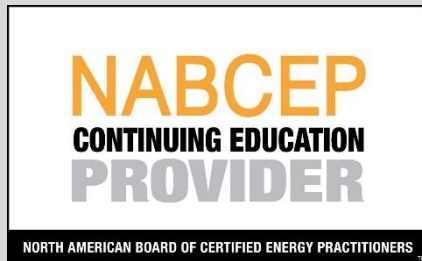




We've Got Your Rack!

Roof Attachment Overview





MY STORY

Brandon Gwinner

Account Executive

- Construction and Sales for over 15 years
- SunModo brand representative for over 5 years
- OSEIA board of Directors

OUR RACKING SOLUTIONS



THE NEXT
GENERATION
IN SOLAR RACKING



MY STORY

Jeremy Taylor

Product System Engineer

- Started in early grid tied market in 2002 as an Installer
- Became NABCEP certified in Installation in 2007
- Worked on the Engineering aspects for Developers, EPC's, Manufacturers, and as a Design Consultant for over 5 years
- At SunModo supports project implementation and product development

OUR RACKING SOLUTIONS



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IN SOLAR RACKING



OUR STORY

Founded in 2008

SunModo means "The Way of the Sun"

HQ: Vancouver, Washington

Culture of Innovation: 15 patents and growing

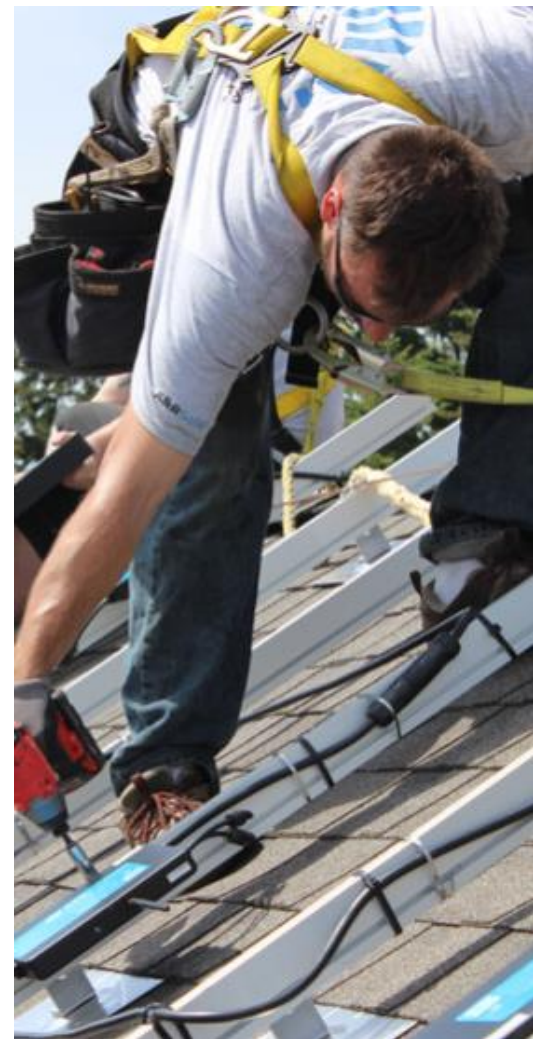
Complete line of racking solutions for roof & ground mount systems

Mission: Drive down the total cost of solar system

Vision: Accelerate the adoption of affordable clean energy technologies worldwide

OUR FOCUS

THE PROFESSIONAL INSTALLER





Holistic PV Racking Philosophy

What is it? Aligned values in structural solutions

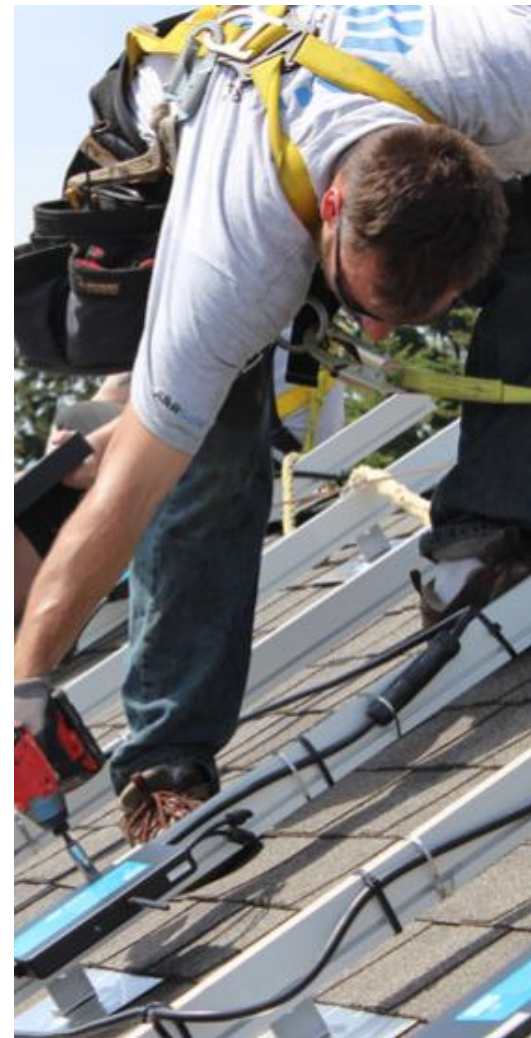
SunModo creates value for either with....

Longevity: Warranty, Weatherization, Quality, and Value Engineering

Liability: Testing, Certifications, Approvals, and Licensure (PE and/or C)

Methodology: Project Processes, Safety, Ease of Installation, and O&M

Ownership: Aesthetics, Performance, Sustainability, and Risk to Reward



Project Gallery





Course Overview

- Residential & Commercial Pitched Roofs– Comp, Metal, and Tile
- Commercial & Industrial (C&I) Low Slope Roofs
- Ground Mounts for Residential, Agricultural, and Solar Gardens

SunBeam Flat Roof System
Versatile • Adaptable • Light Weight
All Aluminum
Maximizes the roof space
Adjustable for any tilt desired
Kerfless Mounting System

EZ SunBeam Ground Mount
Rapid Installation • Scalable • Cost Effective
Heavy Duty Aluminum Racking and Cross Bracing
High Wind 150 mph +
Steel Support and Ground Anchors
Sliders & Caps, Beam, Rails

Pitched Roof System
Standard, Heavy or Super Rail, 4 standard lengths
Clamps: Grounding Clamps with unique built-in grounding pins
Rail
EZ Roof Mount: Our EZ Roof Mount for composite shingles is simple, versatile and fast to install
Splice: Grounding Rail Splice for longer rows of rail

OUR RACKING SOLUTIONS

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Residential and Small Commercial – Pitched Roofs

- Roof Survey: Appropriate attachment selection for type, age, and condition
- Structural Elements: wind zone siting, point loading, and codes
- Process: Specification, Layout, Procurement, and Permitting
- Installation Best Practices



Pitched Roof Solutions

THE NEXT
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Composition Roofs and Attachments



Composition Roof Types:

