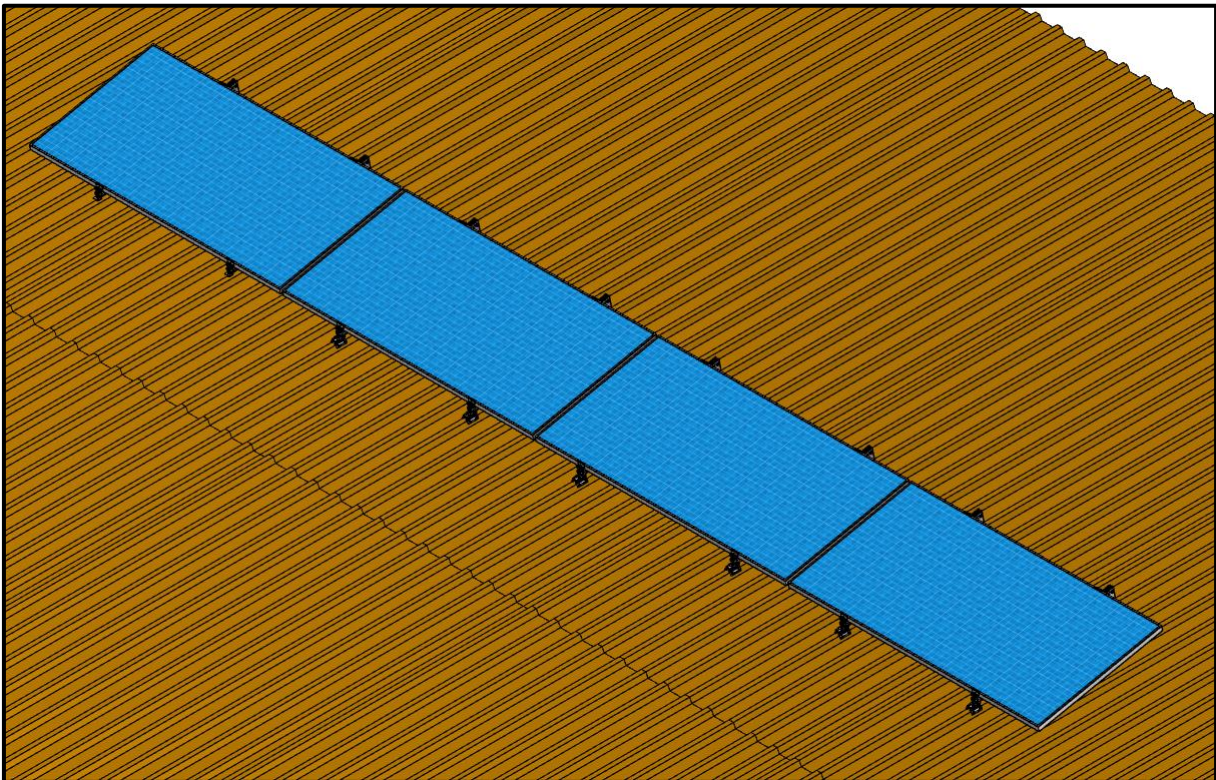


Installation Manual

IM_AXE_RT_ANG_RL

Railless Angled Roof Mounting System

For framed PV modules in landscape orientation



Declaration

- Only the highest quality components are used in the mounting system in order to ensure a trouble-free operation of your solar power system. The following information explains the proper setup of the Axestruct 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 taken into account when planning the layout.
- Always fasten the bolted connection by turning the bolt head. Do not turn the nut, just hold it.

Contents

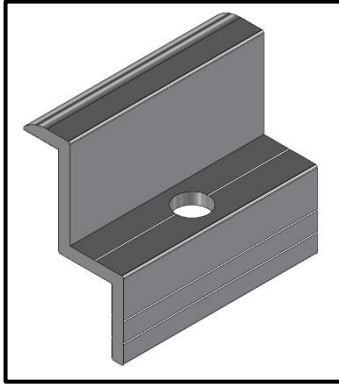
① Components	3
② Layout positioning	7
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④ Mounting Frame.....	14
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⑥ PV module installation	16
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① Components

End Clamp

AXE_AL_CE_AP

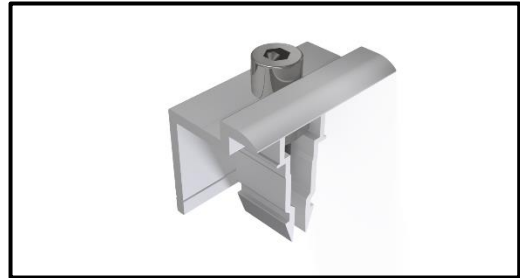
For PV modules with 30mm, 35mm and 40mm frame heights



End Clamp, Click Fix

AXE_AL_CE_CF

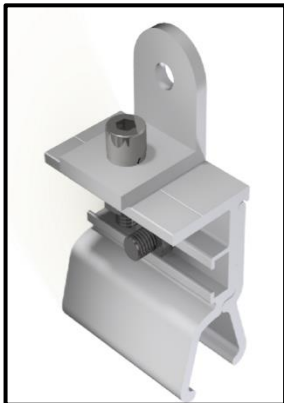
For PV modules with 30mm and 35mm frame heights



Fix Lok Bracket

AXE_AL_BR_FL_V

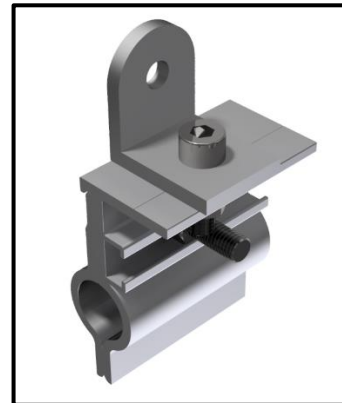
Non-penetrating connection to Klip-Lok, ProLok and Saflok roof sheets



Standing Rib Bracket

AXE_AL_BR_SR_V

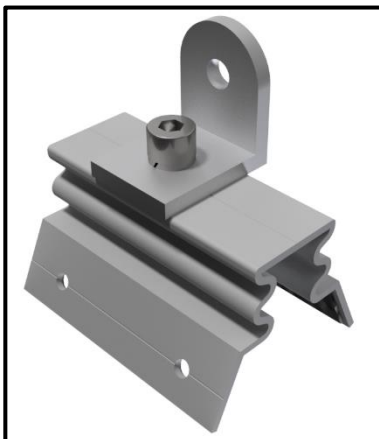
Non-penetrating connection to Zip-Tek, Brownbuilt and Dimondek roof sheets



IBR Bracket

AXE_AL_BR_IBR_V

Penetrating screw connection to IBR roof sheets



IBR Bracket

AXE_AL_BR_L_R

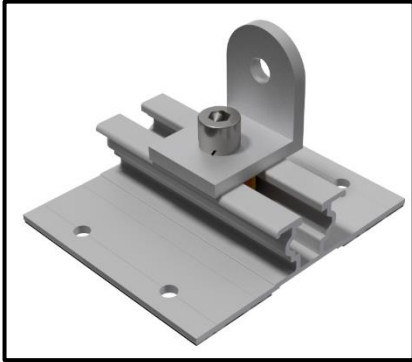
Penetrating screw connection to IBR roof sheets



