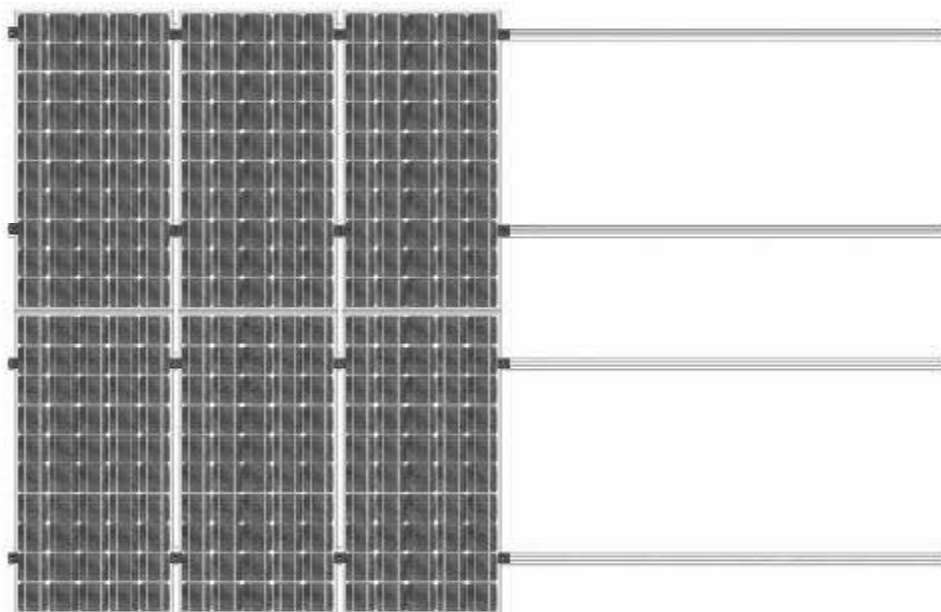


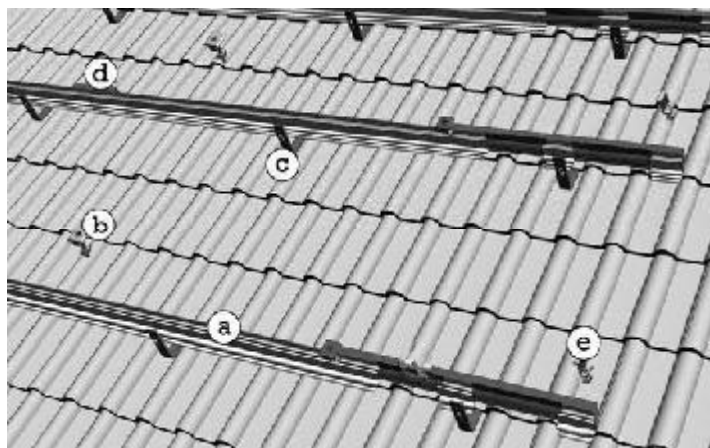
Sunshine Solar fastFIX Roof Mounting System Installation



Planning the Solar Array Area



1. Number of modules in the vertical direction times the module height.
2. Number of modules in horizontal direction times the module width + 17 mm (intermediate Clamps) + 32 mm (end clamps).
3. Horizontal spacing of the roof hooks up to 2.0 m
4. Vertical spacing of the roof hooks = approximately $\frac{1}{2}$ to $\frac{3}{4}$ of the module height.
5. Distance between the modules: 17 mm



- a. fastFIX mounting rail.
- b. fastFIX Intermediate Retaining Clamp.
- c. fastFIX Roof Anchor.
- d. fastFIX Splicing Kit.
- e. fastFIX End Retaining Clamp.

Roof Anchor Mounting

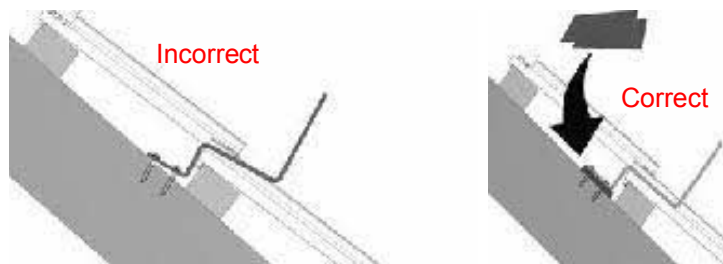
1. Determine the positions of the roof anchors according to your plans. Remove the roof tiles at the marked position or, if possible simply lift them up slightly.