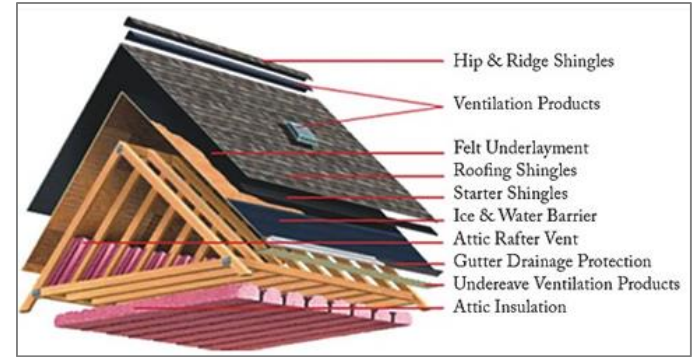
Standard Reveal – simplest install

Presidential Reveal – some cutting for leveling required

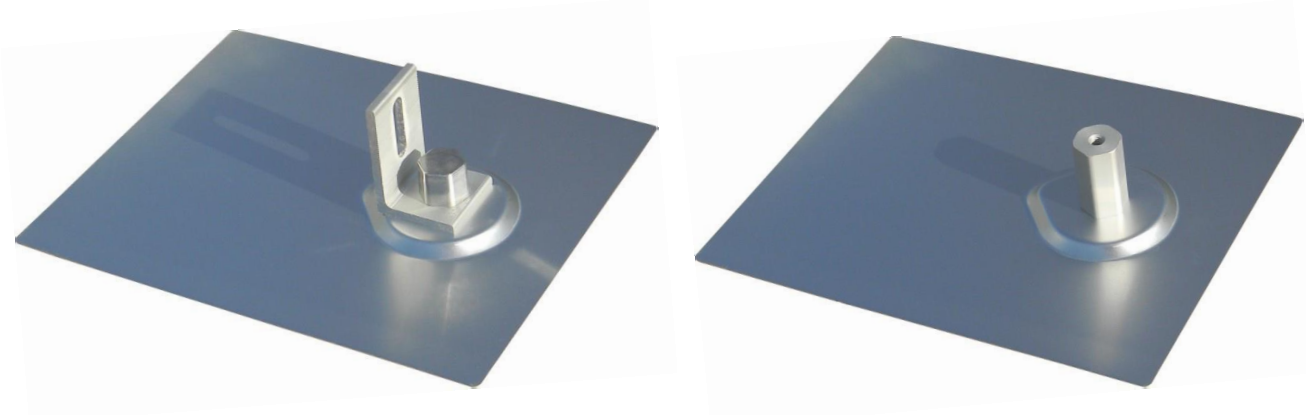


Composition Roof Assessment

- Age and Quality of Underlayment
- Mold
- Deck Thickness (if deck attachment)
- Framing members – size, spacing, and span to what support wall or member (attic pictures!)



EZ Roof Mount w/ L Foot or Standoff



- ✓ Easy to Install: no shingle cutting required, single bolt or 4 deck screws (where allowed)
- ✓ Minimum components; parts are interchangeable
- ✓ Raised flashing to divert water flow; protected seal under the flashing
- ✓ IAPMO certified (for structural and rain test data (ICC-ES AC 286 and UL 441))

Mounting Options: EZ Roof Mount Kits



Versatile aluminum base for multiple configurations.



Perfect for top mounting rail.



Add a L Foot for side mounting rails.



L Foot version available.

- Direct to Deck attachment (4 hole pattern)
- Lag Embedment length (2.5" or more if acceptable) w/ point loads
- Method to get under two courses and seal removed nail holes
- Method to hold base while installing or uninstalling to stop spinning

EZ Roof Mount



IAPMO Certified (both lag bolt and decking screws versions)



EVALUATION REPORT

Number: 248

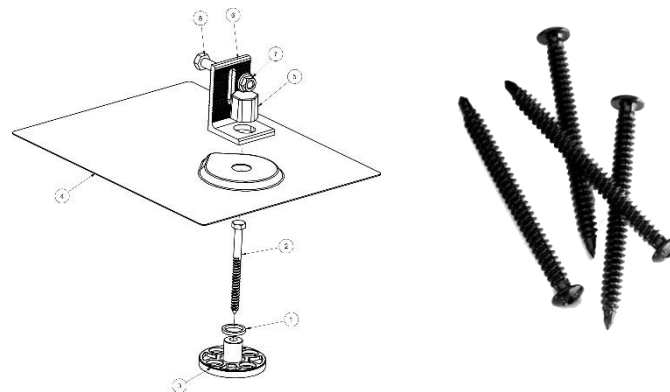
Originally Issued: 09/26/2012

Revised: 05/27/2016

Valid Through: 09/30/2016

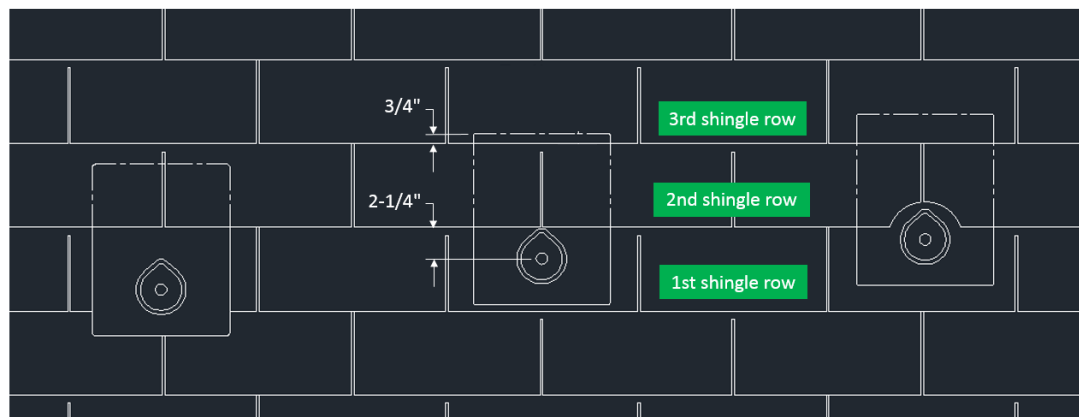
Table 1: Allowable Loads (lbs)			
EZ Roof Mount Kit – K10068-001			
Load Direction (Figure 1)	Test Load at 0.250 inch deflection	Test Load at 0.125 inch deflection	Allowable Design Load ^{1,2}
Uplift (Withdrawal) ³	1,800	695	715
Lateral	240	130	260
EZ Roof Mount Kit – K10068-020 ⁴			
Load Direction (Figure 1)	Test Load at 0.250 inch deflection	Test Load at 0.125 inch deflection	Allowable Design Load ^{1,2}
Uplift -2 in. screw	770	396	200
Lateral -2 in. screw	232	114	85
Uplift -3 in. screw	777	390	177
Lateral -3 in. screw	264	157	102

For SI: 1 inch = 25.4 mm



First racking manufacturer to achieve nationally recognized certification for decking solution

EZ Roof Mounts: Best Practices

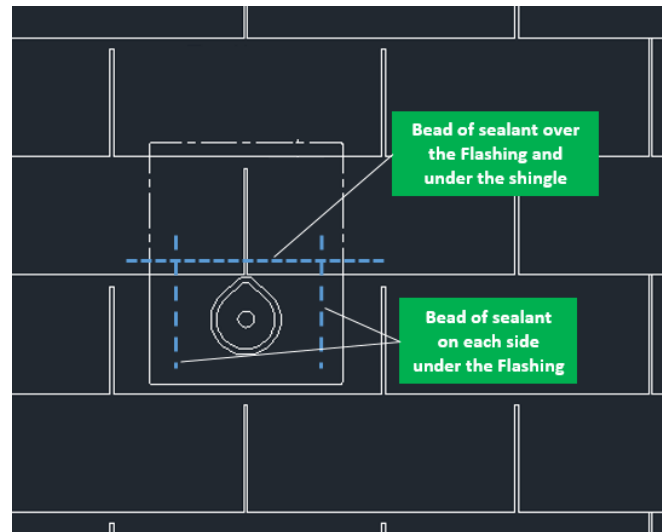


INCORRECT Position
Moisture and debris can accumulate causing early shingle degradation

