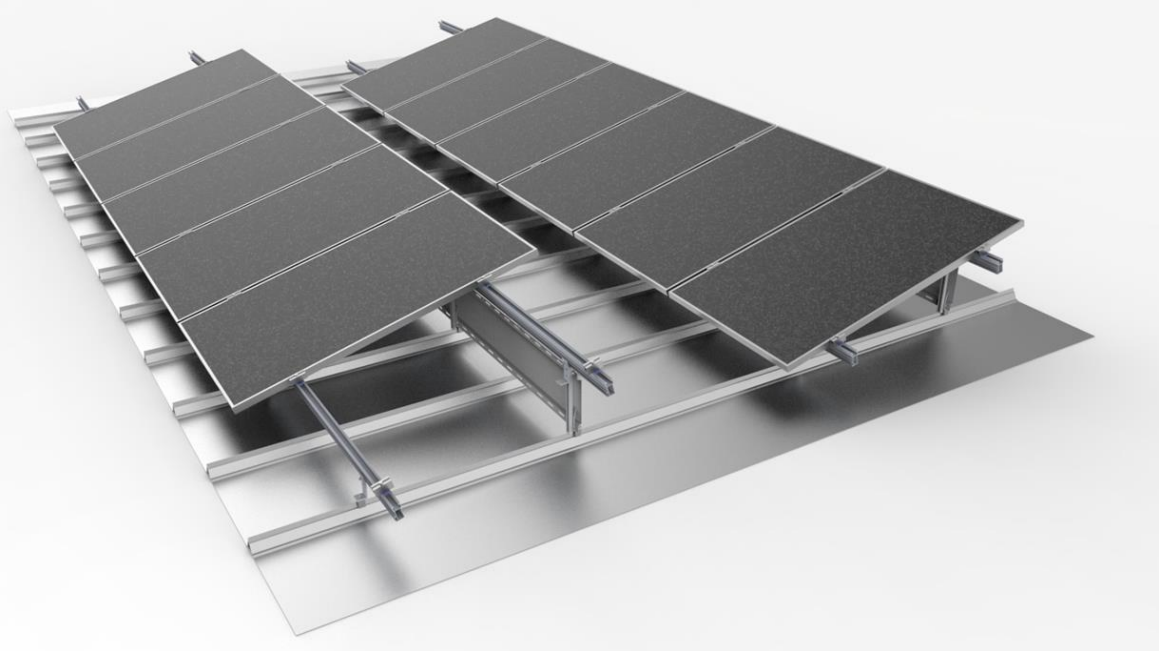
Solar International Inc.

VICERACK2 Installation Field Guide

Nov 2019



c UL us LISTED
PV MOUNTING SYSTEM
E504437

Solar Mounting Systems

Version No. 1.62

Table of Contents/Index:

Notes:

UL2703 verified compatible modules

Modules chosen for UL2703 grounding/bonding testing were chosen to represent a range of available solar modules. Modules tested were from the following manufacturers:

Using Fath ClicLoc Clamps:
Canadian Solar – CS6P-xxxM
Yingli Solar – YLxxxP-29b
LG – LGxxxNxT-A5, LGxxxNxW-A5
Hanwha – Q.PLUS L-G4.2 (Silver Frame)
Hanwha - Q.PEAK L-G4.2 (Silver Frame)
Hanwha - Q. PEAK DUO L-G5.2 (Silver Frame)

Using hb Solar International Clamps:
LG – LGxxxNxT-A5, LGxxxNxW-A5
Hanwha – Q.PLUS L-G4.2 (Silver Frame), Q.PEAK L-G4.2 (Silver Frame)
Hanwha – Q. PEAK DUO L-G5.2 (Silver Frame)

Grounding/Bonding

Only grounding/bonding devices listed in this manual have been approved for use with this racking and qualified per UL2703 - installation details provided in this document

This racking system may be used to ground and/or mount a PV module complying with UL 1703 only when the specific modules has been evaluated for grounding and/or mounting in compliance with the included instructions.

Periodic Inspection

Periodic re-inspection of installed racking components must take place to identify any loose components, loose fasteners or corrosion. Loose or corroded components or fasteners must be replaced immediately.

Fire Rating

UL1703 FIRE CLASSIFICATION

This system has achieved a Class A fire rating when installed using UL1703 Fire Classification Type 1 and Type 2 modules under the following conditions:

- Installation must be done in strict accordance to this instruction manual
- The maximum roof slope may be up to 2”/12” or 9.46°
- The minimum module tilt is 7°

Design Load Rating

This system has not been evaluated for UL2703 Design Load Ratings. Each set of site-specific plans must have system loads evaluated and approved by an appropriate structural engineer. This system is designed to be expandable and is not limited by a maximum number of PV modules. A typical modular rail length is approximately 6m (20') and could hold up to 6 modules.

Sharp Edges and Piercing Module Clamps

Ensure wiring is kept away from any sharp edges that may have resulted from cutting rails etc. Module clamps contain pre-installed bonding nodes which are designed to pierce the module frame when tightened to proper torque.

