Global Cube

EASY STEP

INSTALLATION GUIDE

May 2015

KIVO

CR GENERATION IV

DOUBLE PILE DOUBLE PORTRAIT

OPEN FIELD MOUNTING SYSTEM

READ THIS FIRST!

Before the assembly, please read carefully and understand all installation and safety instructions included in this manual. You must follow these instructions closely to protect you, the assembly personnel and third parties as well as the components installed. All applicable laws, accident protection and insurance regulations, technical regulations, trade association regulations and recommendations at local, state, European and International level must be followed.

GlobalCube's products are designed and manufactured according to the latest industry standards and safety guidelines. However safety can only be guaranteed if the assembly company plans for all necessary security and safety measures and enforces their application.

The assembly and commissioning of the system must be conducted only by qualified and accredited personnel with experience in the relevant technical field. It is important to ensure that the assigned persons can identify potential hazards on the work allocated to them.

Basic Guidelines:

- The mounting system should only be installed and used for its intended purpose. Incorrect usage could result in serious injury or death. The manufacturer/supplier shall not be liable for any damage arising.
- The mounting system should only be used in its fully functional state. Alterations on the mounting system cannot be performed without the written permission of the manufacturer.
- Guidelines from secondary component manufacturers should be followed.
- These installation instructions are part of the product and must be available during installation and remain to the project site for future reference.
- Any load reduction measures specified by GlobalCube such as the need to clear snow as to limit the snow load are to be observed.
- After the installation of the PV mounting system, the inspection and maintenance instructions provided by Globalcube must be followed.

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1) SAFETY GUIDELINES

PROTECTION EQUIPEMENT

WEAR SAFETY HELMET

WEAR PROTECTION GLASSES

WEAR SAFETY GLOVES

WEAR SAFETY SHOES

Safety Guidelines:

- Only trained personnel must be present in the installation area during installation/assembly works.
- The install area must be secured by barriers.
- To meet accident protection regulations, protection equipment must be provided to the installation personnel.
- Protective measurements, including warning signs must by applied for the protection of personnel from electric shock (AC or DC current).
- Exposed sharp edges of the mounting system must be covered with edge protectors to prevent injuries.

IMPORTANT WARNING!
Read the following information carefully

Only if you are a qualified electrician you can perform any electrical work. Electrical works are NOT in the scope of this installation manual and Globalcube is not liable for any damage arising. However for the safety of the installation/assembly personnel please note the following:

- PV modules generate electricity as soon as they are exposed to light. There is always voltage present.
- Even in low lighting conditions, PV modules connected in series produce high DC voltages which can be life threatening.
- Do not insert conductive material into the plugs or sockets of the PV modules and do not install PV modules and wiring when the plugs or sockets are wet.
- Do not carry any electrical works in dump conditions.
- Always follow the Inverter manufacturer installation regulations and safety instructions
- Inverters can produce high voltages even when they are not connected.
- When you break a connected string of PV modules a lethal electric arc can occur. Never brake a string of PV modules or disconnect the PV generator from the inverter while the inverter is in operation.
- When you switch off the inverter, wait for the time interval specified by the inverter's manufacturer to allow remaining voltages of the high voltage components of the inverter to discharge.

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1) SAFETY GUIDELINES

Applicable accident prevention regulations and standards.

- Labor protection law
- BGV A 1, Basics of prevention
- BGV A 2, Electrical systems and Equipement
- BGV C 22, Construction works
- 90/269/EEC, Manual hundling of loads
- DIN 18299, General rules for all kinds of building works
- DIN 18360, Metal contructions and Metal works