CORRECT Position
No shingle cutting required

Acceptable Position
If shingle cutting is required a 1/2" gap between the raised feature of the Flashing and the shingle is recommended

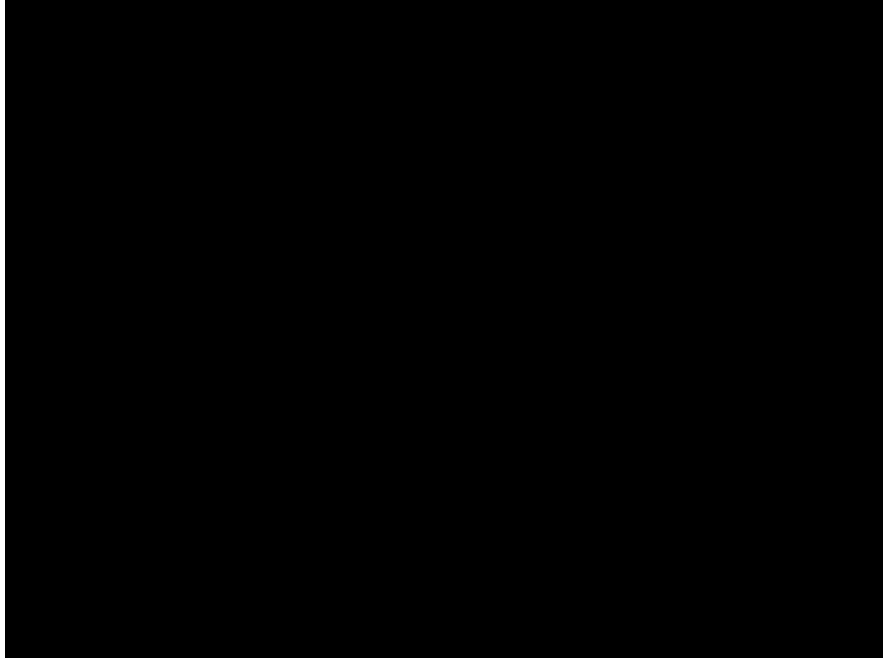
Flashing Placement



Sealant Application



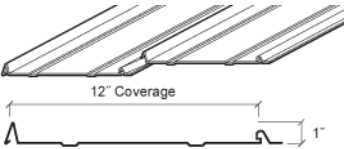
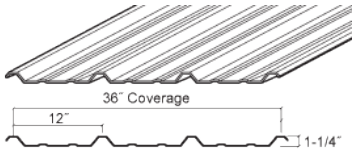
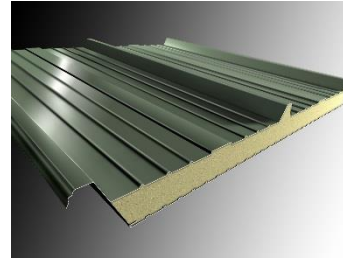
EZ Roof Mount: Install video



Corrugated Roofs and Attachments

Metal Roof Types:

- Aluminum, Steel, Zinc and Copper
- Standing Seam – Snap Lock
- Corrugated
 - R-Panel - best retrofit, typical 12"OC
 - U-Panel –typical 6" OC
 - CF Panel (Concealed fasteners)



Metal Roof Assessment

- Sealing screws (check gaskets)
- Bent, or crushed (careful walking)
- Rust or paint chipping
- Integrated Skylights (harder to see)
- Type of panel, location of structural members

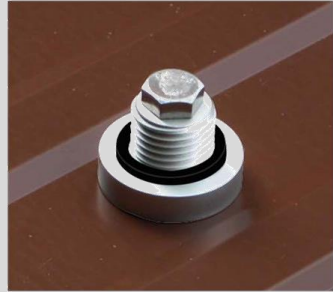


Metal Beam Attachments

- To bridge the peak or compress the valley?
- Attachment to metal purlins (especially with tilt-up)
- Self-Tapping Screws (sizing)
- Consult your structural engineer to select the appropriate fastener for metal framed buildings
- Screw ICC reports per gauge



Mounting Options: EZ Metal Roof Mount Kits



Single penetration mount



Thick EPDM gasket for superior water tight seal.



L Foot can swivel in any direction.



Thick EPDM gasket for superior water tight seal.

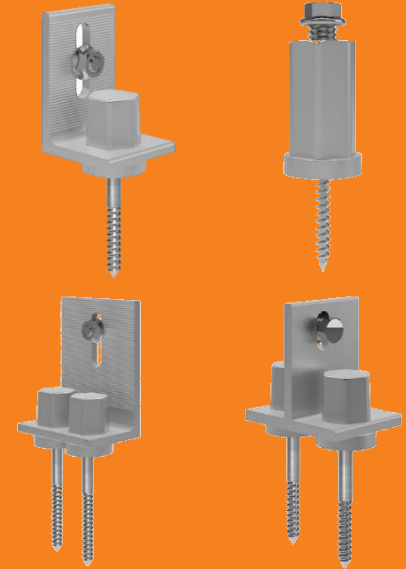


Solid aluminum standoff that comes in different lengths.



Single penetration mount

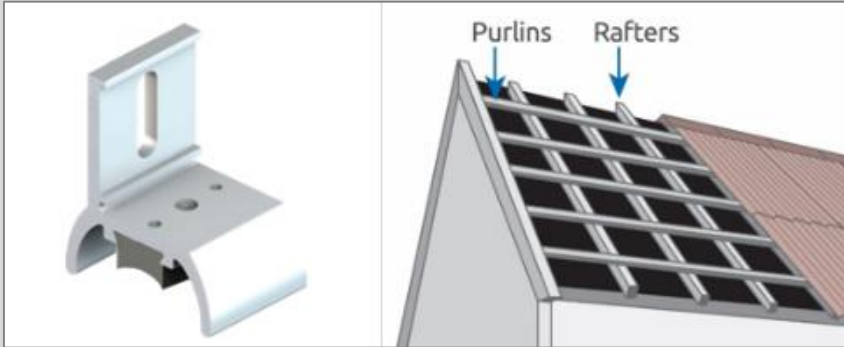
**Easy to install:
single penetration
into purlin or rafter**



**Minimum components;
interchangeable with L-Feet or
Standoffs**

**Sealing integral: thick proprietary
EPDM gasket for water-tight seal**

Mounting Options: RidgeBridge Mount Kits



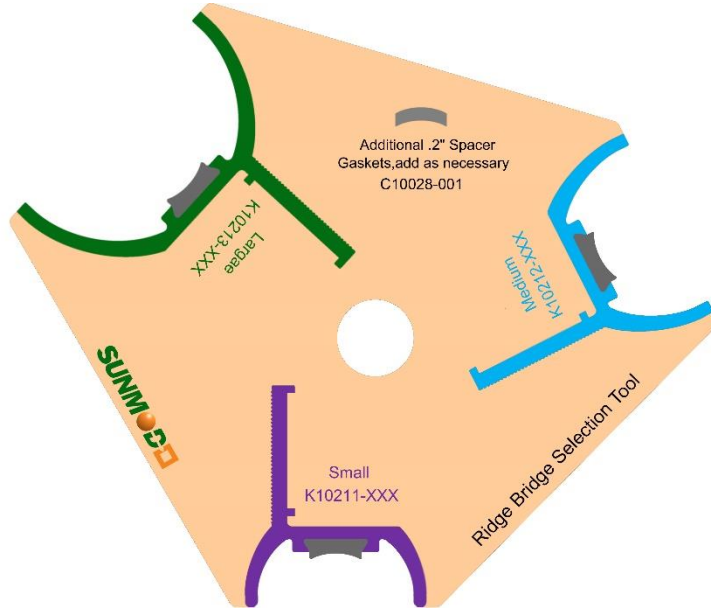
- ✓ 3 bracket sizes fit almost any rolled metal roof profile
- ✓ 1 or 2 hole for Rafter or purlins attachment (change gasket)
- ✓ Choice of various gaskets for superior water tight seal
- ✓ Combined with L-Adaptor to change the orientation of Rail at right angles to corrugations

