

The Schletter **FS System** for ground mount photovoltaic (PV) installations is specifically designed to meet or exceed applicable IBC, ASCE, and UL standards. For more information on the FS System, please see system brochure.

FS System Features

1. Conforms to ANSI/UL STD 1703 & UL SUB 2703
Certified to ULC/ORD STD C1703¹
2. Electrically bonded unit²
3. 20 amp series fuse rating
4. Pre-assembled components
5. Fully integrated and modular components

The FS System is capable of accommodating nearly any framed or frameless PV module currently on the market. Each FS System is custom designed to meet specific structural load requirements³. Included in the FS System are clamps (**Rapid²⁺™** Grounding Clamp) specifically designed to secure the frame of a PV module to the FS System. In turn, the components and assemblies that comprise an FS System form an electrically bonded unit. While individual components and structural sections will vary between designs, the primary assemblies and installation methods will remain the same.

During installation do not secure bolts to the final torque until the system is fully assembled. The following is a guide to properly install an FS System in order to meet design and test standards.

Each installation step contains drawings detailed as follows:

1. Individual parts broken down into their components. Referred to as “EXPLODED COMPONENTS VIEW”
2. Pre-assembled components shown in their relative position to one another. Referred to as “EXPLODED ASSEMBLIES VIEW”
3. The completed installation step with assembled parts. Referred to as “ASSEMBLED VIEW”

¹The FS System is evaluated for electrical bonding only. The FS System meets all IBC and ASCE requirements for structural loading; it has not been evaluated for loading under UL 2703.

² Installer is responsible for verifying that system meets applicable NEC and CSA standards

³ Individual parts and components will vary from system to system. Please reference system specific drawings.

STEP 1: INSTALLATION OF FOUNDATION POSTS

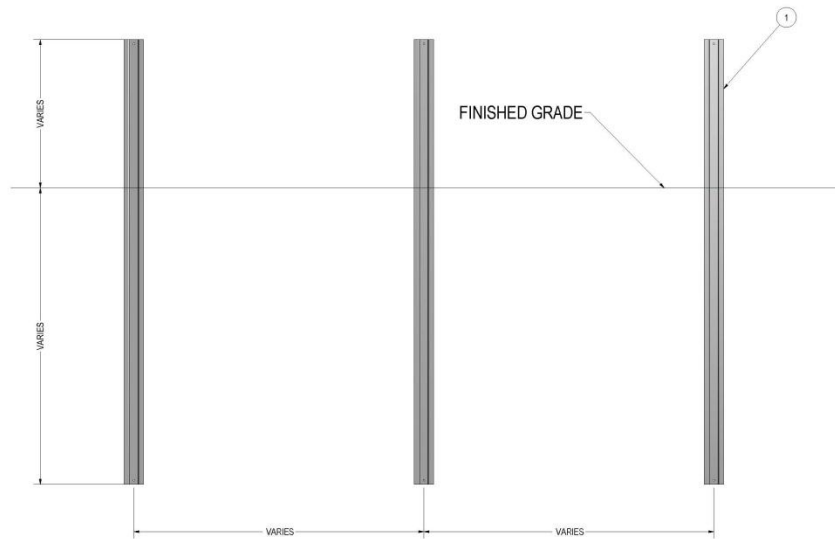
These instructions do not cover details of the ram-driven installation of support posts. Installation procedures may vary depending on terrain and other features that are out of the scope of these instructions. Take care to make sure system installation is within specified tolerances.

STEP 1: INSTALLATION OF SUPPORT POSTS

TORQUE:
 TORX BOLT FOR RAPID 2-MODULE CLAMPS IS 14 N·M (10.5 FT·LBS)
 M6 AND 1/4" BOLT TORQUE IS 6 N·M (4.5 FT·LBS)
 M8 AND 3/8" BOLT TORQUE IS 8 N·M (5.9 FT·LBS)
 M10 AND 3/8" BOLT TORQUE IS 30 N·M (23 FT·LBS)
 M12 AND 1/2" BOLT TORQUE IS 50 N·M (37 FT·LBS)
 M16 AND 5/8" BOLT TORQUE IS 72 N·M (53 FT·LBS)
 M20 AND 3/4" BOLT TORQUE IS 244 FT·LBS (180 FT·LBS)

PARTS LIST		
ITEM	QTY	PART NUMBER
1	3	143008-001 Post, 6, Galvanized, Custom

INSTALLATION TOLERANCES:
 LATERAL POST PLACEMENT IS $\pm 5.0^\circ$
 TOTAL LATERAL DEVIATION OF POSTS WITHIN AN ARRAY IS $\pm 5.0^\circ$
 POST HEIGHT VARIATION TOLERANCE IS ± 3.47
 POST VERTICALITY TOLERANCE $< 2^\circ$ IN ALL DIRECTIONS
 POST ROTATIONAL TOLERANCE $< 7^\circ$
 ARRAY TILT ANGULAR TOLERANCE $\pm 1.0^\circ$



Note: After ramming, the top of the foundation posts should be coated with a zinc dust primer (85% zinc content).