Corrugated Bracket

AXE_AL_BR_COR_V

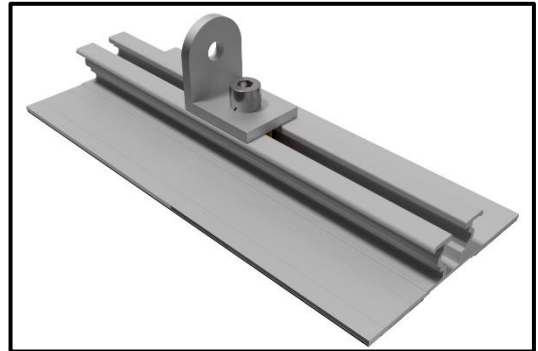
Penetrating screw connection to Corrugated roof sheets



Rib Surface Bracket

AXE_AL_BR_RS_V

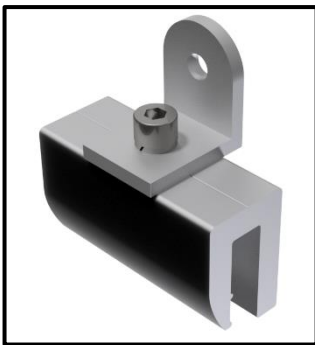
Penetrating screw connection to IBR or Corrugated roof sheets



Pinch Fix Bracket

AXE_AL_BR_PF_V

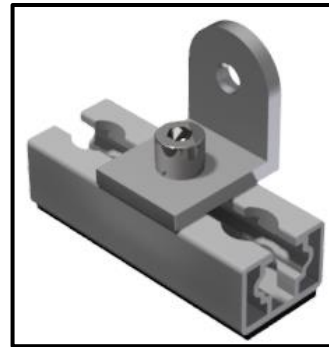
Non-penetrating connection to Craft-Lock, Brownbuilt and Dimondek roof sheets



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

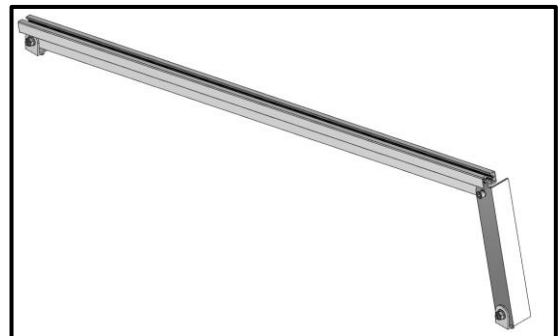
Penetrating screw connection to Asbestos and other roof sheets



Rafter Profile

AXE_AL_L_RF_21_30

Connecting frame to roof brackets



Spring Lok Bracket

AXE_AL_BR_SL_V

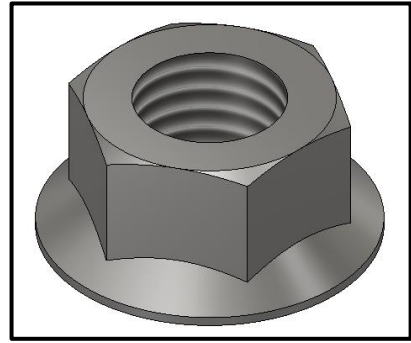
Non-penetrating connection to Springlok roof sheets



M8 Hex-flange Nut

AXE_SS_NHF_8

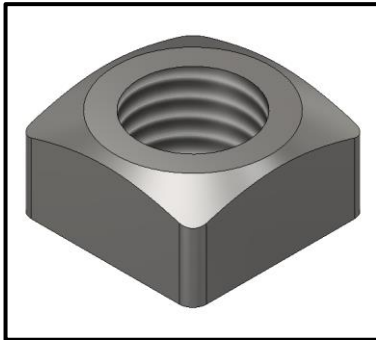
Connection to Fix Lok Bracket



M8 Square Nut

AXE_SS_NSQ_8

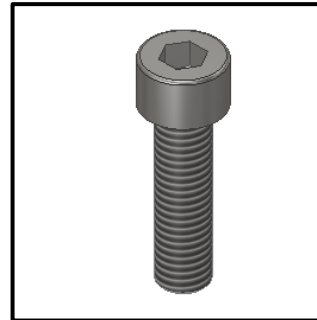
Connection to Rails



M8 Hex-cap Screw

AXE_SS_CS_8

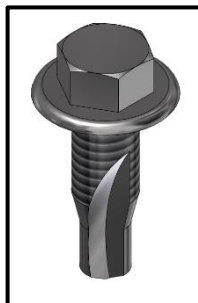
PV module, Splice or Bracket connection



Self Drilling Tek Screw

AXE_GS_ST_6.3

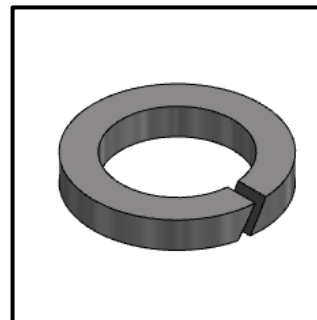
Bracket connection



M8 Spring Washer

AXE_SS_WS_8

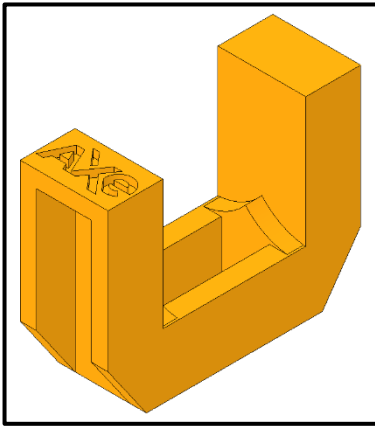
PV module, Splice or Bracket connection



Nut Stopper

AXE_PP_NST_8

Guiding M8 Square nut into position



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 promotes good practice. A further step to prevent seizing is to tighten fasteners at low rpm's, without interruptions and apply steady pressure.