Corrugated Roof Solutions



**THE NEXT
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IN SOLAR RACKING**

RidgeBridge Mount Selection Tool

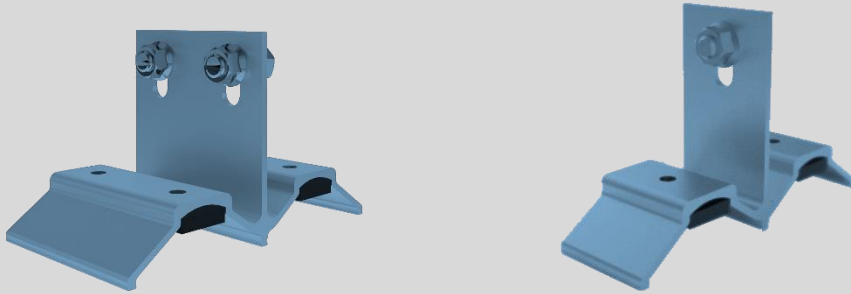


Additional
Spacer
Gage

Select leg
spacing,
then add
spacers as
necessary
to close gap

1. C10028-001
2. C10028-001
3. C10028-001

Mounting Options: EZ Corrugated Mount Kits



- ✓ Sealing integral: Easy to install
- ✓ Minimum components
- ✓ 4 Hole for metal Purlins, 2 Hole lateral wood members
- ✓ Thick proprietary EPDM gasket for water-tight seal

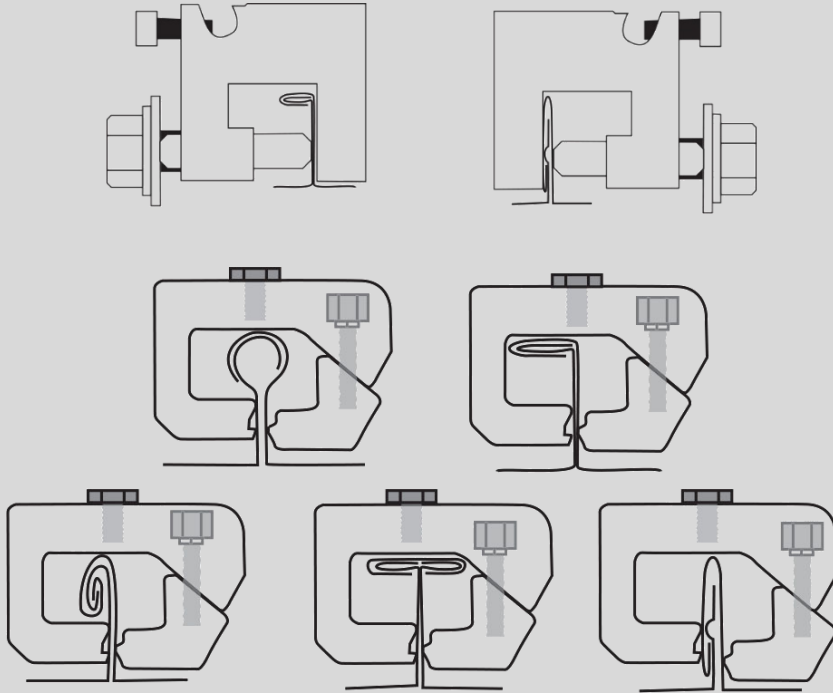
Corrugated Roof Solutions



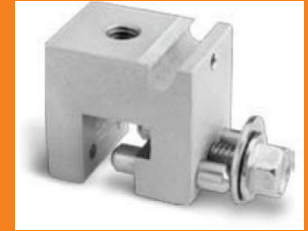
**THE NEXT
GENERATION
IN SOLAR RACKING**

Seam Metal Roofs and Attachments

Mounting Options: Standing Seam Clamp Kits



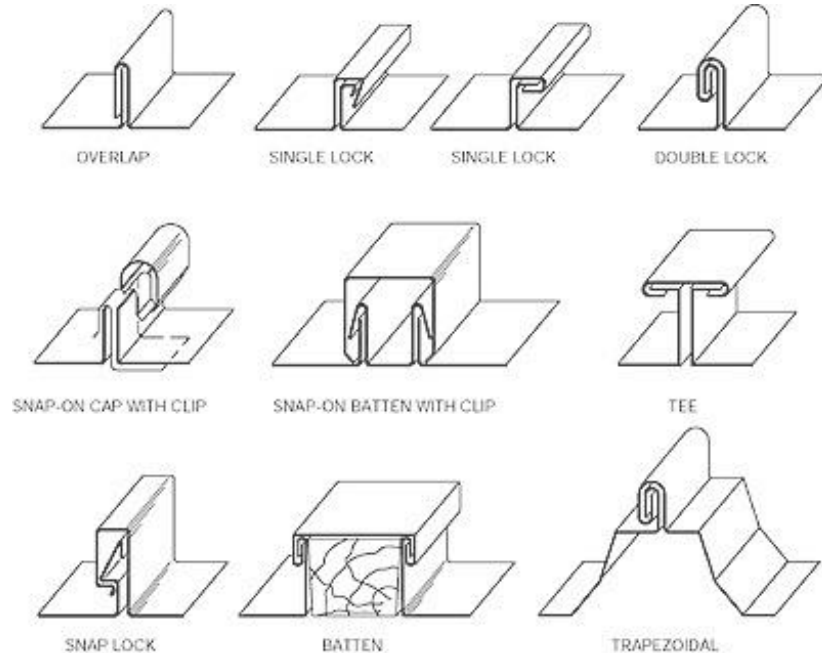
Standing Seam Roof Solutions



THE NEXT
GENERATION
IN SOLAR RACKING

Challenging Profiles

- EZ Metal Roof Mounts will work where seam clamps do not
- Can't grip it without damage to seal



Structural Elements

- Clip Spacing (12-24") and fastener count for pan attachment values (ex: 2x #12WS, ½"deck)
- Attachment (4-6') spacing rests upon this



Tile Roofs and Attachments

Tile Roof Types:

- Curved Concrete - S-Tile, Cordova, Double Roman, Double Pan
- Flat Concrete – Lightweight
- Spanish Clay, Mission style
- S-tile Clay
- Slate
- Fiberglass
- Wood Shake



Roof Assessment: Eave inspection

- Age and Type of Underlayment
- Mold
- Cracked Tiles (Spanish mission style)
- Ridge Flashing
- Availability of Tile (for replacement)
- Construction – Nailer, Cement, or Glue
- Battens – Vertical or Horizontal
- Deck Thickness



