicknesses, use adjustable clamp manufactured by S-5! or other approved supplier to ensure load capabilities on various profiles. Confirm the correct clamp for each installation. The table below represents the normal load capacity and configuration of an S-5! Clamp on a Vic West – 24 Ga. Prestige profile:

Model	Panel Manufacturer	Panel Name	Thickness Material	Screw Tension (inch-lbs)	Ultimate (lbs)	Failure Mode	Allowable (lbs)	Notes
S-5-S Mini	Vic West Ca	Prestige	24 ga steel	115	669 lb	A/D	223 lb	

Ensure that all clamps are non-penetrating (don't cause leaks) and have pullout capacity similar to that of a 5/16" lag screw with 3" penetration into wood.

D. Corrugated Steel Roof Anchoring System



Corrugated metal roofs typically have sealed screws anchoring the cladding to the roof sheathing and a trapezoidal or sinusoidal profile to provide rigidity. Use clamps designed to 'grab' the corrugations and withstand pullout loads, called Corruslide. The adjacent image shows the Corruslide clamp with sealing elements.

As shown in the adjacent image, the Corruslide also uses a double layout of sealing elements to prevent water penetration. These layers are the EPDM gasket on the underside of the sheet metal screw and the more rigid rubber layer between the underside of the clamp and the corrugated roof profile. Ensure a pull out capacity similar to the industry benchmark of a 5/16" lag screw into 3" of SPF.