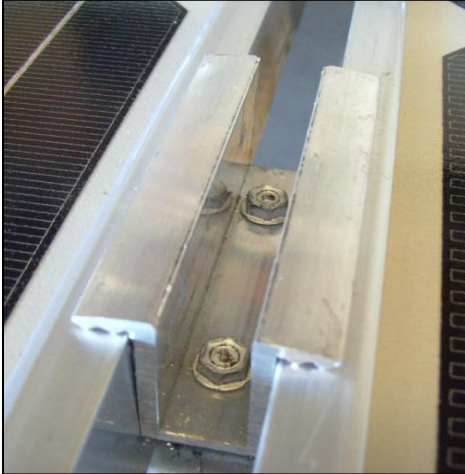
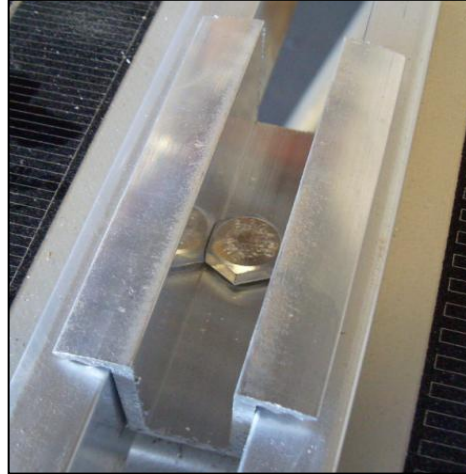


Solar Module Top Clamp - **INSTALLATION GUIDE**

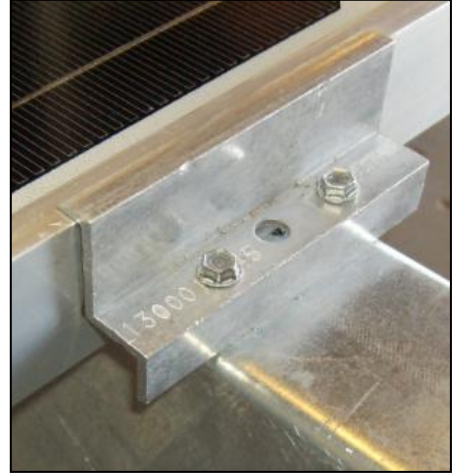
- One Middle Clamp For Varied Frame Heights
- Choice of Clamp Hardware - Bolt or Screws
- Mid-Clamp Captivates Bolt Head - Saves Time
- Self Drilling Screws Replace Pre-Punched Holes



Middle Clamp with Self Drilling Screws



Middle Clamp with 5/16" Hex Bolt



End Clamp with Self Drilling Screws

Skyline Solar Top Clamps are engineered to perform structural Top-Down attachment of aluminum solar module frames to support structures, with fastener options. Top Clamps can be installed using either; two #12-14 Self Drilling Screws, or a single 5/16" stainless Hex Bolt. Fastening hardware is provided separately from Top Clamps (see table 2, Fastener Length). Top clamps are 6063-T5 extruded aluminum, mill finish.

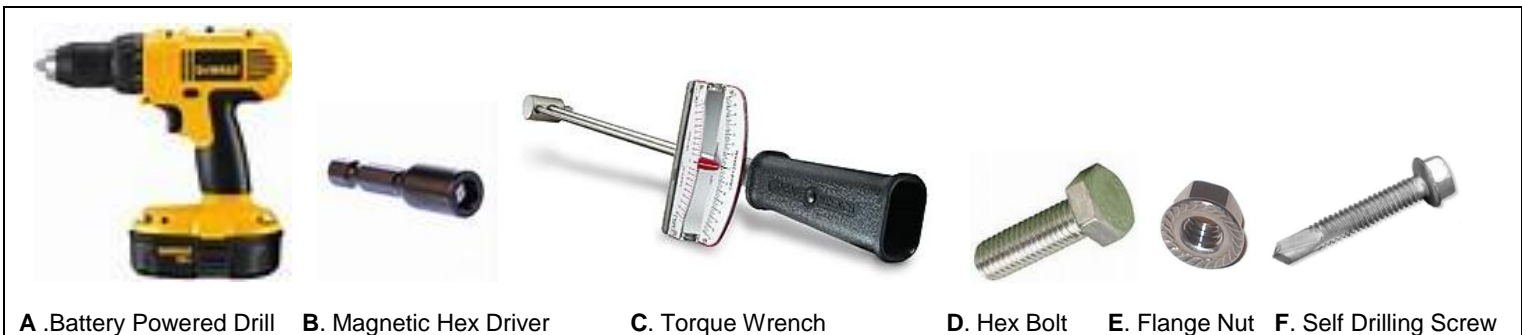
- Middle Clamp is applicable for securing modules of frame heights ranging from 31-51mm
- Middle Clamp features improved gripping-teeth onto the modules' frame.
- End-Clamp is offered by 'Frame-Height Specific' sizes from 31-51mm, in 1mm increments

