

SKYRACK

Dec 2021



Table of Contents/Index:

<u>Item</u>	<u>Page(s)</u>
Notes	3
Component ID/List	4
Flashing Installation	5
Layout/Installation Guide	7
Attachment Spacing/Cantilever	7
Grounding/Bonding	8
Module Clamping	9
Splices (Rail splicing)	9
General Arrangement Dwgs	10

Notes:

UL2703 qualified modules – bonding only

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

Canadian Solar: CS6P-XXXM

Yingli: YLXXXP-29b

LG: LGXXXN2T-A5, LGXXXN2W-A5

Hanwha: Q.PLUS L-G4.2 XXX, Q.PEAK L-G4.2 XXX, Q.PEAK DUO L-G5.2 XXX, Q.PEAK DUO L-G8.3 XXX, Q.PEAK DUO L-G8 XXX, Q.PEAK DUO L-G7 XXX, Q.PEAK DUO LG7.2 XXX, Q.PEAK DUO L-G7.3 XXX, Q.PEAK DUO L-G6 XXX, Q.PEAK DUO L-G5 XXX

HT-SAAE: HT72-156M

Talesun: TP6G72M

Grounding/Bonding

Only grounding/bonding devices listed in this manual have been approved for use with this racking and tested under 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

This system is not fire rated.

Design Loads

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

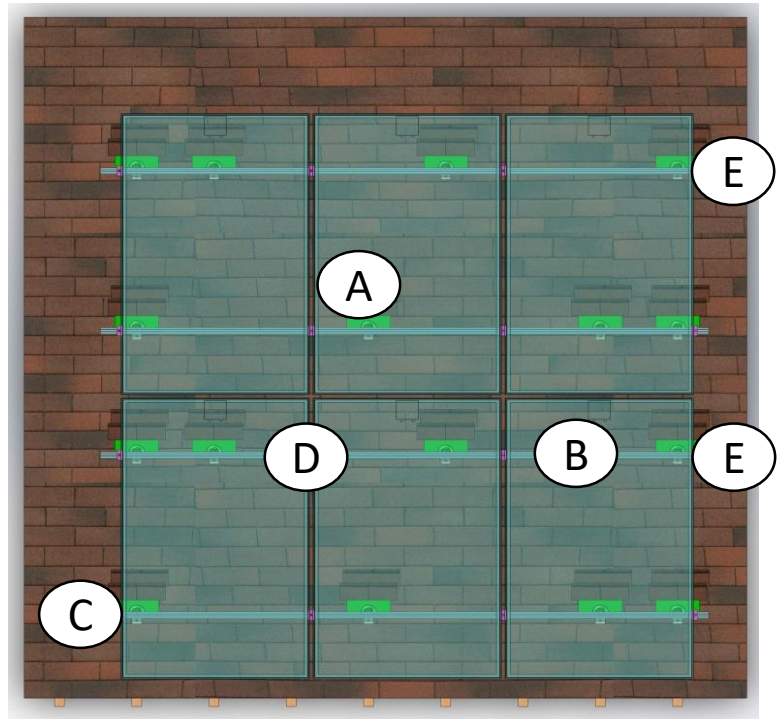
This manual is to be used in conjunction with any site-specific engineering drawings that have been developed for your specific project.

Skyrack – Flushmount Components

Tools Required:

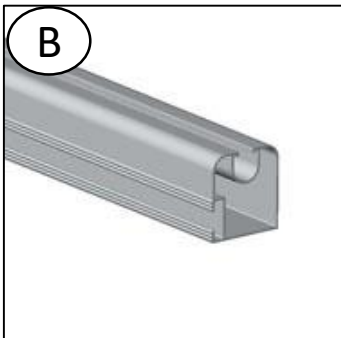
- Impact Driver
- 10mm & 13mm sockets for impact
- Torx 30 Impact Bit
- 7/16" wrench for SGB-4
- Nut driver set (std)
- Shingle lifting tool
- Saw for cutting rail
- Roof Sealant

Components



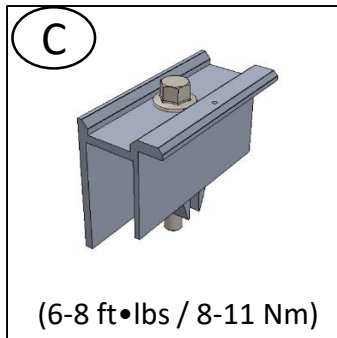
99103

Flashguard flashing kit



8395

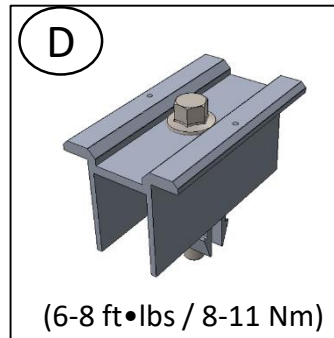
SkyRail3



(6-8 ft•lbs / 8-11 Nm)