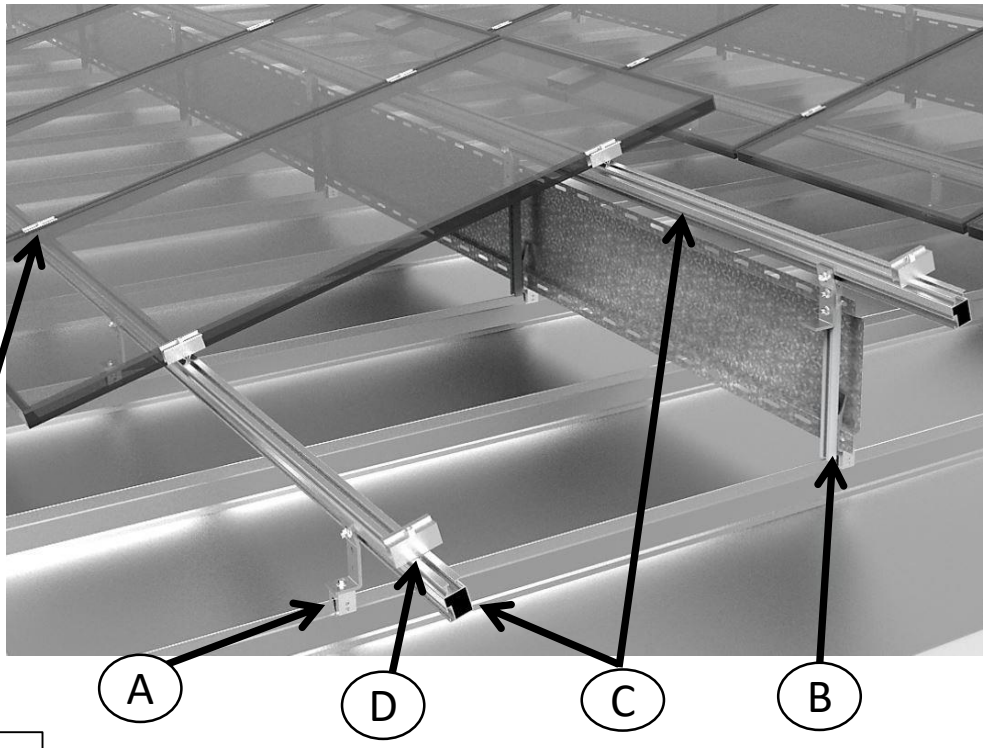
Site-Specific Engineering Drawings

This manual is to be used in conjunction with any site-specific engineering drawings that have been developed for your specific project.

ViceRack2 – Components

Tools Required:

- Impact Driver
- Chalk Line
- Measuring Tape
- Sharpie
- 10mm& 13mm sockets for impact
- Nut driver set (std)
- Saw for cutting rail



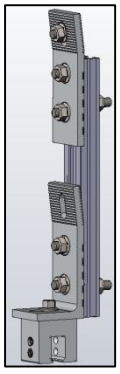
A

TriBracket (1851)

hb Seam Clamp (98121-02)

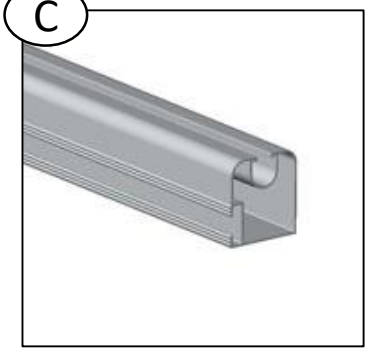
Front Foot Assembly

B



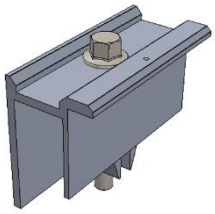
Rear Foot Assembly (factory pre-assembled)

C



8395
SkyRail3

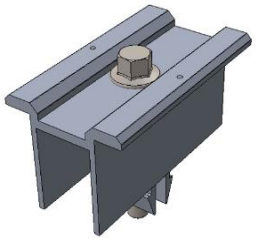
D



(6-8 ft•lbs / 8-11 Nm)

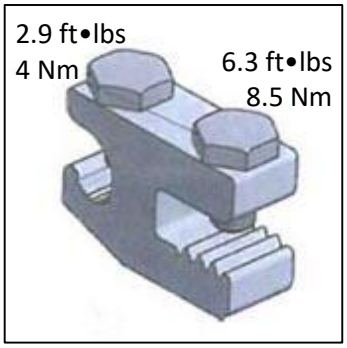
1422b_EC
hb end-clamp (Alternate clamp – Fath Part #1412b not shown)

E



(6-8 ft•lbs / 8-11 Nm)

1421b_MC
hb mid-clamp (Alternate clamp – Fath Part #1411b not shown)



8210
Ilsco SGB-4 lug

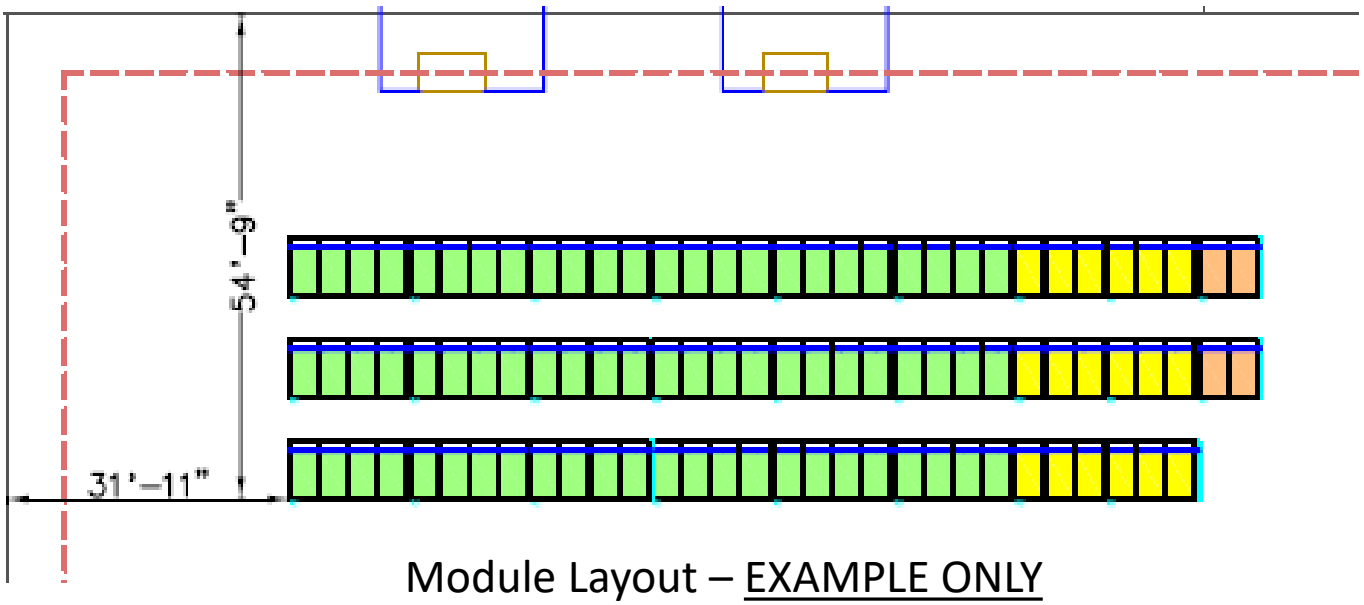
(13-17 ft•lbs / 17-23 Nm)

3220: T-bolt
3501: Nut

1946
Splice bar with bonding washer - SkyRail3

Layout

BEFORE YOU BEGIN MAKE SURE YOU HAVE THE CURRENT SITE-SPECIFIC ENGINEERING DRAWINGS AND MODULE LAYOUT DEVELOPED FOR YOUR PROJECT.



