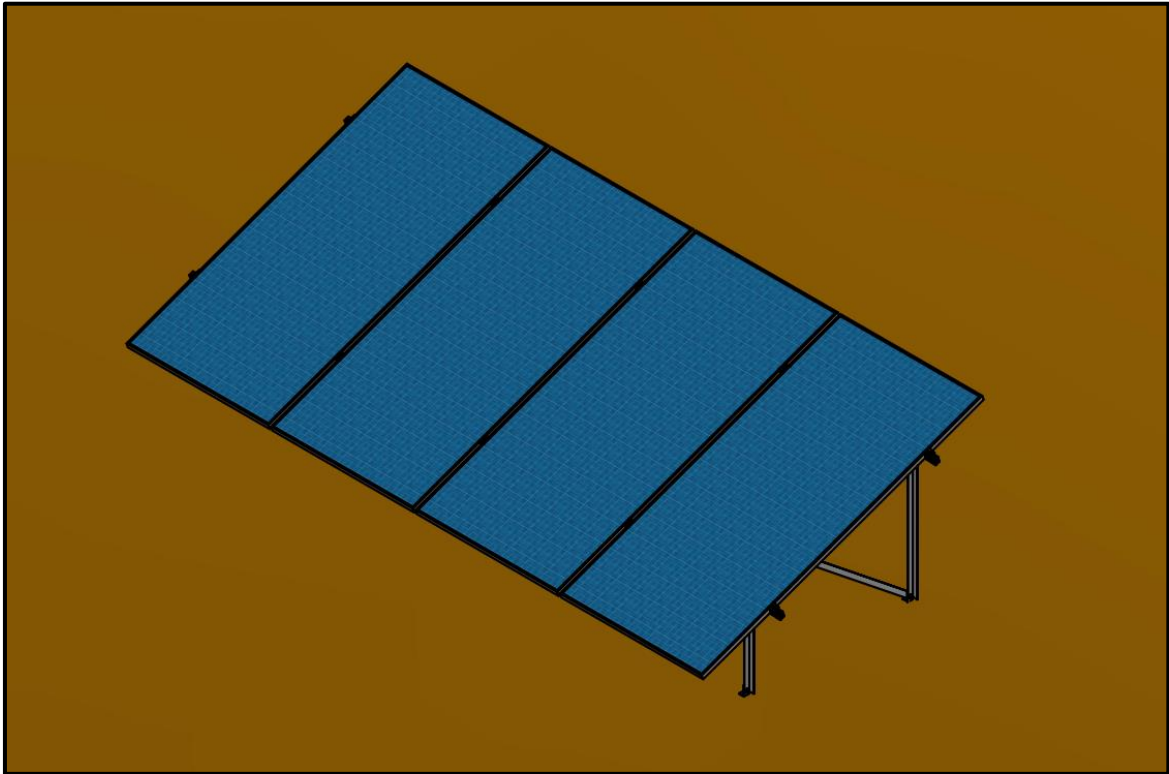


Installation Manual

IM_AXE_RT_RSD_RD

Railed Raised Roof Mounting System

For framed PV modules in portrait orientation



Declaration

- Only the highest quality components are used in the mounting system to ensure a trouble-free operation of your solar power system. The following information explains the proper setup of the Axe Struct roof mounting system at an angle on Klip-Lok, Springlok, IBR, Corrugated, Zip-Tek, Brownbuilt, Dimondek and Craft-Lock sheets.
- Any unique structural features must be documented so that the unique features of the roof can be considered when planning the layout.
- Always fasten the bolted connection by turning the bolt head. Do not turn the nut, just hold it.

Contents

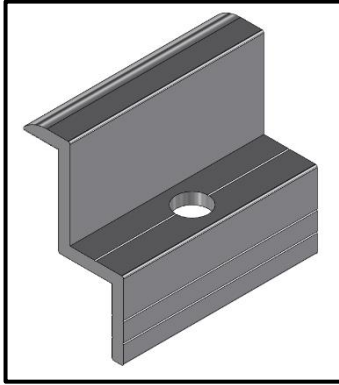
① Components	3
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① Components

End Clamp

AXE_AL_CE_AP

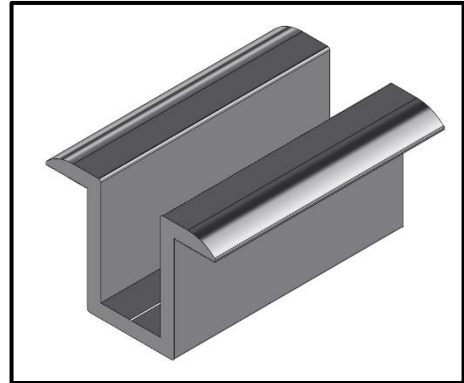
For PV modules with 30mm, 35mm and 40mm frame heights



Mid Clamp

AXE_AL_CM_AP

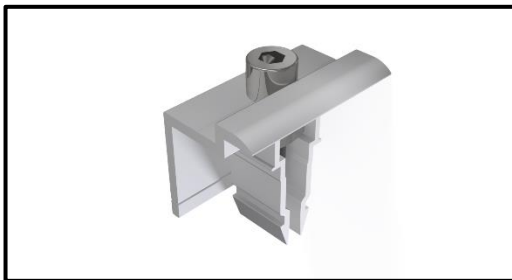
Clamping down any framed PV modules



End Clamp, Click Fix

AXE_AL_CE_CF

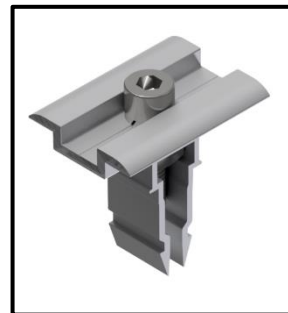
For PV modules with 30mm or 35mm frame heights



Mid Clamp, Click Fix

AXE_AL_CM_CF

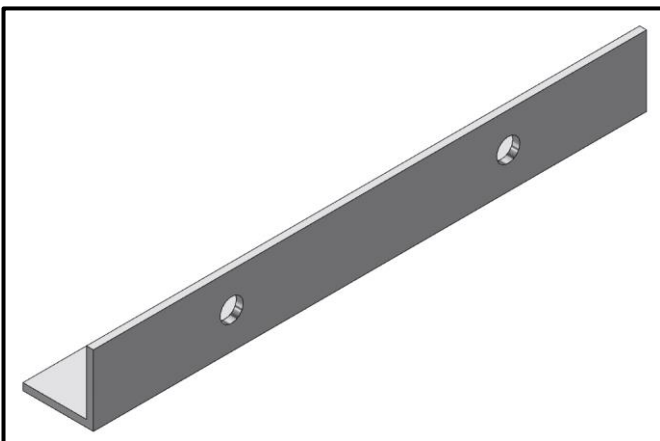
For PV modules with 30mm or 35mm frame heights



Rail Splice

AXE_AL_EX_40

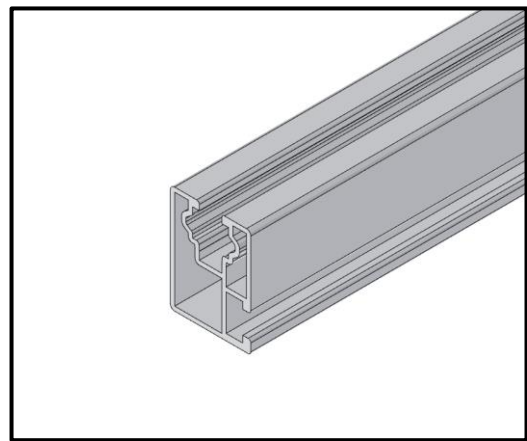
Extending Rails



Rail

AXE_AL_L_R_40_30

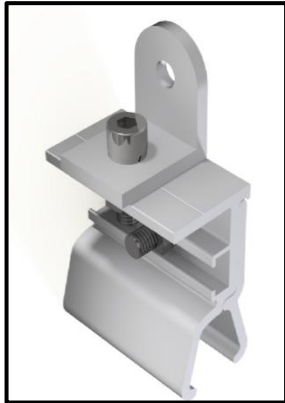
4.4m or 5.9m lengths



Fix Lok Bracket

AXE_AL_BR_FL_V

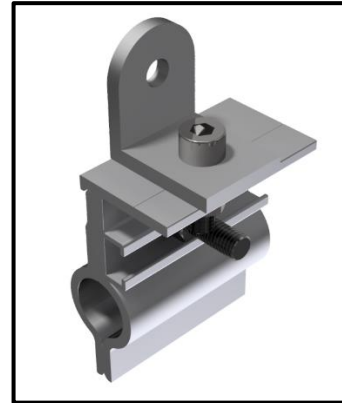
Non-penetrating connection to Klip-Lok, ProLok and Saflok roof sheets