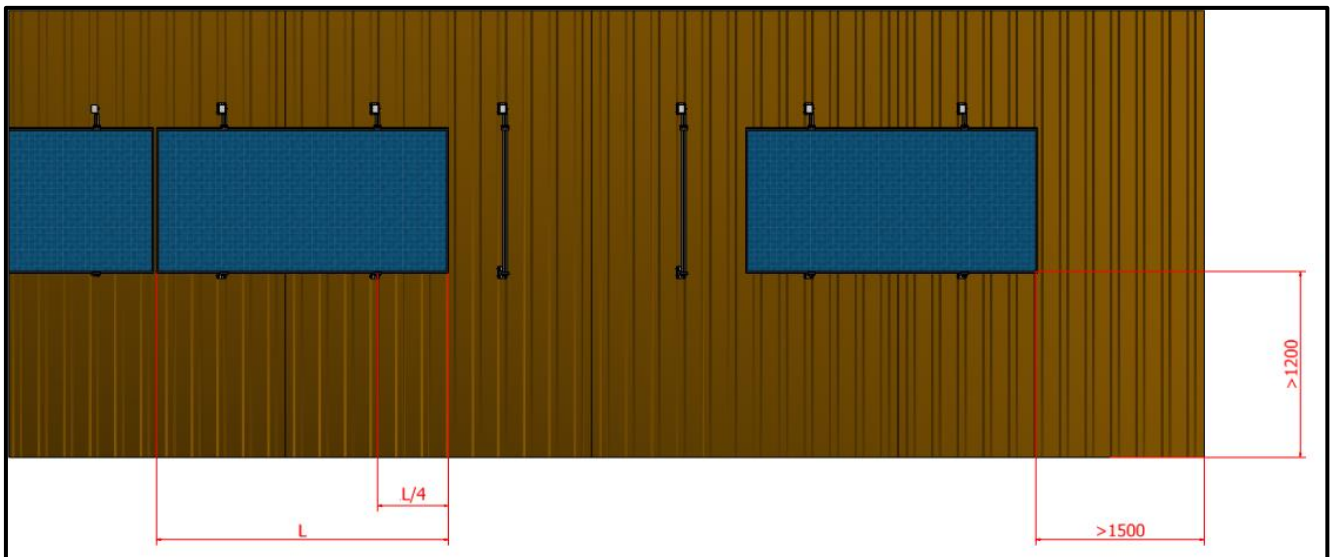
② Layout positioning

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

Bracket span varies per selected PV module and site conditions. The supporting rafters should be placed more or less a $1/4$ of the length of the selected PV module.

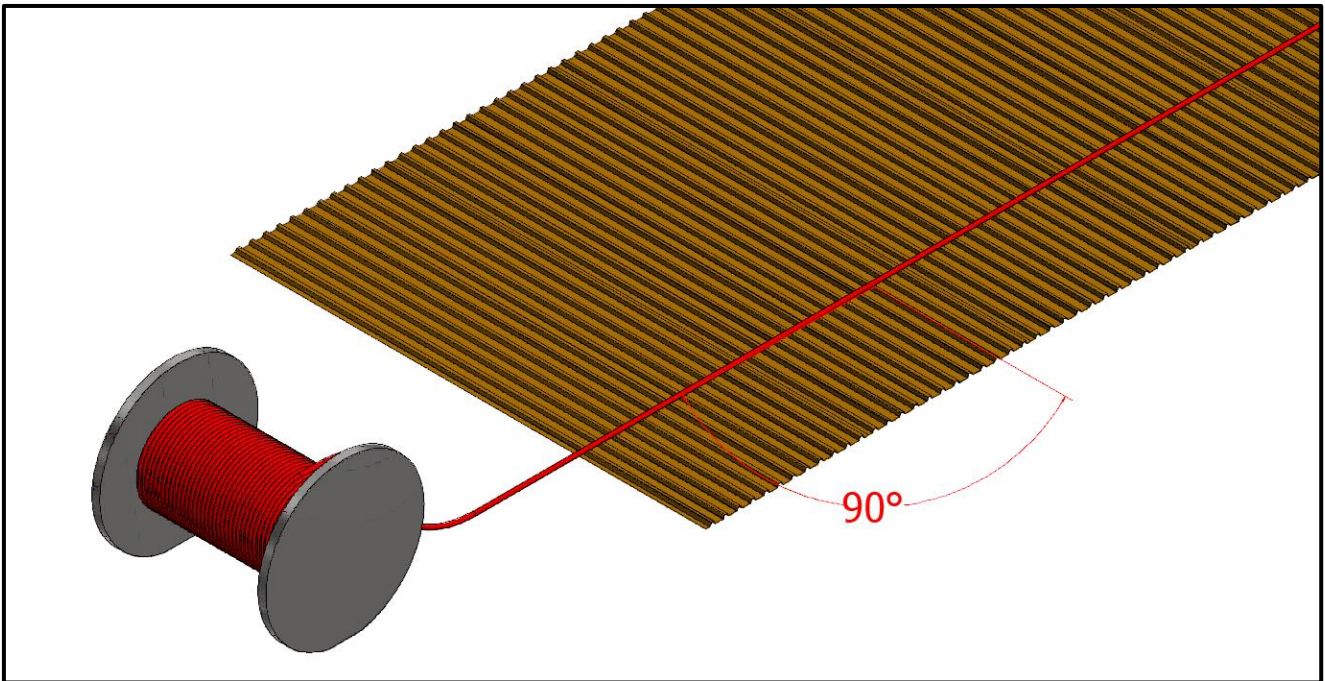
The corner and edge areas of roofs are subject to air turbulence. 1.2 m (or Building height / 5) from the longitudinal side of the building and 1.5 m (or Building height / 4) from the narrow side of the building must therefore be kept clear.

A minimum distance of 19 mm must be kept between PV modules. Mid Clamps can be used as spacing to maintain this distance.