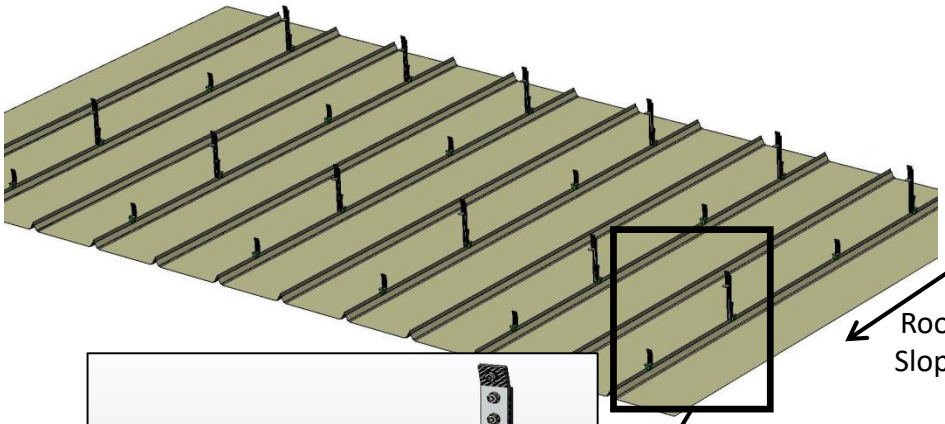
Module Layout – EXAMPLE ONLY

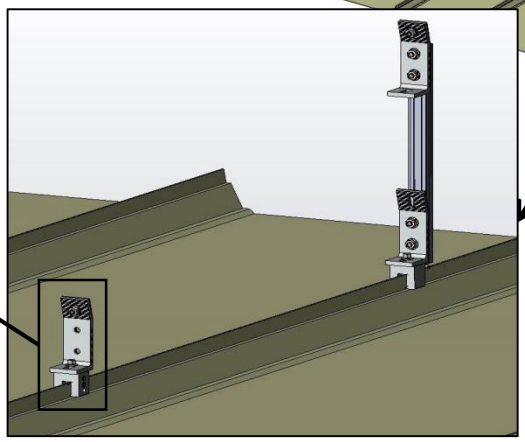
- Using measurements from your site-specific Module Layout, locate your starting location on the roof

Installation

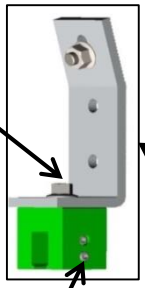
1. Using string line, mark out front and rear feet locations as per your site-specific module layout drawing.

2. Use module clamping zone guidelines to properly space feet and rails *(refer to module manufacturer's installation documentation for spacing)*



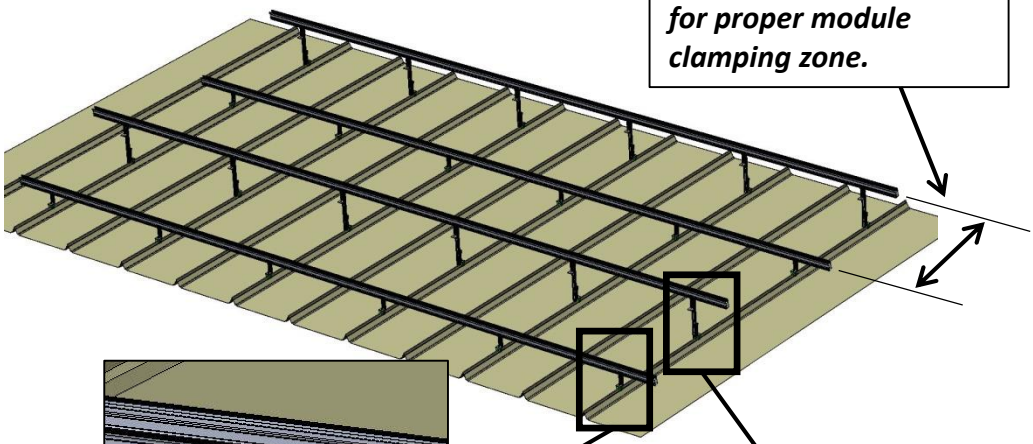


Seam Clamp hex-bolt Torque:
Torque seam clamp hex-bolts (TriBracket to seam clamp connection) to 23Nm (17 ft-lbs)

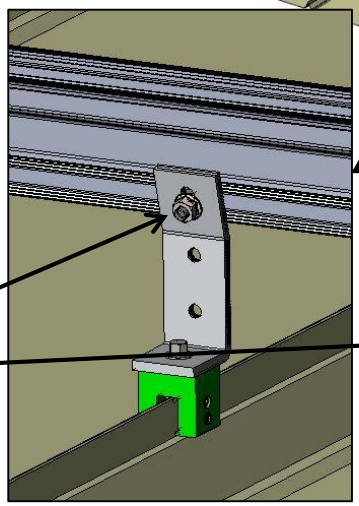


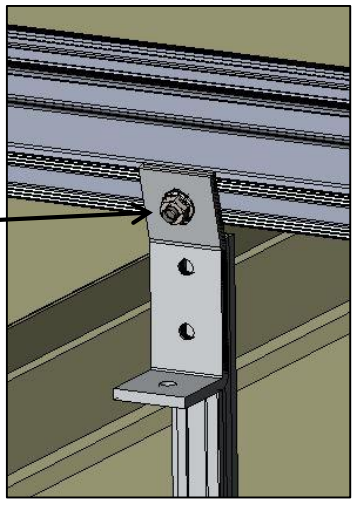
Seam Clamp Set-Screw Torque:
Torque seam clamp set-screws to roof seam to 17NM (13 ft-lbs)

Determine rail spacing by referring to module manufacturer's installation instructions for proper module clamping zone.