Standing Rib Bracket

AXE_AL_BR_SR_V

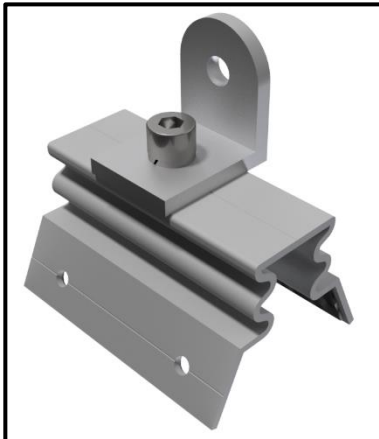
Non-penetrating connection to Zip-Tek, Brownbuilt and Dimondek roof sheets



IBR Bracket

AXE_AL_BR_IBR_V

Penetrating screw connection to IBR roof sheets



IBR Bracket

AXE_AL_BR_L_R

Penetrating screw connection to IBR roof sheets



Craft Lok Bracket

AXE_AL_BR_CL_V

Non-penetrating connection to Craft-Lok roof sheets



Nova Tek Bracket

AXE_AL_BR_NT_V

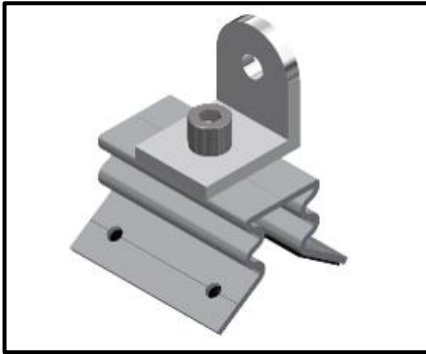
Non-penetrating connection to Novotexi roof sheets



Corrugated Bracket

AXE_AL_BR_COR_V

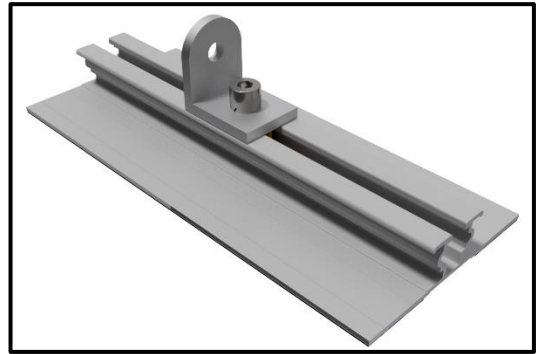
Penetrating screw connection to Corrugated roof sheets



Rib Surface Bracket

AXE_AL_BR_RS_V

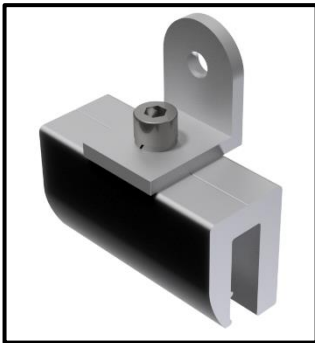
Penetrating screw connection to IBR or Corrugated roof sheets



Pinch Fix Bracket

AXE_AL_BR_PF_V

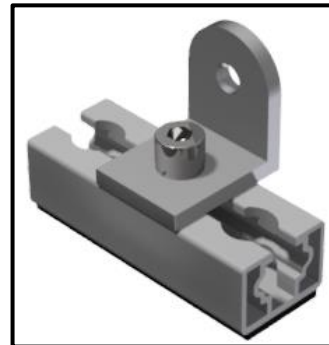
Non-penetrating connection to Craft-Lock, Brownbuilt and Dimondek roof sheets



Ridge Fix Bracket

AXE_AL_BR_RF_V

Penetrating screw connection to purlins on Tile roofs



Hanger Bolt Vertical Bracket

AXE_AL_BR_HB_V

Penetrating screw connection to Asbestos and other roof sheets



Spring Lok Bracket

AXE_AL_BR_SL_V

Non-penetrating connection to Springlok roof sheets



Craft Lok Bracket

AXE_AL_BR_CL_V

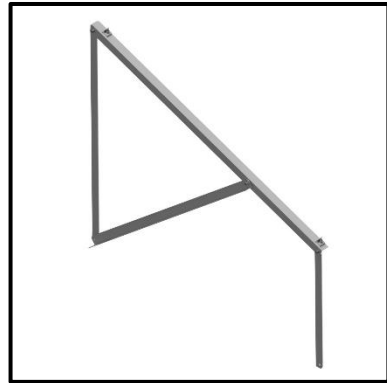
Non-penetrating connection to Craftlok roof sheets



Raised Railed Frame

AXE_AL_RSD_RD

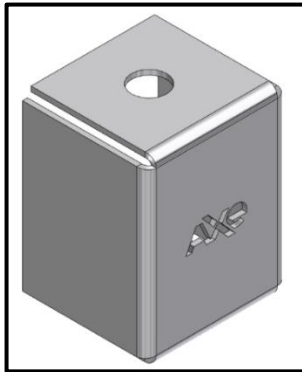
Connecting frame to roof brackets



End Cap

AXE_AL_EC_40

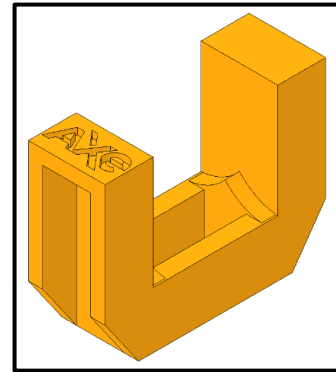
Rounding of Rail ends



Nut Stopper

AXE_PP_NST_8

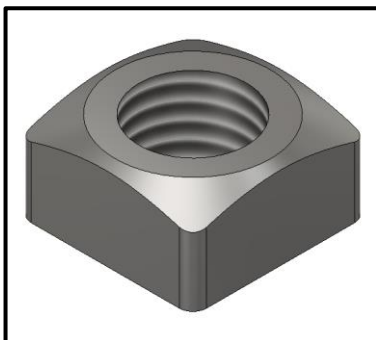
Guiding M8 Square nut into position



M8 Square Nut

AXE_SS_NSQ_8

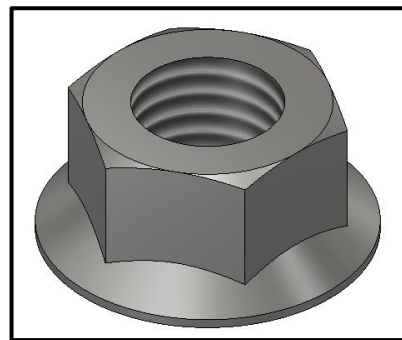
Connection to Rails



M8 Hex-flange Nut

AXE_SS_NHF_8

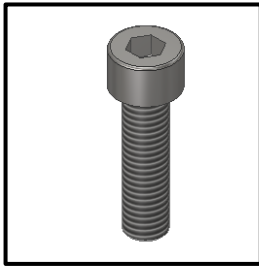
Splice connection



M8 Hex-cap Screw

AXE_SS_CS_8

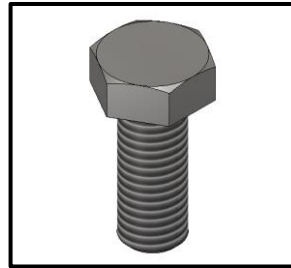
PV module, Splice or Bracket connection



M8 Hex Bolt

AXE_GS_BH_8_20

Splice connection to Rails



Self-Drilling Tek Screw

AXE_GS_ST_6.3

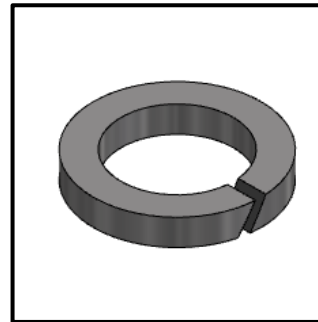
Bracket connection



M8 Spring Washer

AXE_SS_WS_8

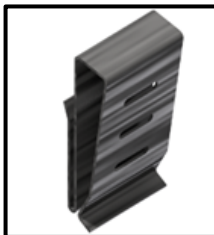
PV module or Bracket connection



Frame Cable Clamp

AXE_SS_CC_6

Bracket connection



Torque settings

The specified settings below are assumed to have a dry application. Should a lubrication agent or anti-seizing be used, 80% of the below-listed values would apply.