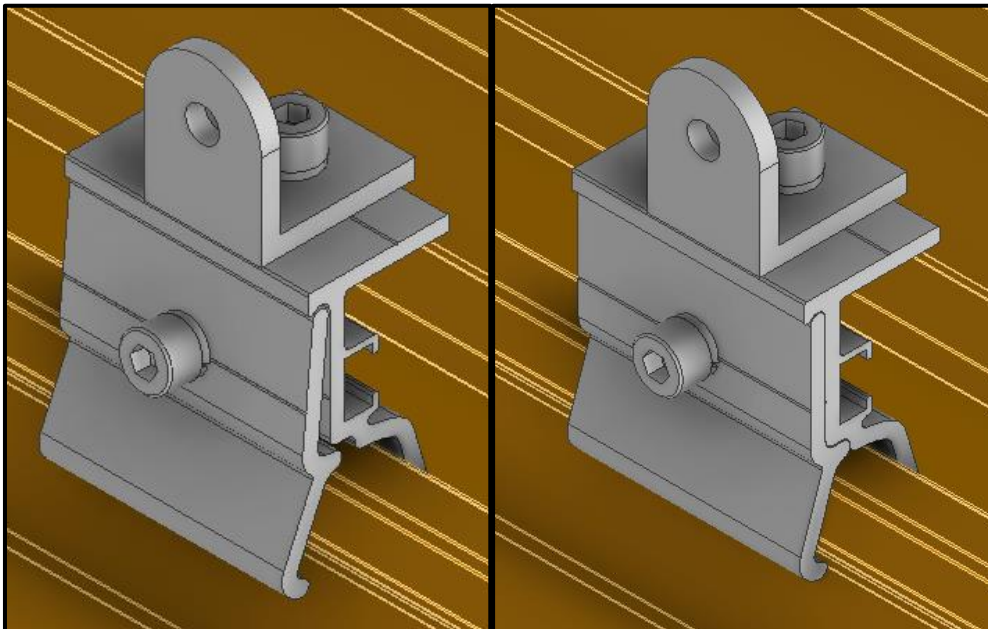
③ Roof brackets

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



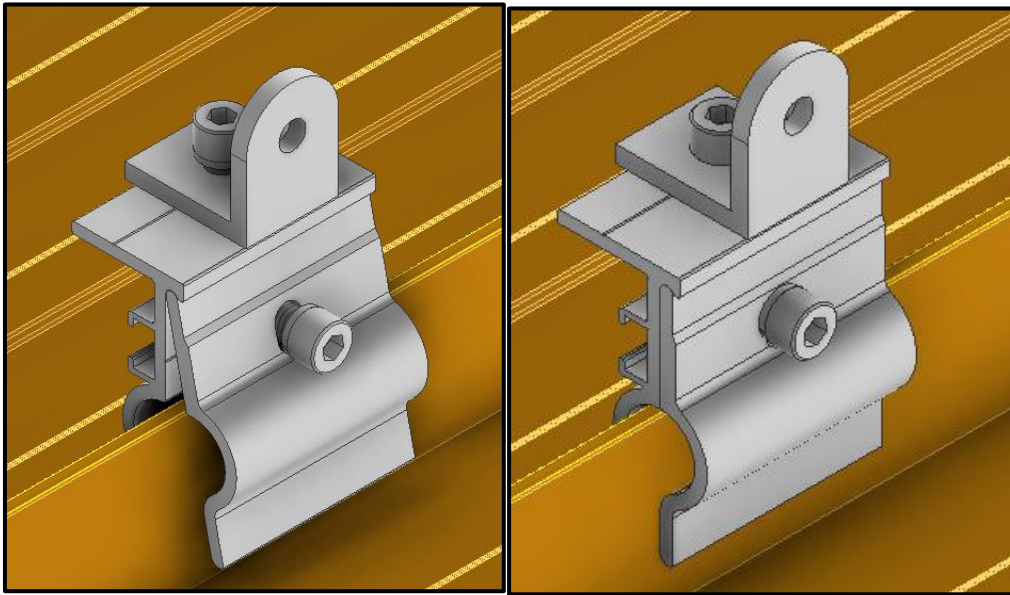
Fix Lok and Spring Lok:

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



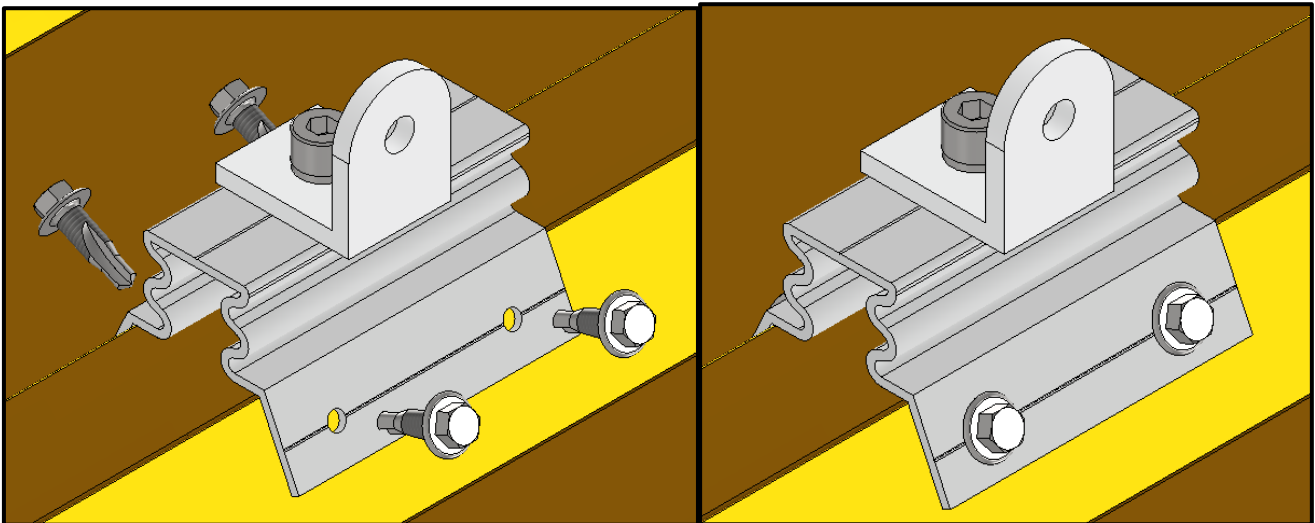
Standing Rib:

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



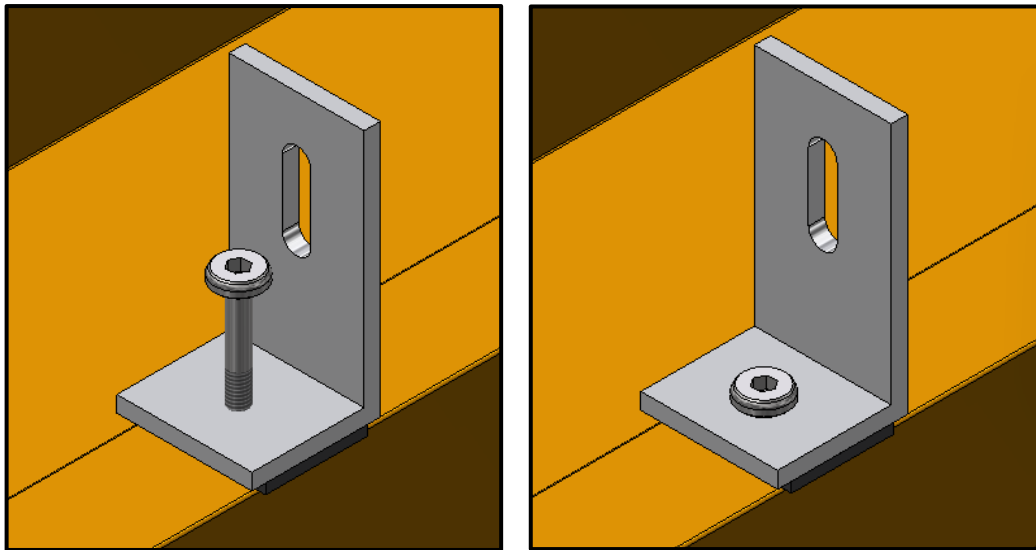
IBR:

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



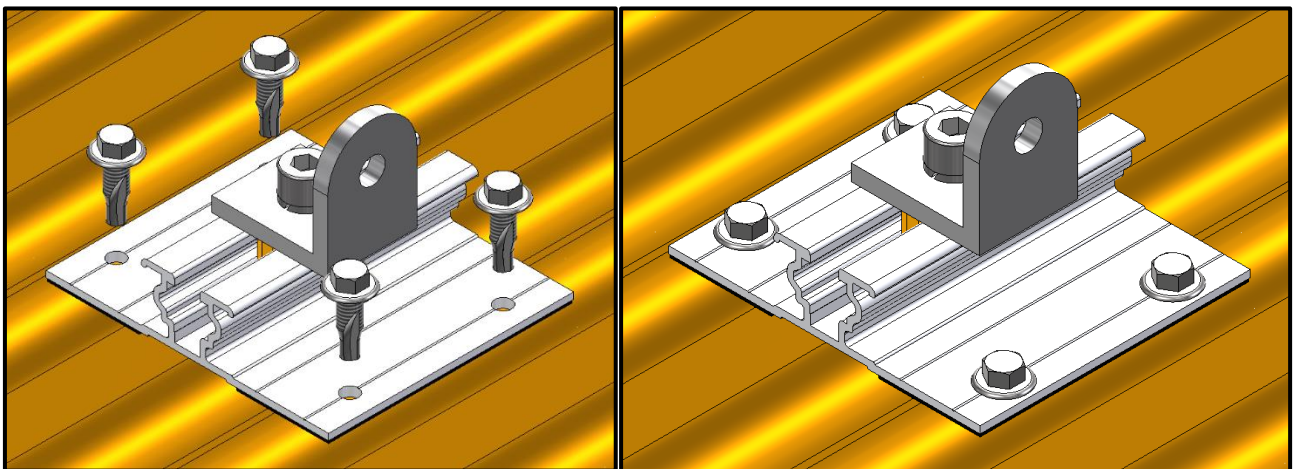
L-Bracket Rib:

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



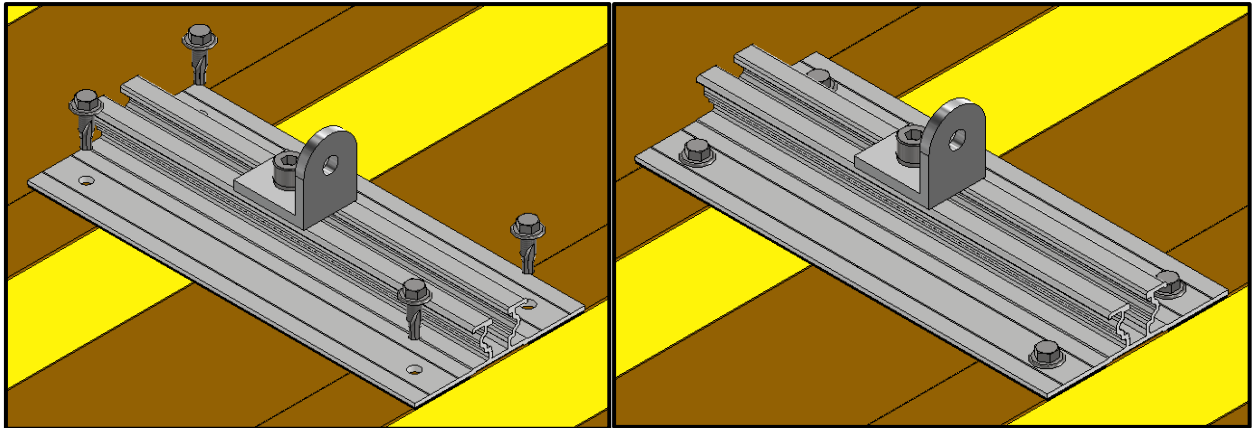
Corrugated:

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



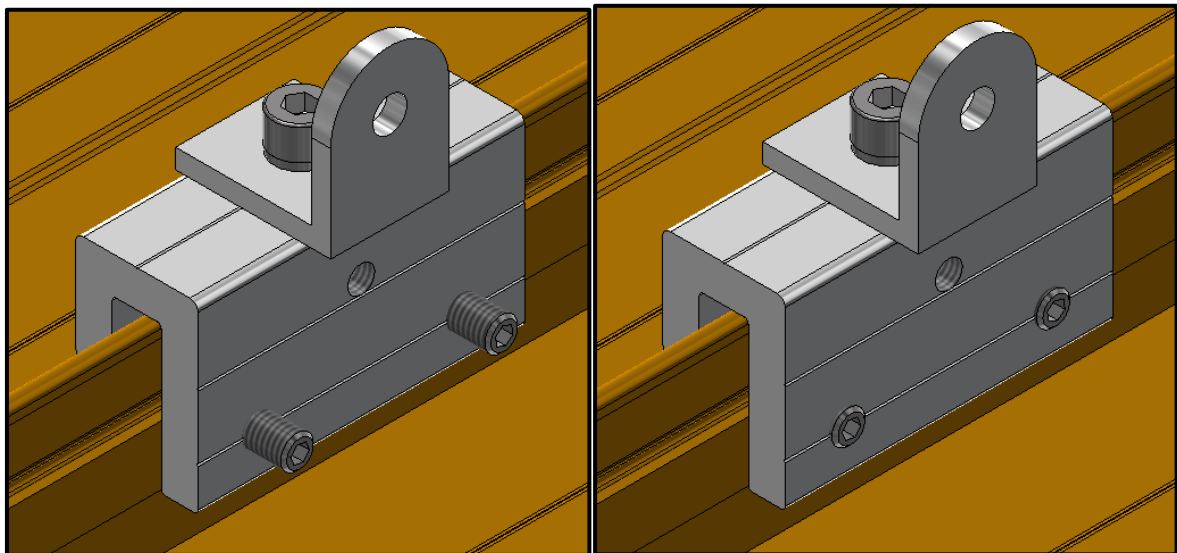
Rib Surface:

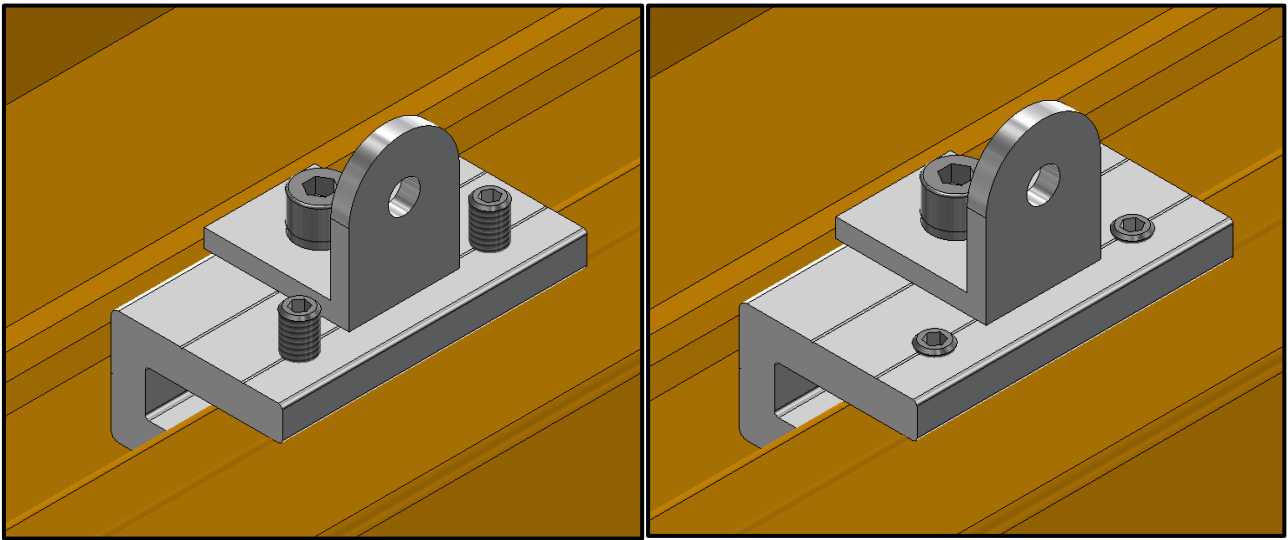
Connect brackets to the roof ribs by penetrating the roof sheets with M6.3 screws of the Rib Surface Bracket.