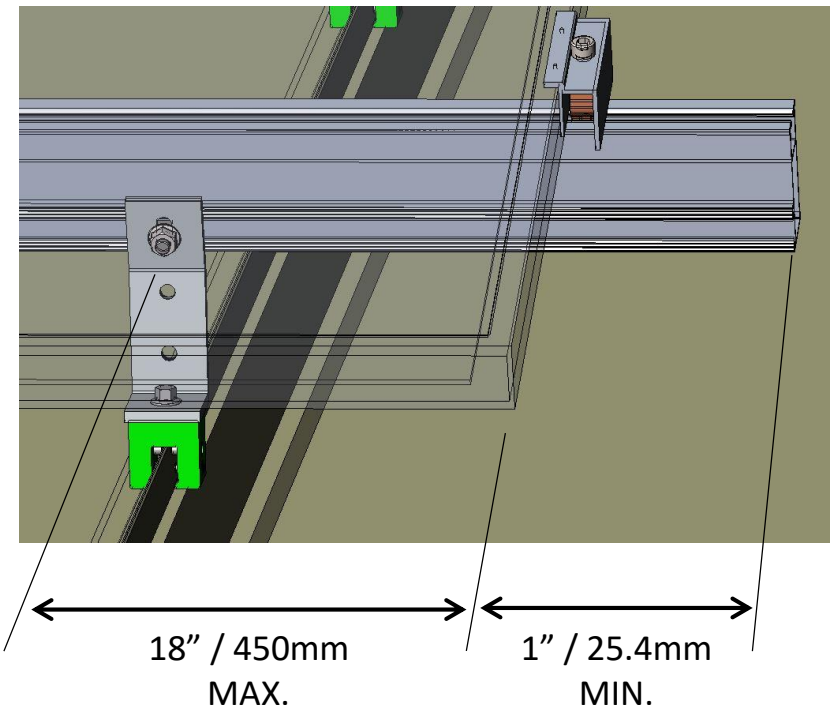
3. Attach rail to front and rear legs using t-bolt and nut.





TriBracket to Rail Torque:
Torque nut on T-bolt (TriBracket to Rail connection) to 17Nm (13 ft-lbs)

4. MAX. rail cantilever (length of unsupported rail under the module) shall be no more than 18” / 450mm

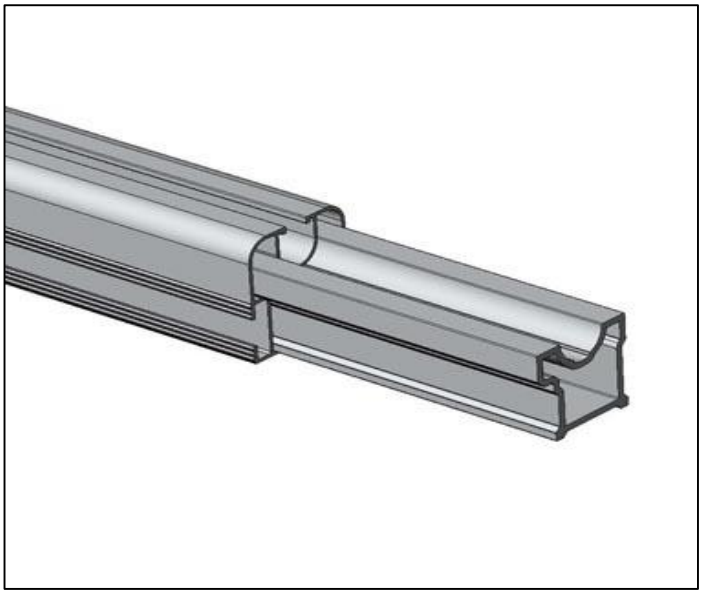


5. Rail must extend a minimum of 1”(25mm) past the end of the module to allow room for module clamps.

****Torque module clamps to 8Nm (6 ft-lbs)****

CLAMP NOTE: if module clamps are loosened for maintenance, the location of the frame piercing pins should be moved to create a new bonding connection.

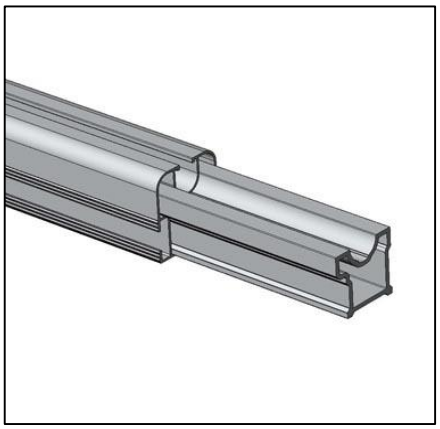
6. Join rails by inserting splice bar into first rail, then sliding second rail over splice. The integrated bonding washer bonds the two pieces of rail. No braided jumper is necessary.



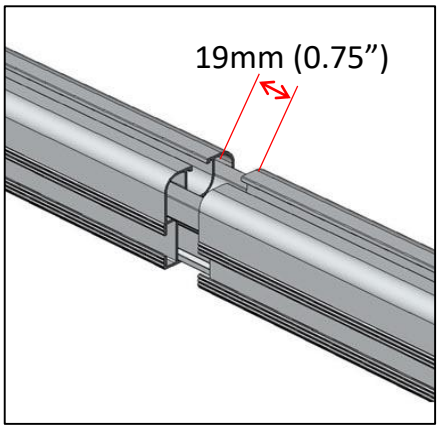
IMPORTANT - SEE DETAILED INSTRUCTIONS ON NEXT PAGE FOR SPLICES AND EXPANSION SPLICING

NOTE: Confirm torque values using only properly calibrated torque wrench.

