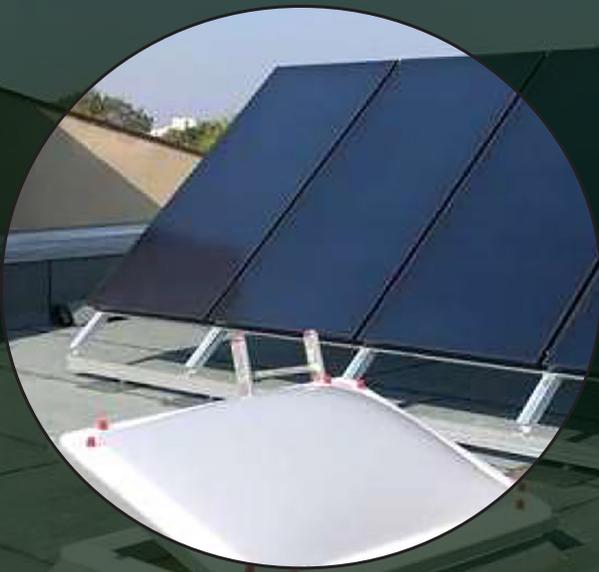




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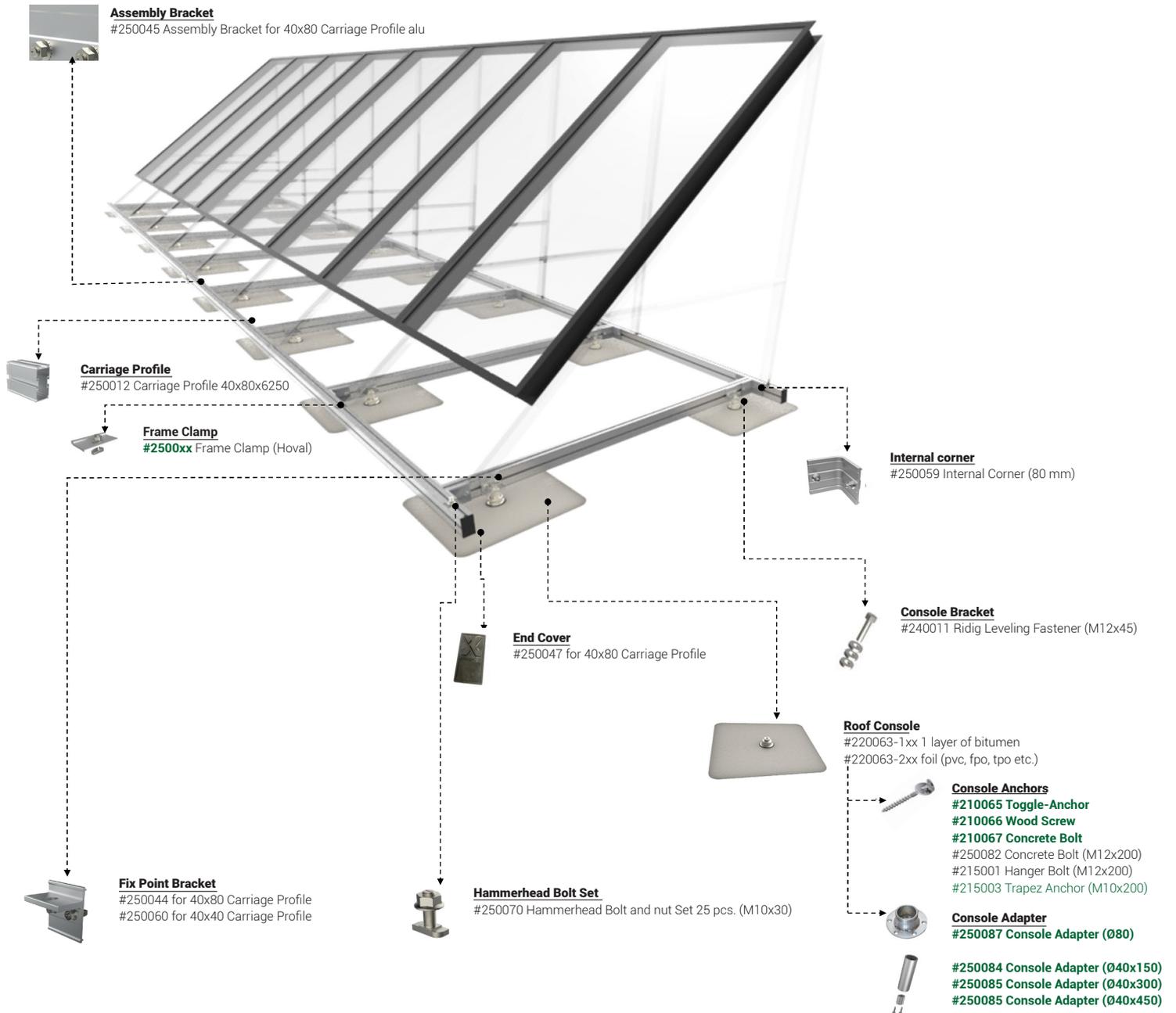
Installation Guide Thermal Console System