Zinc dust primer is the only coating approved, according to standards, to provide the required protection. Basic zinc spray coatings do not provide long-term protection and longevity of the system. The primer should be used to coat the top 3 cm of the post, inside and out to seal potential abrasions.

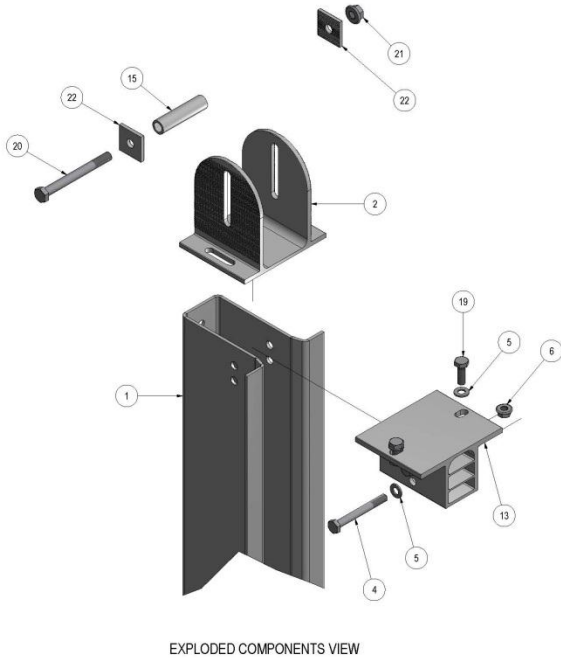
STEP 2: HEAD-PIECE ASSEMBLY IS BOLTED TO FOUNDATION POST

- a. Place head-piece onto foundation post
- b. Bolt head-piece in place using supplied hardware

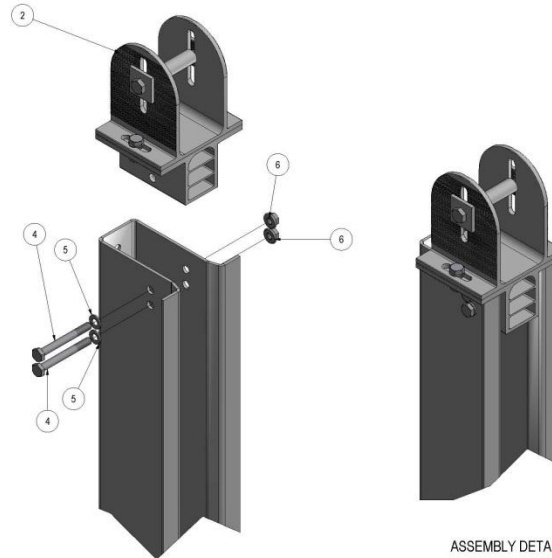
STEP 2: HEAD PIECE ASSEMBLY IS BOLTED TO SUPPORT

TORQUE:
 TORX BOLT FOR RAPID 2+ MODULE CLAMPS IS 14N-M (10.5 FT-LBS)
 M6 AND 1/4" BOLT TORQUE IS 6 N-M (4.5 FT-LBS)
 M8 AND 5/16" BOLT TORQUE IS 14 N-M (10.5 FT-LBS)
 M10 AND 3/8" BOLT TORQUE IS 30 N-M (23 FT-LBS)
 M12 AND 1/2" BOLT TORQUE IS 50 N-M (37 FT-LBS)
 M16 AND 5/8" BOLT TORQUE IS 121 N-M (89 FT-LBS)
 M20 AND 3/4" BOLT TORQUE IS 244 FT-LBS (180 FT-LBS)

ITEM	QTY	PART NUMBER	PARTS LIST	DESCRIPTION
1	3	142008-001		Post, 8, Galvanized, Custom
2	3	142500-002		FS Head, Top, Generation 5
4	6	943910-090 (Head Assembly HardWare)		Screw, HexHead, M10x90, DIN933, 304 (Head Assembly HardWare)
5	12	943912-010 (Head Assembly HardWare)		Washer, M10, DIN 125, 304 (Head Assembly HardWare)
6	12	943912-010 (Head Assembly HardWare)		Nut, Flange, Serrated, M10, DIN6923, 316 (Head Assembly HardWare)
13	3	142500-001		FS Head, Base Console, Generation 5
15	3	142500-003		Spacer Sleeve, Generation 5, L=81mm
19	6	943910-100 (Head Assembly HardWare)		Screw, HexHead, M10x30, DIN933, 304 (Head Assembly HardWare)
20	3	943000-006 (Head Assembly HardWare)		Screw, HexHead, M12x120, DIN933, 304 (Head Assembly HardWare)
21	3	943912-012 (Head Assembly HardWare)		Nut, Flange, Serrated, M12, DIN6923, 316 (Head Assembly HardWare)
22	6	161003-000 (Head Assembly HardWare)		No Slide Plate, Generation 5 (Head Assembly HardWare)