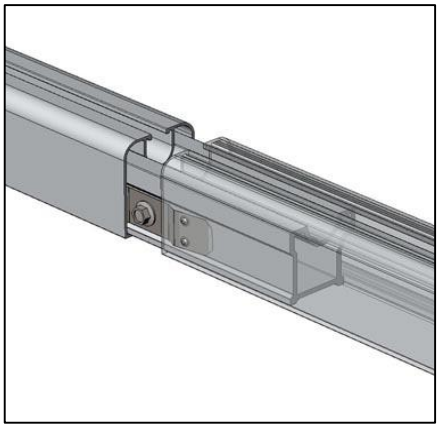
Module Rail Splicing



Step 1 – Insert splice bar into first rail

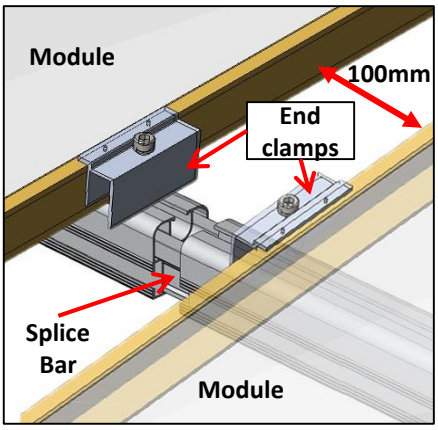


Step 2 – Slide second rail over splice – gap between rails = 19mm (0.75”)



Step 3 – back side of rail/splice showing grounding washer

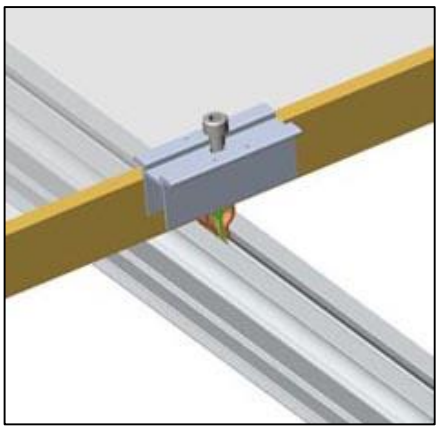
Expansion Splice



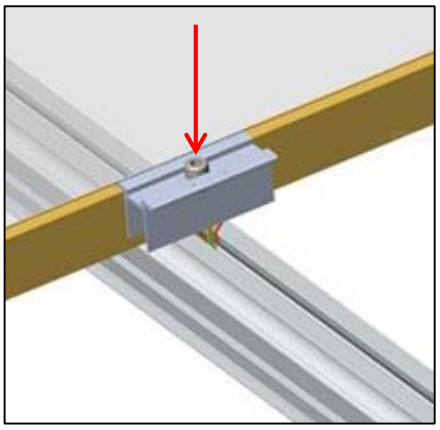
Expansion splices - ***only where indicated on Layout*** **(using end-clamps and standard splice bar):**

- Expansion splices typically installed after every 18m of continuously joined rails
- Leave 100mm (4”) between modules. Cut rails in between modules if needed.
- ***Leave 19mm (0.75”) between rail ends***
- Use end-clamps on either side of expansion splice

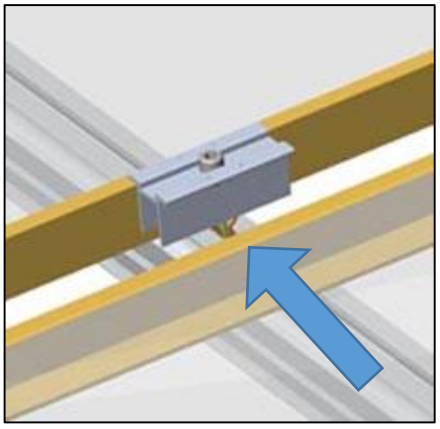
Module Clamping



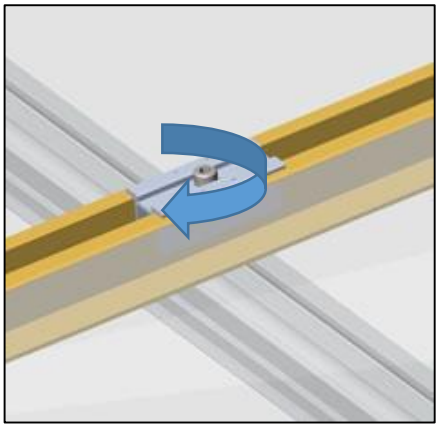
Step 1 – Place clamp on rail near first module



Step 2 – Push down sharply on bolt with tool. Confirm teeth are engaged with rail



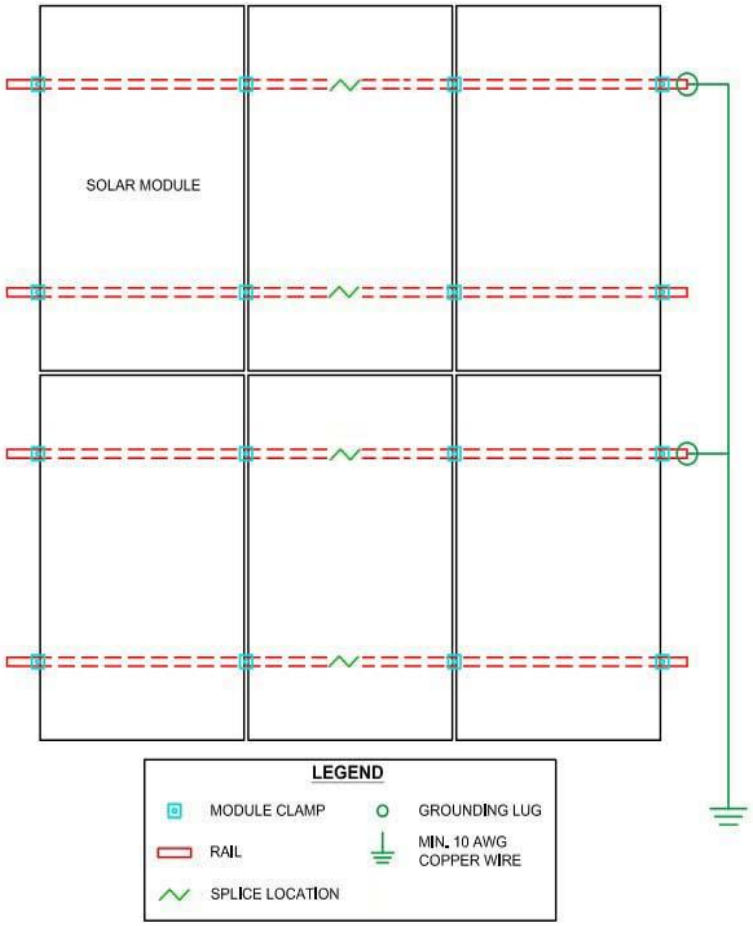
Step 3 – Slide next module tight to/under clamp