FIXNORDIC
proof enough.



System Overview

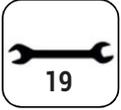


Tools and symbol overview

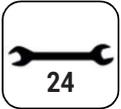


Leveling device

laser or similar



Wrench (19 mm)



Wrench (24 mm)



Miter Saw



Impact wrench (13 mm socket)

Capacity: (100 - 120 Nm)



13 mm Socket incl. 1/4" adapter

Article number: #250090

Max. out side diameter \varnothing 17,5 mm

Caulking gun

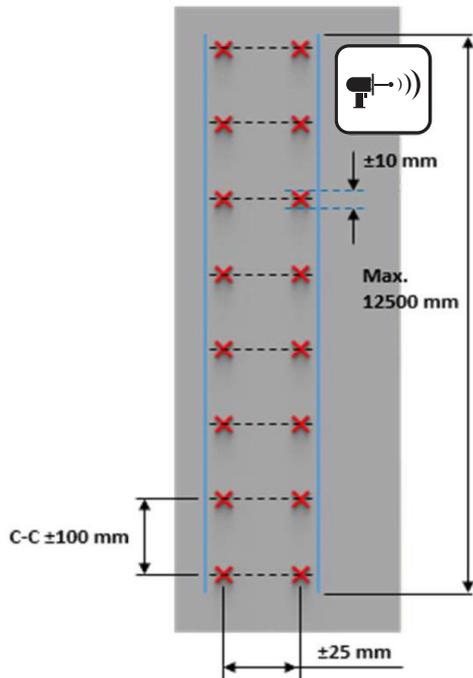
Must be applicable for 300 ml and 1000 ml cartridges



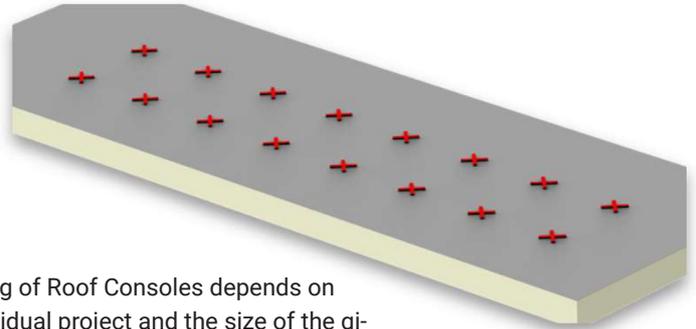
Soft hammer



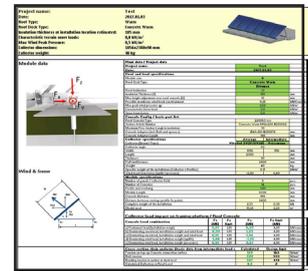
1. Positioning of Roof Consoles



The illustration above shows the generally allowed tolerances for positioning of Roof Consoles. If a larger play is required Fixnordic must be contacted.