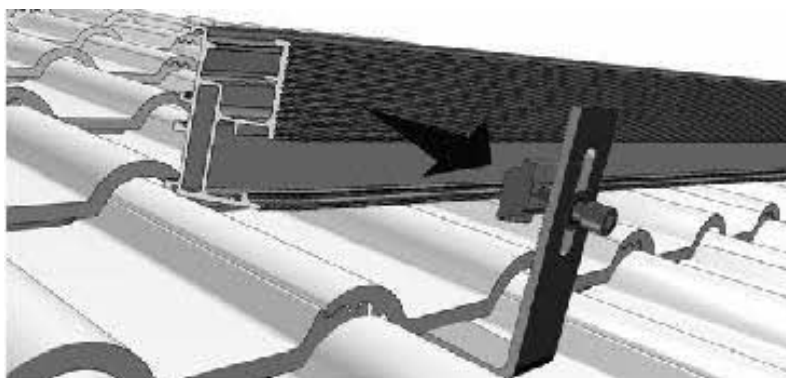
2. Fix the roof anchor to the rafter using the fixings provided.



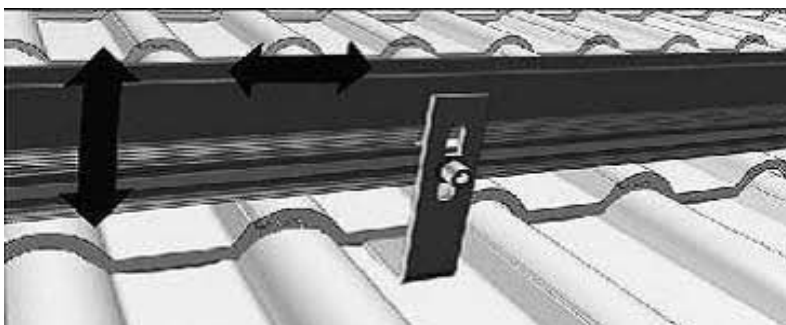
3. The roof anchor must not press against the roof tile. If necessary shim the roof hook with wood.



4. Installation of the rails on the roof anchors. If your set of rails consists of rails of different lengths, always begin with the shortest piece. Install the framing of each row of modules loosely on the roof anchors, using M8 x 25mm Allen bolt, washers and the ECHELON module.

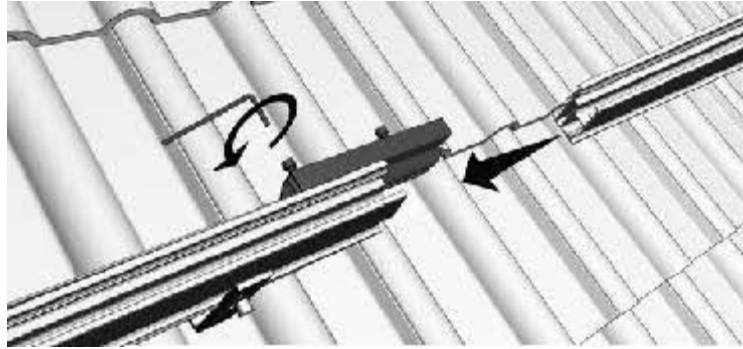


5. An optimum adjustment of the vertical and horizontal position can be made by taking advantage of the slot in the roof anchor and the still loose connection of the ECHELON module or T-head bolts in the rail.

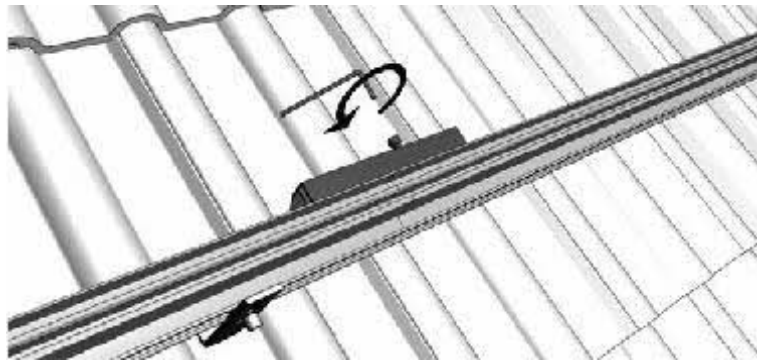


Using the fastFix Splicing Kit

6. Installation of the Splice kit with base rail. To connect multiple rails together, slide the splices on the rear side of the pre-assembled rails. Fasten the first M8 Allen bolt firmly using an Allen key. Now slide the next rail segment into the splice.

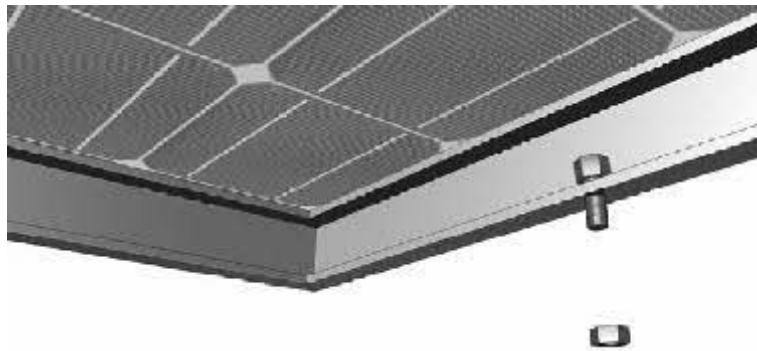


7. An expansion gap at the joint is recommended. For this purpose leave a gap about the same width as a finger between the rail joints. Loosely tighten the second M8 Allen bolt using an Allen key and the connection is finished.