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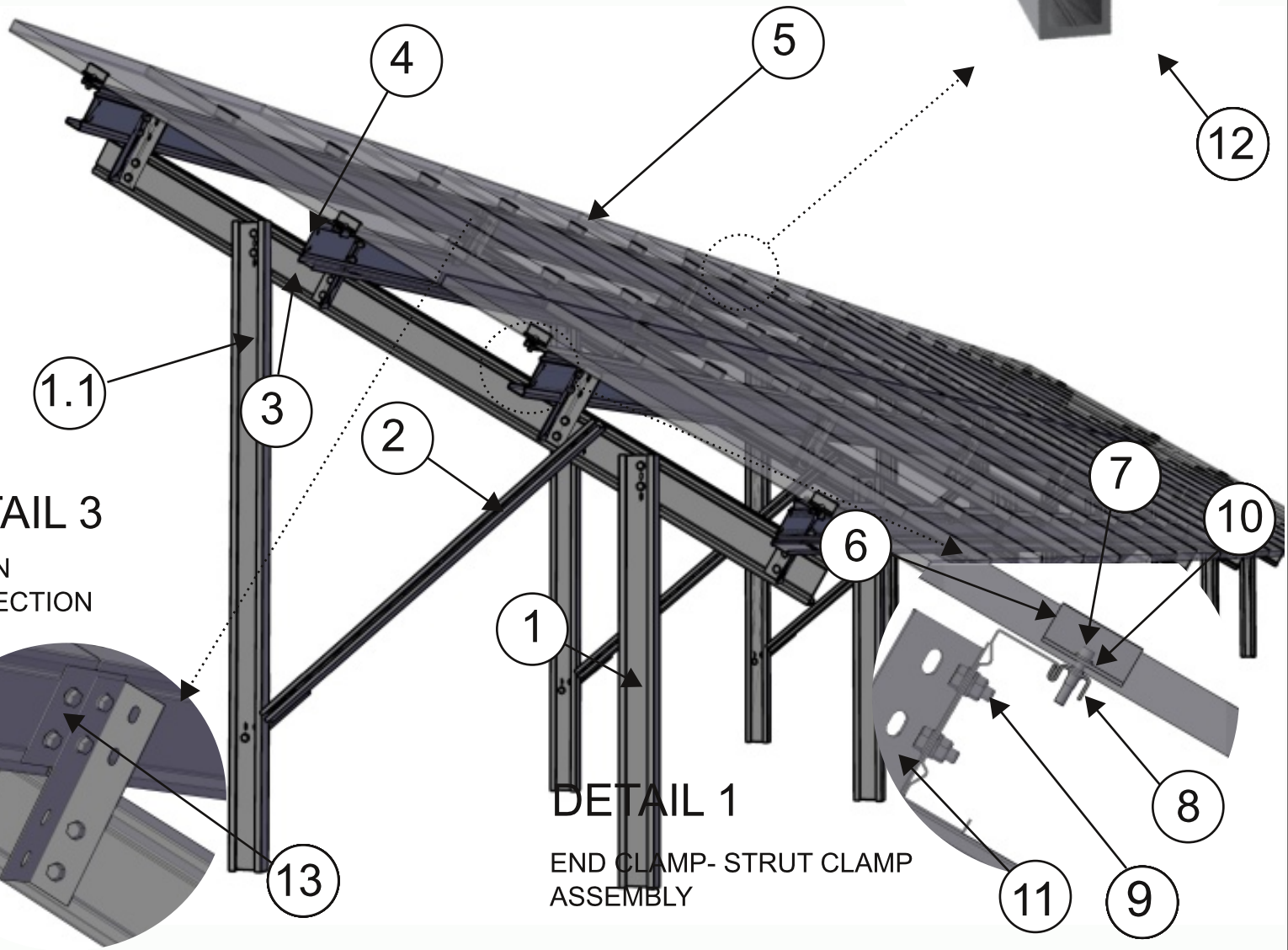
DETAIL 2

MIDDLE
CLAMP



DETAIL 3

PURLIN
CONNECTION

DETAIL 1

END CLAMP- STRUT CLAMP
ASSEMBLY

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2) PARTS INDEX

Main Figure

1. FRONT PILE
1.1 REAR PILE
2. BRACING ELEMENT STRUT
3. TRAVERSE BEAM
4. PURLIN ULTRABEAM
5. PV MODULE

Detail 1

6. END (Z) CLAMP
7. M8 ALLEN BOLT
8. HOOK
9. M12 BOLT, WASHER AND NUT
10. GROVER WASHER M8
11. FORMED ANGLE BRACKET

Detail 2

12. MIDDLE (Ω) CLAMP

Detail 3

13. PLATE EXT. BRACKET

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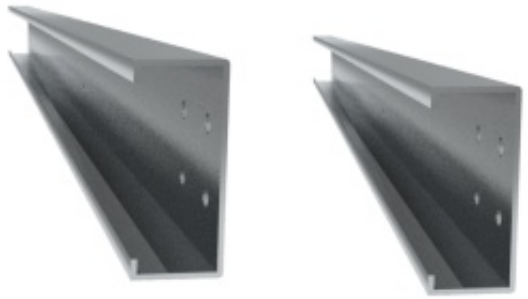
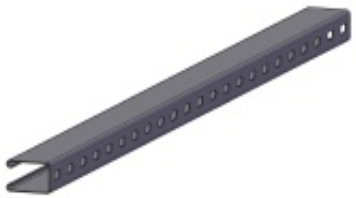
KIVO-CR GENERATION IV SYSTEM COMPONENTS

FRONT AND REAR PILES



BRACING ELEMENT STRUT



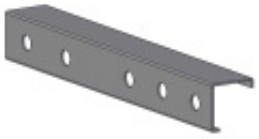
TRAVERSE BEAM

PURLIN ULTRABEAM

END CLAMP (Z)

MIDDLE CLAMP (Ω)

BRACING BRACKET



M12 BOLT WASHERS AND NUT

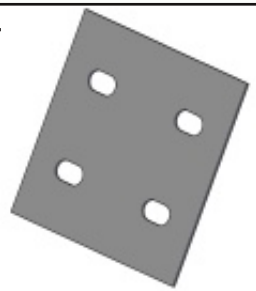
M8 ALLEN BOLT,GROVER WASHER

HOOK M8

Dimensions and Quantities

The exact quantities and dimensions of the system components are project specific and determined by the PV layout and the statical calculations. All quantities and dimensions are provided in the " Mounting System Drawing (DT01)" and "Order (MO)" documents provided for the specific project by GlobalCube.

PLATE Ext. Bracket



ATTENTION!

OBJECTS NOT TO SCALE !
ACTUAL PARTS MAY DIFFER FROM PROJECT TO PROJECT!