Tools

- A. Battery Powered Drill-Variable Speed/Adj.Torque
- B. Magnetic Hex Driver 5/16" (for self drilling screw)
- C. Torque Wrench 0-50 ft/lbs

Hardware

- D. Optional, 5/16"-18 Bolt, Hex HD, St-St
- E. Optional, 5/16"-18 Serrated Flange Nut, St-St
- F. ELCO 'Dril-flex' #12-14 Self Drilling Screws



A. Battery Powered Drill

B. Magnetic Hex Driver

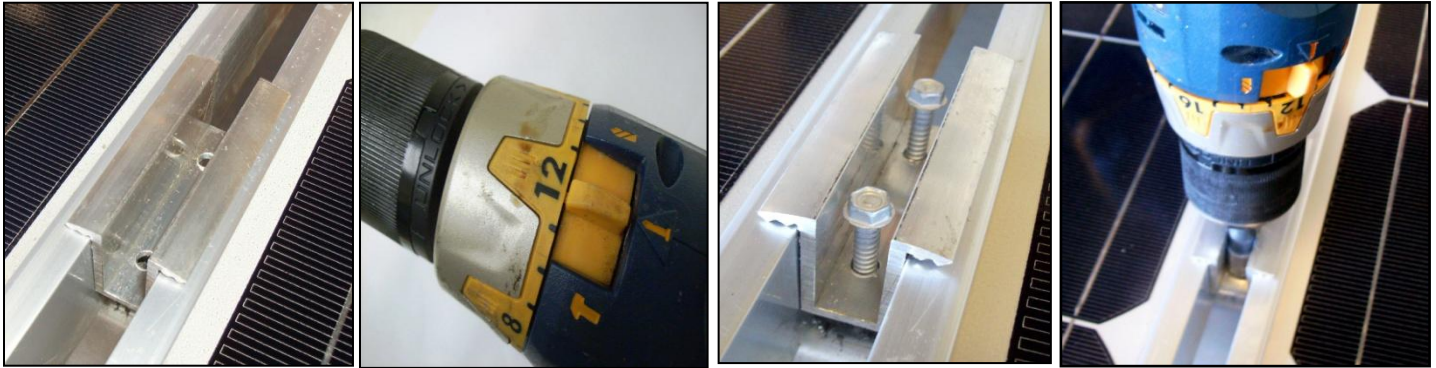
C. Torque Wrench

D. Hex Bolt

E. Flange Nut

F. Self Drilling Screw

INSTALLATION SEQUENCE - With Self Drilling Screws into #14ga. or #12ga. steel



1. Position the clamp over the support rail, snug in-between solar modules.
2. Set to 'screw' mode, adjust the screw gun's clutch setting.
3. Place two #12-14 self drilling screws into holes, insure screw alignment.
4. Using the magnetic 5/16" hex drive bit, drill screws and torque 2.5 to 3 ft-lbs.