Size	Stainless Steel (N.m)	Galvanized Grade 8.8
M8	18 N.m	N/A
M10	38 N.m	N/A
M12	60 N.m	100 N.m
M16	150 N.m	245 N.m
M20	300 N.m	510 N.m
M24	N/A	900 N.m

Fastening should cease when aluminium sections start to visually deform.

Seizing (Galling) Prevention

It is recommended that Copper Slip paste is applied in all threaded connections, specifically Stainless-Steel fasteners. This will prevent fasteners from seizing and promote good practice. A further step to prevent seizing is to tighten fasteners at low rpm, without interruptions and apply steady pressure.

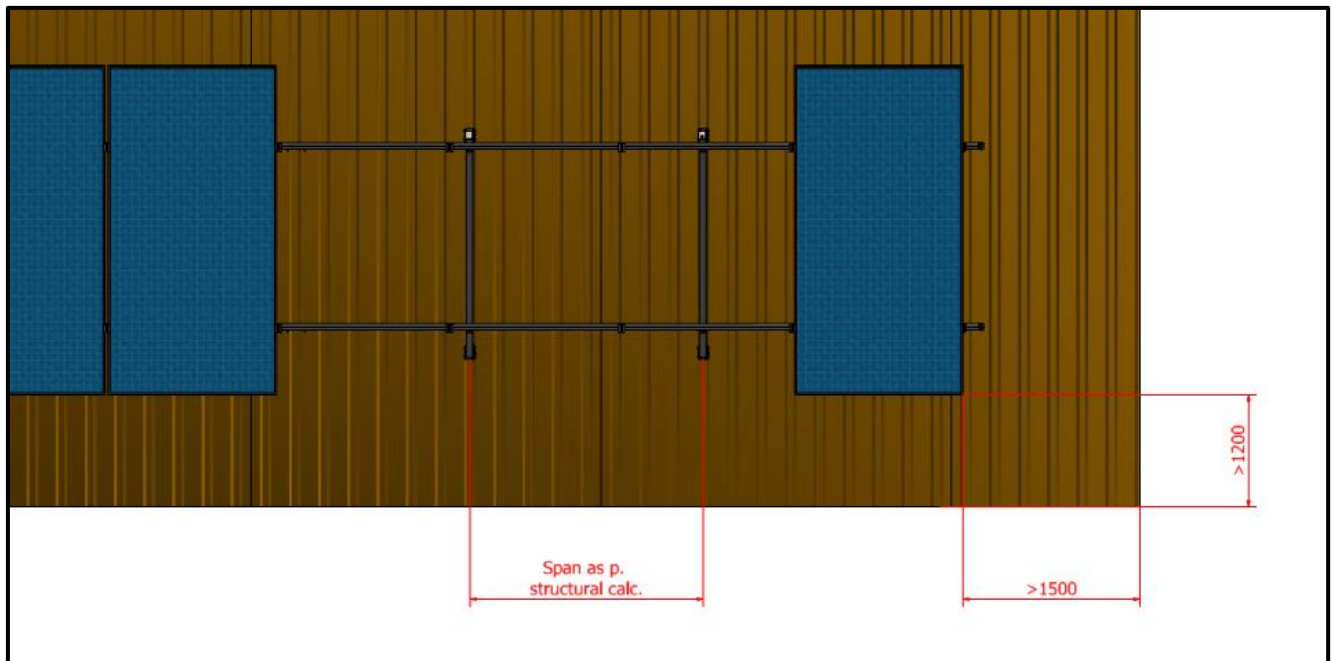
② Layout positioning

The structural stability of the PV system must be verified before installation. In addition, the building must be able to support the additional weight safely.

The bracket span varies per selected PV module and site conditions. The distance must be determined by structural analysis.

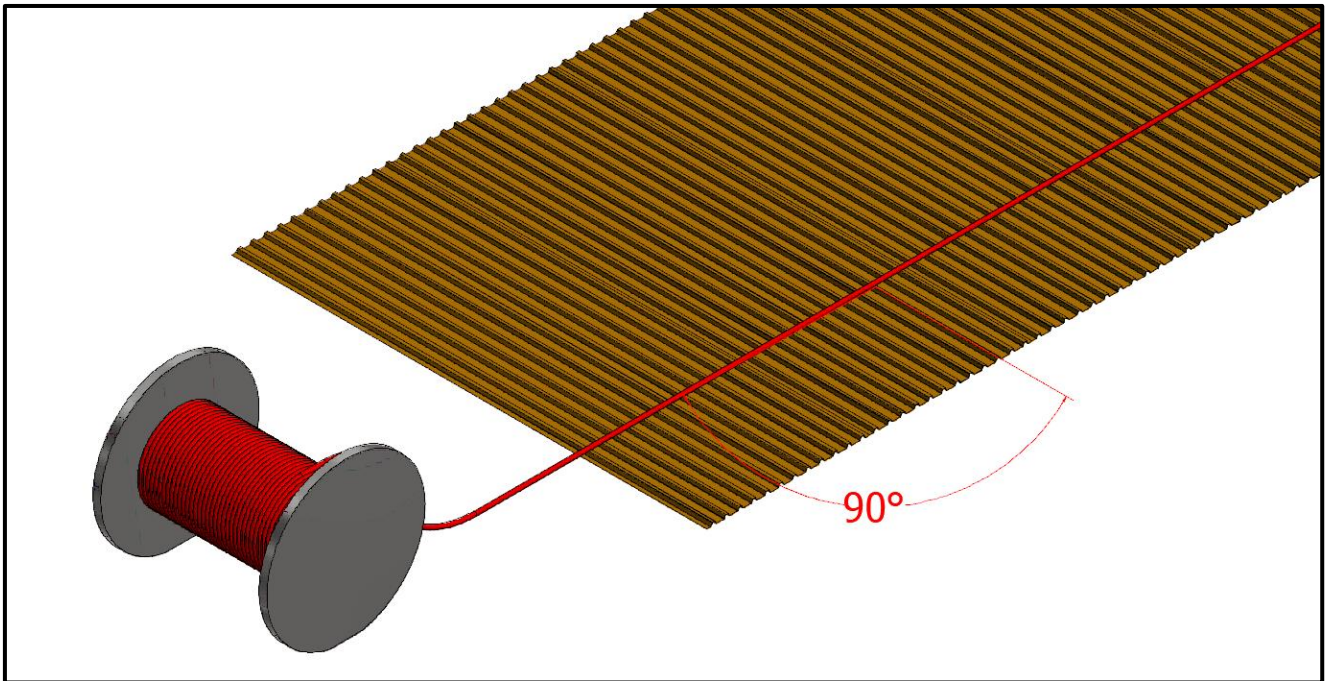
The corner and edge areas of roofs are subject to air turbulence. Therefore, 1.2 m (or Building height / 5) from the longitudinal side of the building and 1.5 m (or Building height / 4) from the narrow side of the building must therefore be kept clear.

A minimum distance of 20 mm must be kept between PV modules. Mid Clamps can be used as spacing to maintain this distance.



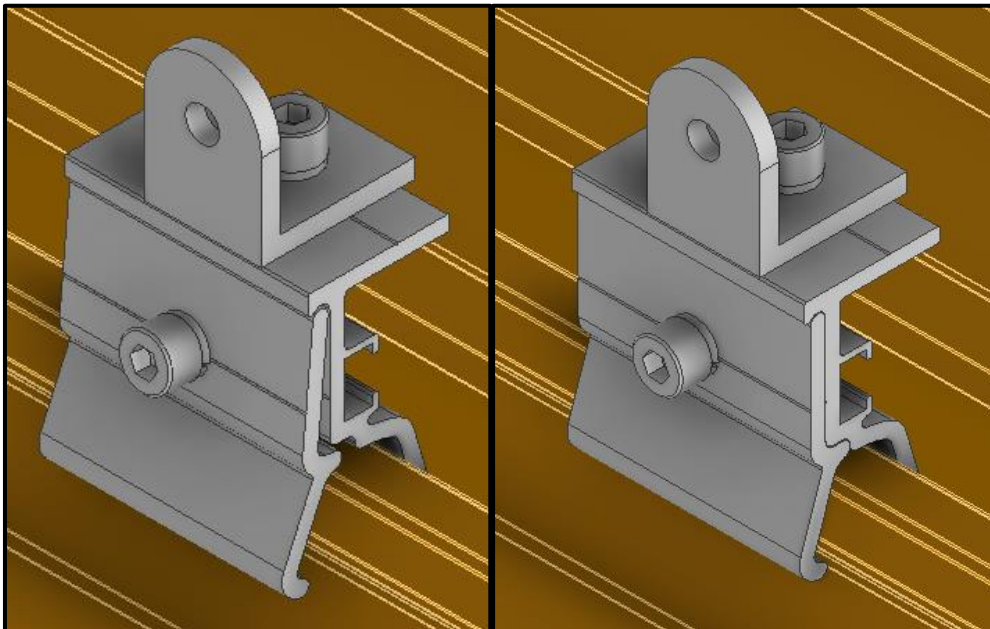
③ Roof brackets

Mark out the positions of roof brackets. Brackets must be in a straight line and 90° to the roof ribs.