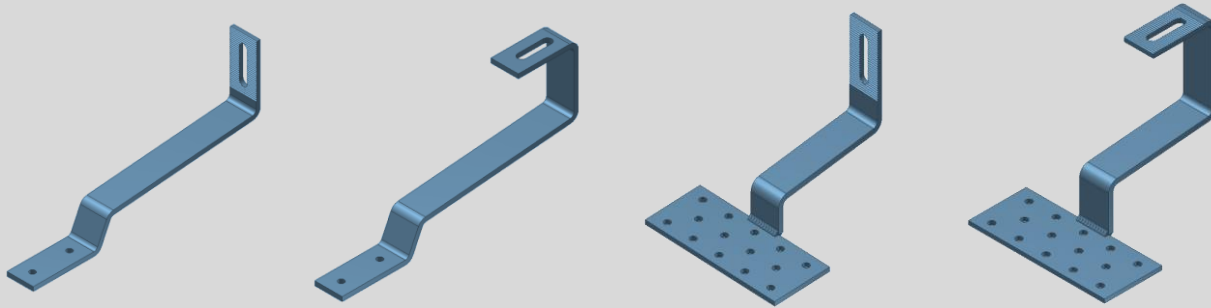
Decide which is best product for that roof in its condition

Tile Mounting Options:

- EZ Tile Hooks- Easy to remove and re-fit tiles
- Top Tile Mount – Great roof with delicate construction (not disrupted)
- Tile Inlay – Roof in need of repair soon, replace with comp shingles EZ Mount Flashing

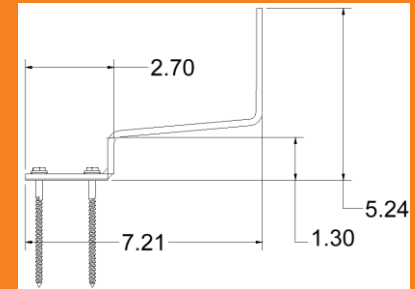


Mounting Options: EZ Tile Hook Kits



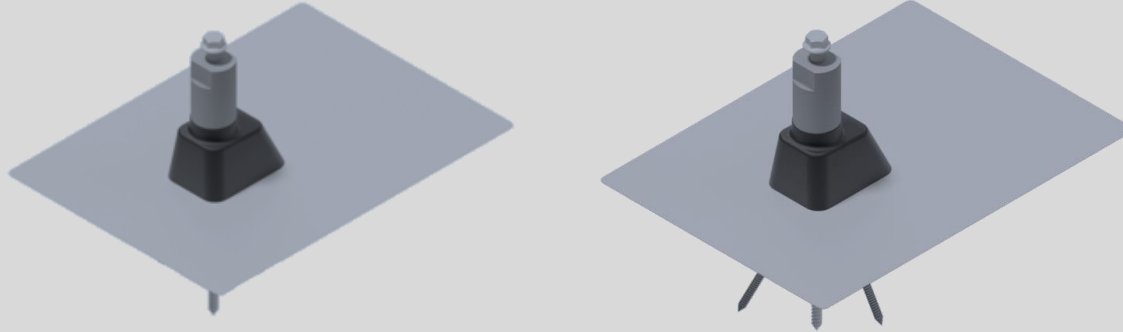
- ✓ 4 choices of hook for vertical rail orientations and 4 hooks for flat mounting of strut type rails
- ✓ Multi-screw mounting plate allows hook to be positioned to bolt onto roof truss
- ✓ All Hooks supplied with two 1/4 x 3-1/2 inch long stainless steel Roofing Screws with Sealing Washers for maximum strength mounting and protection.
- ✓ All Hooks have attached EPDM Hook Base Gaskets between hook and roof surface.

Tile Hook Solutions



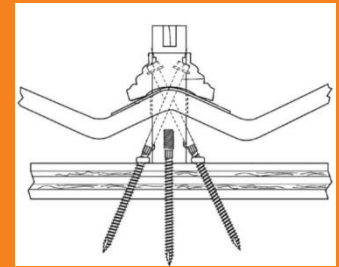
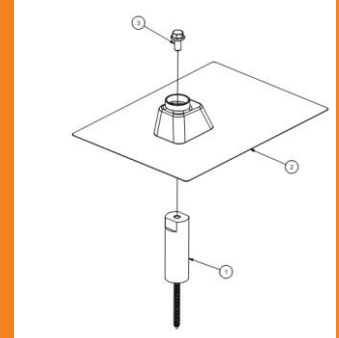
**THE NEXT
GENERATION
IN SOLAR RACKING**

Mounting Options: EZ TopTile Mounting Kits



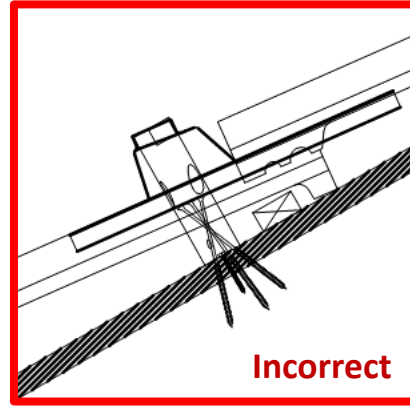
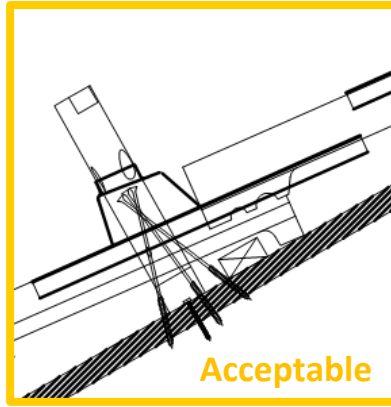
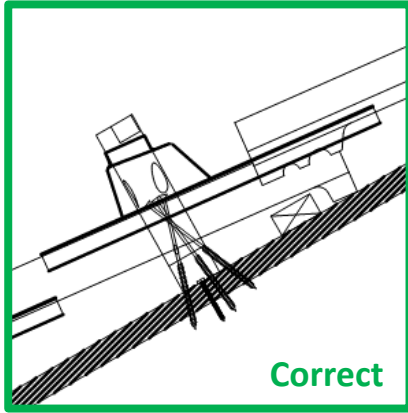
- ✓ No more lifting tiles, less breakage, and struggle to fit roof hooks
- ✓ The entire installation is done from above the roof, without removing any tiles
- ✓ 2 choices of TopTile Mounts for rafter mounting or roof deck mounting
- ✓ Strong, low profile roof attachment solution for flat or curved tiles
- ✓ Hand formable flashing provides superior leak protection

Tile Roof Solutions



**THE NEXT
GENERATION
IN SOLAR RACKING**

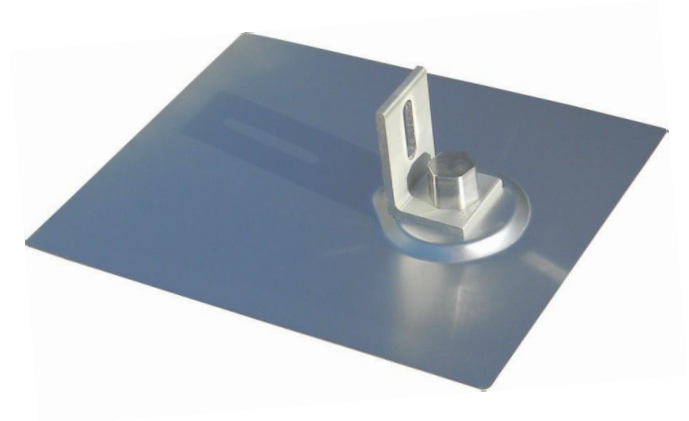
EZ TopTile Mount: Best Practices



Tripod Height	Maximum measurement from Deck to top of Tile Surface
5" Stanchion	2.25" to 3.25"
6" Stanchion with Spacer	3.25" to 4.00"
7" Stanchion	3.50" to 4.50"
8" Tripod Stanchion with Spacer	4.50" to 5.5"