Step 4 – ***Torque bolt to 6-8 ft•lbs (8-11 Nm) or to module manufacturer’s specified torque.***

7. As per diagram, use SGB-4 to bond one rail per row of modules using #6 copper wire. System grounding must be in accordance with the National Electrical Code, ANSI/NFPA 70.

8. ***Per manufacturer's instructions:*** apply a liberal amount of anti-oxidant conductor compound into both openings of lug before attaching. (not supplied)



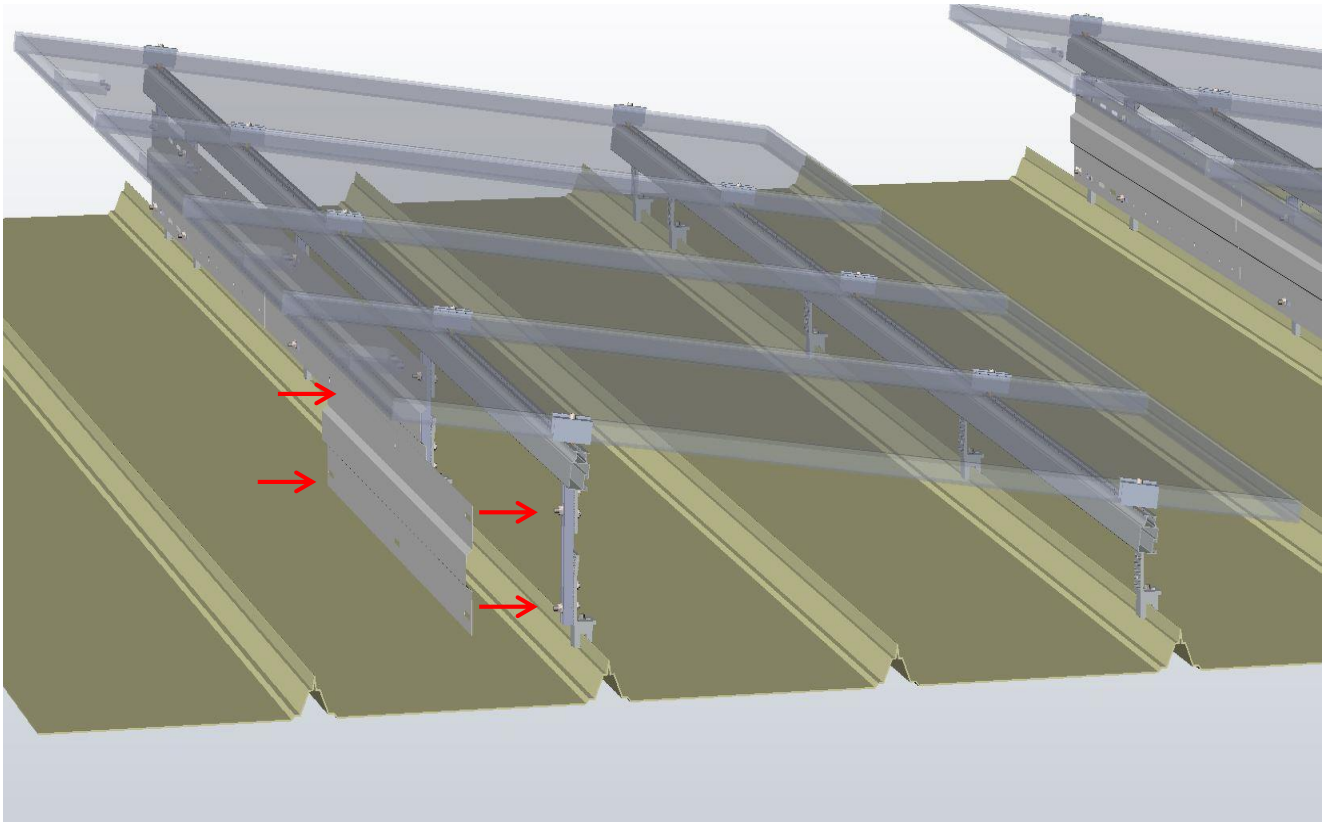
NOTE: ISOLATE COPPER FROM ALUMINUM CONTACT TO PREVENT CORROSION