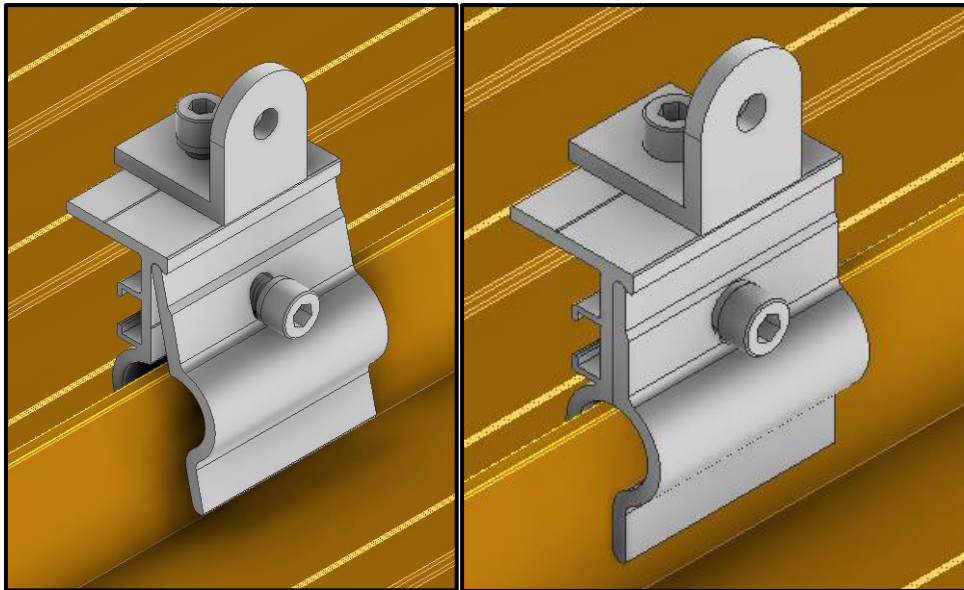
Fix Lok and Spring Lok:

Connect brackets to the roof ribs by torquing the M8 bolts of the Fix Lok/Spring Lok Bracket at 18 N.m.



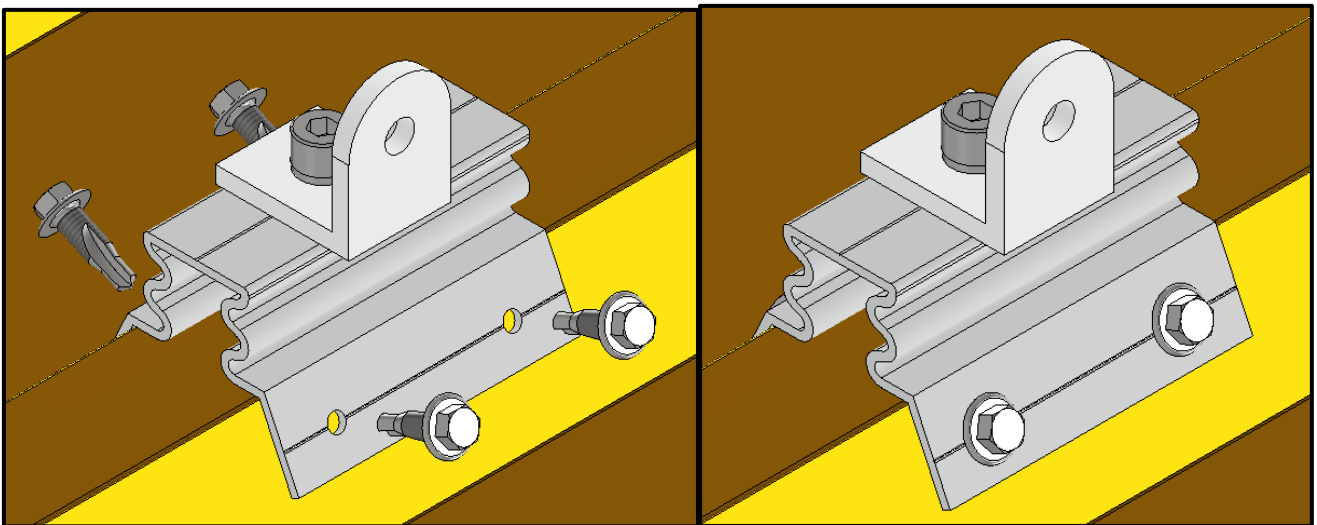
Standing Rib:

Connect brackets to the roof ribs by torquing the M8 bolts of the Standing Rib Bracket at 18 N.m.



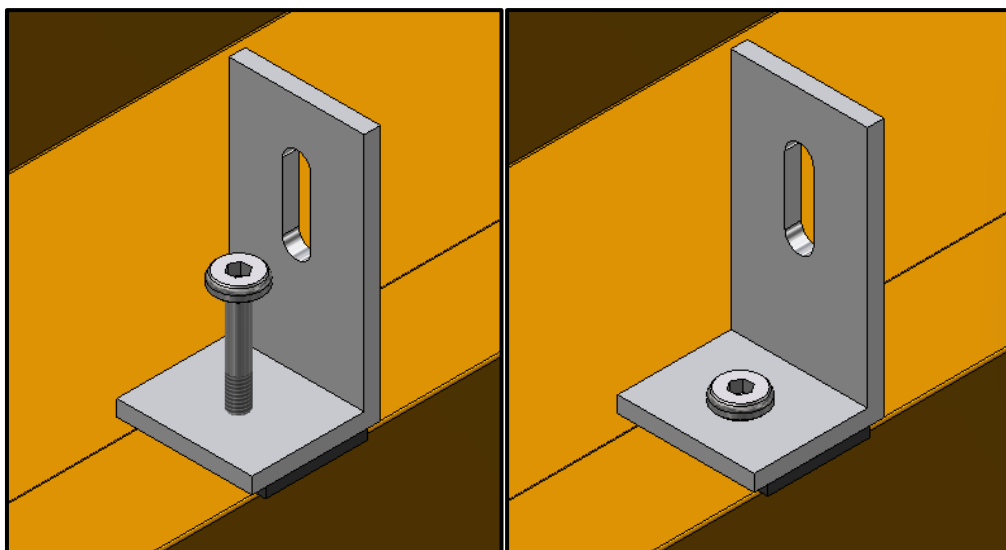
IBR:

Connect brackets to the roof ribs by penetrating the roof sheets with the M6.3 screws of the IBR Bracket.



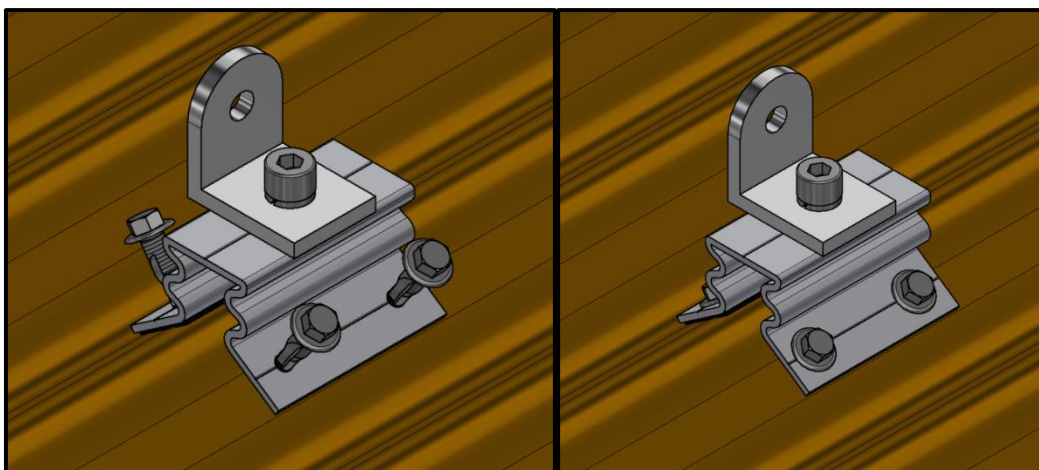
L-Bracket Rib:

Connect brackets to the roof ribs by penetrating the roof sheets with M6.3 screws of the L-Bracket Rib.