Pinch Fix:

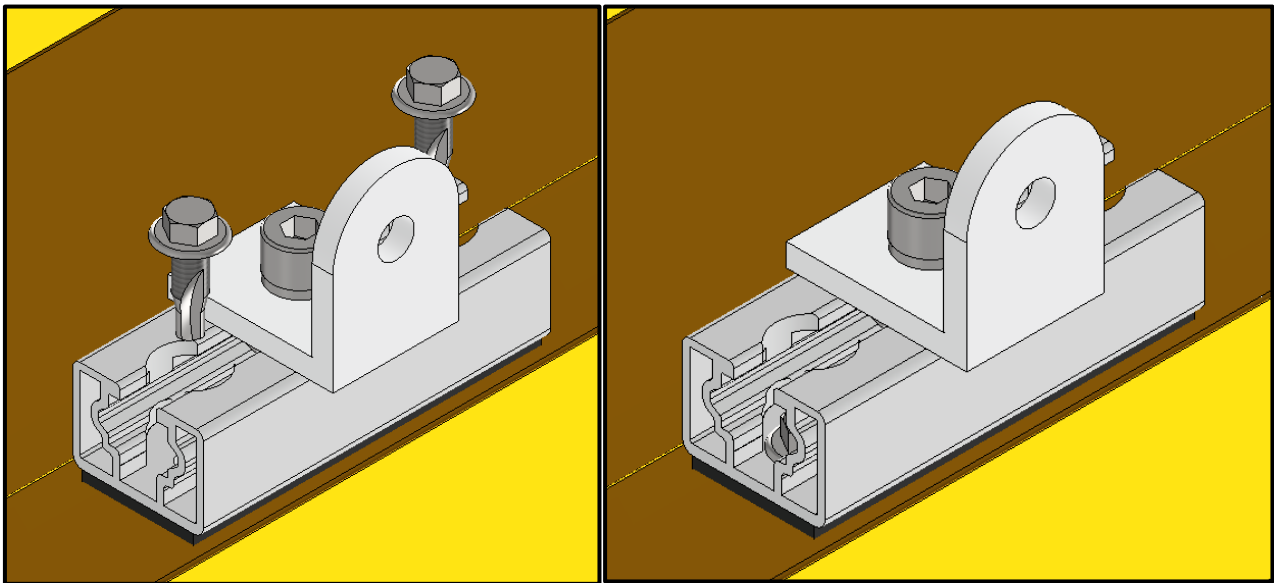
Connect brackets to the roof ribs by torquing the M8 Set Screws of the Pinch Fix Bracket at 18 N.m.





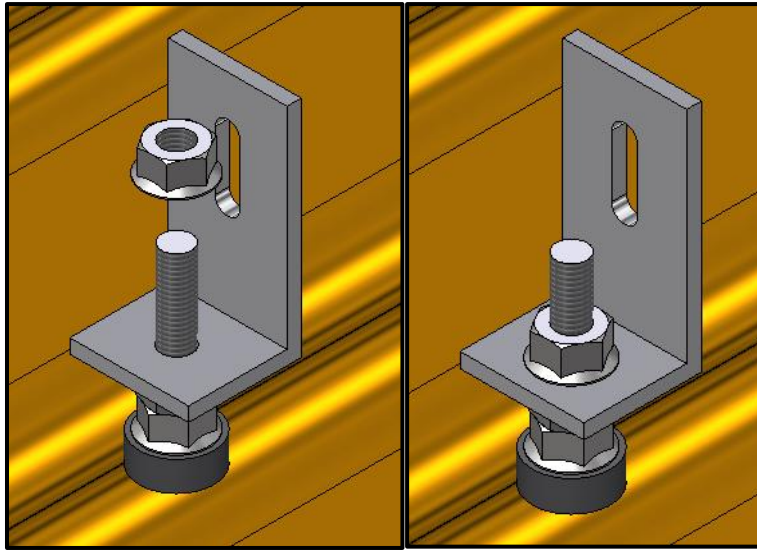
Ridge Fix:

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



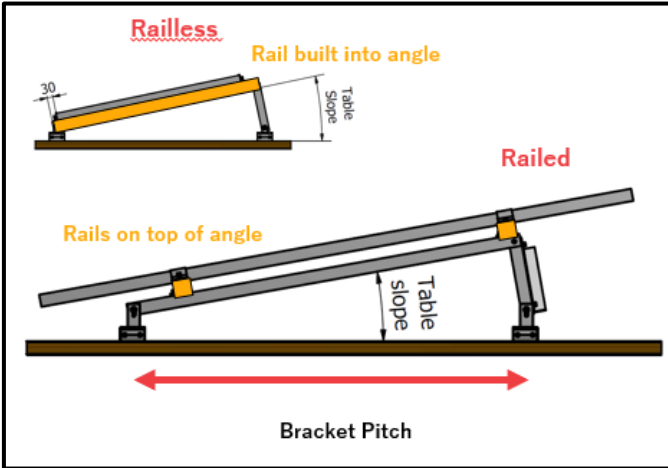
Hanger Bolt:

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.

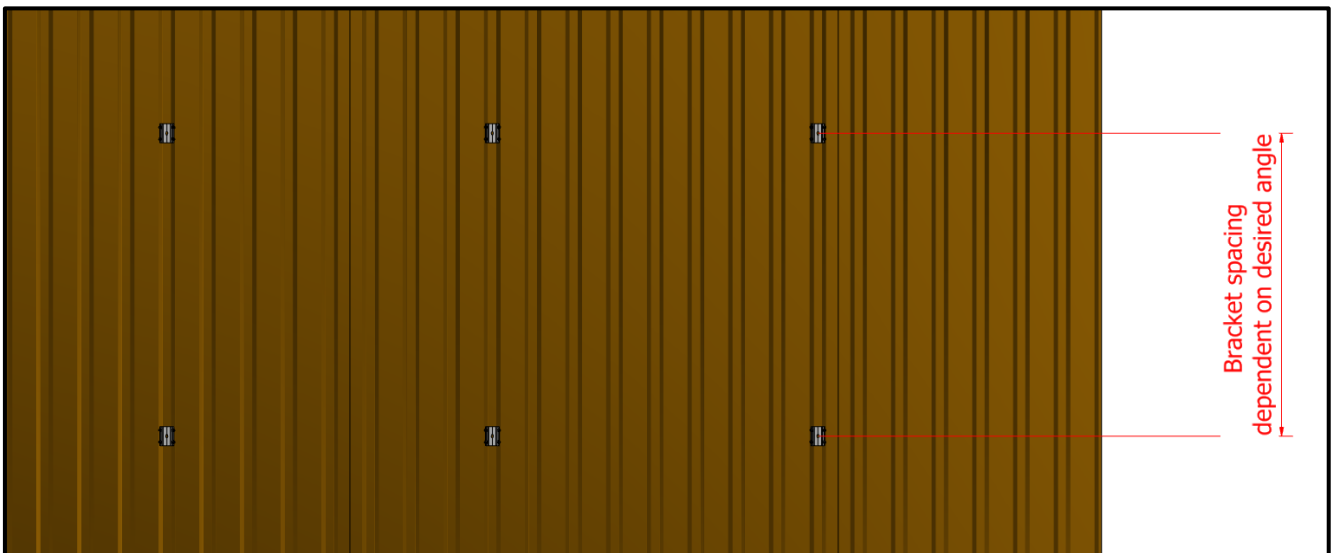


④ Mounting Frame

According to the framing plan, each Rafter length requires at least 2x support Brackets fixed to the roof construction.