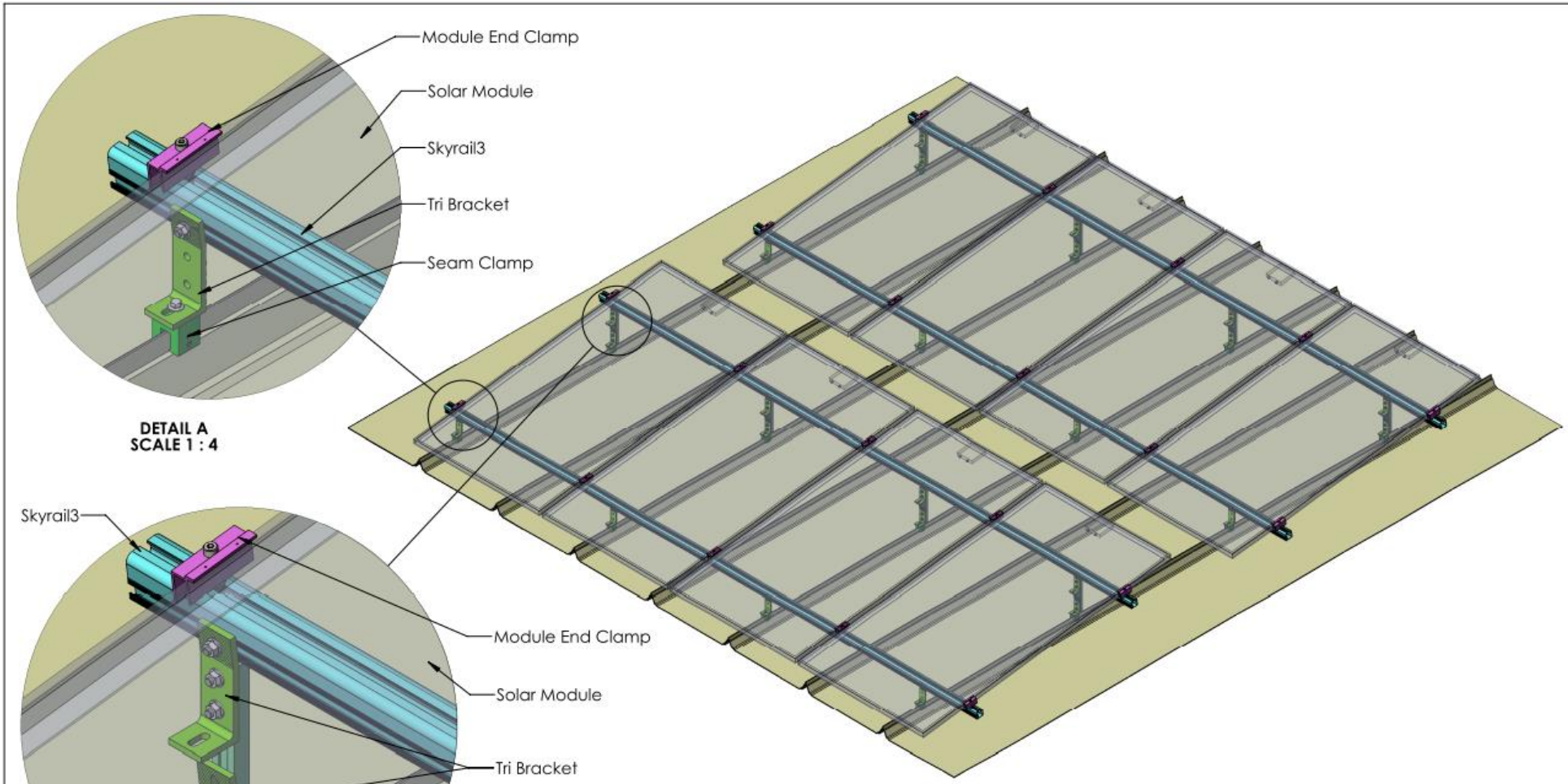
8. If using optional wind deflectors, attach wind deflectors to rear struts.

- Attach deflector using two t-bolts and two nuts at each point a deflector crosses over a rear strut.
- Final deflector in row will usually have to be drilled and overlapped to complete row:
  - attach final deflector to final rear strut of row using pre-drilled holes
  - using holes in final wind deflector as a guide, drill out the 2nd last deflector being overlapped and attach the two deflectors together using a pair of t-bolts/nuts

Torque nut on T-bolts to

17Nm (13 ft-lbs)





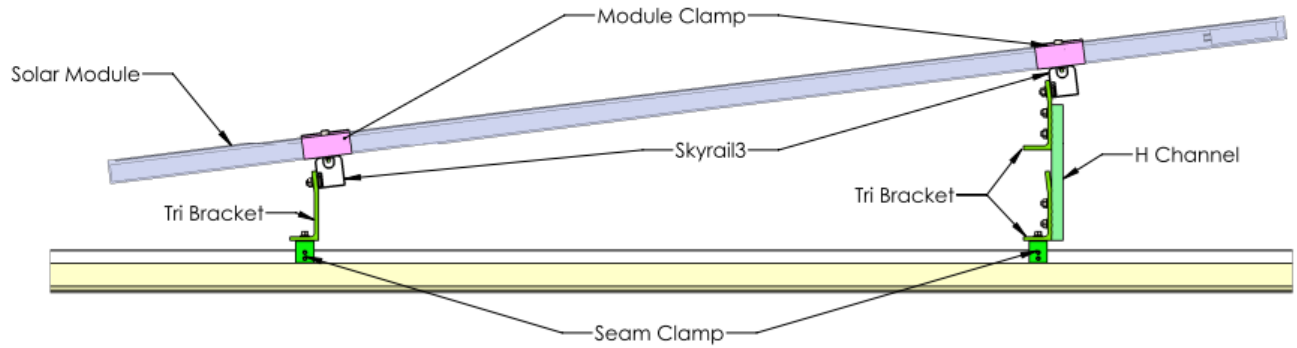
NOTE:

- SEE DRAWING VR-312 FOR FRONT AND SIDE VIEWS
- SEE DRAWING VR-313 FOR COMPONENT DETAILS

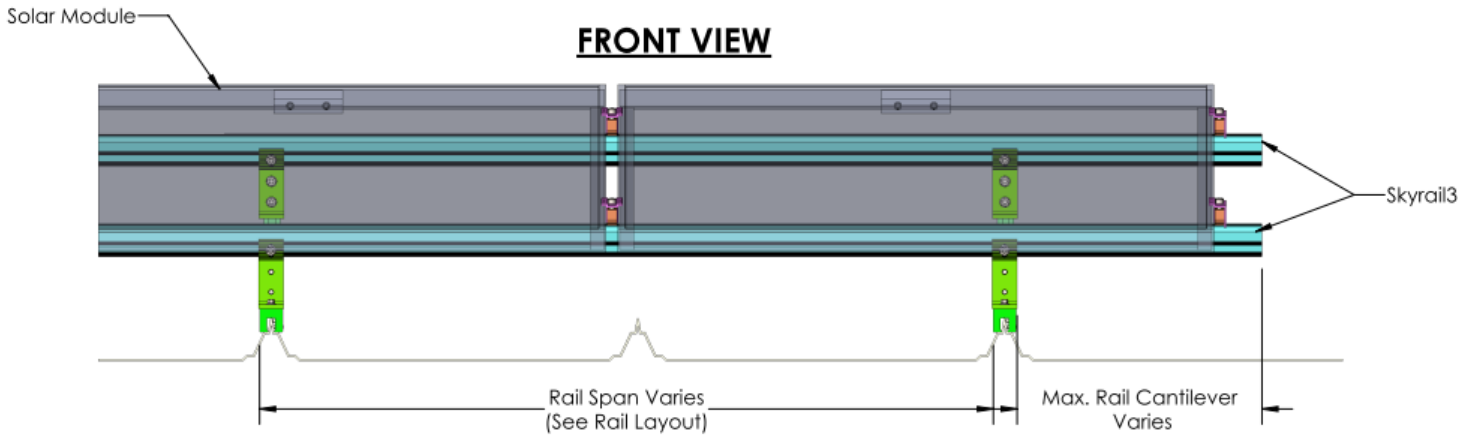
TITLE:	Vicerack-II		
CLIENT:	hb Solar International Inc.		
ROOF VARIETY: Standing Seam	DIRECTION OF RIBS: EW	MODULE ORIENTATION: Portrait	
DWG. NO.: VR-311	REV: 01		
SCALE: 1:26	SHEET 1 OF 3		
	NAME	DATE	
DRAWN	JT	2019-02-06	