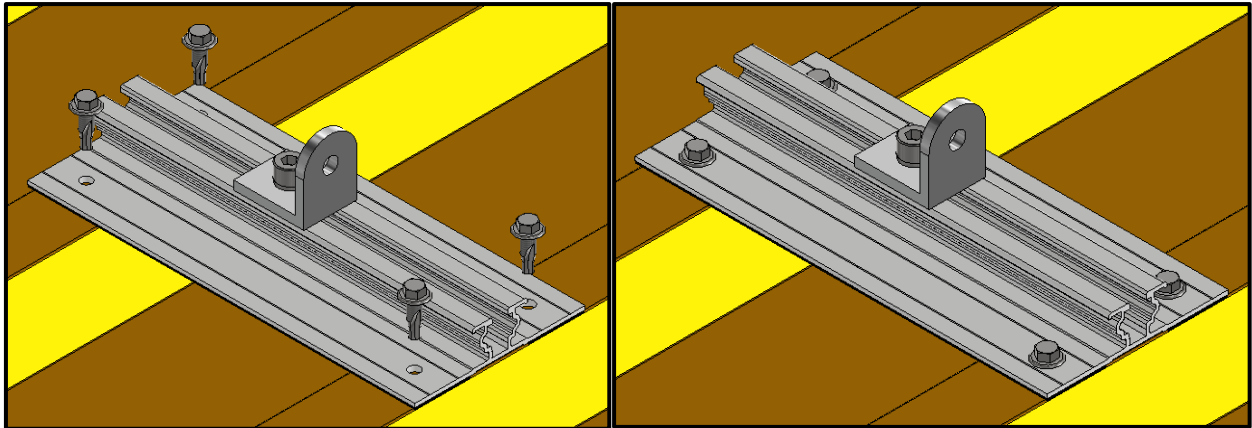
Corrugated:

Connect brackets to the roof ribs by penetrating the roof sheets with M6.3 screws of the Corrugated Bracket.



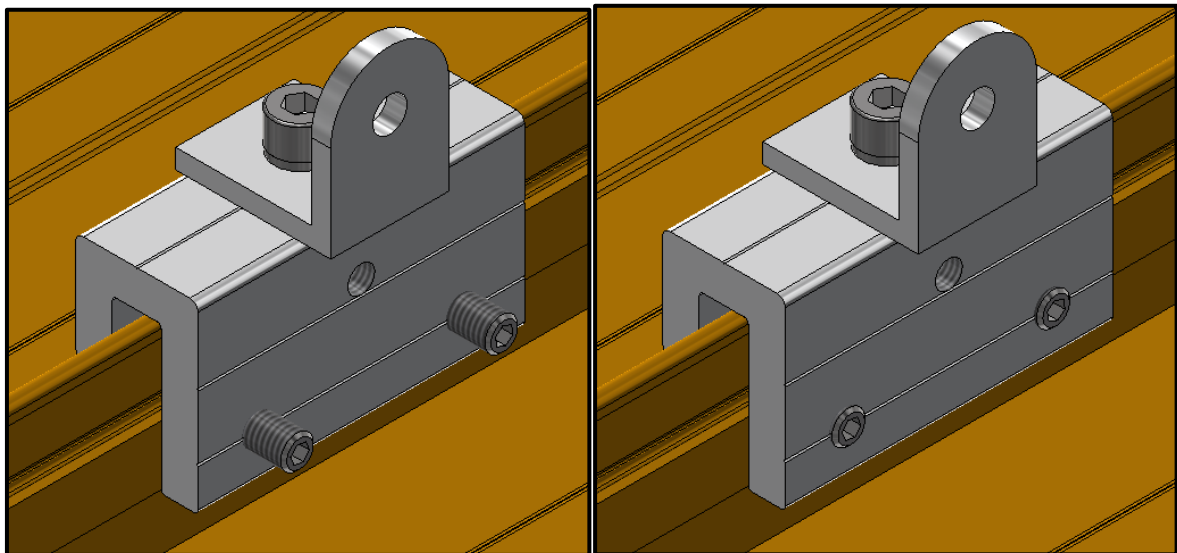
Rib Surface:

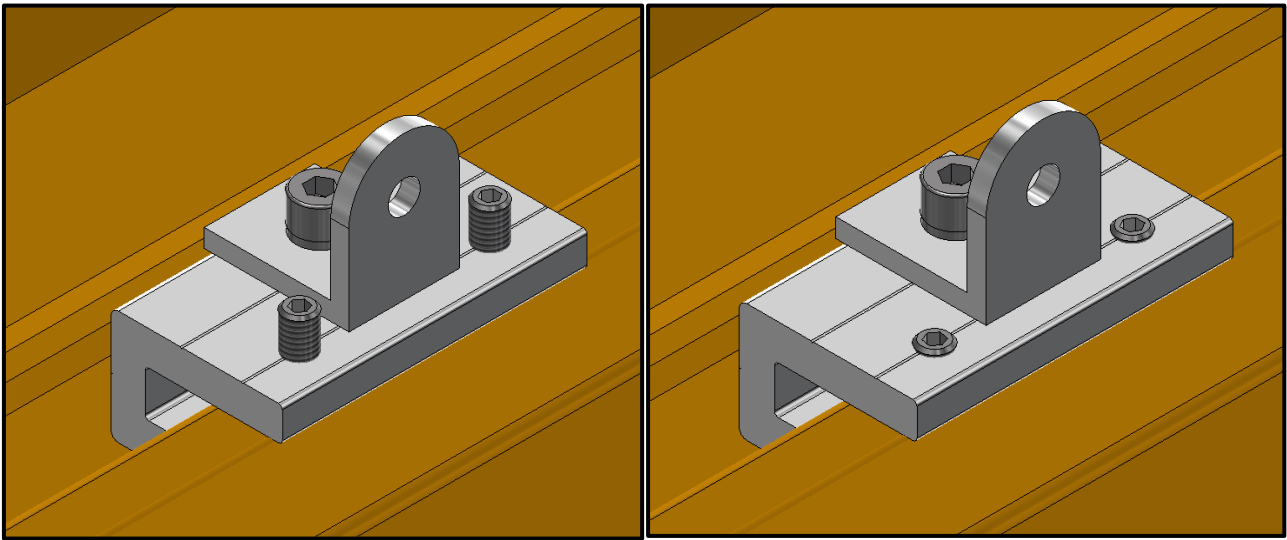
Connect brackets to the roof ribs by penetrating the roof sheets with M6.3 screws of the Rib Surface Bracket.