1422b_EC

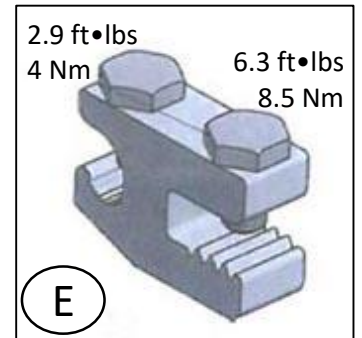
hb end-clamp
(Alternate clamp –
Fath Part #1412b not
shown)



(6-8 ft•lbs / 8-11 Nm)

1421b_MC

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



8210

IlSCO SGB-4 lug



3220: T-bolt

3501: Nut



1946

Splice bar with bonding
washer - SkyRail3

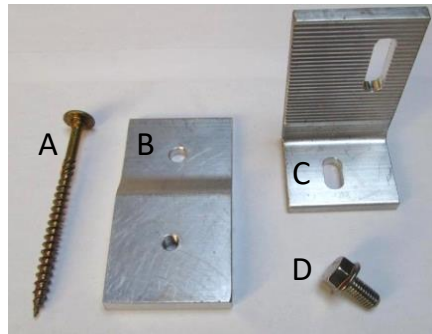
Flashing Installation Guide

Tools Required:

● Tape measure ● #30 Torx Bit ● 13mm (½") socket for Impact ● Caulking Gun ● Sealant – compatible with roofing material ● Chalk/Marking Crayon ● Roofing Bar/Shingle Lifting tool ● Impact Driver

Components:

- A. 4" Torx 30 Self drilling fastener
- B. Base Plate
- C. L-Foot
- D. M8 x 15mm Bolt
- E. Flashing



Steps:



1. Mark location of rafters to be attached to as per engineering requirements. Determine which course of shingles is to be used for each row of flashings.



2. Place base plate, flat/ridged side down, at shingle edge – *note arrow in photo*. Drive 4" fastener through *unthreaded* hole in base plate just far enough to confirm rafter location. This creates hole to accept roofing sealant.

****FOR PROPER WATER PROOFING - ALWAYS ALIGN BOTTOM EDGE OF BASE PLATE WITH BOTTOM EDGE OF SHINGLE COURSE****



3. Fill hole with sealant then drive screw through *unthreaded* hole in base plate until snug. Do not over tighten – ensure base plate is flat/parallel to roof.



4. Base plate installed – note bottom edge of plate is flush with shingle edge.



5. Lift shingle course above base plate slightly after loosening with roofing bar or similar tool to make room for flashing. Loosen just enough for flashing to slide up and under shingle (see photo, step 8).



6. For maximum protection, sealant should be applied to trough in underside of flashing before installation.



7. Slide flashing into position under shingle course above base plate.



8. Align hole in flashing with threaded hole in base plate.



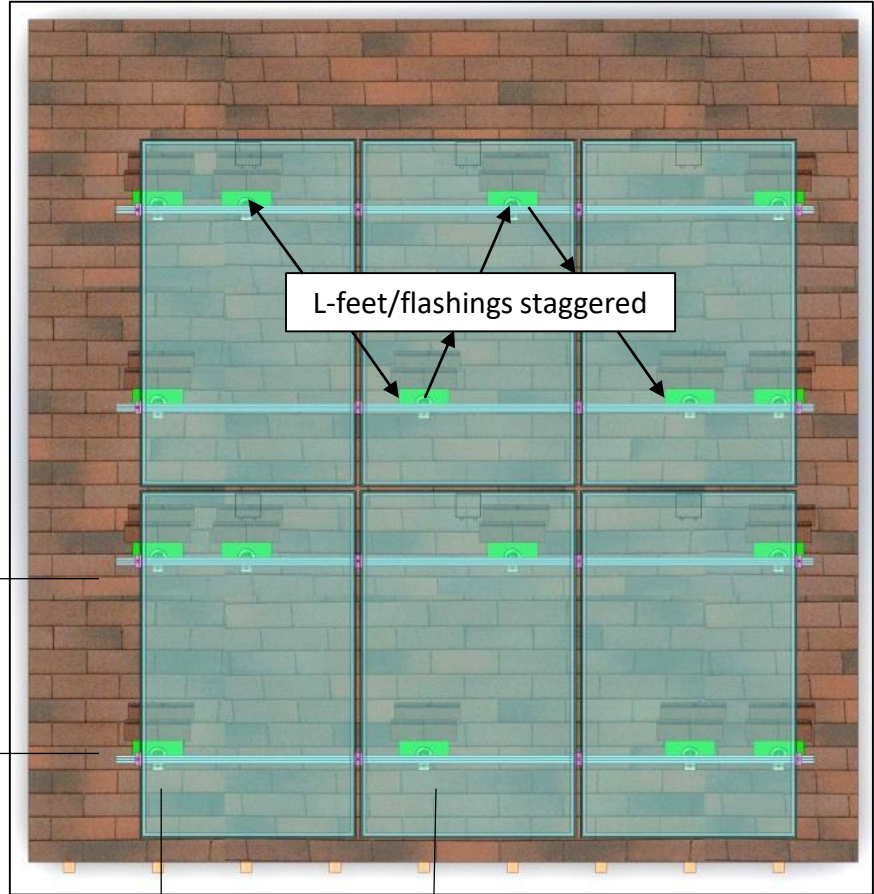
9. Attach L-Foot through flashing and into threaded hole in base plate using M8 bolt. Torque M8 bolt to 20Nm (15 Ft-Lbs)