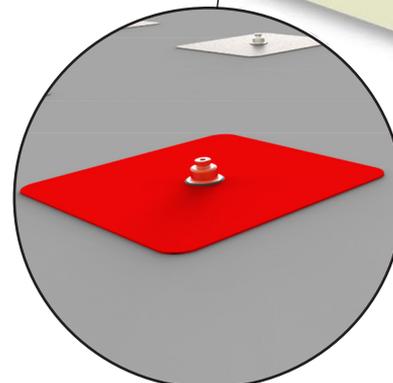
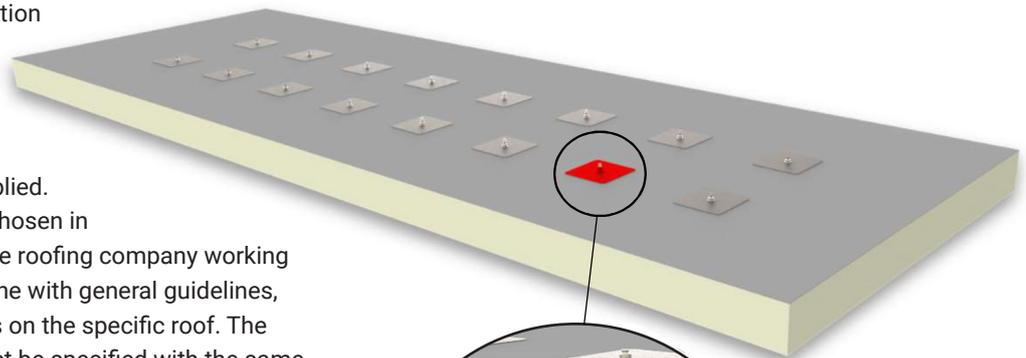


Positioning of Roof Consoles depends on each individual project and the size of the given module. Specific module dimensions are defined in the corresponding technical design report or technical specifications created for the project by Fixnordic.



2. Installation of Roof Consoles

Details about how to install Fixnordic Roof Consoles correctly are found in the separate installation guide lines and videos available at www.fixnordic.dk. Please note that each guide is specific for one roof type only. Please also notice that project specific installation guide lines may have to be applied. The exact type of Roof Console must be chosen in collaboration with Fixnordic A/S or with the roofing company working on the installation. This must be done in line with general guidelines, best practices and warranty specifications on the specific roof. The general rule is that the Roof Consoles must be specified with the same type of membrane as the roof on which these are to be installed.



On this illustration the installed Roof Consoles are presented in an installation state where they are ready for the following installation of the Thermal frame system.



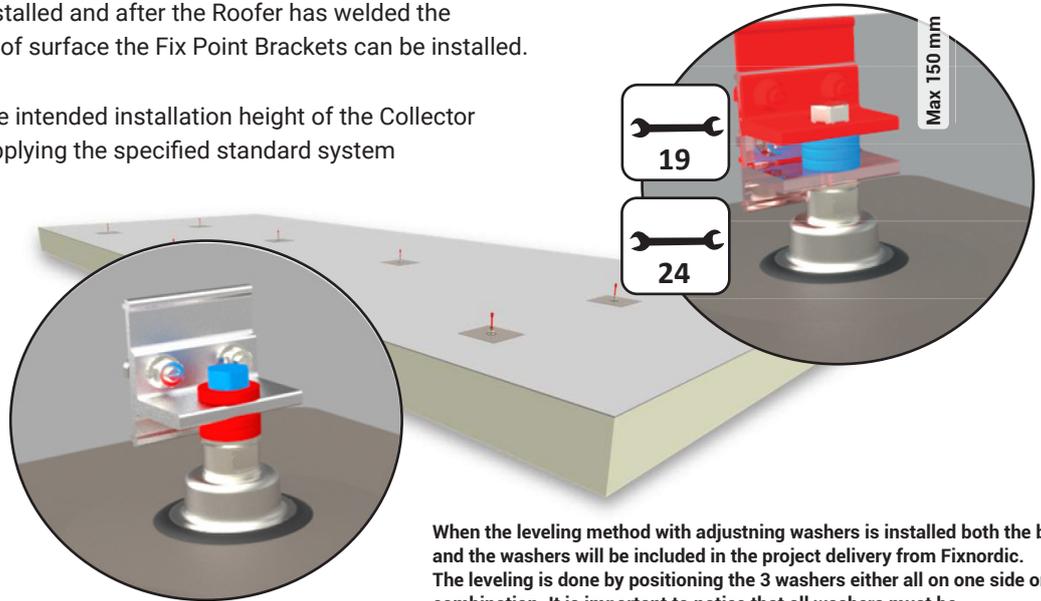
3. Rigid leveling of the collector module relative to the surface of the roof

Once the Roof Consoles have been installed and after the Roofer has welded the integrated roofing membrane to the roof surface the Fix Point Brackets can be installed.

For this process it is important that the intended installation height of the Collector Module is considered and reached by applying the specified standard system components.