EXPLODED COMPONENTS VIEW



EXPLODED ASSEMBLIES VIEW

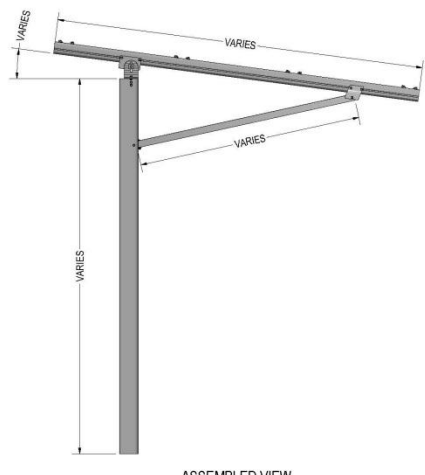
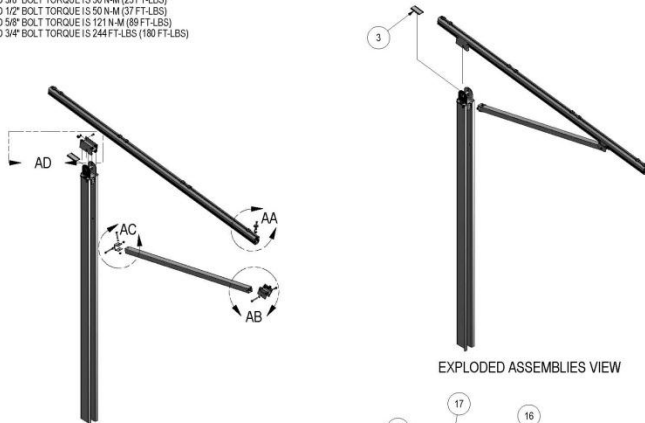
ASSEMBLY DETAIL

STEP 3: GIRDER & STRUT ASSEMBLY IS SET IN PLACE

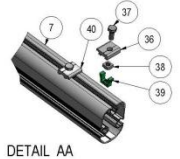
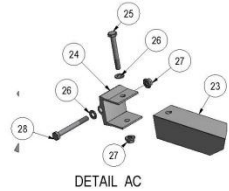
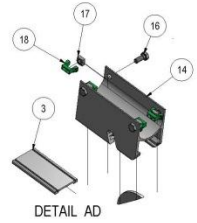
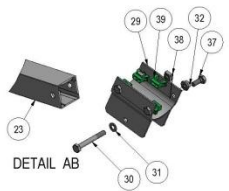
- Position girder and strut assembly to rest on top of the head-piece assembly
- Bolt lower portion of strut to foundation post
- IMPORTANT!** Insert locking wedge (Part # 142009-002) into the connector (Part # 140001-000)
- Verify that assemblies are set in place square

STEP 3: GIRDER & STRUT ASSEMBLY IS SET IN PLACE

TORQUE:
 TORX BOLT FOR RAPID 2+ MODULE CLAMPS IS 14 N·M (10.5 FT-LBS)
 M6 AND 1/4" BOLT TORQUE IS 9 N·M (4.5 FT-LBS)
 M8 AND 5/16" BOLT TORQUE IS 14 N·M (10.5 FT-LBS)
 M10 AND 3/8" BOLT TORQUE IS 30 N·M (23 FT-LBS)
 M12 AND 1/2" BOLT TORQUE IS 50 N·M (37 FT-LBS)
 M16 AND 5/8" BOLT TORQUE IS 121 N·M (89 FT-LBS)
 M20 AND 3/4" BOLT TORQUE IS 244 FT-LBS (180 FT-LBS)



EXPLODED COMPONENTS VIEW



ITEM	QTY	PART NUMBER	DESCRIPTION
3	3	142009-002	Wedge, Safety, Generation 5, ETL
7	3	141004-001	Rail, T4, Fixed Elevation, Custom
14	3	140001-000	Shoe, "T" Rail-Head, Generation 5
23	3	142002-001	Strut, 55x55x4, Gen 5
24	3	141003-000	Shoe, Strut, Postside
25	3	943610-080 (Strut Shoe HardWare)	Screw, Hexagon cap, M10x80, DIN933 (Strut Shoe HardWare)
26	6	943921-010 (Strut Shoe HardWare)	Washer, M10, DIN 125, 304 (Strut Shoe HardWare)
27	6	943912-010 (Strut Shoe HardWare)	Nut, Flange, Serated, M10, DIN6923, 316 (Strut Shoe HardWare)
28	3	943610-090 (Strut Shoe HardWare)	Screw, Hexagon Cap, M10x90, DIN933 (Strut Shoe HardWare)
29	3	141002-000	Shoe, "T", Rail-Strut, Generation 5
30	3	943610-080	Screw, HexHead, M10x80, DIN933, 304
31	3	943921-010	Washer, M10, DIN 125, A2
32	3	943912-010	Nut, Flange, Serated, M10, DIN 6923, A4
36	12	141006-002	Mounting Clamp, Open, 40mm
37	36	943610-025	Screw, HexHead, M10x25, DIN 933, A2
38	36	943914-010	Nut, Square, M10, DIN 557, A4
39	36	129010-001	Clickin, M10
40	12	141006-000	Mounting Clamp, Locking, 40mm