10. Completed flashing installation. Use T-Bolt and nut to secure racking to L-Foot. Note correct base plate/flashing position – edge of flashing is closely aligned with edge of shingle course. ****THIS ALIGNMENT IS CRITICAL FOR PROPER WATER-PROOFING****

Installation

1. L-feet & flashings must be spaced according to Rail Load Tables and are recommended to be staggered to distribute load amongst rafters. Refer to site-specific engineering drawings developed for your project.



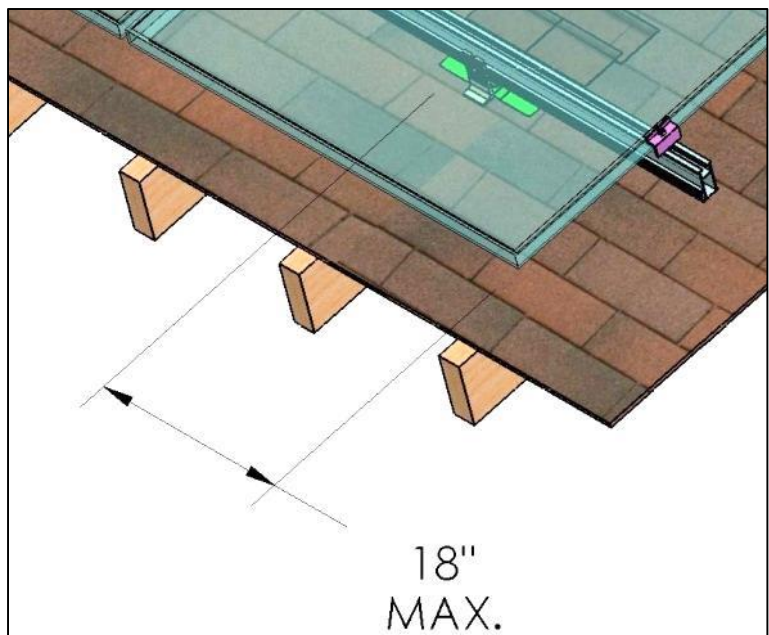
For spacing between rails, refer to module manufacturers installation instructions.

2. Rail layout and splice locations shall be determined on site by the installer. Rails are supplied in standard 122" (3.1m) lengths.

Max spacing as per rail load table and working drawings

****Torque T-Bolt at I-foot/rail to 15 ft-lbs (20Nm)****

3. MAX. rail cantilever (length of unsupported rail under the module) shall be no more than 18" unless specified in site-specific rail load table developed as part of installation plan



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

****Torque module clamps to 7 ft-lbs (9.5Nm). Do not over-torque****

CLAMP NOTE: if a module is removed/replaced, adjust clamp position slightly to allow clamp bonding nodes to pierce fresh bonding holes into module frame.