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3) SYSTEM COMPONENTS

Required Tools

• Pile Ramming Machine

• Electric impact wrench (with torque clutch) and M12 socket

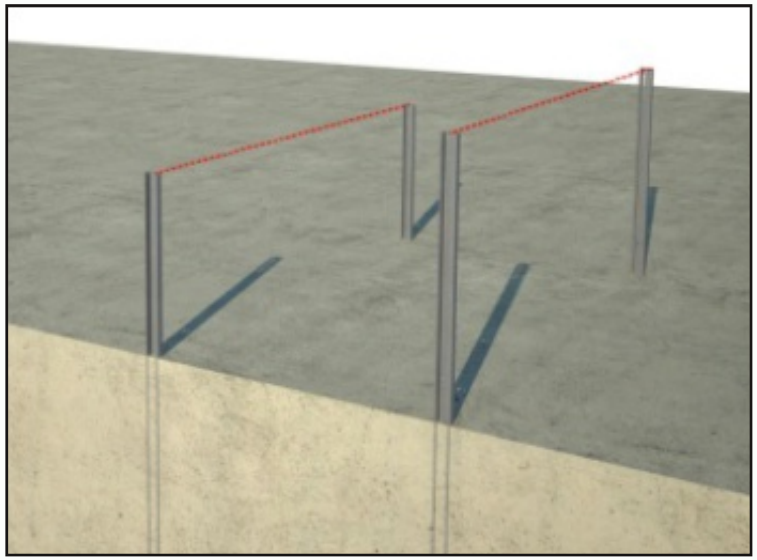
• M8 Allen key

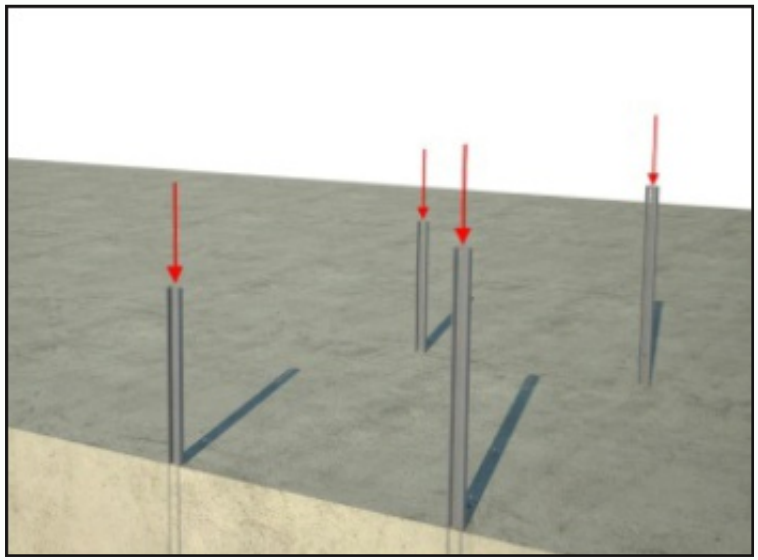
• M12 and M8 torque wrench and M12 strut sockets

Step 1:

Insertion of the piles into the ground

A) The piles are inserterd into the ground by a pile ramming machine.
For the exact placement of the piles please check the "Ramming Piles & Purlins Position Drawing (XR01)" provided for the specific project by GlobalCube





B) The length and type of the Piles, as well as the exact ramming depths are described in the " Mounting System Drawing (DT01)" document provided by GlobalCube.

ATTENTION !

- A Geotechnical Study or a Ramming test should be performed beforehand to ensure the suitability of the foundation method and of the mounting system to the ground conditions.
- For instructions refering to the pile ramming process, including positioning tolerance and alignment of piles please read the "GlobalCube_IS06_Ramming Specifications_v1_EN" document provided by GlobalCube.
- Before the pile ramming operation kicks off, always double check the exact placement and verticality of the piles.

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4) INSTALLATION INSTRUCTIONS

ATTENTION!

The ram head must match the profile of the pile to prevent deformation of the pile.

If there is damage on the zinc layer covering the piles as a result of pile ramming, please apply zinc dust paint as described in the "Inspection and maintenance (L04)" document provided by GlobalCube.