Solar International Inc.
244 Montrose St N, Unit 6
Cambridge, On N3H 2H7
E-mail:info@hbsolar.ca

SIDE VIEW



FRONT VIEW

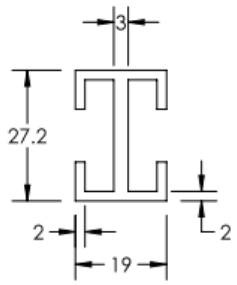


NOTE:

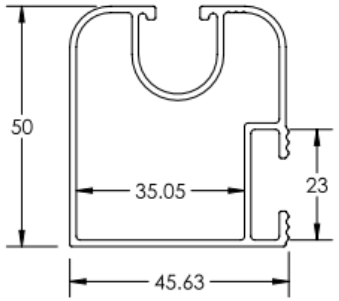
- SEE DRAWING VR-311 FOR OVERVIEW
- SEE DRAWING VR-313 FOR COMPONENT DETAILS

TITLE: **Vicerack-II**			Solar International Inc.
CLIENT: **hb Solar International Inc.**			244 Montrose St N, Unit 6 Cambridge, On N3H 2H7 E-mail:info@hbsolar.ca
ROOF VARIETY **Standing Seam**	DIRECTION OF RIBS **EW**	MODULE ORIENTATION **Portrait**	
DWG. NO. **VR-312**	REV **01**		**PROPRIETARY AND CONFIDENTIAL**
SCALE: **1:8**	SHEET **2 OF 3**		THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF hb Solar International Inc. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF hb Solar International Inc. IS PROHIBITED.
	NAME	DATE	
DRAWN	JT	2019-02-06	

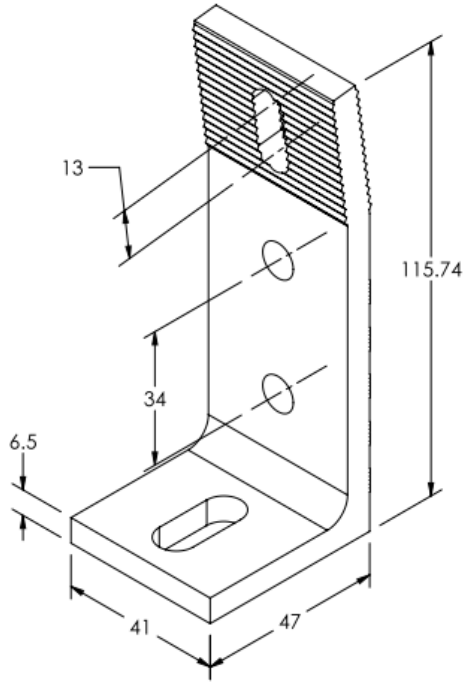
H Channel
Part # 1360



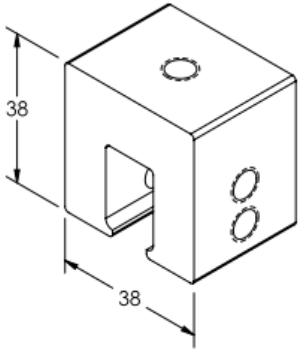
Skyrail3
Part # 8395



Tri Bracket
Part # 1851



Seam Clamp
Part # 8121



NOTE:

- SEE DRAWING VR-311 FOR OVERVIEW
- SEE DRAWING VR-312 FOR FRONT AND SIDE VIEWS

TITLE: **Vicerack-II**			Solar International Inc.
CLIENT: **hb Solar International Inc.**			244 Montrose St N, Unit 6 Cambridge, On N3H 2H7 E-mail:info@hbsolar.ca
ROOF VARIETY **Standing Seam**	DIRECTION OF RIBS **EW**	MODULE ORIENTATION **Portrait**	
DWG. NO. **VR-313**	REV **01**		**PROPRIETARY AND CONFIDENTIAL** THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF hb Solar International Inc. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF hb Solar International Inc. IS PROHIBITED.
SCALE: **1:1**	SHEET **3 OF 3**		
	NAME	DATE	
DRAWN	**JT**	**2019-02-06**	

Revision Notes:

1.0 July 10, 2015– Initial ViceRack2 Guide
1.1 Aug 15,2015– Added optional wind-deflector page
– Added section re: UL1703 compliance
1.2 Oct 29,2015– Added Minimum module tilt
– Changed roof diagram
1.3 May 2016 – added splice with integrated bonding
1.4 Oct 2016 – added SGB-4 lug
1.5 Feb 2017 – modified some part numbers and references for consistency. Clarified Torque values and instructions for seam clamp connections
1.51 Jun 2017 – added note re: moving modules and relocating bonding pins on clamp
1.52 Jun 2017 – changed torques to single values
1.60 Feb 2019 – logos, Skyrail3, change parts images & GA's
1.61 May 2019 – hb module clamps
1.62 Nov 2019 – splice detail added (pg8)