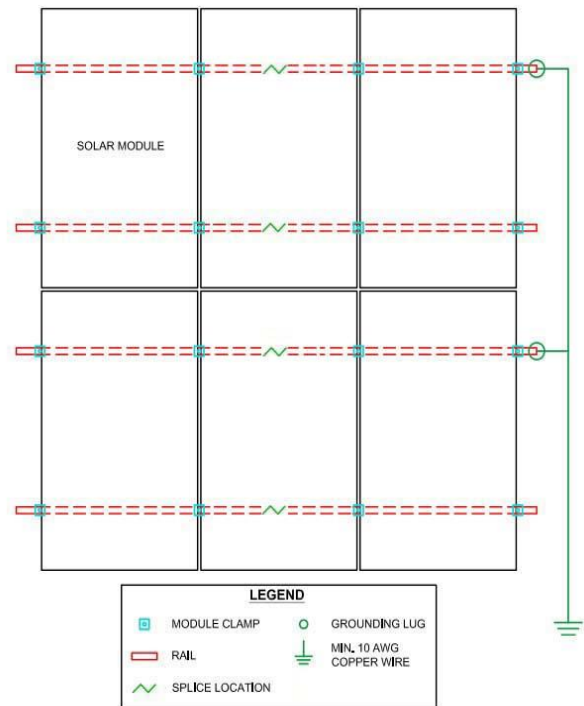
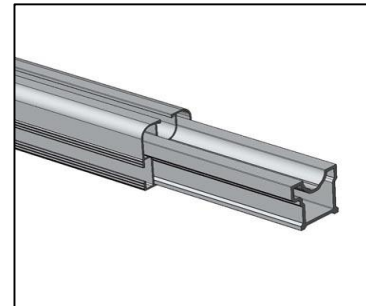
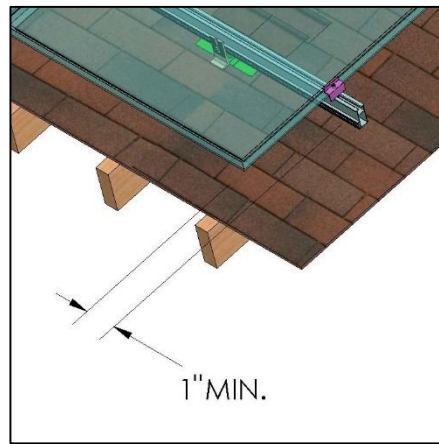
- Join rails by inserting splice bar into first rail, then sliding second rail over splice. The integrated bonding washer bonds the two pieces of rail. No braided jumper is necessary.

SEE DETAILS NEXT PAGE FOR SPLICES AND EXPANSION SPLICING

- 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.

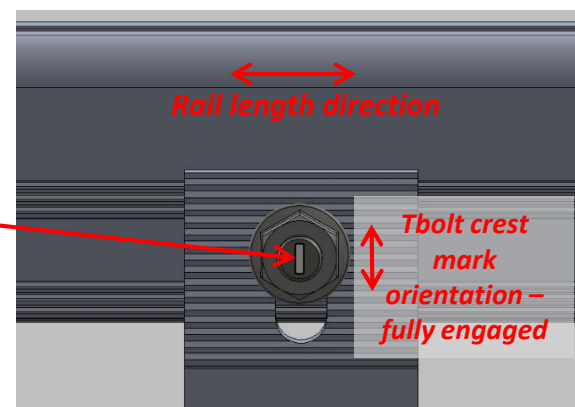
- Per manufacturer's instructions: apply a liberal amount of anti-oxidant conductor compound into both openings of lug before attaching. (not supplied)**

NOTE: ISOLATE COPPER FROM ALUMINUM CONTACT TO PREVENT CORROSION

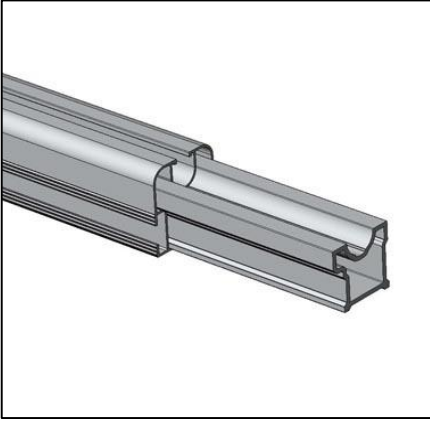


IMPORTANT – FOR ALL T-BOLT CONNECTIONS:

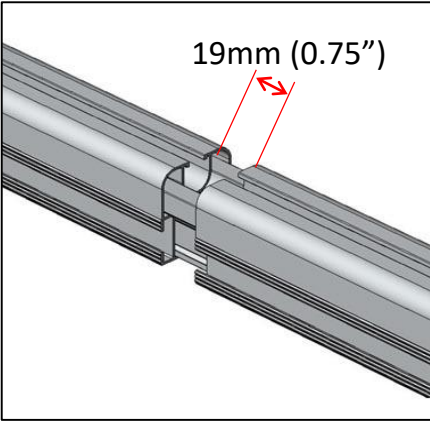
- Note crest mark on tbolt end
- Crest mark becomes perpendicular to rail length when tbolt is fully engaged in side slot
- Always ensure crest mark is perpendicular to rail length on all tbolt connections to confirm full engagement of tbolt