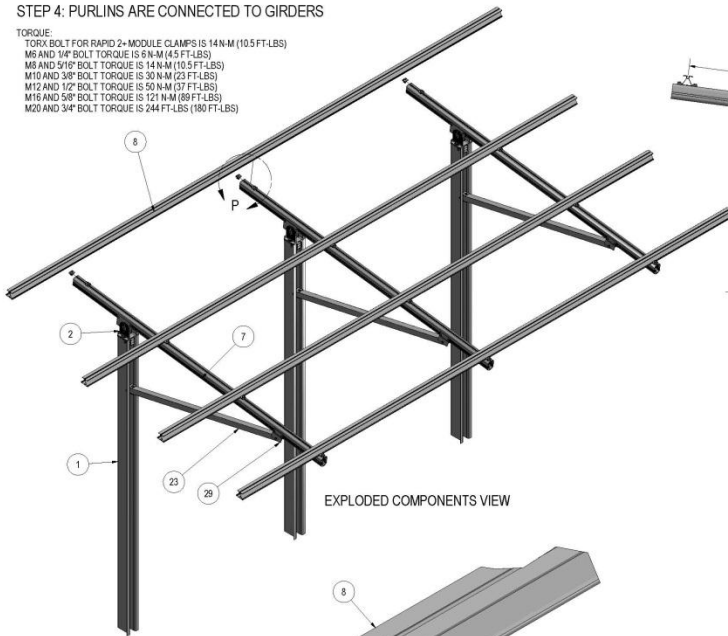
STEP 4: PURLINS ARE CONNECTED TO GIRDERS

The connection locations of purlins (rails) to girders are factory set. Do not loosen lower mounting clamp (Part # 141006-002) unless needed.

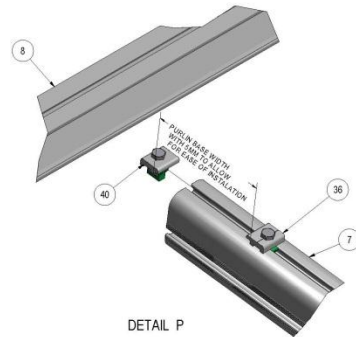
- Align purlin as shown on system specific drawings
- Slide lip of purlin under mounting clamp (Part # 141006-002)
- Verify that purlin is positioned correctly
- Secure purlin in place by tightening down upper mounting clamp (Part # 141006-000)

STEP 4: PURLINS ARE CONNECTED TO GIRDERS

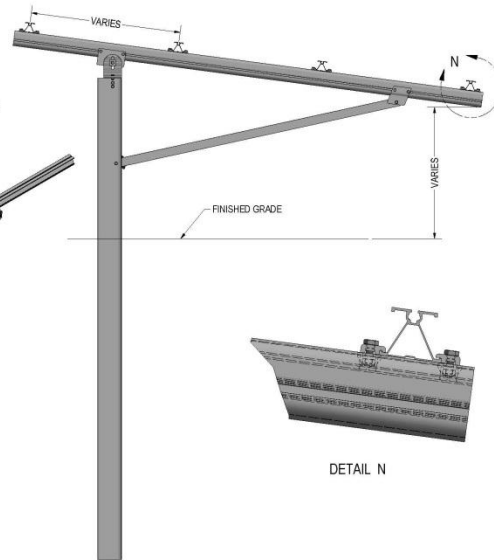
TORQUE:
 TORX BOLT FOR RAPID 2-MODULE CLAMPS IS 14 N·M (10.5 FT·LBS)
 M6 AND 1/4" BOLT TORQUE IS 9 N·M (6.5 FT·LBS)
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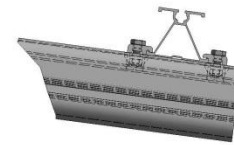
EXPLODED COMPONENTS VIEW



DETAIL P



ASSEMBLY DETAIL



DETAIL N

ITEM	QTY	PART NUMBER	PARTS LIST	DESCRIPTION
1	3	143008-001		Post, 8, Galvanized, Custom
2	3	142500-002		FS Head, Top, Generation 5
7	3	141004-001		Rail, T4 Fixed Elevation, Custom
8	4	124500-001		Rail, S0, Custom
23	3	142002-001		Shut, 5/8x55x4, Gen 5
29	3	141002-000		Shoe, 11", Rail-Shut, Generation 5
36	12	141006-002		Mounting Clamp, Open, 40mm
40	12	141006-000		Mounting Clamp, Locking, 40mm