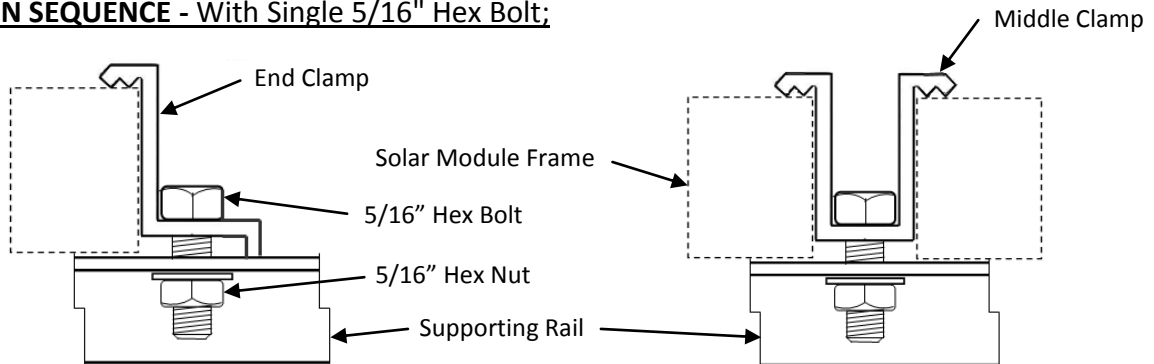
Table 1. #12 Self Drilling Screw (SDS) Installation Guide

Metal Thickness	Battery Powered Screw Gun Clutch * (Setting)	Field Torque Ft-Lbs
16 ga. (0.060")	10 (screw)	2.5 (30 in-lbs)
14 ga. (0.075")	12 (screw)	2.5 to 3 (30-36 in-lbs)
12 ga. (0.106")	Max (screw)	4 to 5
1/8" (0.125")	Max (screw)	5 to 6

The screw gun's adjustable-clutch value may vary depending on the manufacturer and battery voltage. Recommend to first test using the value listed in table, then-after screw is fastened, check screw with torque wrench. Adjust the drill's clutch if needed to arrive at the desired 'Field Torque'.

- Use only Self Drilling Screws which are dual heat treated for ductility and resistance to Hydrogen Assisted Cracking (HAC), suitable for dissimilar metals with a galvanic barrier coating for corrosive environments – salt spray tested minimum 1000 hours per ASTM B117.
- Do not over torque fasteners beyond the recommended values, this may cause damage to fasteners, the clamps or the solar module frames.
- Use of percussion drills, impact drivers or corded AC drills of Non-Adjustable torque to install self drilling screws is not recommended as these may cause micro-crack damage to case hardened fasteners or strip sheet metal by over-torque.

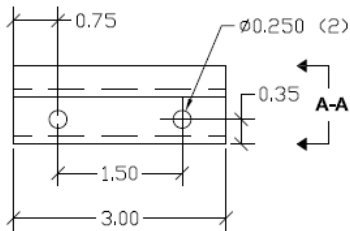
INSTALLATION SEQUENCE - With Single 5/16" Hex Bolt;



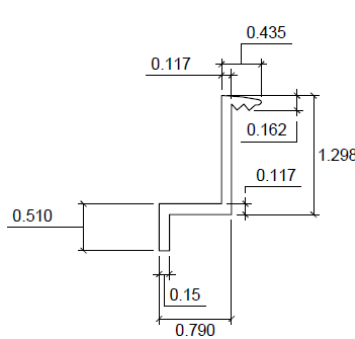
The Middle-Clamp is designed to captivate the hex head of the 5/16" bolt. Pre-drill supporting rails with 3/8" diameter holes. Place the bolt through the center hole of clamp, snug clamp against module frame(s) and align bolt into rail and fasten with a serrated flange hex nut to 10ft-lbs.