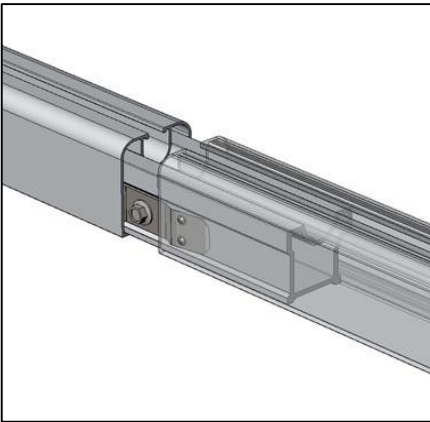
Module Rail Splicing



Step 1 – Insert splice bar into first rail

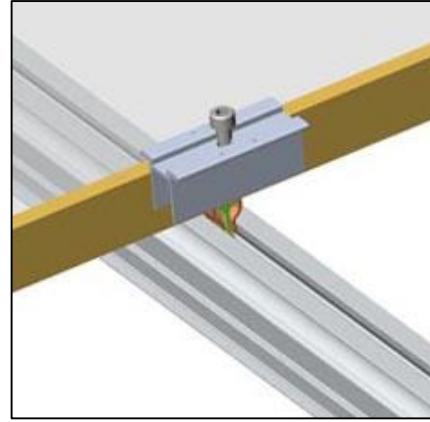


Step 2 – Slide second rail over splice – gap between rails = 19mm (0.75")

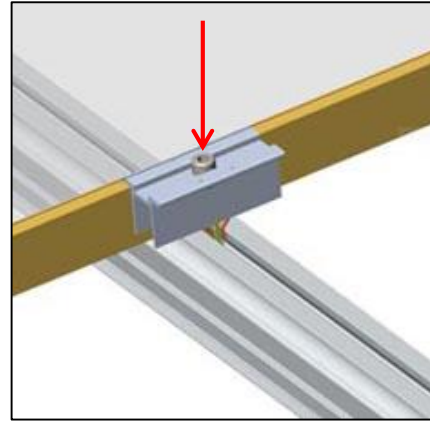


Step 3 – back side of rail/splice showing grounding washer

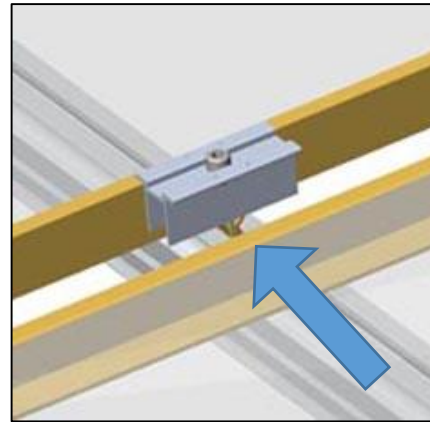
Module Clamping



Step 1 – Place clamp on rail near first module

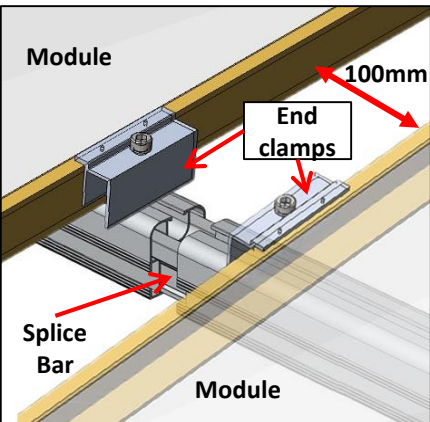


Step 2 – Push down sharply on bolt with tool. Confirm teeth are engaged with rail



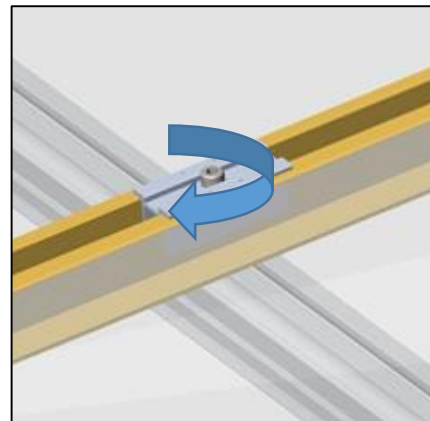
Step 3 – Slide next module tight to/under clamp