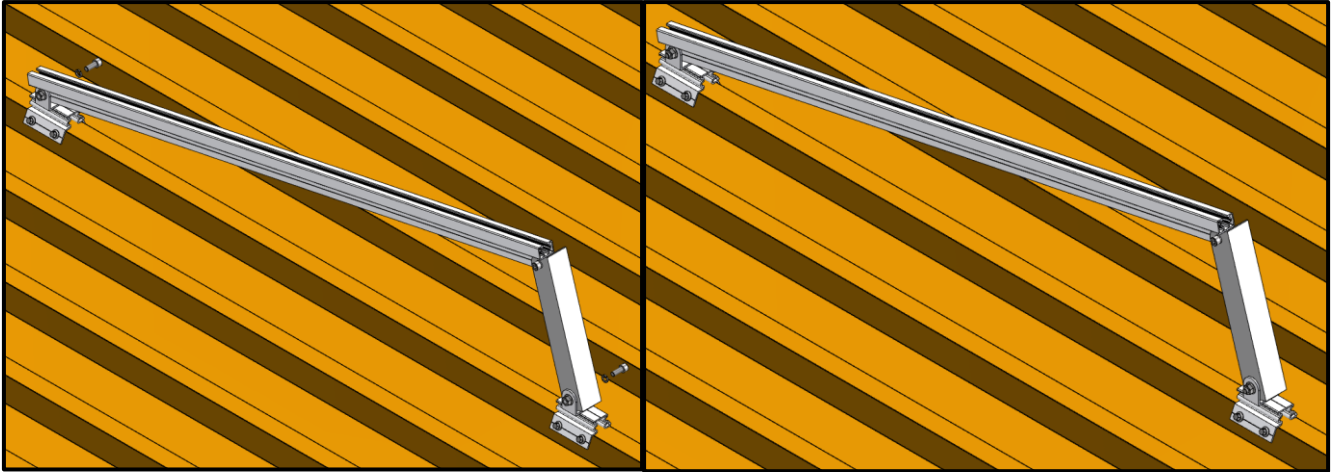


Part code	Part name	Bracket pitch
AXE_AL_ANG_RD_10	Angled Frame, Aluminium, Railed 10deg	1446
AXE_AL_ANG_RD_15	Angled Frame, Aluminium, Railed 15deg	1474
AXE_AL_ANG_RD_20	Angled Frame, Aluminium, Railed 20deg	1515
AXE_AL_ANG_RD_25	Angled Frame, Aluminium, Railed 25deg	1571
AXE_AL_ANG_RD_30	Angled Frame, Aluminium, Railed 30deg	1644
AXE_AL_ANG_RL_10	Angled Frame, Aluminium, Railless 10deg	1198
AXE_AL_ANG_RL_15	Angled Frame, Aluminium, Railless 15deg	1222
AXE_AL_ANG_RL_20	Angled Frame, Aluminium, Railless 20deg	1266
AXE_AL_ANG_RL_25	Angled Frame, Aluminium, Railless 25deg	1302
AXE_AL_ANG_RL_30	Angled Frame, Aluminium, Railless 30deg	1363
AXE_AL_ANG_WW_10	Angled Frame, Aluminium, Walkway 10deg	528
AXE_AL_ANG_WW_15	Angled Frame, Aluminium, Walkway 15deg	538
AXE_AL_ANG_WW_20	Angled Frame, Aluminium, Walkway 20deg	553
AXE_AL_ANG_WW_25	Angled Frame, Aluminium, Walkway 25deg	574
AXE_AL_ANG_WW_30	Angled Frame, Aluminium, Walkway 30deg	600



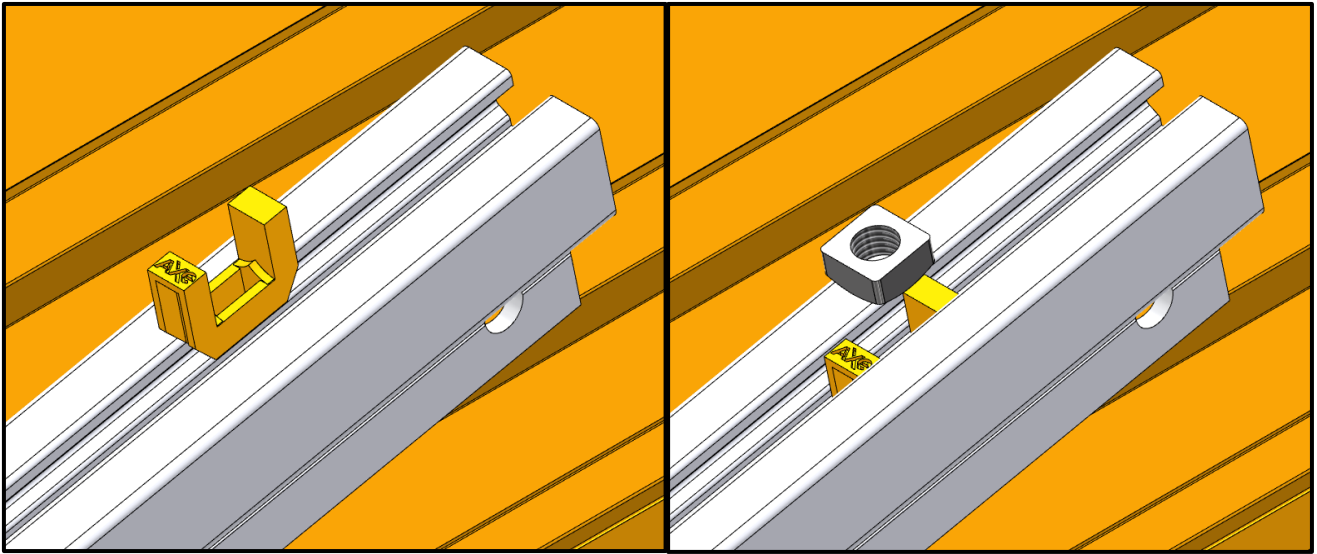
⑤ Angled Frame

Position L-Bracket hole in line with Angled Frame's hole. Connect Angled Frame to L-Brackets with M8x25 Hex-Cap Screws, Spring Washer and M8 Hex Flange Nuts to tighten connection at 18 N.m. In the case of using 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 Angled Frame so that the bolt and nut connection sits at the top or high up the slot on the L-Bracket.