For the Thermal Console System one standard solution is offered where the Fix Point Bracket is positioned directly on top of the Roof Console and where a possibly leveling can be achieved with the spacing washers supplied with the Console Bracket (Bolt + Spacing washers), while keeping the rigidity of the anchor system intact.

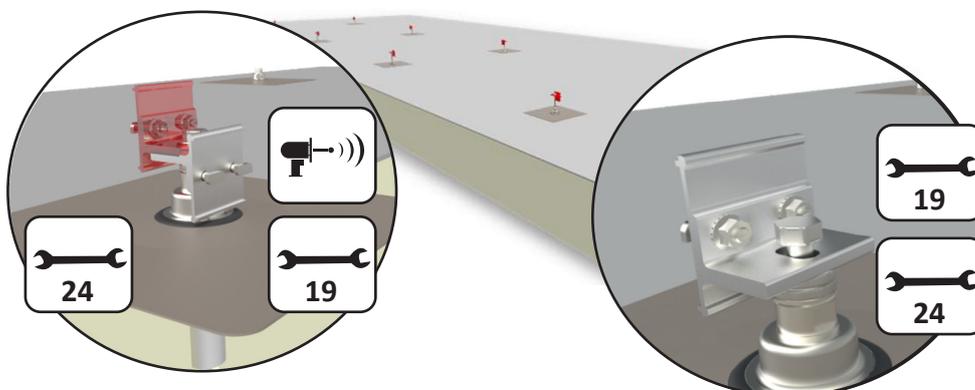
Further vertical flexibility can be achieved by paying attention to installation step. 4.



When the leveling method with adjusting washers is installed both the bolt and the washers will be included in the project delivery from Fixnordic. The leveling is done by positioning the 3 washers either all on one side or a combination. It is important to notice that all washers must be mounted due to the length of the bolt.

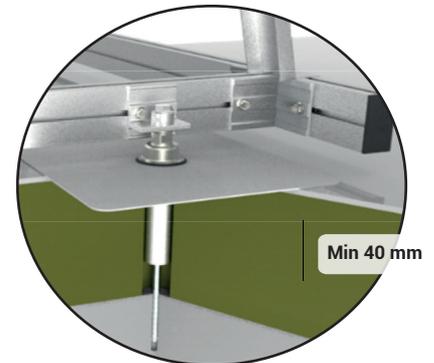
4. Fix Point Bracket flexibility and installation

In order to ensure both the vertical -and the horizontal installation flexibility of the framing system the Fix Point Bracket has been designed with a lot of flexibility which is illustrated on the following detailed illustrations:



The Fix Point Bracket can be rotated or turned until the right height and position is reached.

The long hole in the Fix Point Bracket helps to provide a horizontal play for the positioning of the cross beam carriage profiles.