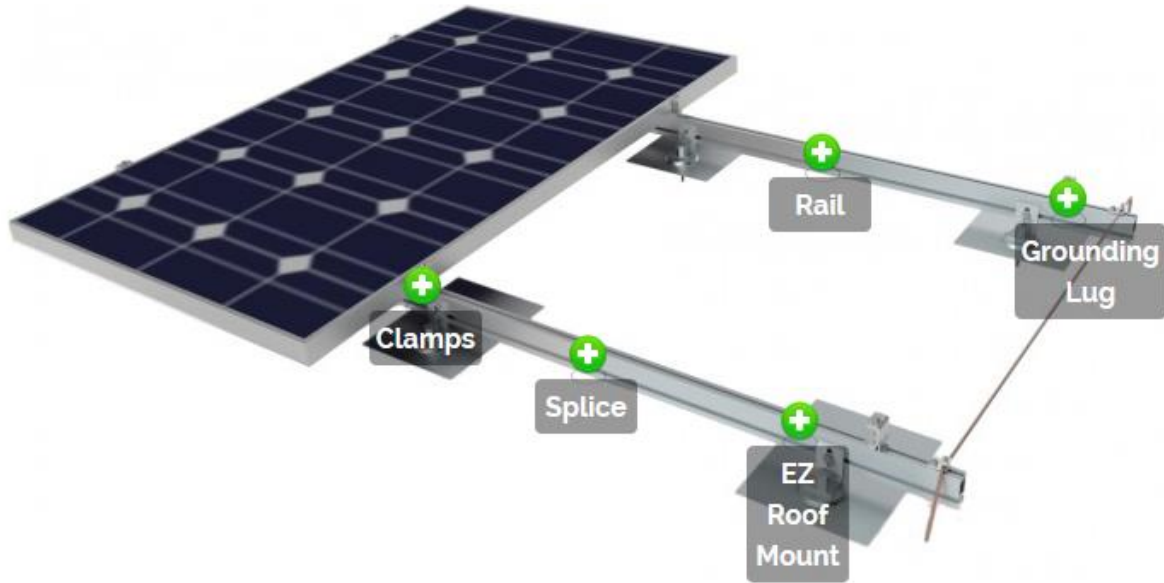
Tile Inlay

- Re-Roof Section and use EZ Roof Mount
- 16" from edge of array to overlap underlayment





Pitched Roof Racking System



Rail and Span Optimization

- Influence by snow or wind bias (green)
- White is best value/balance of up and down forces



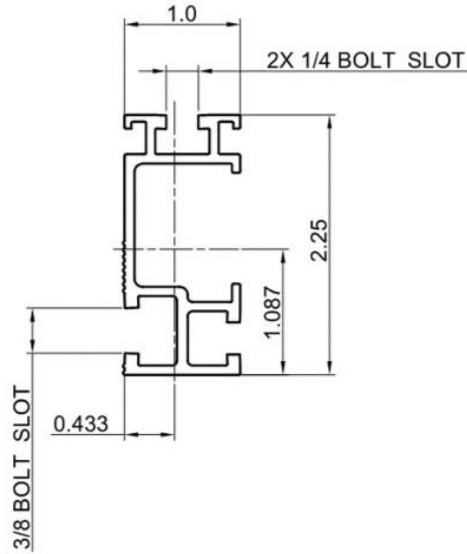
HR350 (Helio Heavy Rail)

HR250 (Helio Standard Rail)

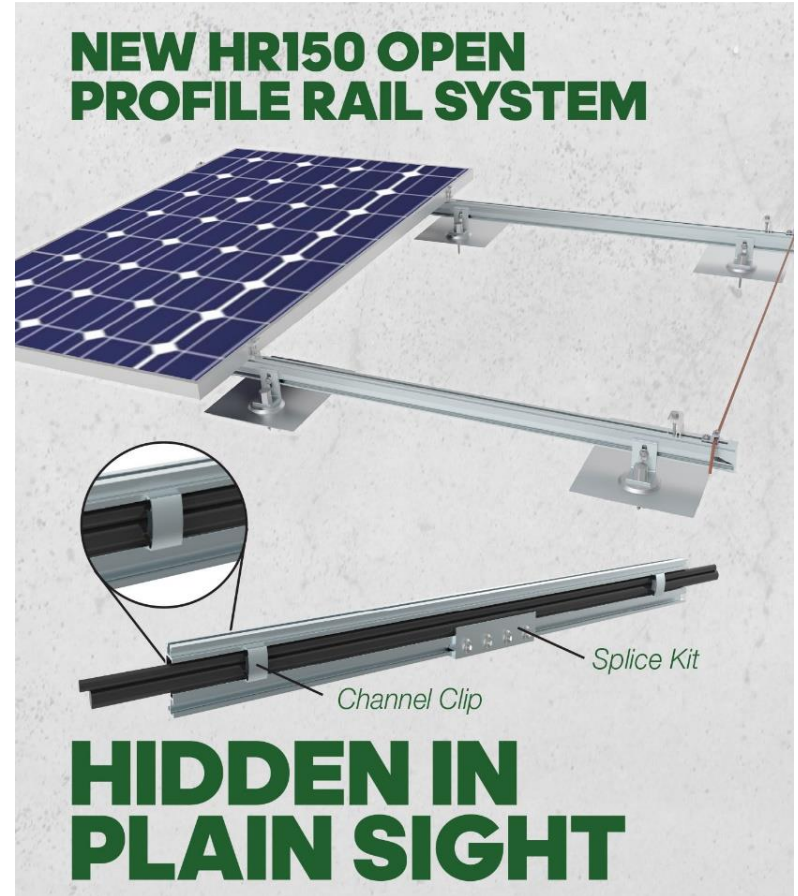
		Snow Load (psf)								
		0	10	20	30	40	50	60	70	80
Wind Load (psf)	10	10' 6"	9' 9"	9' 0"	8' 3"	7' 9"	7' 3"	6' 6"	6' 0"	5' 9"
	15	9' 9"	9' 3"	8' 6"	8' 3"	7' 9"	7' 3"	6' 6"	6' 0"	5' 9"
	20	9' 3"	9' 0"	8' 3"	8' 0"	7' 6"	7' 0"	6' 6"	6' 0"	5' 9"
	25	8' 9"	8' 6"	8' 3"	7' 9"	7' 3"	6' 9"	6' 3"	6' 0"	5' 9"
	30	8' 3"	8' 3"	8' 0"	7' 6"	7' 0"	6' 6"	6' 3"	6' 0"	5' 6"
	35	8' 0"	8' 0"	7' 9"	7' 3"	6' 9"	6' 3"	6' 0"	5' 9"	5' 6"
	40	7' 9"	7' 9"	7' 6"	7' 0"	6' 6"	6' 3"	6' 0"	5' 6"	5' 6"
	45	7' 6"	7' 6"	7' 3"	6' 9"	6' 3"	6' 0"	5' 9"	5' 6"	5' 3"
	50	7' 3"	7' 3"	7' 0"	6' 6"	6' 3"	6' 0"	5' 6"	5' 6"	5' 3"
	55	6' 9"	6' 9"	6' 9"	6' 3"	6' 0"	5' 9"	5' 6"	5' 3"	5' 0"
	60	6' 6"	6' 6"	6' 6"	6' 3"	6' 0"	5' 6"	5' 6"	5' 3"	5' 0"
	65	6' 3"	6' 3"	6' 3"	6' 0"	5' 9"	5' 6"	5' 3"	5' 0"	5' 0"
70	6' 0"	6' 0"	6' 0"	6' 0"	5' 6"	5' 6"	5' 3"	5' 0"	4' 9"	
75	6' 0"	6' 0"	6' 0"	5' 9"	5' 6"	5' 3"	5' 0"	5' 0"	4' 9"	
80	5' 9"	5' 9"	5' 9"	5' 6"	5' 6"	5' 3"	5' 0"	4' 9"	4' 9"	