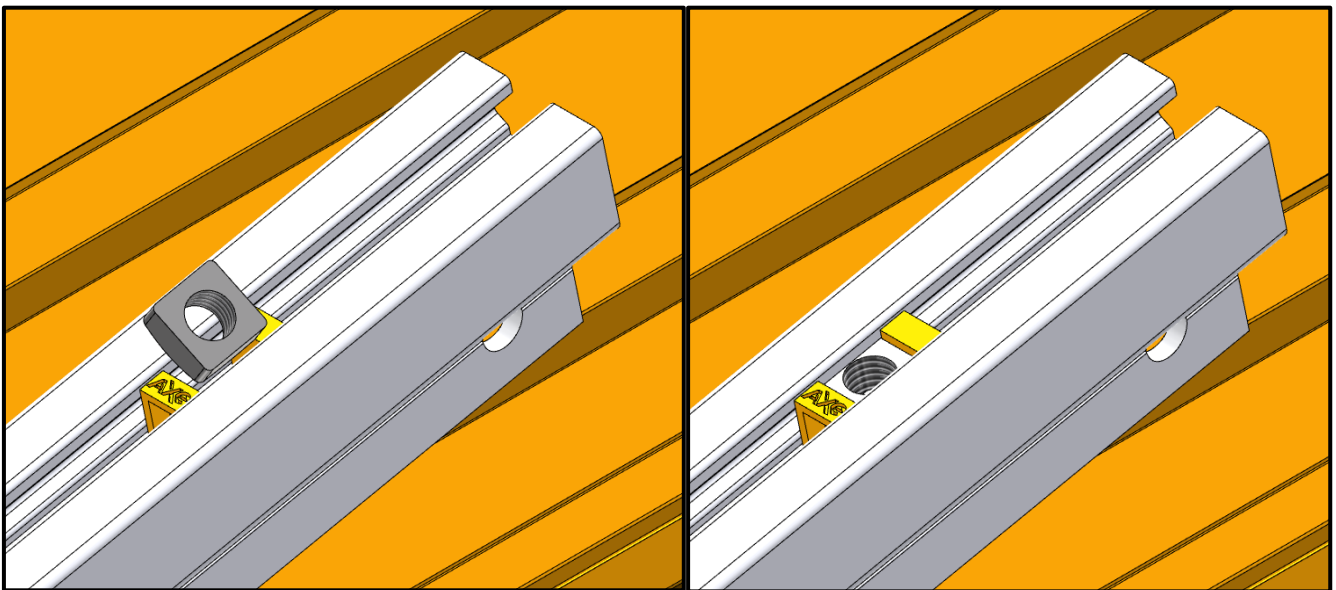


⑥ PV module installation

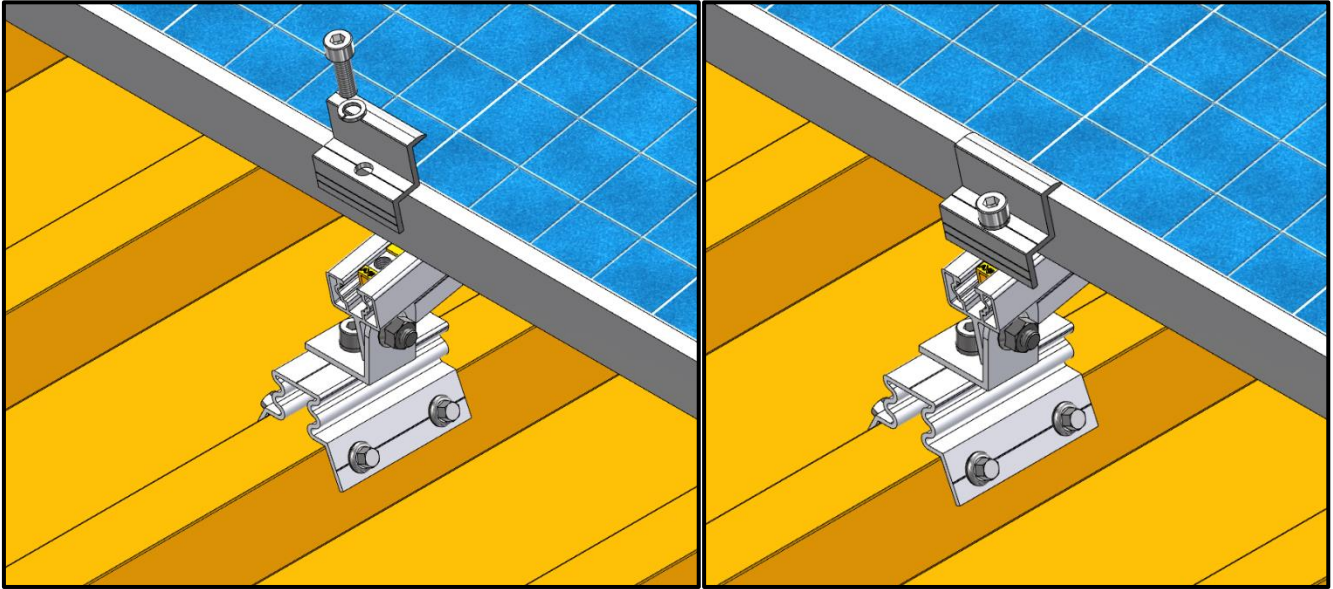
Insert Nut Stoppers into Rafter gap where the installation of PV module Clamps will be.



Position an M8 Square Nut at each Nut Stopper. Slide M8 Square Nut at an angle into Rafter cavity so that it falls vertically with the flat side facing upwards.

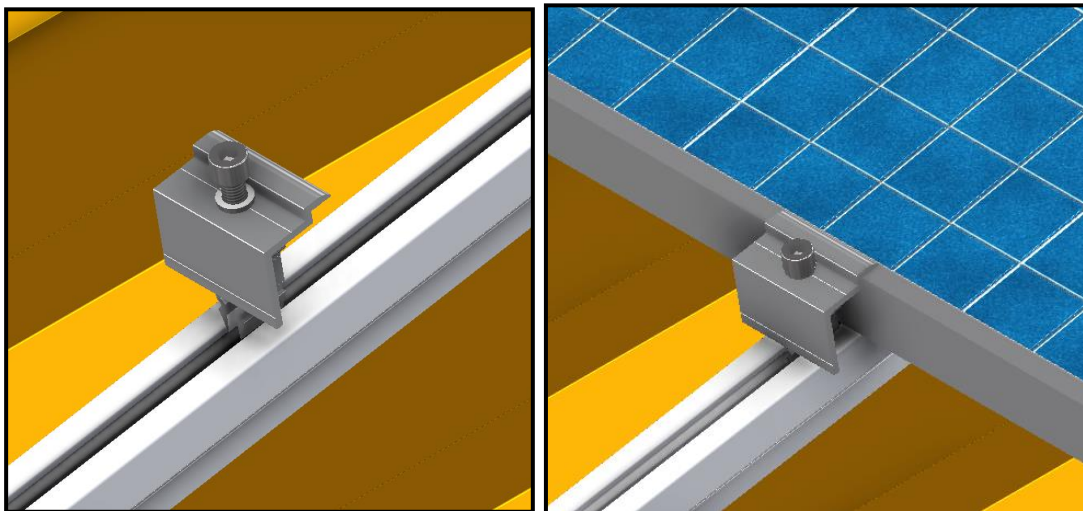


PV modules are laid onto Rafters in landscape view so that 2x Rafter lengths support each PV module. Install PV module Clamps on long sides of the PV module so that each PV module is fixed on 4x locations. 2x clamps per opposing long side will hold each PV module down to the Rafters. Torque M8 Hex-Cap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



Click Fix

Insert **End Clamp Click Fix** by simply pushing the pegs in to the slot in the rail. With the **Click Fix Clamp** firmly in the angle frame, position the panel against the **Click Fix End Clamp** and **Torque the M8 Hex Screw to 18N.m**. Do not repeatedly insert and remove the **Click Fix Parts**.



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)
35	AXE_AL_CE_AP_35	M8x30 Hex Cap Screws
40	AXE_AL_CE_AP_40	M8x35 Hex Cap Screws

⑦ 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.

⑧ 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.