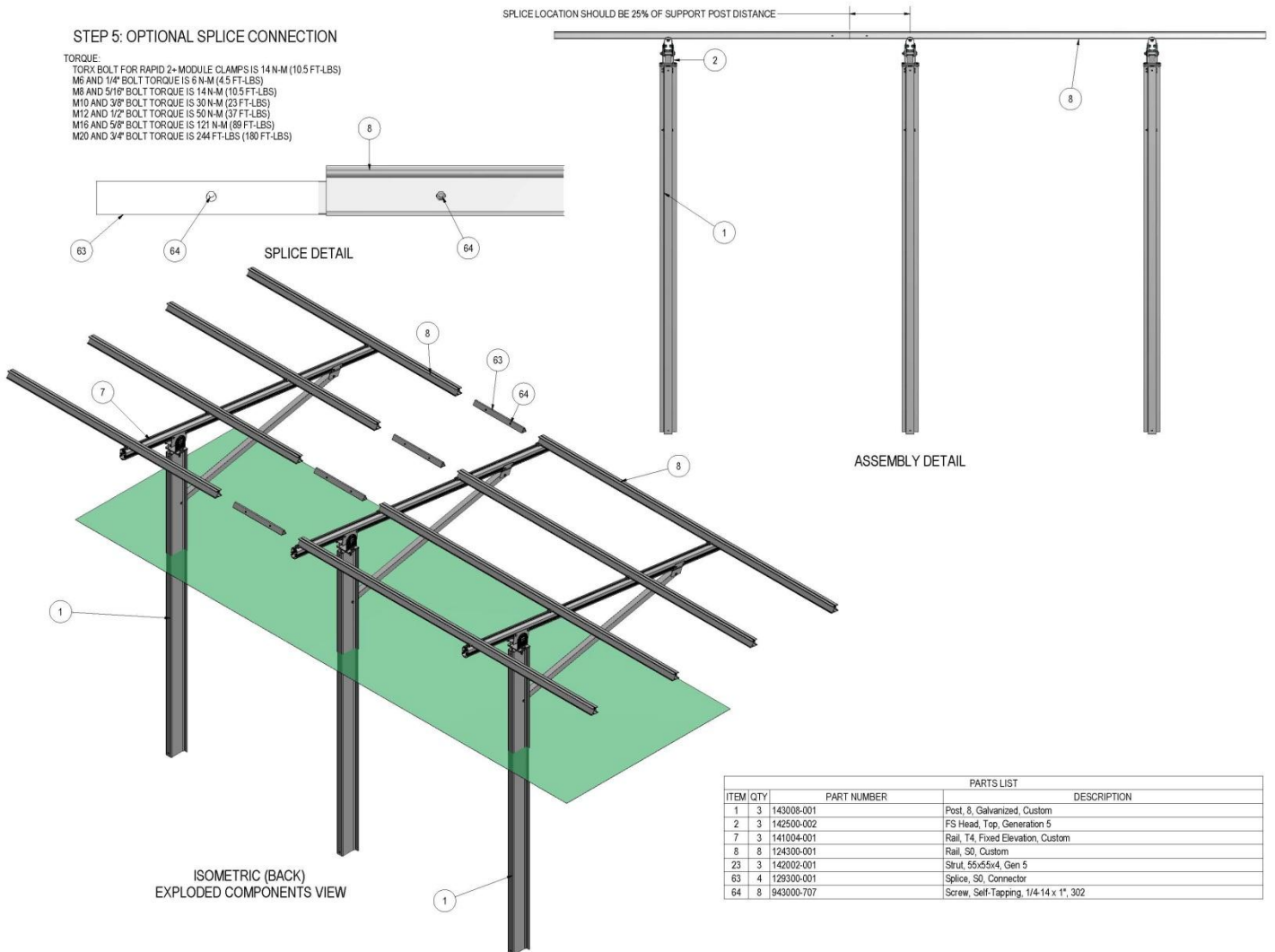
STEP 5: OPTIONAL SPLICE CONNECTION

Often, it is necessary to join two shorter purlins together in order to form a longer section. In such cases purlins have a specific splice insert used to join two pieces together. (If splices are not used, continue to Step 6.) Splices should be approximately located at the quarter points of a given span.