		Snow Load (psf)								
		0	10	20	30	40	50	60	70	80
Wind Load (psf)	10	8' 9"	8' 0"	7' 3"	6' 9"	6' 0"	5' 3"	5' 0"	4' 6"	4' 3"
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	40	6' 0"	6' 0"	5' 9"	5' 3"	5' 0"	4' 9"	4' 6"	4' 3"	4' 0"
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	50	5' 3"	5' 3"	5' 3"	5' 0"	4' 9"	4' 6"	4' 3"	4' 0"	4' 0"
	55	5' 0"	5' 0"	5' 0"	4' 9"	4' 6"	4' 3"	4' 0"	4' 0"	4' 0"
	60	5' 0"	5' 0"	5' 0"	4' 9"	4' 6"	4' 3"	4' 0"	4' 0"	4' 0"
	65	4' 9"	4' 9"	4' 9"	4' 6"	4' 3"	4' 0"	4' 0"	4' 0"	4' 0"
70	4' 6"	4' 6"	4' 6"	4' 6"	4' 3"	4' 0"	4' 0"	4' 0"	4' 0"	
75	4' 6"	4' 6"	4' 6"	4' 3"	4' 0"	4' 0"	4' 0"	4' 0"	3' 9"	
80	4' 3"	4' 3"	4' 3"	4' 3"	4' 0"	4' 0"	4' 0"	4' 0"	3' 9"	

New Product Announcement



- ✓ HR150 open rail system
- ✓ Easy-snap channel clips
- ✓ Eliminate the cost and hassle of cable ducts and ties
- ✓ Tested by ETL to UL 2703 Edition 1



SUNMODO'S SELF-GROUNDING SYSTEM

The Newest Industry Standard is Here!

Professional solar installation just became easier and more secure. SunModo's self-grounding product line simplifies your solar installations with a complete line of solar mounting products.

We took feedback from professional installers to create a new standard in self-grounding that meets NEC 690.47 and UL 2703. Here's how it works:



Self-Grounding Pins

Each product in our new system features self-grounding pins that pierce rail coatings to form a reliable, durable grounding connection as part of the natural installation process.



Self-Grounding Rail Splices

Our splices with built-in grounding pins deliver a stronger rack and a solid bond between rails.



Self-Grounding Lug

Our lug features self-grounding to the rail, ensuring proper grounding of the PV system.



Self-Grounding Portrait Mid Clamps

Our self-grounding mid clamps have our own innovative "T" bolt locking assembly that makes positioning and torquing a breeze.



Self-Grounding Landscape Mid Clamps

Our system conveniently handles landscape configuration to minimize roof time and parts required.



Self-Grounding Landscape End Clamps

Our system easily converts standard rails to shared rails to allow landscape mounting of PV panels on E-W rails.

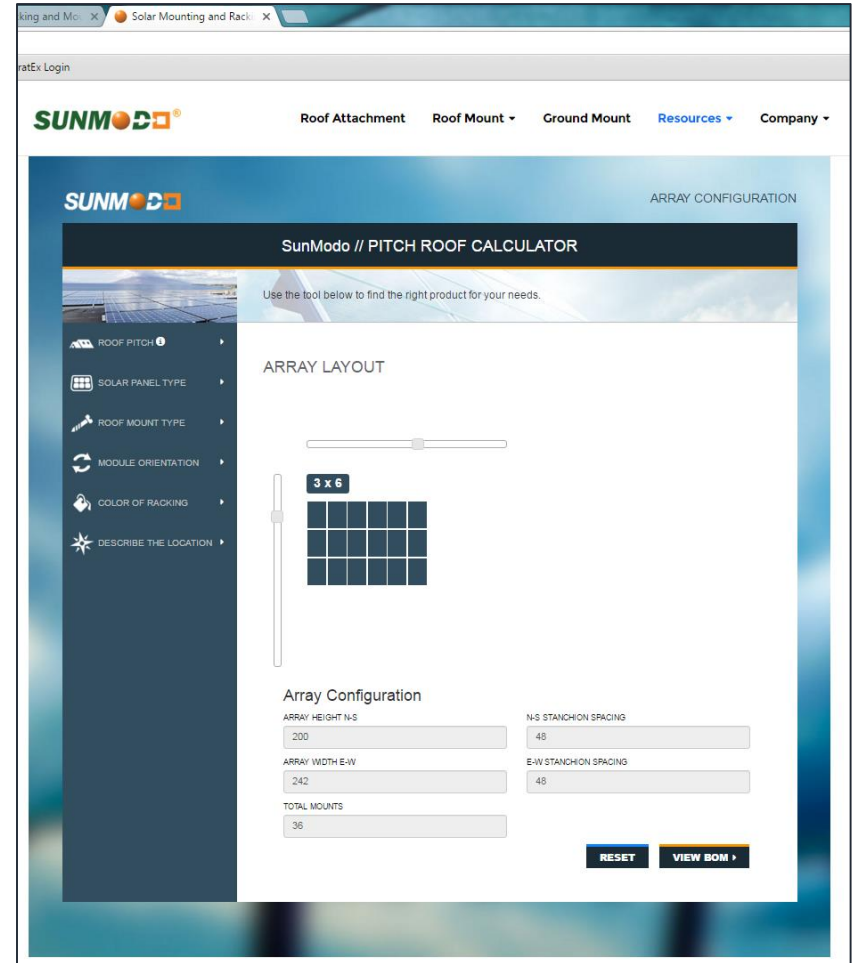
Online Resources



Online Resources

PITCH ROOF CALCULATOR

- Roof Pitch
- Solar Panel Type
- Roof Mount Type
- Module Orientation
- Color of Racking
- Describe the Location





Online Resources

PITCH ROOF CALCULATOR

- Detailed Bill of Materials
- PDF Report
- It's free

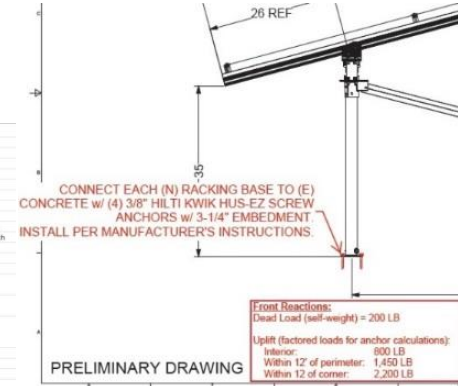
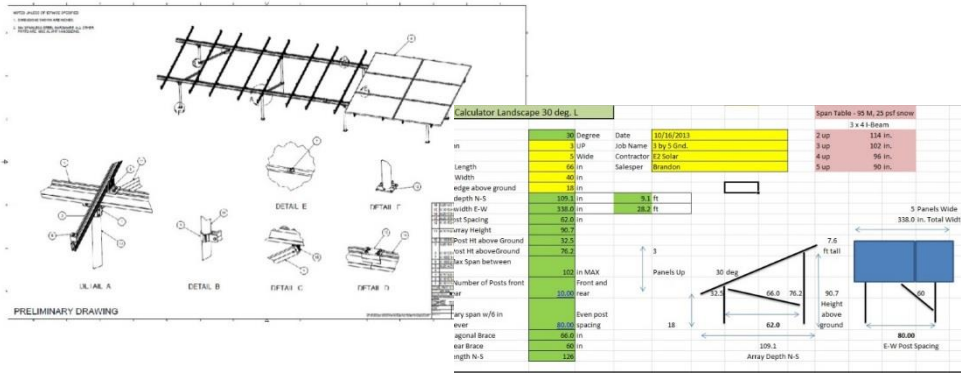
The screenshot shows the SUNMOC website's Pitch Roof Calculator interface. At the top, there are navigation links for "Roof Attachment", "Roof Mount", "Ground Mount", "Resources", and "Company". The main heading is "SUNMOC // PITCH ROOF CALCULATOR". Below this is a "Detailed Bill of Materials" section with a sub-heading "Below is a breakdown of your custom bill." The "Array Configuration" section includes input fields for "ARRAY HEIGHT N-S" (200), "ARRAY WIDTH E-W" (242), "N-S STANCHION SPACING" (48), and "E-W STANCHION SPACING" (48). The "TOTAL MOUNTS" is calculated as 36, with a note: "*Determined by after spacing, typically 12, 16, or 24 inches".