Pinch Fix:

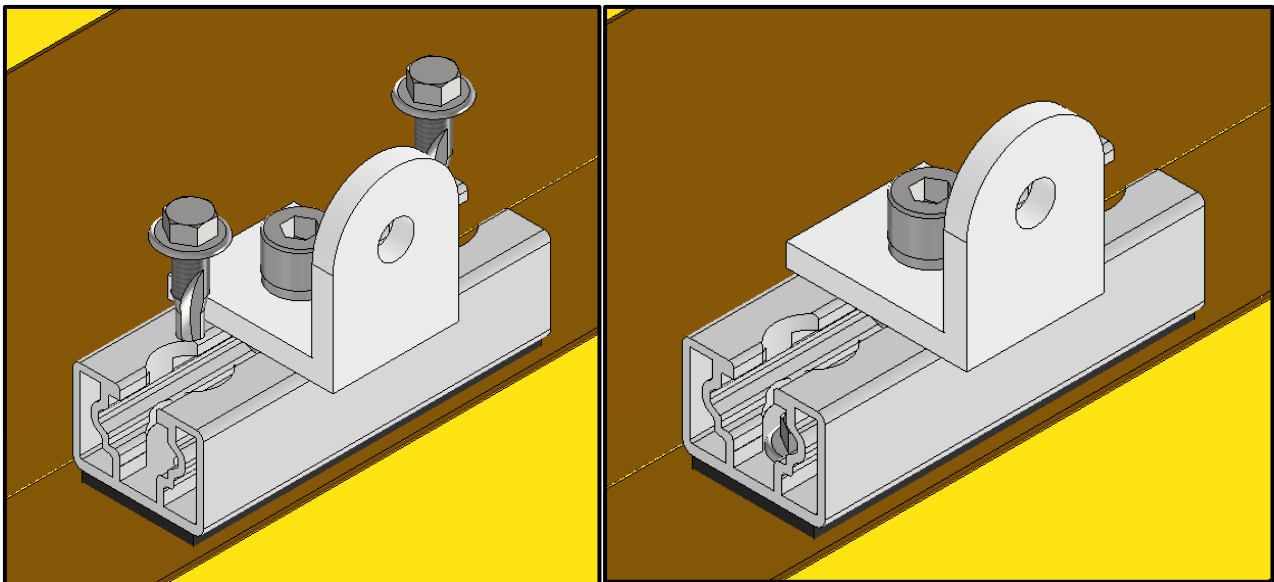
Connect brackets to the roof ribs by torquing the M8 Set Screws of the Pinch Fix Bracket at 18 N.m.





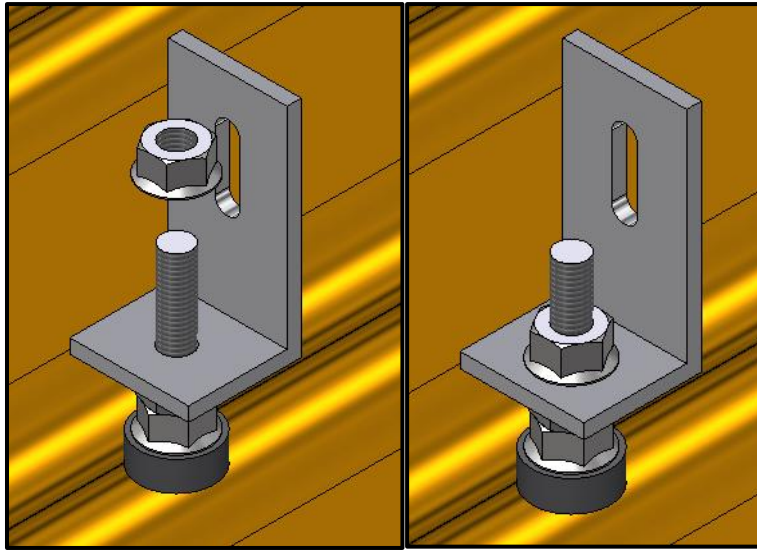
Ridge Fix:

Connect brackets to the roof ribs by penetrating the roof sheets with M6.3 Self-Drilling Tek screws of the Ridge Fix Bracket.



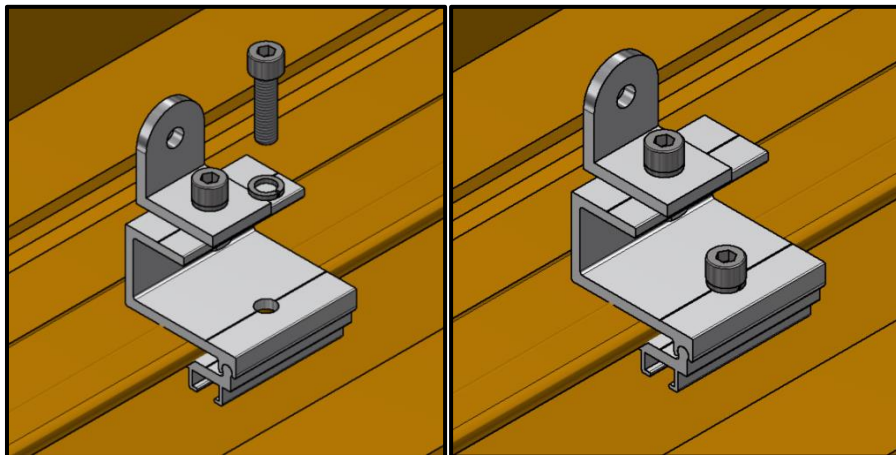
Hanger Bolt:

Connect Hanger Bolts to the substructure of the roof. The brackets connect to the Hanger Bolt by fastening the M8 Hex Flange Nut to 18 N.m.



Craft Lok:

Connect brackets to the roof ribs by torquing the M8 bolts of the Craft Lok Bracket at 18 N.m.



④ Mounting Frame

According to the framing plan, each raised frame requires at least 2x support Brackets fixed to the roof. The bracket spacing/pitch (distance from front bracket to back brackets) is dependent on the raised frame in use. These distances are in the table below.

The size of the PV panel you plan to mount would determine if you would need a Short or Long Raised frame. The Long Raised Frame Railed would be used for longer panels (>2200mm), allowing clamping close to L/4.

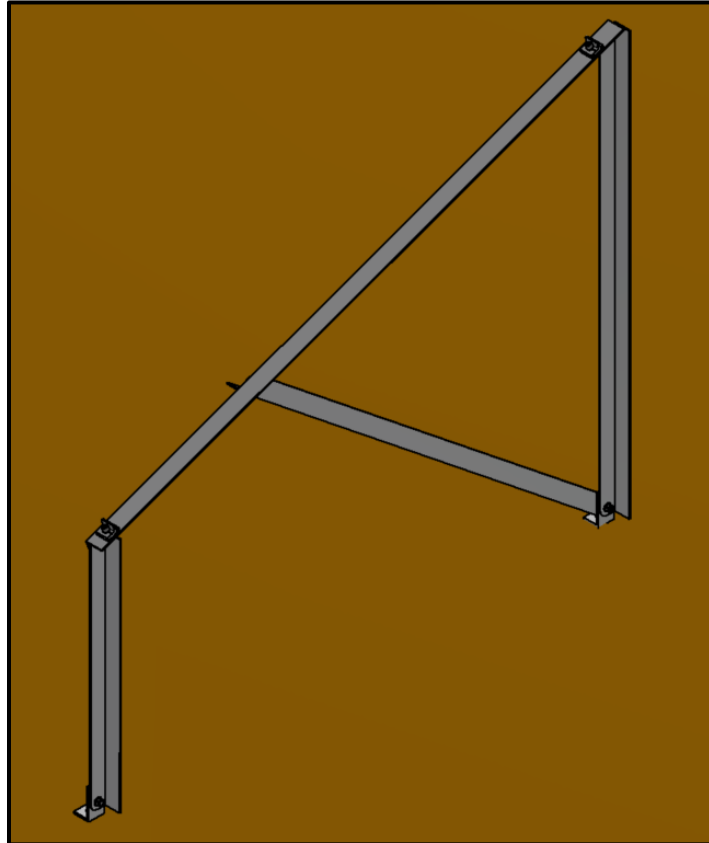
Part Code	Part Name	Bracket Pitch
AXE_AL_RSD_RD_S_10	Raised Frame, Aluminium, Railed, Short, 10deg	1178
AXE_AL_RSD_RD_S_15	Raised Frame, Aluminium, Railed, Short, 15deg	1155
AXE_AL_RSD_RD_S_20	Raised Frame, Aluminium, Railed, Short, 20deg	1124
AXE_AL_RSD_RD_S_25	Raised Frame, Aluminium, Railed, Short, 25deg	1084
AXE_AL_RSD_RD_L_10	Raised Frame, Aluminium, Railed, Long, 10deg	1370
AXE_AL_RSD_RD_L_15	Raised Frame, Aluminium, Railed, Long, 15deg	1344
AXE_AL_RSD_RD_L_20	Raised Frame, Aluminium, Railed, Long, 20deg	1307
AXE_AL_RSD_RD_L_25	Raised Frame, Aluminium, Railed, Long, 25deg	1261



⑤ Raised Frame

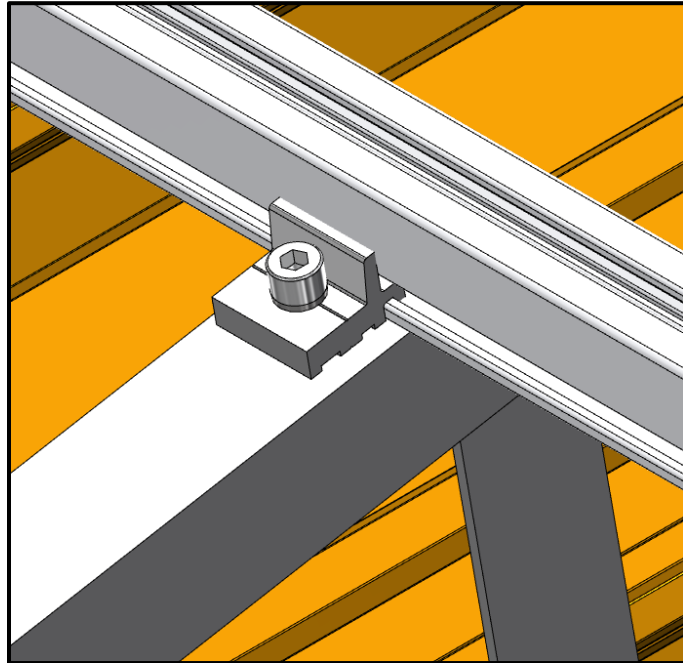
Connect Raised Frame to the L-Bracket on the brackets with M8x25 Hex-Cap Screws, Spring Washer and M8 Hex Flange Nuts to tighten the connection at 18 N.m.