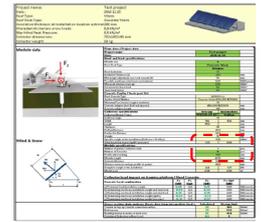


Minimum distance between Carriage Profiles and the roof surface

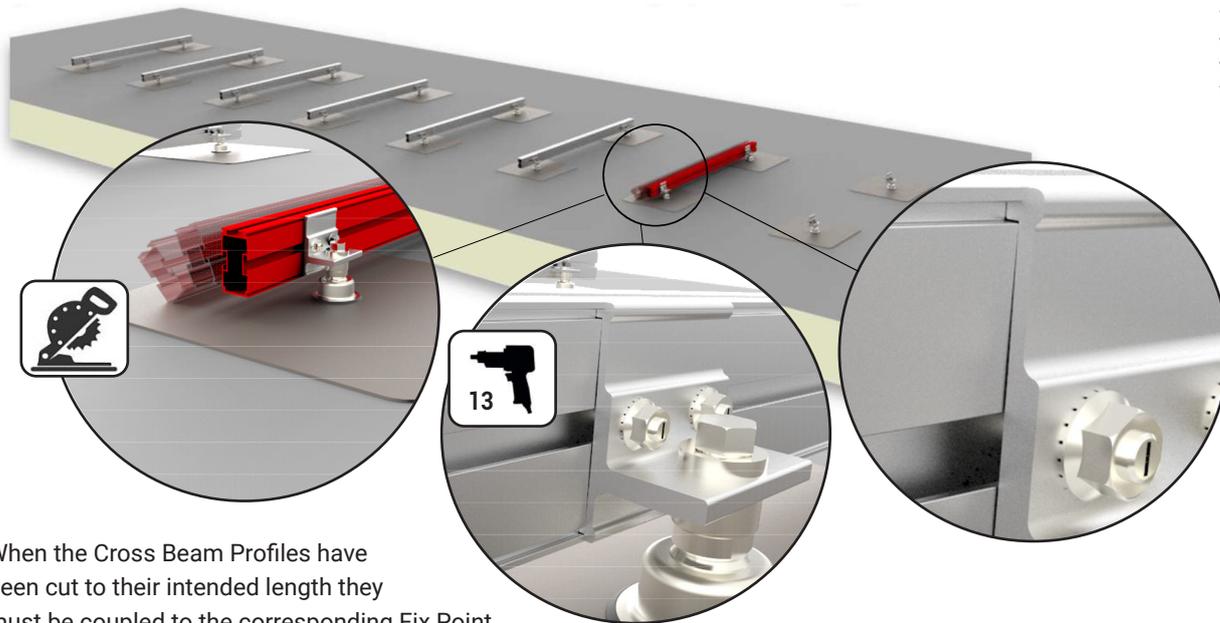


5. Installation of Cross Beam Carriage Profiles

With the Fix Point Brackets installed in their intended positions the next step is to install the Cross Beam Carriage Profiles. For this purpose the current module specification must be cross checked in order to set the right profile cut length.



The design calculation for the current module also contains the specified cut length for Cross Beam Profiles

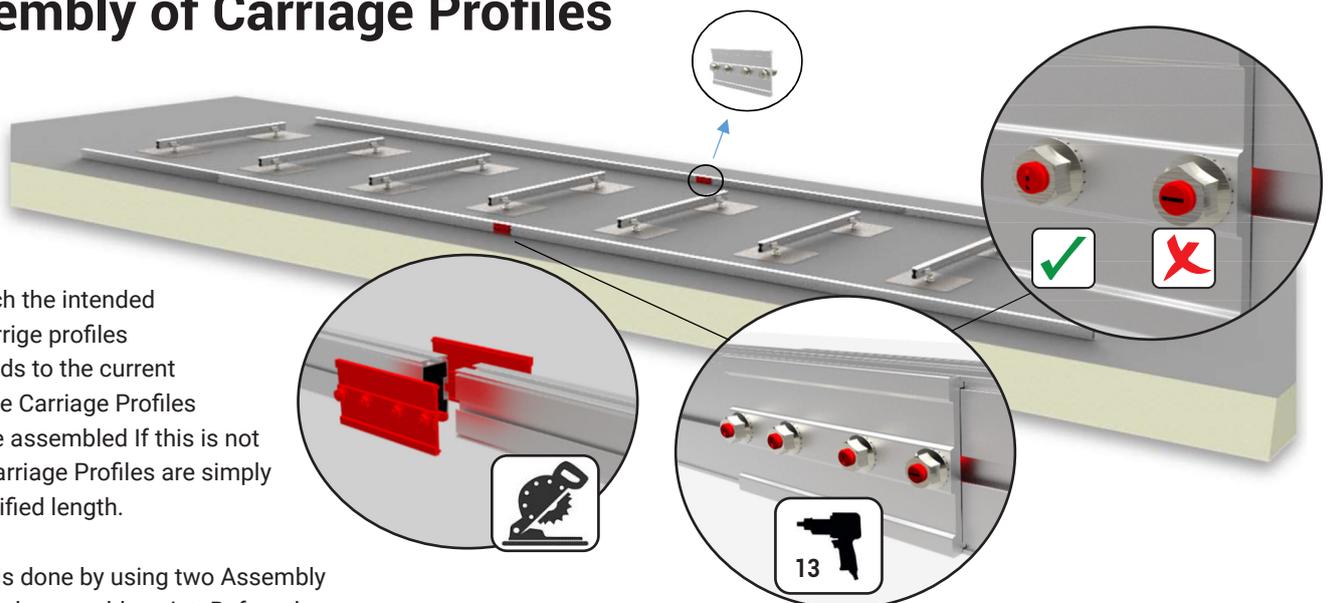


When the Cross Beam Profiles have been cut to their intended length they must be coupled to the corresponding Fix Point Brackets. The illustrations above presents this process and the detailed close ups shows the how the directional tracks in each Profile must be aligned with the two reinforcement ribs on the Fix Point Brackets and finally how the Hammerhead bolts must be constrained with the cross oriented position mark.