Table 2 – Top Clamp Selection Guide

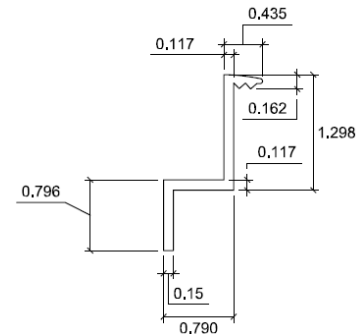
Module	End Clamp-1 Hole	End Clamp-2 Holes	Mid Clamp-1 hole	Mid Clamp-2 holes	Self Drilling Screws	5/16"-18 Bolt	
Mm	Inch	item # (Bolted)	Item # (SDS)	item # (Bolted)	Item # (SDS)	Length	Length
31	1.22	130001-031	130001-031A	MC-3	MC-2	1"	1"
32	1.26	130001-032	130001-032A	MC-3	MC-2	1"	1"
33	1.30	-----	-----	MC-3	MC-2	1"	1"
34	1.34	130001-034	130001-034A	MC-3	MC-2	1"	1"
35	1.38	130001-035	130001-035A	MC-3	MC-2	1"	1"
36	1.42	130001-036	130001-036A	MC-3	MC-2	1-1/2"	1-1/4"
37	1.45	-----	-----	MC-3	MC-2	1-1/2"	1-1/4"
38	1.50	130001-038	130001-038A	MC-3	MC-2	1-1/2"	1-1/4"
39	1.54	-----	-----	MC-3	MC-2	1-1/2"	1-1/4"
40	1.57	EC-3	EC-1	MC-3	MC-2	1-1/2"	1-1/4"
41	1.61	-----	-----	MC-3	MC-2	1-1/2"	1-1/4"
42	1.65	130001-042	130001-042A	MC-3	MC-2	1-1/2"	1-1/4"
43	1.69	-----	-----	MC-3	MC-2	1-1/2"	1-1/4"
44	1.73	130001-044	130001-044A	MC-3	MC-2	1-1/2"	1-1/4"
45	1.77	130001-045	130001-045A	MC-3	MC-2	1-1/2"	1-1/4"
46	1.81	EC-4	EC-2	MC-3	MC-2	2"	1-1/2"
47	1.85	-----	-----	MC-3	MC-2	2"	1-1/2"
48	1.89	130001-048	130001-048A	MC-3	MC-2	2"	1-1/2"
49	1.93	-----	-----	MC-3	MC-2	2"	1-1/2"
50	1.97	130001-050	130001-050A	MC-3	MC-2	2"	1-1/2"
51	2.01	130001-051	130001-051A	MC-3	MC-2	2"	1-1/2"



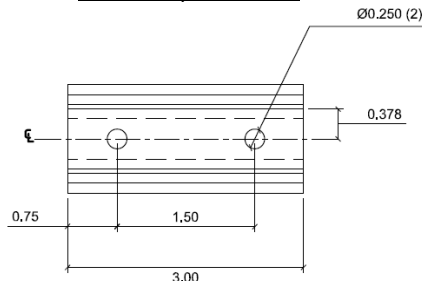
End Clamp - 2 Holes



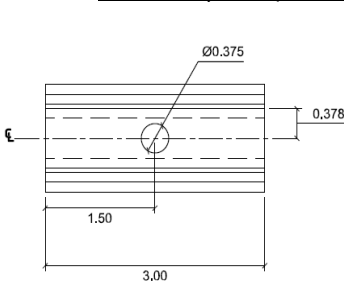
End Clamp A-A (40 mm)



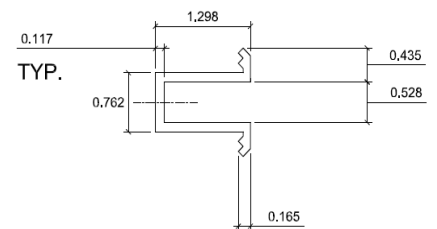
End Clamp A-A (46 mm)