Expansion Splice

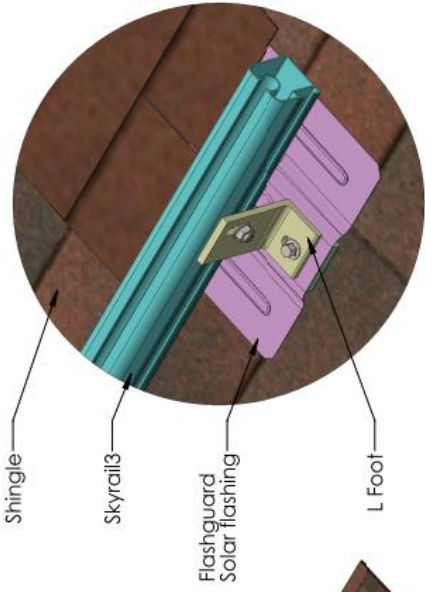
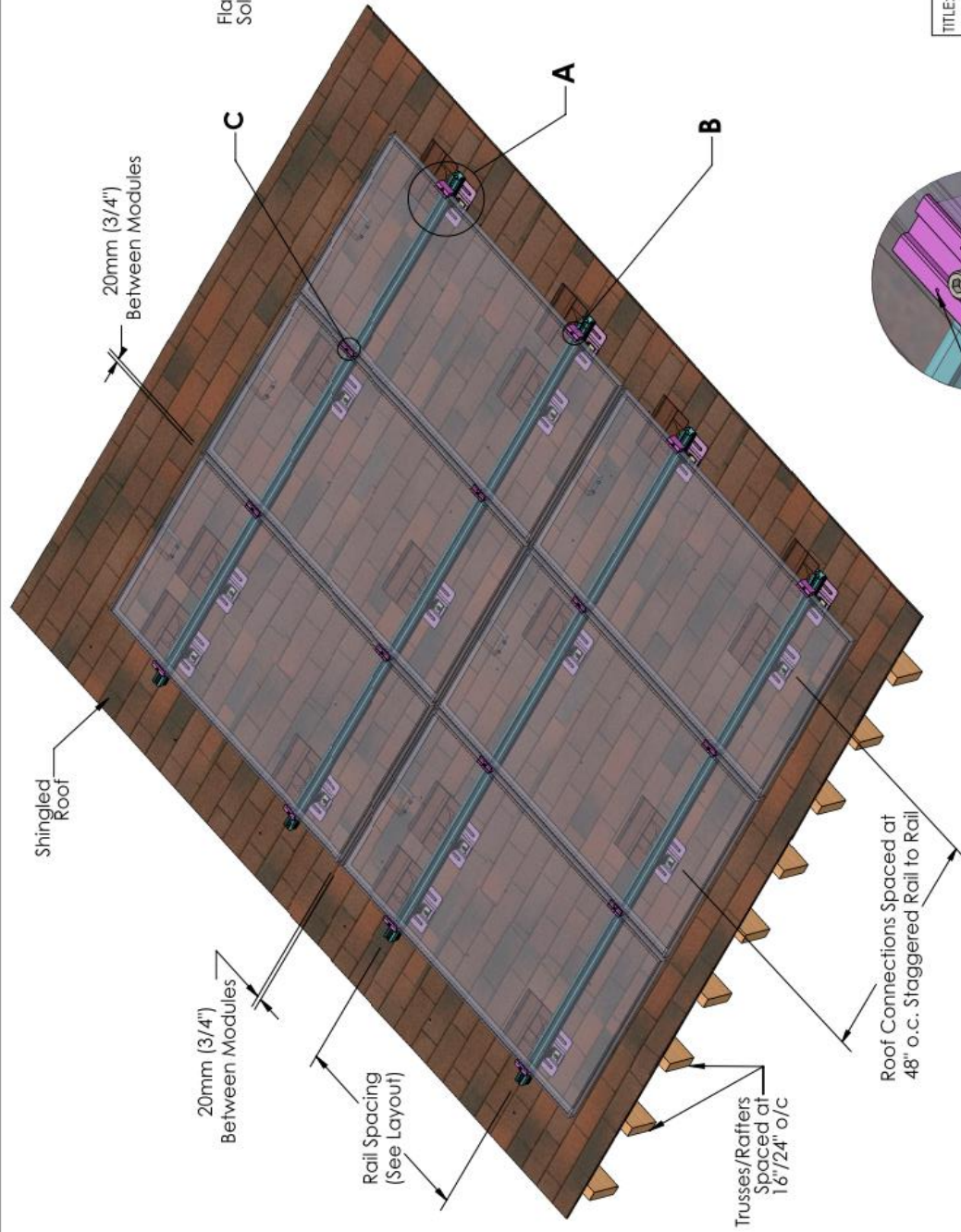


Expansion splices - *only where indicated on Layout (using end-clamps and standard splice bar):*

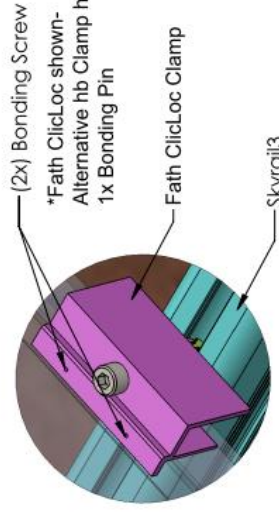
- Expansion splices typically installed after every 18m of continuously joined rails
- Leave 100mm (4") between modules. Cut rails in between modules if needed.
- **Leave 19mm (0.75") between rail ends**
- Use end-clamps on either side of expansion splice



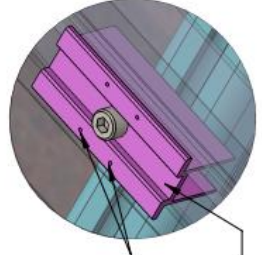
Step 4 – **Torque bolt to 6-8 ft•lbs (8-11 Nm) or to module manufacturer's specified torque.**