The "Materials" section contains a table with the following data:

DESCRIPTION	PART NUMBER	QTY	DETAIL
NO MOUNT SELECTED		36	Number of Roof Mounts Required
Grounding Rail Splice	K10177-001	6	Number of Splices
Helio Std Rail L=124	A20144-124	12	Rail Lengths Needed
Mid Clamp Kit	K10180-001	30	Mid Clamps, spec panel thickness
End Clamp Kit	K10224-000	12	End Clamps, spec panel thickness
60 Cell PV Panel	Solar Panel*	18	60 Cell Solar Panel, less than 40 by 66 inches

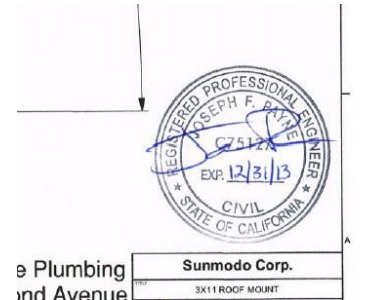
Below the table is a form titled "ENTER YOUR INFORMATION TO RECEIVE YOUR CUSTOMIZED PDF REPORT" with contact information: "Contact Us: (800)-844-0048". The form includes input fields for "mm/dd/yyyy" (12/31 Main St), "Project name" (Portland), "Phone #" (Alabama), and "Email" (john@gmail.com, Zipcode). There are "BACK TO ARRAY CONFIG" and "SUBMIT INFORMATION" buttons. A disclaimer at the bottom states: "This output is for estimating purposes only and is meant as a guide. Further analysis may be required. Please check with your local jurisdiction for spacing requirements to comply with all local, state, and federal codes."

Engineering & Technical Support



SERVICES

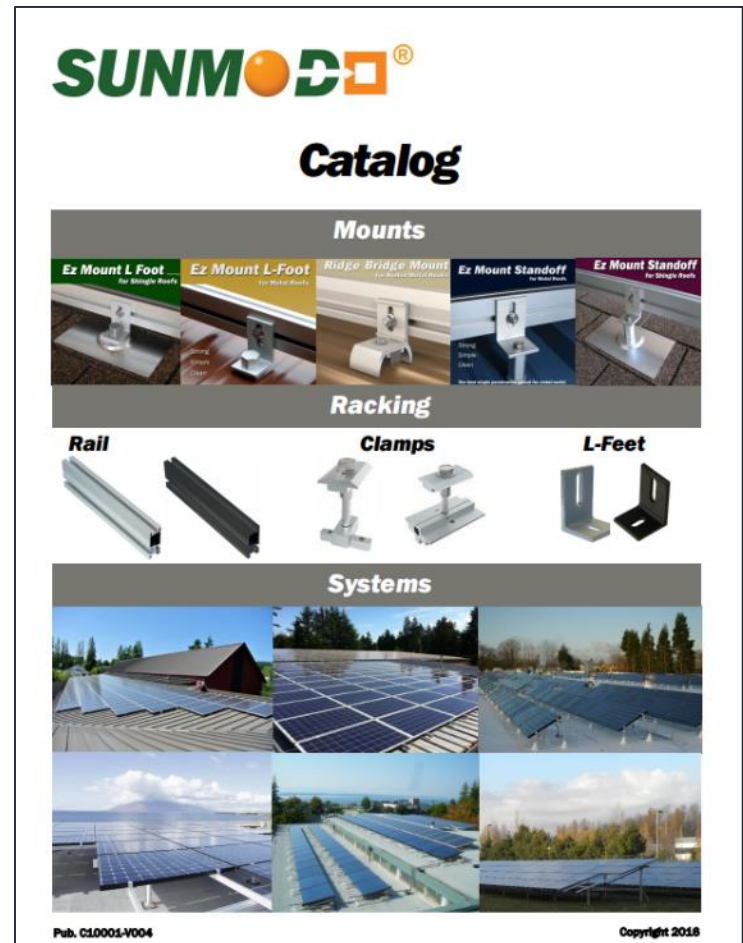
- Assembly Drawings for Projects
- Wet Stamped Engineering Available
- Configuration Tool and Calculators
- Custom Racking Solution
- Superior Technical Support



Online Resources

Catalog, Manuals, Guides, and Ap Notes

- Roof Attachments (Comp, Metal, and Tile)
- Pitched Roof Systems (UL 2703 Racking)
- Flat Roof Tilt Up Systems
- EZ SunBeam Roof Systems
- EZ SunBeam Ground Systems and foundations



General Documents

Roof Attachment

Pitched Roof

Flat Roof

Ground Mount

Webinars & Training

- Brochure
 - Shingle Roof
 - [EZ Roof Mount w/L Foot Kit](#)
 - [EZ Roof Mount w/Standoff Kit](#)
 - Metal Roof
 - [EZ Metal Roof Mount w/L Foot Kit](#)
 - [EZ Metal Roof Mount w/Standoff Kit](#)
 - [RidgeBridge Metal Roof Mount](#)
 - [RidgeBridge Metal Mount Selection Tool](#)
 - [A2 Ace Clamp](#)
 - [Ace Clamp ML](#)
 - Tile Roof
 - [Tile Hook Mount](#)



[General Documents](#)[Roof Attachment](#)[Pitched Roof](#)[Flat Roof](#)[Ground Mount](#)[Webinars & Training](#)

- Brochure
 - [EZHelio Pitched Roof System Guide](#)
 - [Self-Grounding System Promo](#)
 - [Helio Rails](#)
- Installation Manual
 - [UL 2703 EZ Roof Mount Pitched Roof System_Grounding](#)
 - [Self-grounding System Installation Instruction](#)
 - [Grounding Lug Installation Instruction](#)
 - [Wiley SunModo WEEB Installation Instruction](#)
- Certificate
 - [UL 2703 Letter of Compliance](#)
 - [UL Sub 2703 Fire Tests Type 1 – Letter of Compliance](#)



Webinar & Training

SUNMOD Roof Attachment Roof Mount Ground Mount Resources Company

General Documents Roof Attachment Pitched Roof Flat Roof Ground Mount **Webinars & Training**

Webinar

- [Best Practice for Managing Commercial and Industrial Rooftop Solar Installations](#)
- [Self-grounding PV racking system](#)

NABCEP CE Training Presentation

- [NABCEP CE Training Presentation](#)

Summary

- Innovative & Cost-Effective Racking Solutions
- Superior Engineering and Technical Service
- Continuous Improvement and New product Development



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