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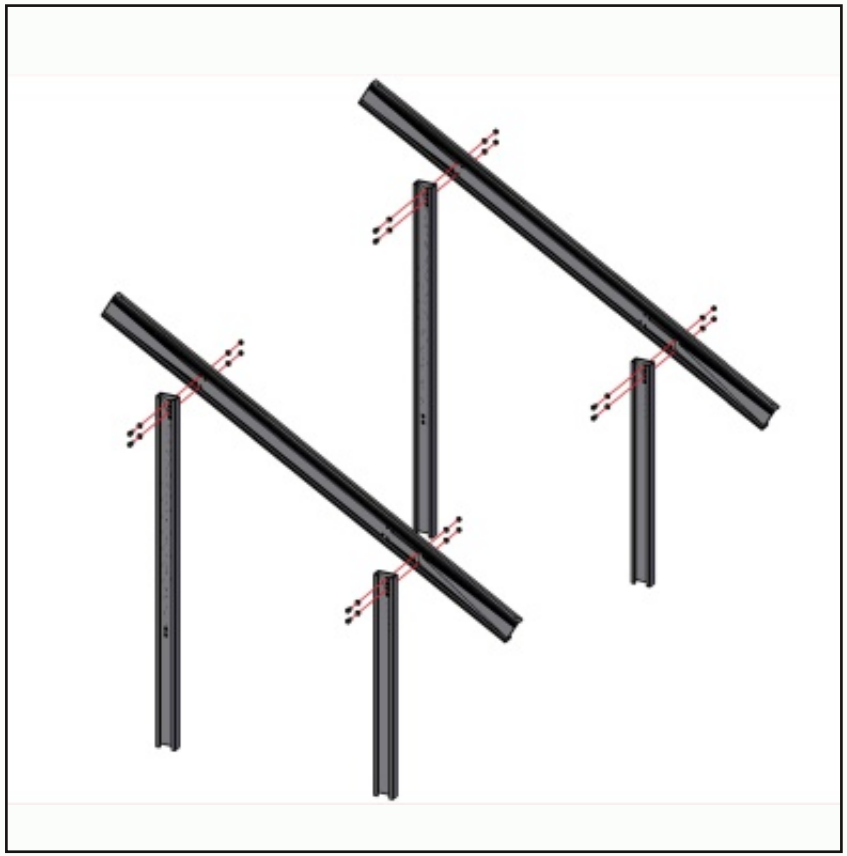
Step 2:

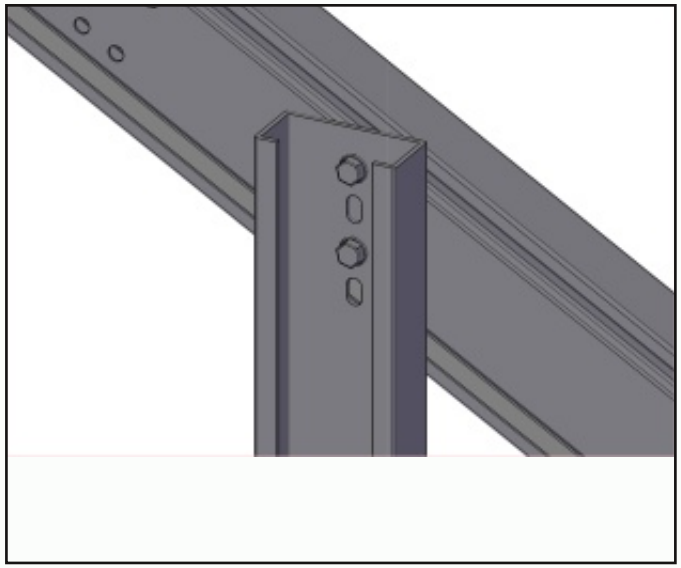
Fix the traverse Headbeams



HEADBEAM

Place the traverse headbeam, in direction north-south as shown on the DT01 provided drawing and use the slot position indicated using (2pcs M12 bolts, nuts and 2xwashers, per pile).

No bolts are to be tightened before all parts are assemblied in position.



ATTENTION !

- All bolts are not to be tightened before step 3.
- Place DIN125 Washers in both sides of all bolt and Nuts connections (not shown)

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4) INSTALLATION INSTRUCTIONS

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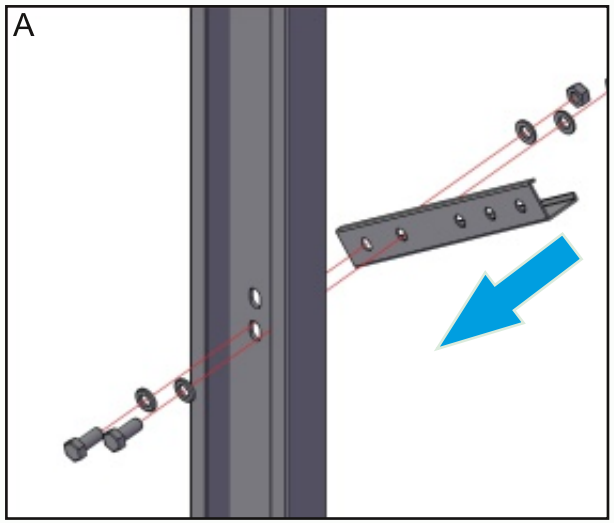
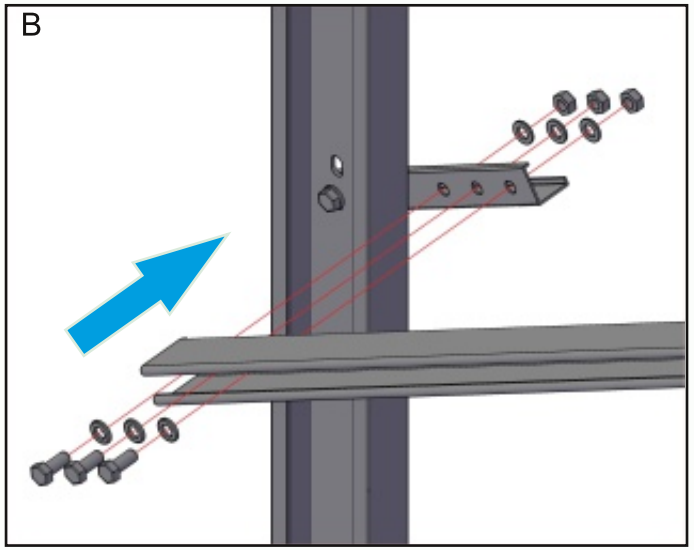
Step 3:

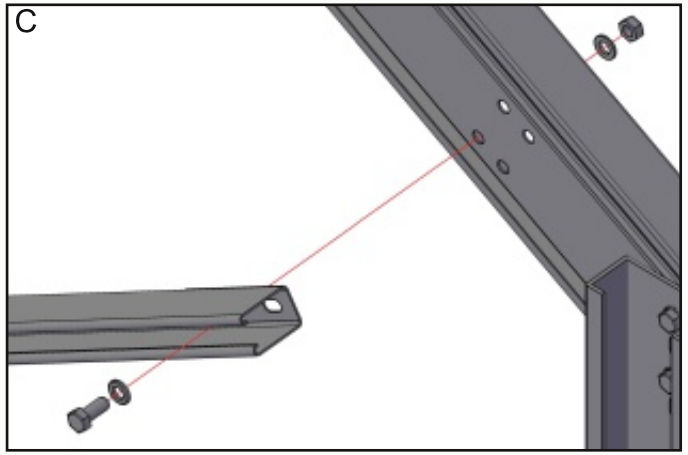
Fix the bracing elements



A) Place the bracing element support as indicated in the figure on the left, and hold into position. Insert the bolts, washers and nuts in the apropiate holes to fix the Bracing Element Support on the pile as indicated in the figure on the left and on the DT01 drawing.

B)Place the Bracing element as indicated in the figures below and on the right and bolt into position.





C)Insert the bolts, washers and nuts in the apropiate holes to connect the bracing element on the traverse beam as indicated in the figures. (1xM12, 2xWashers, 1xNut)

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4) INSTALLATION INSTRUCTIONS

ATTENTION!

Tighten All bolts of the Mounting Structure using a Torque Wrench set at 30 Nm torque!

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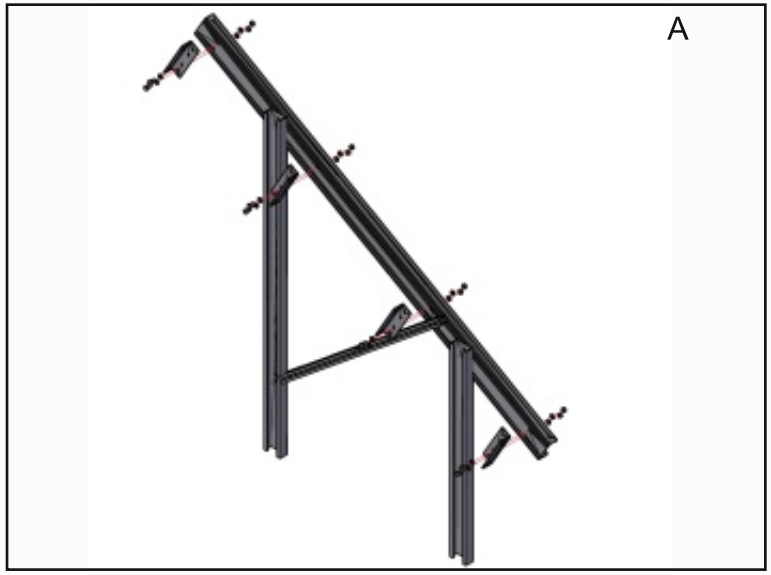
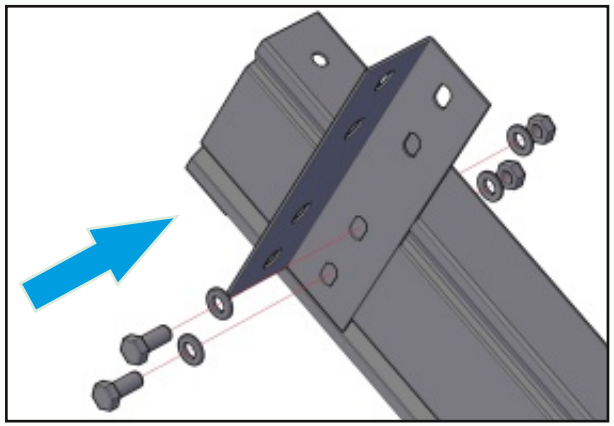
Step 4:

Install the Purlin mounting brackets



A) Fix all the angle brackets on the traverse beams as indicated on DT01 drawing and image above,using M12 bolts, washers and nuts.



B)Start placing the purlins. Please refer to the "Ramming Piles & Purlins Position Drawing (XR01)" provided for the specific project by GlobalCube for the exact placement of the Purlins,plates and angle brackets.
In order to place a succesive purlin to purlin extension for the full length of the (PV-mounting) table, add the plate conn brackets where needed (as shown in provided XR01 drawing), and fix on the Traverse Beam as explained in the Step 5 (Attach the Purlins).

ATTENTION !