- a. Attach first purlin to girder as stated in Step 4
- b. Insert splice piece halfway into the end of first purlin section and secure in place using self-drilling screws (Part # 943000-707)
- c. Loosely attach second purlin section to girder and slide over splice piece that is connected to first purlin. Secure in place using self-drilling screws (Part # 943000-707)
- d. Verify purlin is installed in correct location as specified on the project drawings
- e. Secure assembled purlin in place by tightening upper mounting clamp (Part # 141006-000)

STEP 5: OPTIONAL SPLICE CONNECTION

TORQUE:
 TORX BOLT FOR RAPID 2-MODULE CLAMPS IS 14 N-M (10.5 FT-LBS)
 M6 AND 1/4" BOLT TORQUE IS 8 N-M (4.5 FT-LBS)
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 M20 AND 3/4" BOLT TORQUE IS 244 FT-LBS (180 FT-LBS)



ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	143008-001	Post, 8, Galvanized, Custom
2	3	142500-002	FS Head, Top, Generation 5
7	3	141004-001	Rail, T4, Fixed Elevation, Custom
8	8	124300-001	Rail, S0, Custom
23	3	142002-001	Strut, 55x5x4, Gen 5
63	4	129300-001	Splice, S0, Connector
64	8	943000-707	Screw, Self-Tapping, 1/4-14 x 1", 302

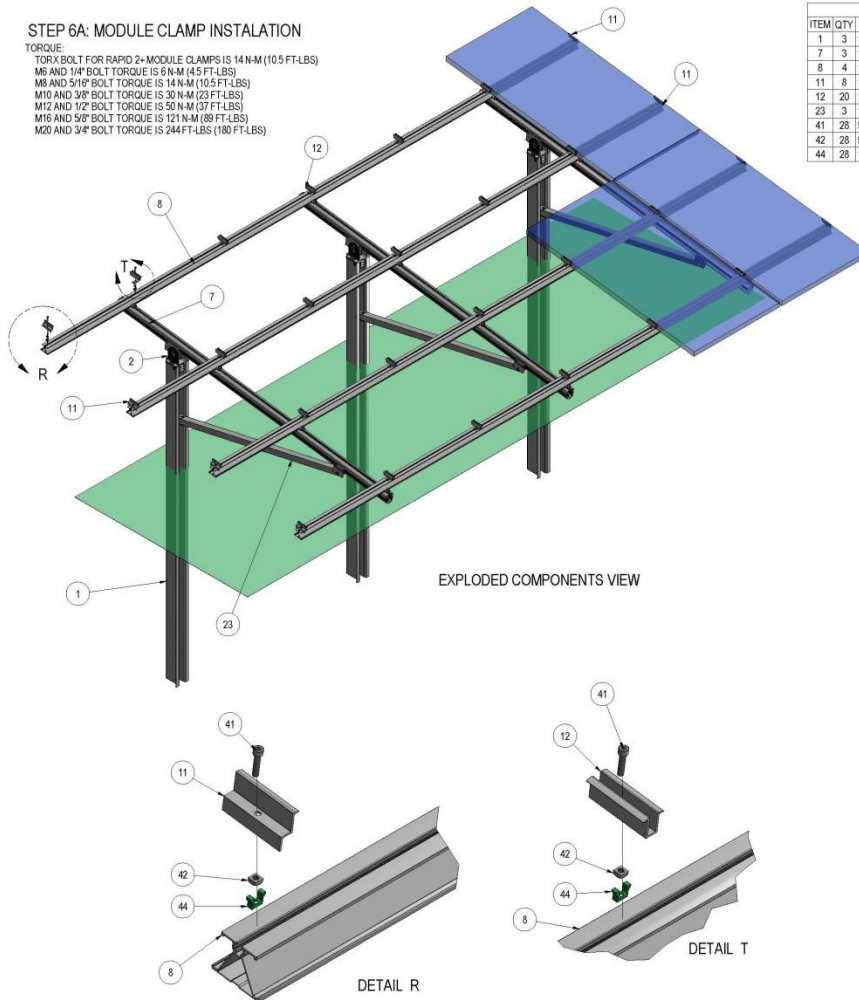
STEP 6A: MODULE CLAMP INSTALLATION

Schletter grounding middle clamps ensure that PV modules are both physically secured and electrically bonded to the mounting system. Grounding clamps contain two stainless steel pins that pierce the anodized layer of a PV module frame. This forms an electrical bond between the frame and the purlin to which the module is attached. Take care to verify that clamping locations fall within allowable ranges, provided by the module manufacturer.

- Locate approximate locations of grounding clamps
- Insert M8 Klick™ component (Part # 129010-008) into purlin
- Insert M8 square nut (Part # 943914-008) into M8 Klick component, ensuring the rounded side of the nut is facing down
- Position PV module as specified on project drawings
- Secure in place by affixing the grounding middle clamp to the M8 nut with an M8 bolt
- Secure ends of modules in place with end clamps in the same manner as explained in steps a-e above