DETAIL A
Roof Connection
SCALE 1 : 4



DETAIL B
ClicLoc End Clamp
SCALE 1 : 2



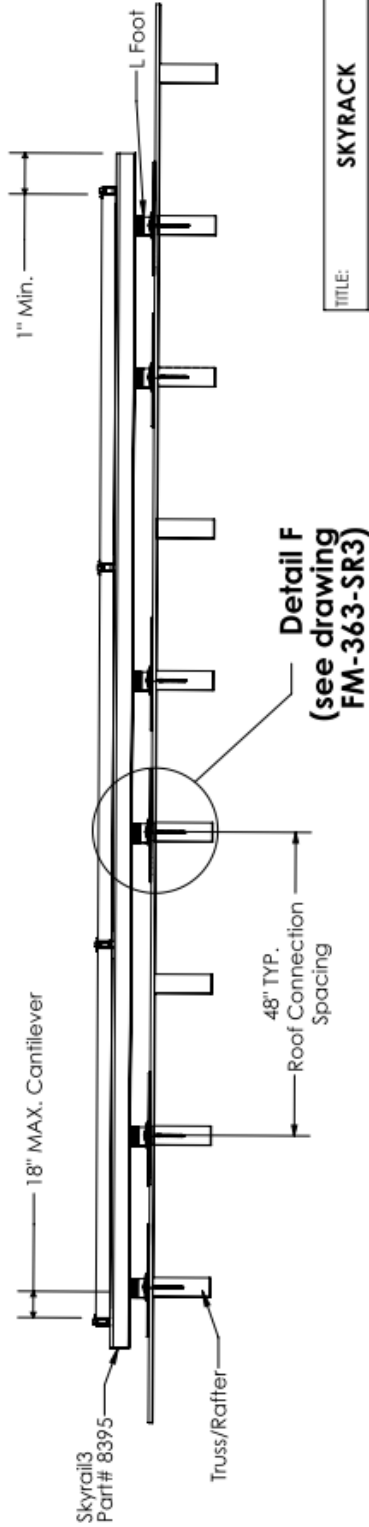
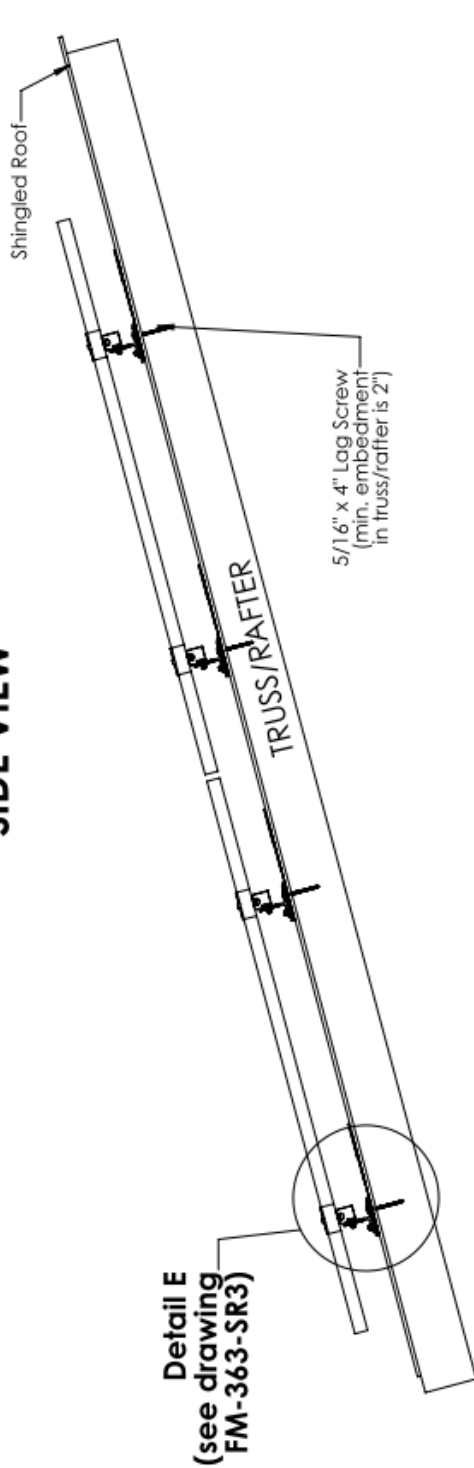
DETAIL C
Clicloc Mid Clamp
SCALE 1 : 2

TITLE: SKYRACK		CLIENT: hb Solar International Inc.	MODULE ORIENTATION: PORTRAIT	REV: 01	DATE: 2017-06-29
ROOF VARIETY: SHINGLED	ROOF STRUCTURE: WOOD	DWG. NO.: FM-361-SR3	SCALE: 1:24	NAME: JT	
<p>hb Solar International Inc. 244 Montrose ST N, Unit 6 Cambridge, ON E-mail: info@hbsolar.ca</p> <p>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.</p>					