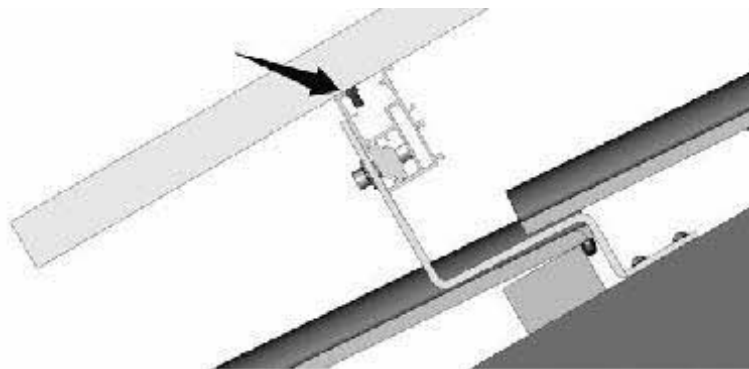


PV Module Installation

8. Before installing the modules add anti-slip protection to the lowest row of modules (horizontal rail installation only). To do this, fasten M6 x 20mm bolts (with the shank downwards) to the lower mounting holes of the module frame. When installing larger modules use M x 20mm bolts.



9. Place the first module of the bottom row so that the anti-slip protection sits in the rail channel of the lowest row of rails.

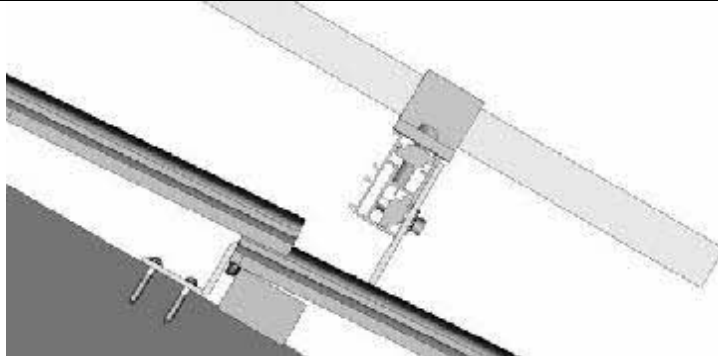


PV Module Installation

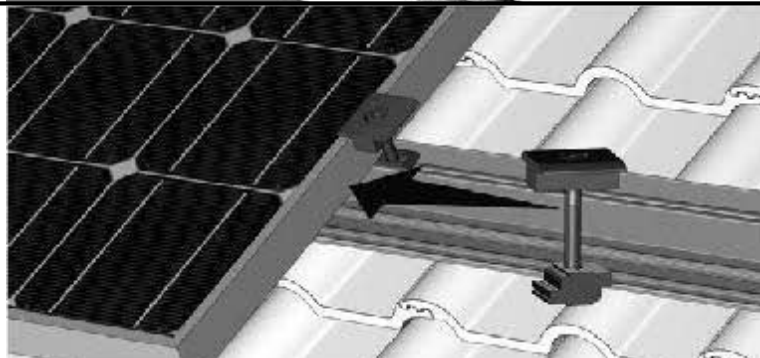
10. Slide the module end retaining clamp tightly against the module and fasten tightly using the Allen bolt (recommended torque is 8 Nm).



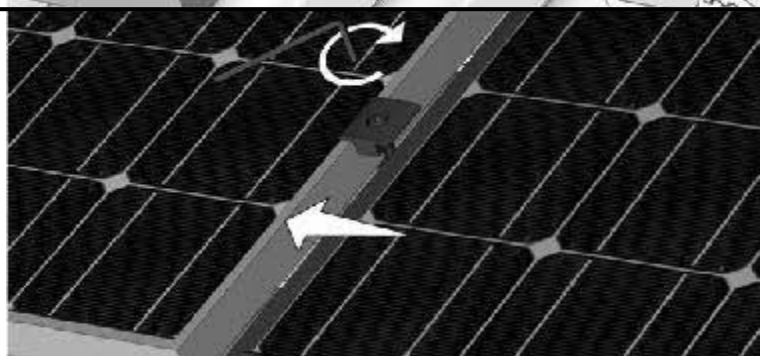
11. Cross-section through the module end clamp when installation step 10 has been correctly performed.



12. Slide the pre-assembled intermediate clamp into the rails from above, place firmly against the module and fasten loosely (approx 2-3 turns).



13 Now slide the next module against the previously installed module and tighten the intermediate clamp using an Allen key (recommended torque is 8 Nm). Take care that the anti-slip protection is in the rail channel of the lowest row of rails.



14. Position the last module of the row on the base rail and fasten the module with the end retaining clamps (recommended torque is 8 Nm).