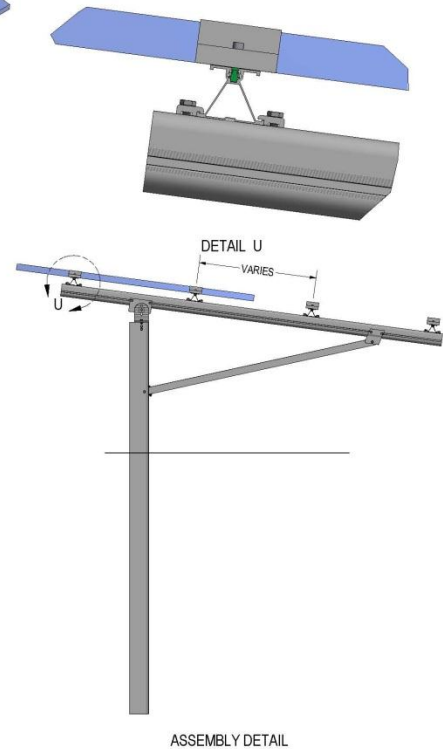
STEP 6A: MODULE CLAMP INSTALLATION

TORQUE:
 TORX BOLT FOR RAPID 2+ MODULE CLAMPS IS 14 N-M (10.5 FT-LBS)
 M6 AND 1/4" BOLT TORQUE IS 6 N-M (4.5 FT-LBS)
 M8 AND 5/16" BOLT TORQUE IS 14 N-M (10.5 FT-LBS)
 M10 AND 3/8" BOLT TORQUE IS 30 N-M (23 FT-LBS)
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 M20 AND 3/4" BOLT TORQUE IS 244 FT-LBS (180 FT-LBS)



EXPLODED COMPONENTS VIEW

ITEM	QTY	PART NUMBER	PARTS LIST	DESCRIPTION
1	3	143008-001	Post, 8, Galvanized, Custom	
7	3	141004-001	Rail, T4, Fixed Elevation, Custom	
8	4	124300-001	Rail, S0, Custom	
11	8	130001-050	End Clamp, 50mm	
12	20	135001-001	Grounding Middle Clamp	
23	3	142002-001	Strut, 55x55x4, Gen 5	
41	28	943308-135	Screw, Allen, Serrated, M8x35, DIN 912, A2	
42	28	943914-008	Nut, Square, M8, DIN 557, A4	
44	28	129010-008	Klickin, M8	



ASSEMBLY DETAIL

STEP 6B: MODULE CLAMP INSTALLATION

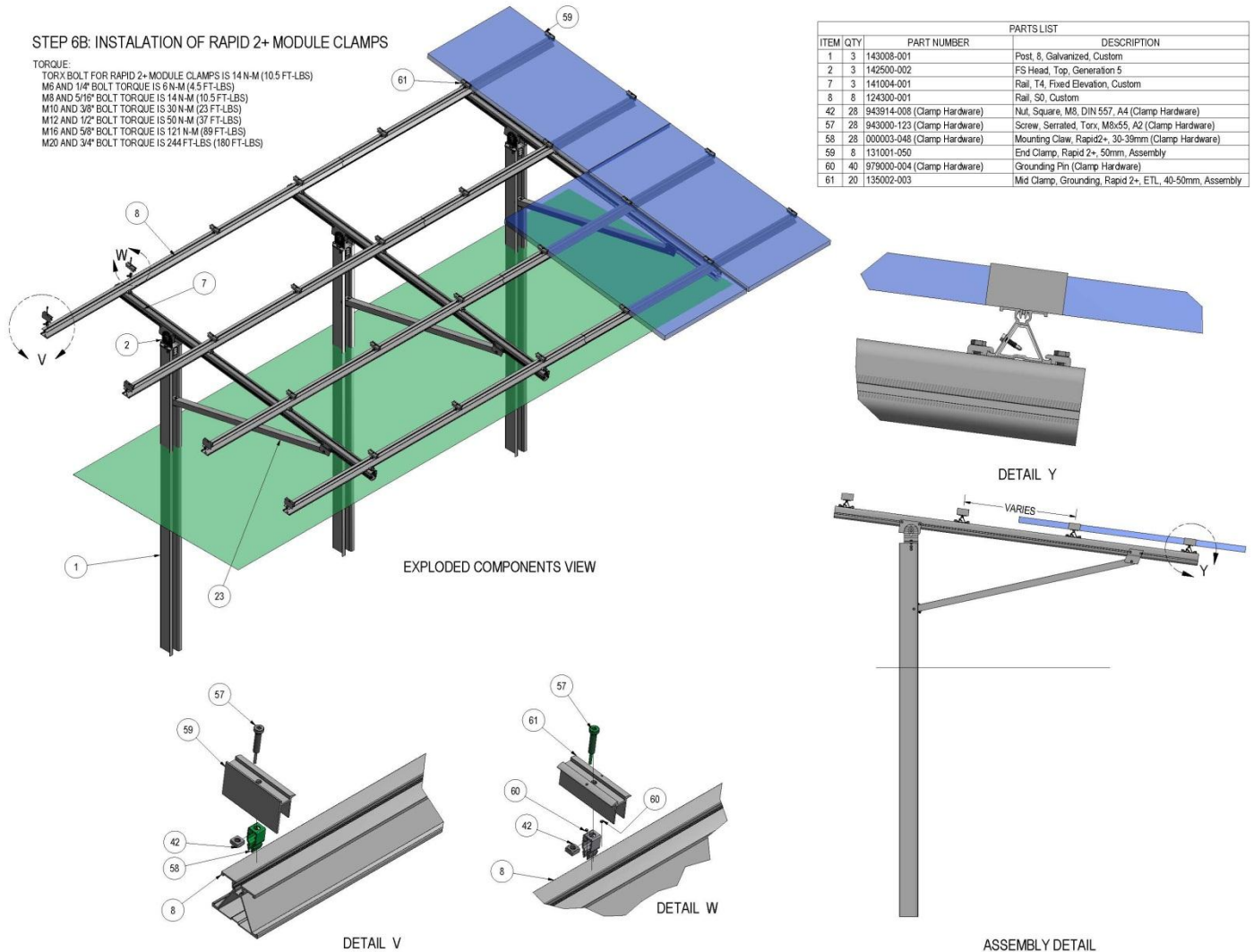
Schletter Rapid²⁺ grounding middle clamps ensure that PV modules are both physically secured and electrically bonded to the mounting system. Rapid²⁺ grounding clamps contain two stainless steel pins that pierce the anodized layer of a PV module frame, forming an electrical bond between the frame and the purlin to which the module is attached. Rapid²⁺ clamps are fully assembled units that snap into the purlin. Take care to verify that clamping locations are within allowable ranges.