In the case of using the L-Bracket Rib or Hanger Bolt Vertical, ensure that the M8 Hex Flange Nut connects on the L-Bracket side, along with the slot. Lift the Raised Frame so that the bolt and nut connection sit at the top or high up the slot on the L-Bracket.



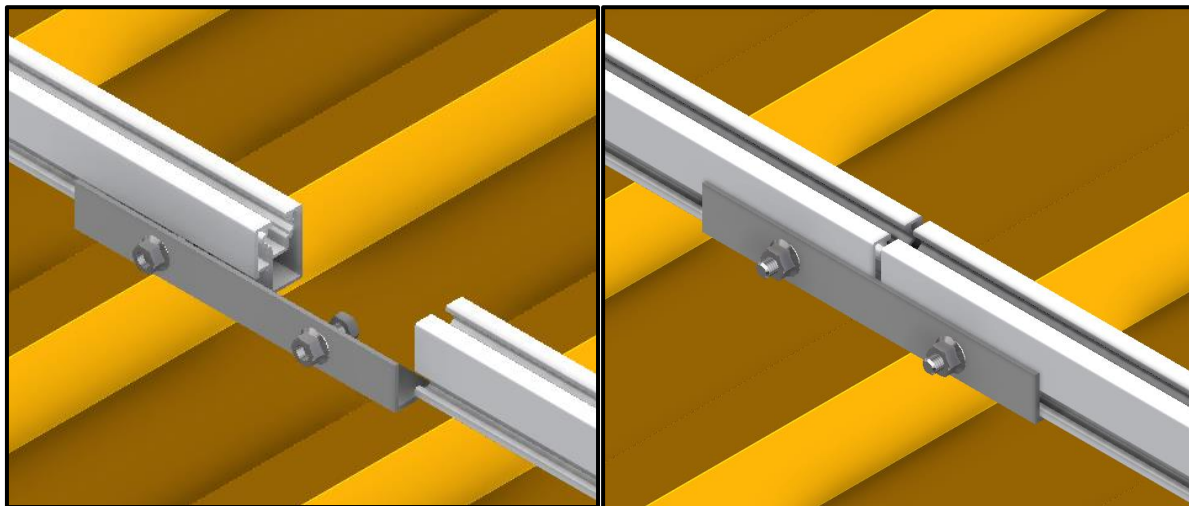
⑥ Mounting Rails

Position Rails on top of Raised Frame. The rails should rest on the rail clip and not hang from it. Connect Rail Clips to rail and line up with slots on Raised Frame. Use M8x25 Hex-Cap Screws, Spring Washer and M8 Hex-flange Nuts to tighten connection at 18 N.m.



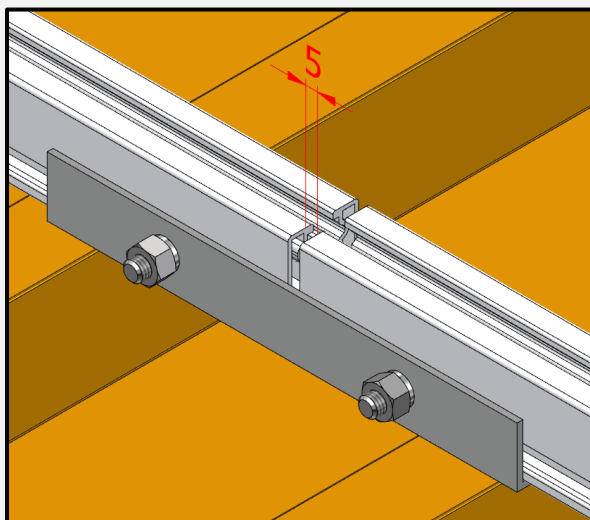
⑦ Joining Rails

Slide the 2x M8x20 Hexagon Bolt into each Rail length. Ensure that the Rail Splice's centre is at the gap between adjoining rails. Once the two rails are in place, Tighten the M8 Hex Flange Nuts to 18 N.m.



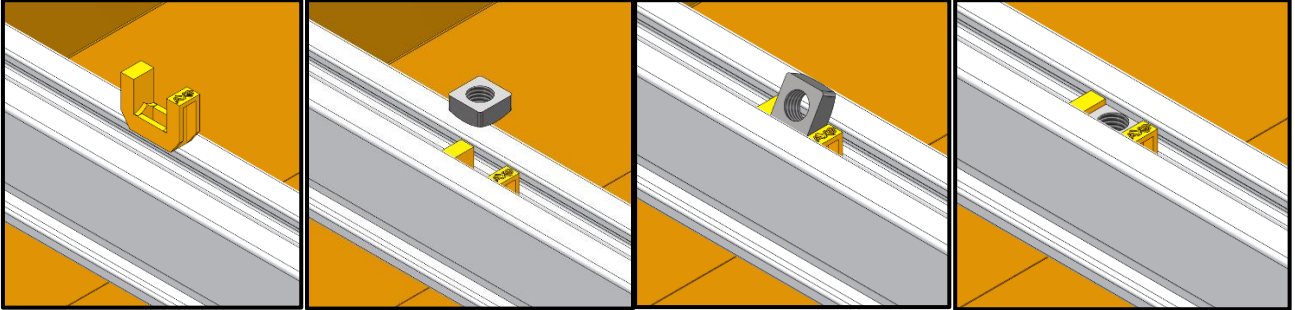
Thermal Gap

If the total rail connection is 20m or longer, a 5mm thermal gap between Rails should be maintained at one of these connections.

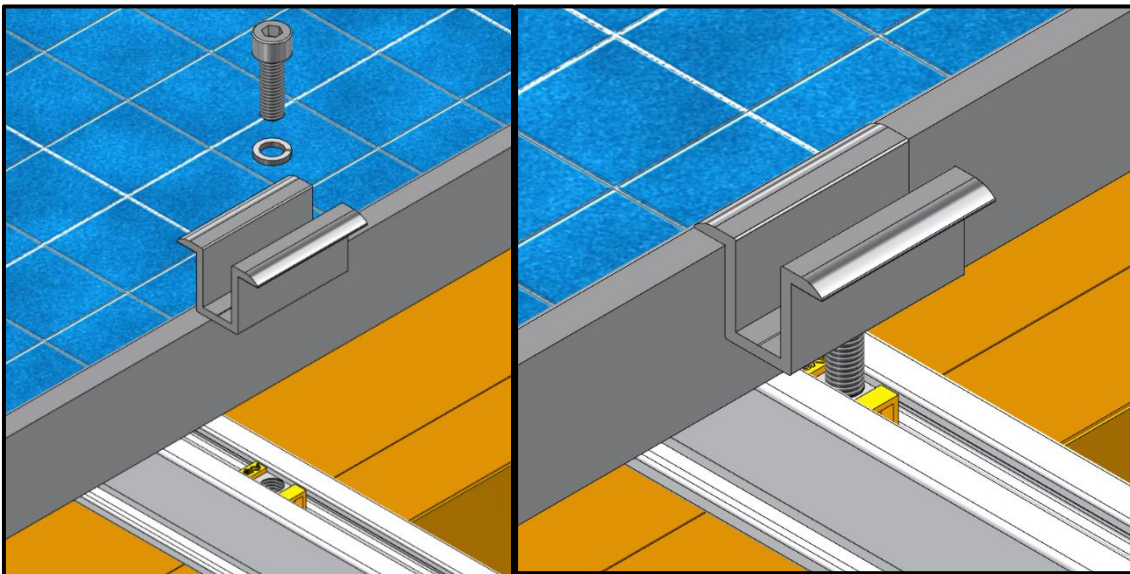


⑧ PV module installation

Insert Nut Stoppers into the Rail gap where the installation of PV module Clamps will be. Position a M8 Square Nut in each Nut Stopper. Slide the M8 Square Nut at an angle into the Rail cavity so that it falls vertically with the flat side facing upwards. The nut will rotate itself once it goes into the rail.