- All bolts are not to be tightened before step 5.
- Place DIN 125 Washers in both sides of all bolt and Nuts connections (not shown)

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4) INSTALLATION INSTRUCTIONS

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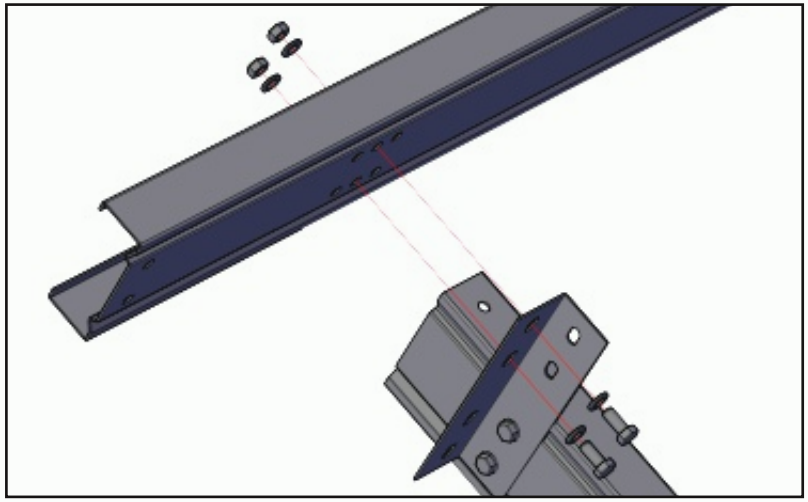
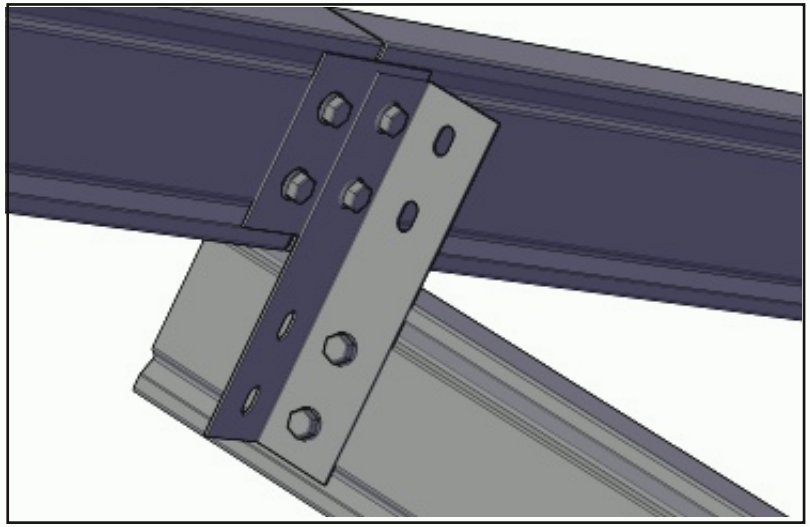
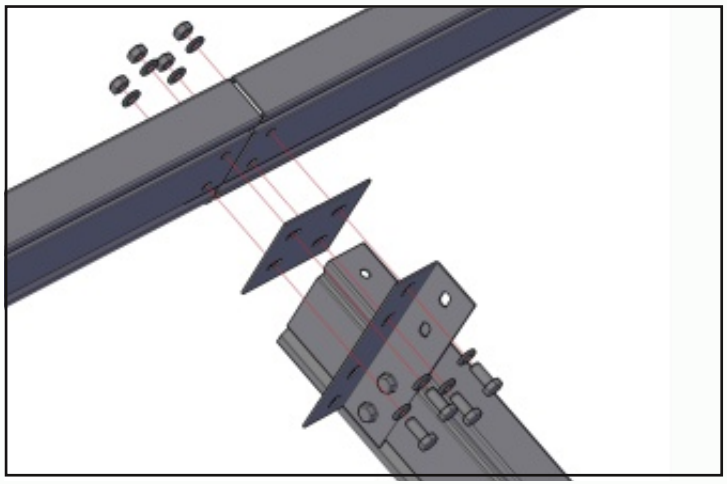
Step 5:

Attach the Purlins





A) Mount the Purlins on the Traverse Beams at the positions indicated through the Angle Brackets nad purlin holes and bolt in place. For exact type/dimension and correct holes/slot assembly of Purlin please refer to the "Ramming Piles & Purlins Position Drawing (XR01)" and "Mounting System Drawing (DT01)" documents provided for the especific project by GlobalCube.



B)When a purlin to purlin connection is required for the extension of the full length table, use the connection plate provided and fix as shown on the above image using M12 bolts, washers and nuts. The connection should be formed as shown on the left.

In this step:

Tighten all bolts of the mounting structure with a torque wrench set at 30 Nm torque. Check the steel frame for alignment variations.

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4) INSTALLATION INSTRUCTIONS

ATTENTION!

Tighten All bolts of the Mounting Structure using a Torque Wrench set at 30 Nm torque!