6. Assembly of Carriage Profiles

In order to reach the intended length of the carriage profiles which corresponds to the current module length the Carriage Profiles may need to be assembled. If this is not the case the Carriage Profiles are simply cut to the specified length.

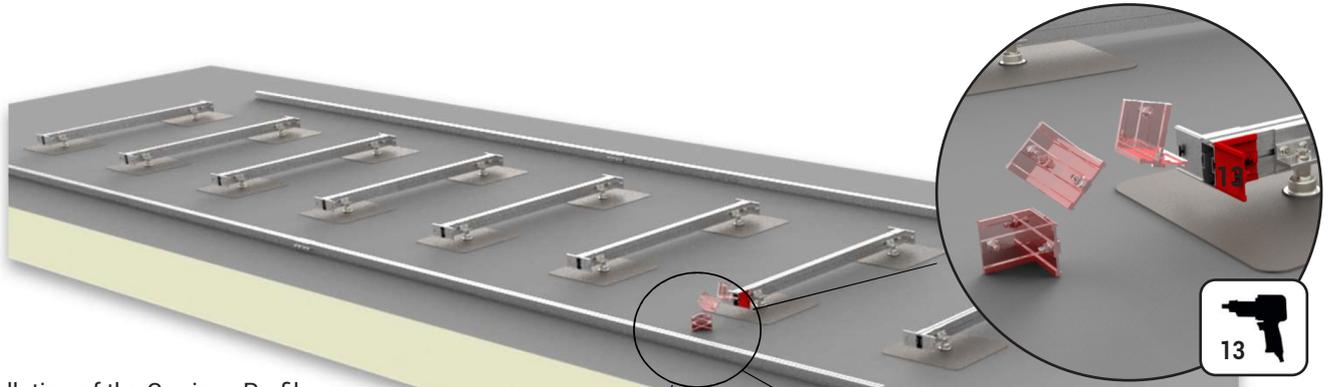
The assembly is done by using two Assembly Brackets for each assembly point. Before the bolts are fixed, the Carriage Profiles must be pushed together whereafter all the hammer-head bolts are turned and tightened.



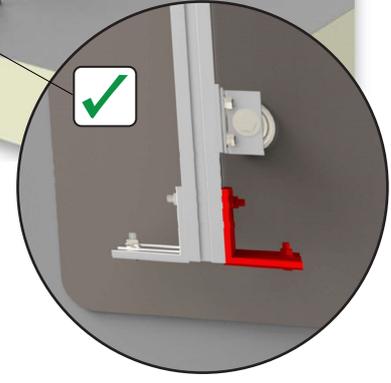
This illustration shows how the two Assembly Brackets are positioned in each profile assembly point.