- Locate approximate location of grounding clamps
- Insert Rapid²⁺ clamp into rail
- Align modules as required
- Secure Rapid²⁺ grounding middle clamp
- Secure ends of modules using Rapid²⁺ end clamps in same manner as steps a-d

STEP 6B: INSTALATION OF RAPID 2+ MODULE CLAMPS

TORQUE:
 TORX BOLT FOR RAPID 2+ MODULE CLAMPS IS 14 N-M (10.5 FT-LBS)
 M6 AND 1/4" BOLT TORQUE IS 6 N-M (4.5 FT-LBS)
 M8 AND 5/16" BOLT TORQUE IS 14 N-M (10.5 FT-LBS)
 M10 AND 3/8" BOLT TORQUE IS 30 N-M (23 FT-LBS)
 M12 AND 1/2" BOLT TORQUE IS 50 N-M (37 FT-LBS)
 M16 AND 5/8" BOLT TORQUE IS 121 N-M (89 FT-LBS)
 M20 AND 3/4" BOLT TORQUE IS 244 FT-LBS (180 FT-LBS)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	143008-001	Post, 8, Galvanized, Custom
2	3	142500-002	FS Head, Top, Generation 5
7	3	141004-001	Rail, T4, Fixed Elevation, Custom
8	8	124300-001	Rail, S0, Custom
42	28	943914-008 (Clamp Hardware)	Nut, Square, M8, DIN 557, A4 (Clamp Hardware)
57	28	943000-123 (Clamp Hardware)	Screw, Serrated, Torx, M8x55, A2 (Clamp Hardware)
58	28	000003-048 (Clamp Hardware)	Mounting Claw, Rapid2+, 30-39mm (Clamp Hardware)
59	8	131001-050	End Clamp, Rapid 2+, 50mm, Assembly
60	40	979003-004 (Clamp Hardware)	Grounding Pin (Clamp Hardware)
61	20	135002-003	Mid Clamp, Grounding, Rapid 2+, ETL, 40-50mm, Assembly



This concludes the installation guide portion of this document.

CONNECTING MULTIPLE RACKS

Many PV installations contain more than one mounting system. Such cases call for electrically bonding each of the different manufacturers mounting systems together. Since individual racks are fully bonded units it is only necessary to connect individual racks together from one single point to another single point. Only use stainless steel hardware when connecting harnesses or jumpers to the mounting system. Take care to prevent copper wires from directly contacting aluminum surfaces as this will cause corrosion.

- The PV INSTALLER of Schletter's electrically bonded FS mounting system must provide the components necessary for the final connections to the grounding electrode system. Typically the installation will incorporate a grounding electrode (ground rod), appropriately sized copper wire, rated wire connectors, and grounding lugs which are rated for this purpose. The PV INSTALLER must follow all manufacturers' installation literature. Installation must comply with all applicable NEC/CSA sections including but not limited to; NEC 250 (Grounding and Bonding), NEC 690 (Solar Photovoltaic Systems), CSA 22.1 (Safety Standard for Electrical Installations), Canadian Electrical Code Part 1, and all other applicable state, provincial, and local electrical code requirements.
- PV INSTALLER shall be fully responsible for all connections between Schletter's bonded FS mounting system and PV grounding electrode system.

SAFETY⁴ PRECAUTIONS

Follow proper installation and safety procedures at all times. Edges of parts may be sharp. Follow proper lifting procedures.

⁴Mounting structure is comprised of stainless steel and aluminum components and is not evaluated for its fire rating.