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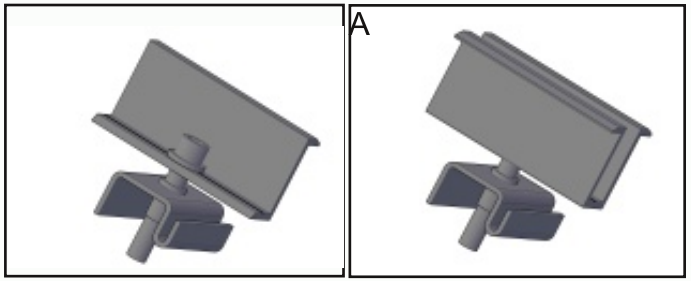
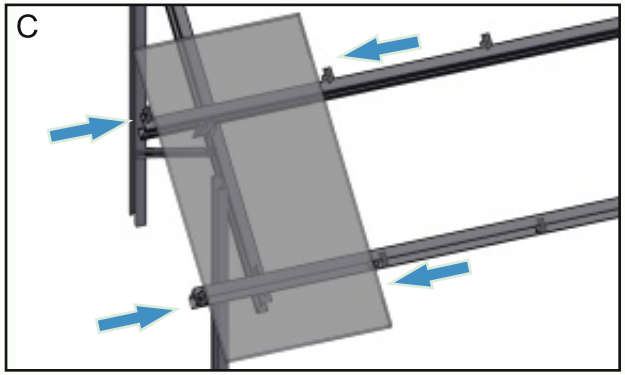
Step 6:

Attach the clamps, hooks and PV modules



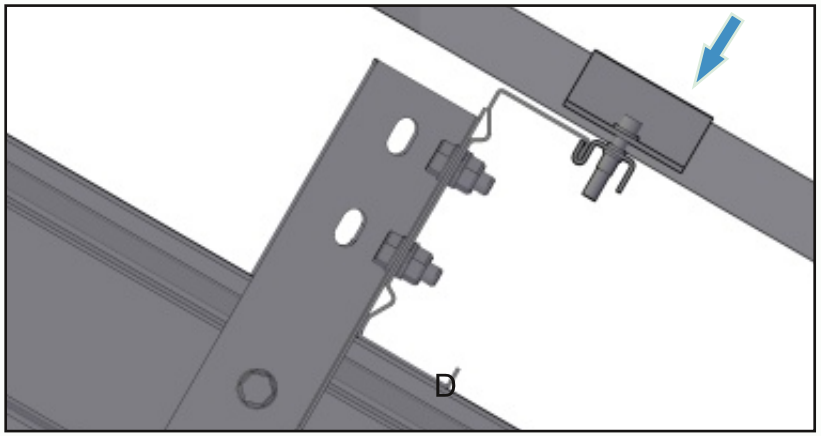
A) Pre-assemble the Clamp-Grover-M8 Bolt-Hook assemblies using end-Clamps and middle-Clamps. The quantities and positioning of end-Clamps and middle-Clamps are shown in the "Ramming Piles & Purlins Position Drawing (XR01)" and "Order (MO)" documents provided for the specific project by GlobalCube.

B) Attach on the purlins and fix to loose position.Distribute the Clamp-Hook assemblies on the Purlins, at intervals roughly approximating the dimensions of the PV-modules.



C) Start placing the PV-modules accordingly as in layout shown in drawing XR01. Slide the pv modules in position of the assemblies placed at the mounting locations specified by the PV-module manufacturer. Allign and fix into position.

D) The PV-panels are fixed by tightening the four aluminum clamps against the Purlin through the M8-allen head bolts and the Hook-Clamps with build in thread. M8 Hook will provide the required contact. Tightening is carried out with a torque wrench set according to the PV-module manufacturer specifications (usualy 10Nm).



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4) INSTALLATION INSTRUCTIONS

ATTENTION!

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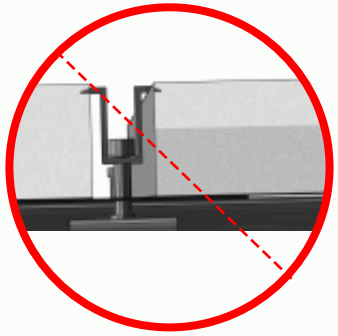
Step 7:

Clamp and Hook placement Guidelines

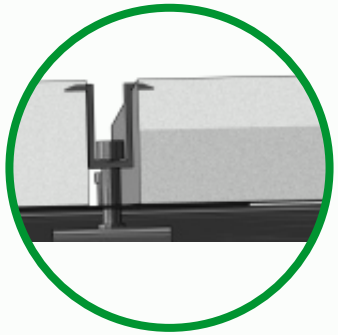
1) Clamp Placement

Make sure that there is sufficient contact area between the PV module and the clamp

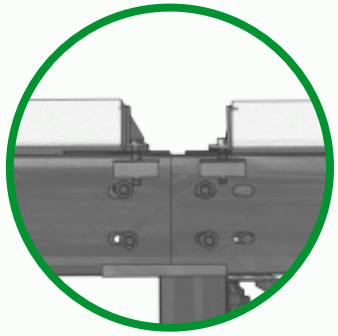
WRONG!



CORRECT!



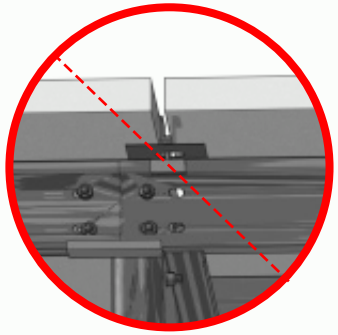
CORRECT!