Middle Clamp - 2 holes



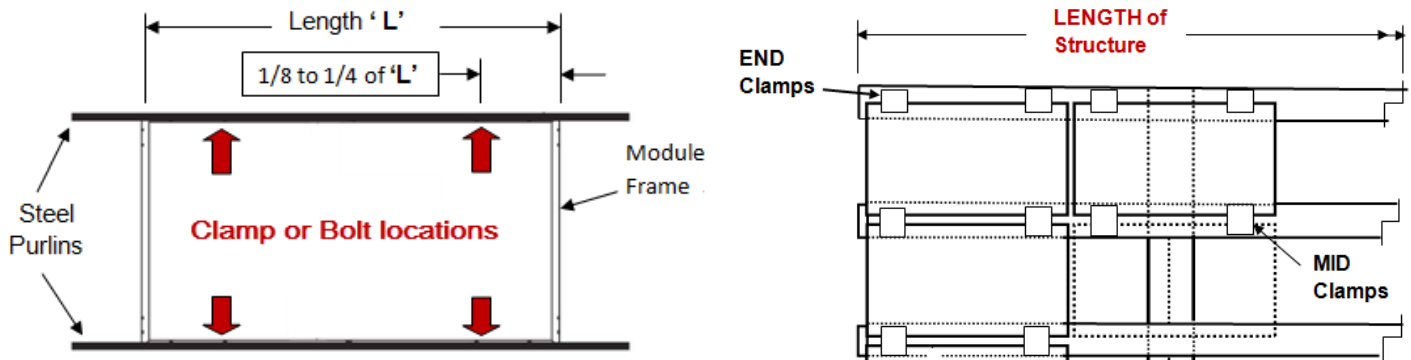
Middle Clamp - 1 hole



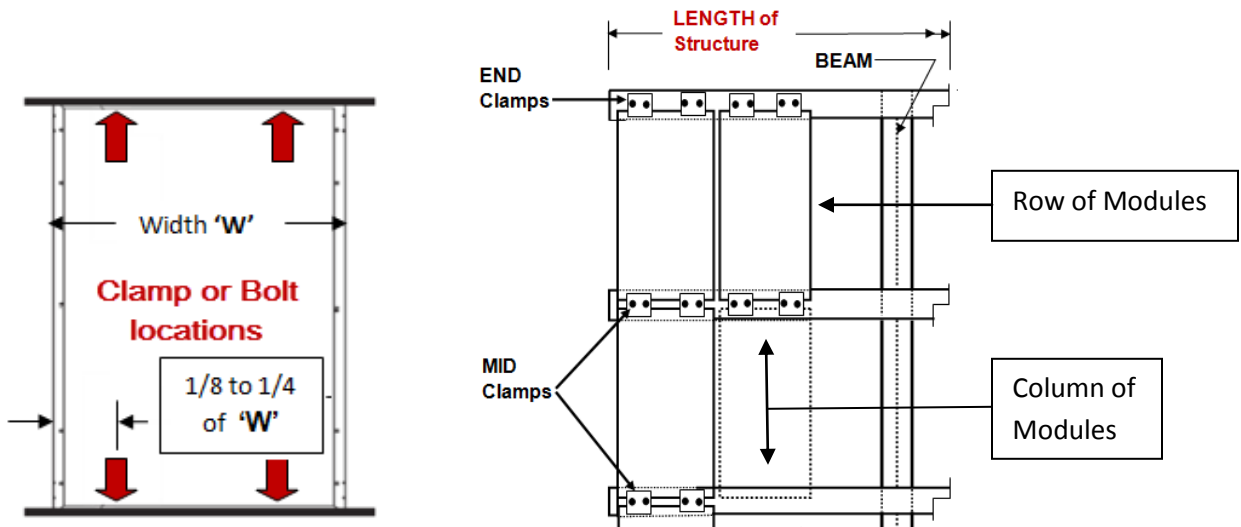
TYP.

Top clamp attachments may be installed on the solar module's short end or long side of the aluminum frame. Follow the specific solar module manufacturer's installation instructions for clamp placement guidelines. The Middle Clamp is placed in-between adjacent solar modules.

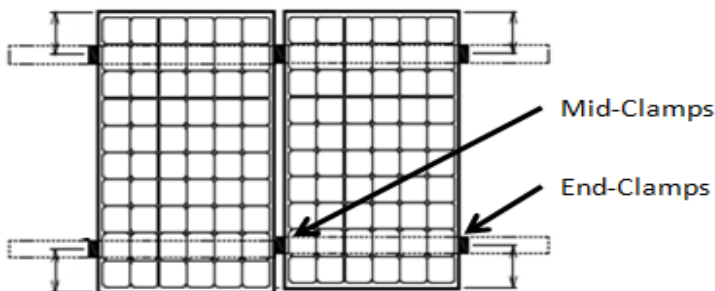
- Two (2) Middle Clamps are required between adjacent modules in a row.
If: row = 7 modules, then: Middle Clamp quantity = 12.
- End Clamps are positioned at each end of the first and last module in a row or column. Four (4) additional end-clamps are needed for every row or column.



Example: Modules in Landscape - Shared Purlins Parallel to Solar Module's Length



Example: Modules in Portrait - Shared Purlins Parallel to Solar Module's Width



Example: Modules in Portrait - Dual Purlins Parallel to Solar Module's Width