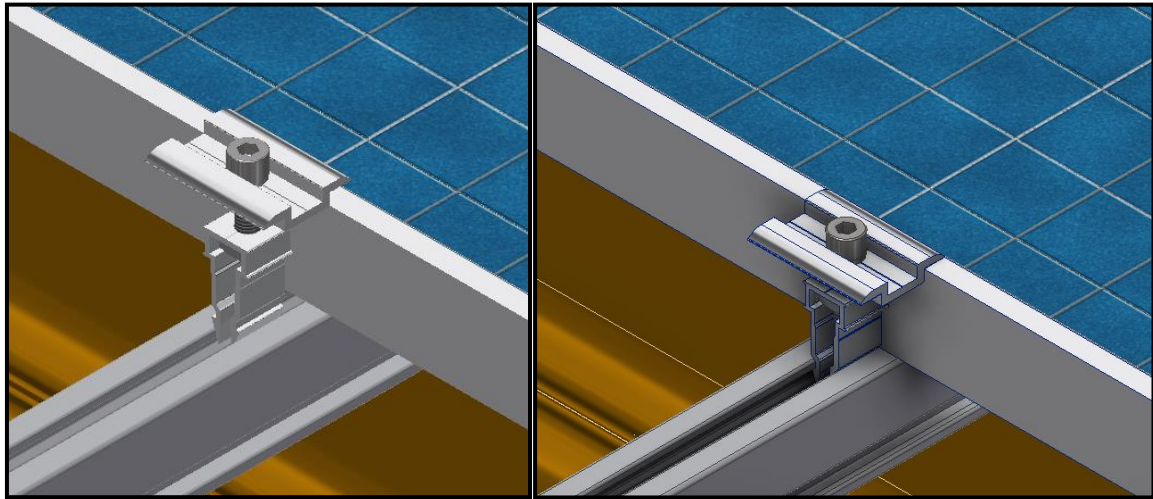


PV modules are laid onto Rails in portrait view so that 2 x Rail lengths support each PV module. Install PV module Clamps on the long sides of the PV module so that each PV module is fixed on 4x locations. 2x clamps per opposing long side will hold each PV module down to the Rails. Torque M8 Hex-Cap Screws at 18 N.m.

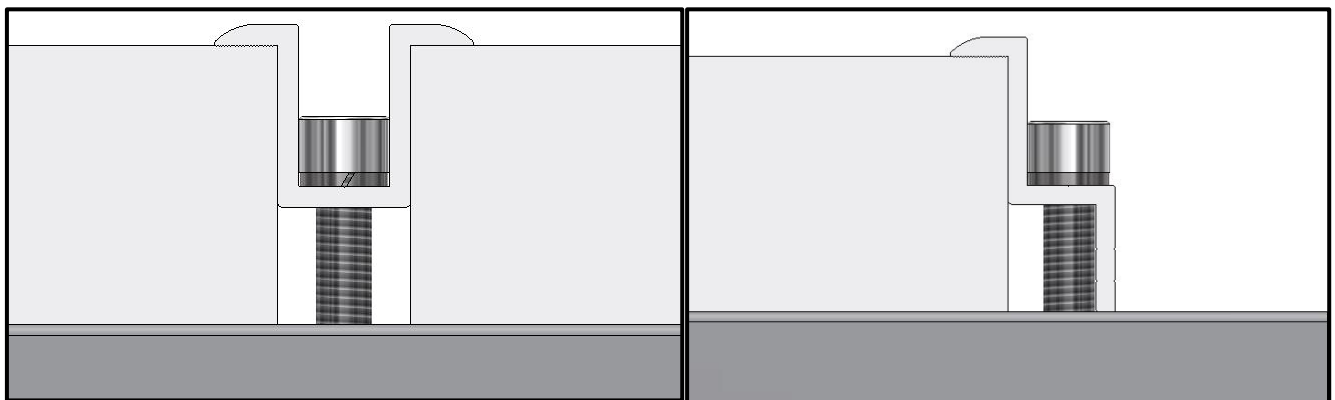


Click Fix

With the **M8 Hex Cap Screw** protruding, Insert the **Mid Clamp Click Fix** between panels by simply pushing the pegs into the slot in the rail. With the **Click Fix Clamp** firmly in the rail, position the panels flush with the clamp and torque the **M8 Hex Screw** to **18N.m**. Do not repeatedly insert and remove the **Click Fix Parts**.



Mid Clamps are used in between 2x PV modules, and End Clamps are used at the end of a row of PV Modules. Make sure to mount Clamps flush against the PV module sides.



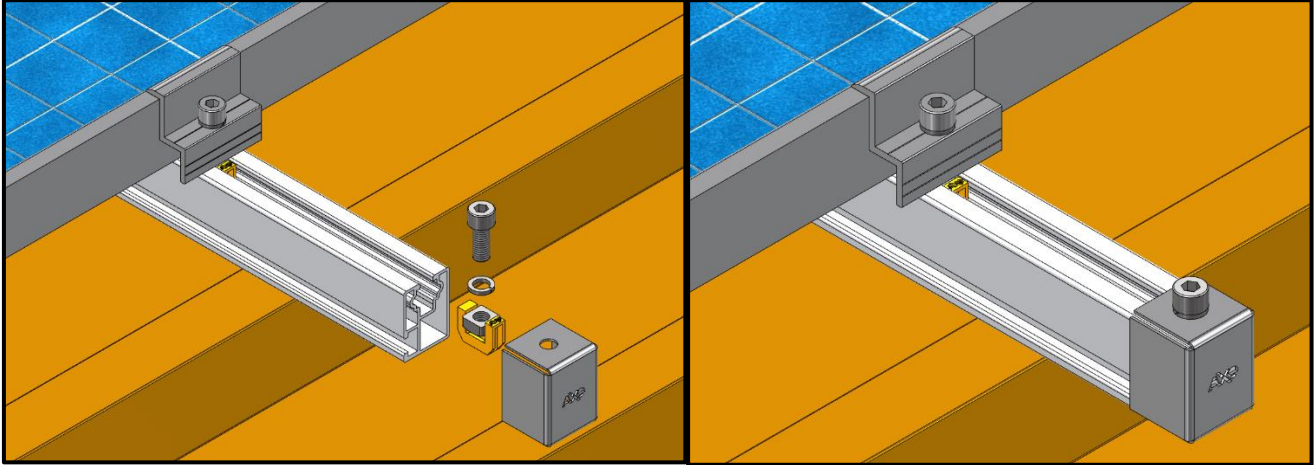
End Clamps and Fasteners

It is of utmost importance to ensure that the correct End Clamps and Fasteners are supplied according to the PV Module height.

Module height (mm)	End Clamps	Fasteners (Mid & End Clamps)
30	AXE_AL_CE_AP_30	M8x25 Hex Cap Screws
35	AXE_AL_CE_AP_35	M8x30 Hex Cap Screws
40	AXE_AL_CE_AP_40	M8x35 Hex Cap Screws

⑨ End Caps

Slide End Caps over the end of Rails for neat aesthetics. Position the Nut Stopper and Square Nut configuration close to the end of a Rail. Slide End Cap over and tighten with M8x20 Hex Cap Screw and Spring Washer.



⑩ Maintenance

The products are to be inspected annually in the form of a visual inspection of the whole installation. Axe Struct must be notified of any first appearances of rust and abnormal deformations.

Annual spot checks are to be done on fasteners to ensure that the minimum required torque moment specified in this Manual is met.

Cleaning of the product must be done with water with a pH between 6 and 10 and without chemicals.

⑪ Liability

Axe Struct can accept no liability for damage arising due to improper use, installation, operation or maintenance. Liability is further excluded if Axe Struct is not at fault due to gross negligence or intent.

The text and images in this Installation Manual correspond to the state of the art upon printing. Subject to change.