REFERENCE NOTE:

- SEE FM-362-SR3 FOR FRONT AND SIDE VIEWS
- SEE FM-363-SR3 FOR ROOF CONNECTION DETAILS
- SEE FM-364-SR3 FOR COMPONENT DETAILS

SIDE VIEW



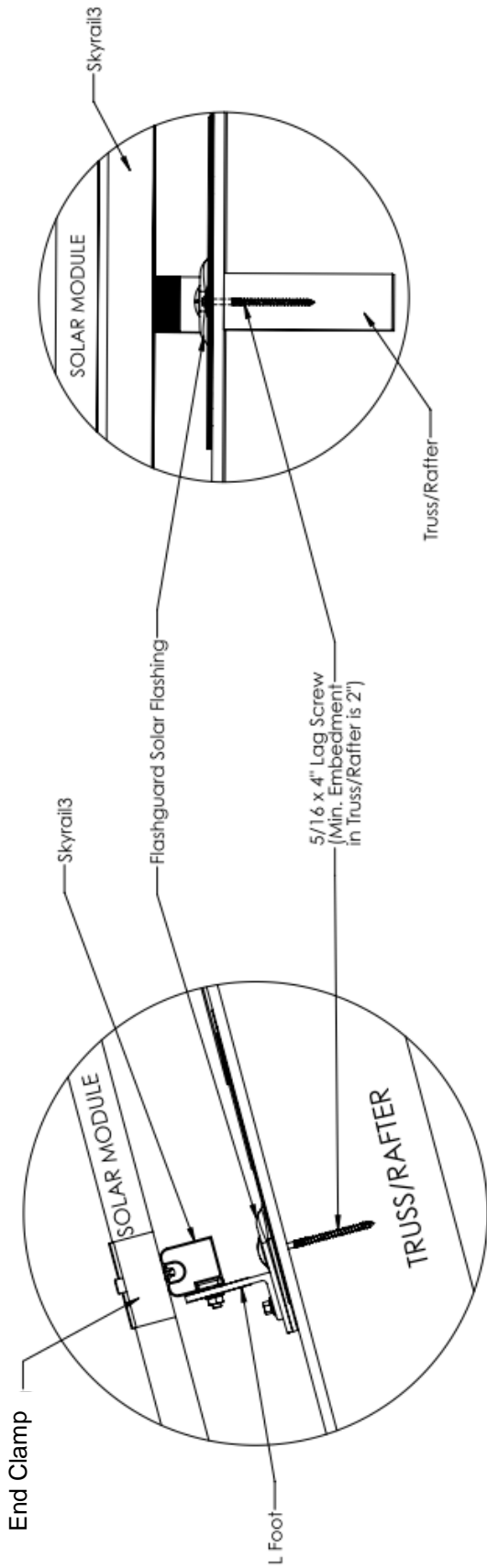
TITLE: SKYRACK	
CLIENT: hb Solar Canada Inc.	
ROOF VARIETY SHINGLED	MODULE STRUCTURE ORIENTATION WOOD PORTRAIT
DWG. NO. FM-362-SR3	REV 01
SCALE: 1:14	SHEET 2 OF 4
DRAWN	DATE
	NAME JT
	DATE 2017-06-29

hb Solar International Inc.
 23-399 Four Valley Dr, Vaughan, ON
 Phone: (905) 766-9993
 Email: info@hbSolar.ca

PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF hb Solar. IT IS TO BE USED ONLY FOR THE PROJECT AND IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF hb Solar. Canada Inc. IS PROHIBITED.

REFERENCE NOTE:

- SEE FM-361-SR3 FOR OVERVIEW
- SEE FM-363-SR3 FOR ROOF CONNECTION DETAILS
- SEE FM-364-SR3 FOR COMPONENT DETAILS



DETAIL E
SCALE 1 : 4

DETAIL F
SCALE 1 : 4

REFERENCE NOTE:

- SEE FM-361-SR3 FOR OVERVIEW
- SEE FM-362-SR3 FOR FRONT AND SIDE VIEWS
- SEE FM-364-SR3 FOR COMPONENT DETAILS

TITLE: SKYRACK			
CLIENT: hb Solar Canada Inc.		23-399 Four Valley Dr. Vaughan, ON Phone: (905) 740-9993 Email: info@hbssolar.ca	
ROOF VARIETY SHINGLED	ROOF STRUCTURE WOOD	MODULE ORIENTATION PORTRAIT	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF hb Solar Canada Inc. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF hb Solar Canada Inc. IS PROHIBITED.
DWG. NO. FM-363-SR3	REV 01	SHEET 3 OF 4	
SCALE: 1:14	NAME	DATE	
DRAWN	JT	DATE	2017-06-29