6. Installation of Carriage Profiles (Internal Corner Bracket)



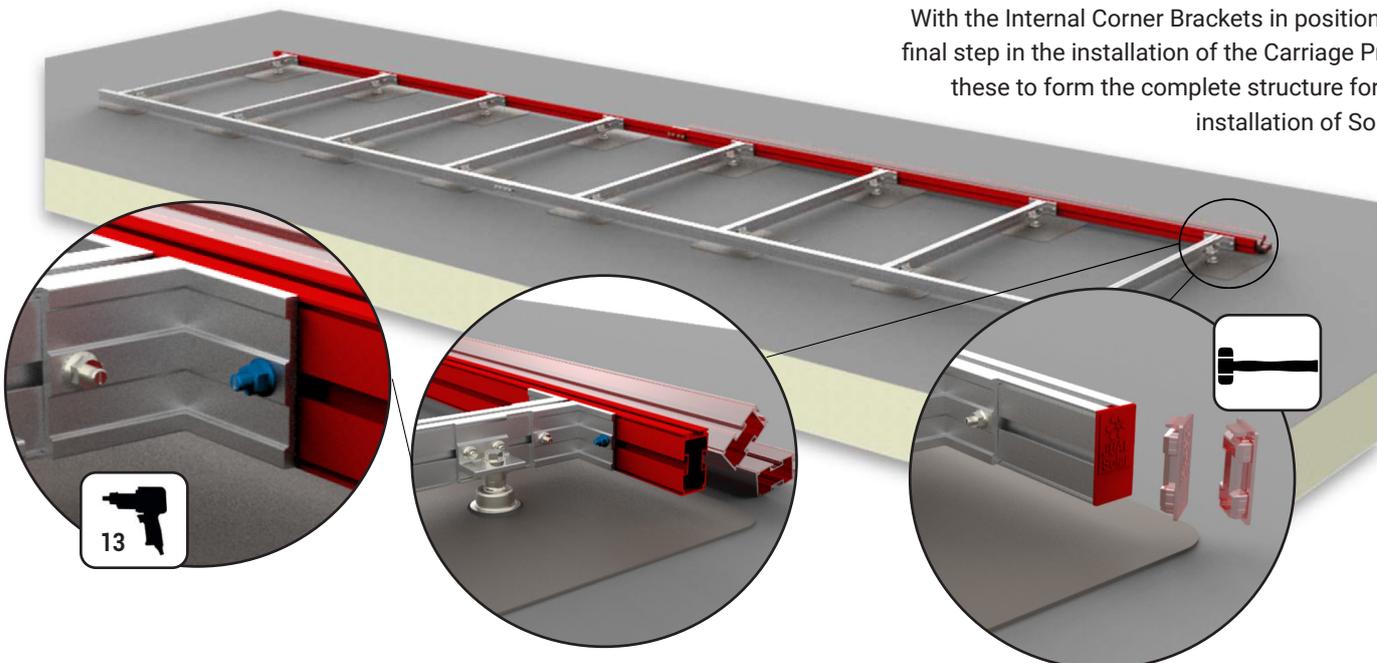
The installation of the Carriage Profiles is done on to the Cross Beam Profiles by applying 4 Internal Corner Brackets per Cross Beam. The Internal Corner Bracket does as the Fix Point Bracket and Assembly Bracket include the reinforcement ribs which must be aligned with the corresponding tracks in the Carriage Profile. The following illustrations show the requirements for installing the Internal Corner Bracket as well as the Carriage Profiles.



The Internal Corner Bracket must align with the end of the Cross Beam Profiles and the Cross Beam profile may not extend beyond the connecting surface of the Bracket.

7. Installation of Carriage Profiles (Fixation)

With the Internal Corner Brackets in position and fixed the final step in the installation of the Carriage Profiles is to fix these to form the complete structure for the following installation of Solar Collectors.



The Internal Bracket is finally fixed to the Carriage Profiles by constraining the Hammer-head bolt while assuring that the position mark is oriented correctly.

The illustration above shows the insertion of the Carriage Profile End Cover which is the final step in the installation process of the Fixnordic Solar Collector Platform.

FIXNORDIC EAST/WEST CONSOLE SYSTEM

The Console system has been designed with the intension of creating the basis for a trouble free PV-installation with a long life time for flat roofs with bituminous- or synthetic roofing membranes.

A technical design report which describe how the PV-installation influences the current roof surface is generated for each individuel project and the specific requirements for the roof surface has been validated through out the project planning.

Design calculations are based upon the EuroCode EN1991 1-3 and EN1991 1-4 where aerodynamic values derived from specific wind tunnel tests forms the foundation for the wind related fixation into the building structure. Besides the wind technical aspect the snow related design is also an important part of the load design as this forms the basis for how the pressure load will be distributed from the framing structure to the roof surface.

The precondition for a succesfull result is that each element in the installation is carried out in full compliance with both the Technical Design Report as well as the relevant installation guide lines. It is therefore recommended that the installation guide line is thouroughly studied and that Fixnordic is contacted if uncertainties, questions or if the need for changes arises.

Calculated console load:

$\uparrow F_z$	Windload	1,67 kN	Console load capacity	3,5 kN	Windload + Module weight < Console load capacity	YES
$\rightarrow F_y$	Windload	0,20 kN	Console load capacity	$\pm 0,5$ kN	Windload + Module weight < Console load capacity	YES
	Snowload	3,64 kN	Console load capacity	4,0 kN	Snowload + Module weight < Console load capacity	YES

Calculated support load:

$\downarrow F_z$	Snowload	1,84 kN	Support load capacity	1,84 kN	Snowload + Module weight <= Support load capacity	YES
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