2) Hook Placement

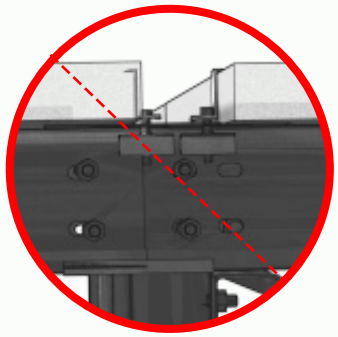
Always place end-Clamps at the end of the Purlin and at the begining of the succesive purlin

WRONG!



Do not place a Clamp-Hook assembly directly on the junction of two purlins

WRONG!



Each Clamp-Hook assembly must be seated in a different purlin as indicated in the figure on the left

Solar Cube PV Mounting Solutions

4) INSTALLATION INSTRUCTIONS

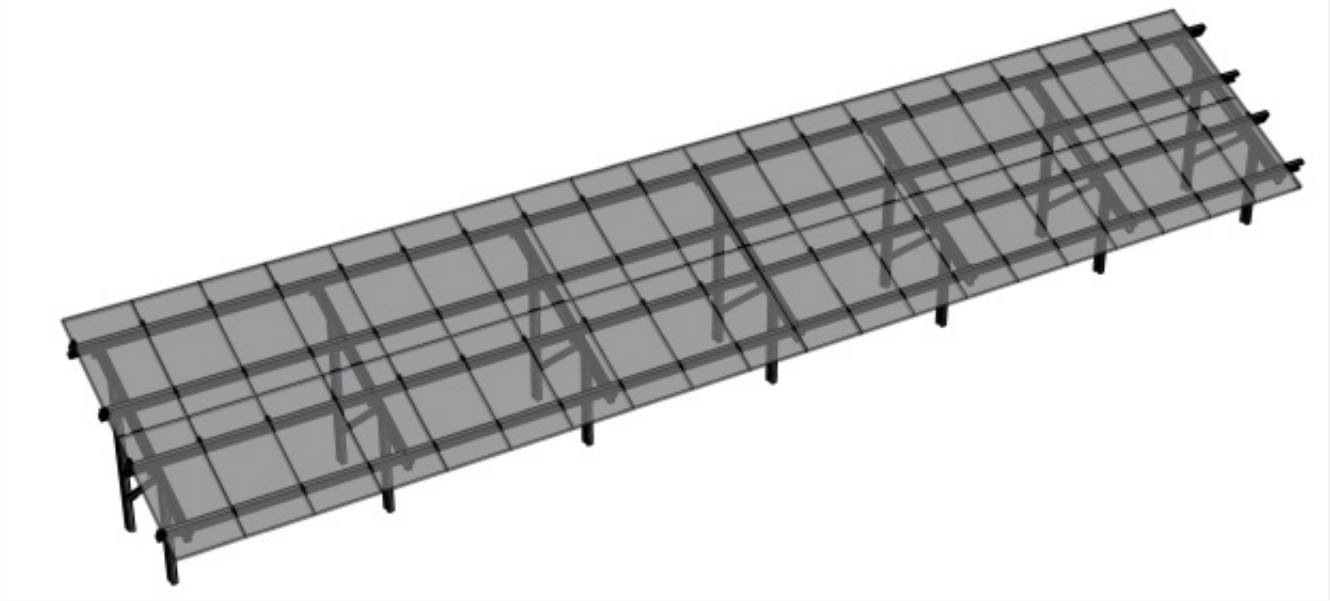
KIVO-CR GENERATION IV

DOUBLE PILE

ADVANTAGES OF KIVO-CR GENERATION IV

5) ADVANTAGES

- **All components are made of high quality steel**
- **Designed to meet the needs of any type of Installation**
- **Minimum number of parts per system**
- **Only 600 piles per MWp**
- **Only one type and size of bolt, nut and washer on the mounting structure**
- **Patent pending fast clamping system**
- **Thermal expansion does not limit the length of the tables**
- **Long service life of all Kivo products**



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DESIGN NORMS AND STANDARDS

Eurocode 1:

Actions on structures (EC1, ENV 1991 1-1, 1--3, 1-4),
- Part 1-1: General actions – Densities, self-weight and imposed loads
- Part 1-3: General actions – Snow loads
- Part 1-4: General actions – Wind actions

Eurocode 3:

Design of steel structures (EC3, ENV 1991-1-1, 1-3)
- Part 1-1: General rules and rules for buildings
- Part 1-3: General – Cold formed thin gauge members and sheeting
- Part 1-8: General – Design of joints
- Part 1-10: General – Material toughness and through thickness assessment

Eurocode 8:

Design of structures for earthquake resistance (EC8, ENV 1998-1-1)
-Part 5: Foundations, retaining structures and geotechnical aspects
-Part 1: General rules, seismic actions and rules for buildings

-National Norms for Earthquake Resistance

Other Regional Standards where Eurocodes not applicable.

OFFICE LOCATIONS

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LOCATIONS

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