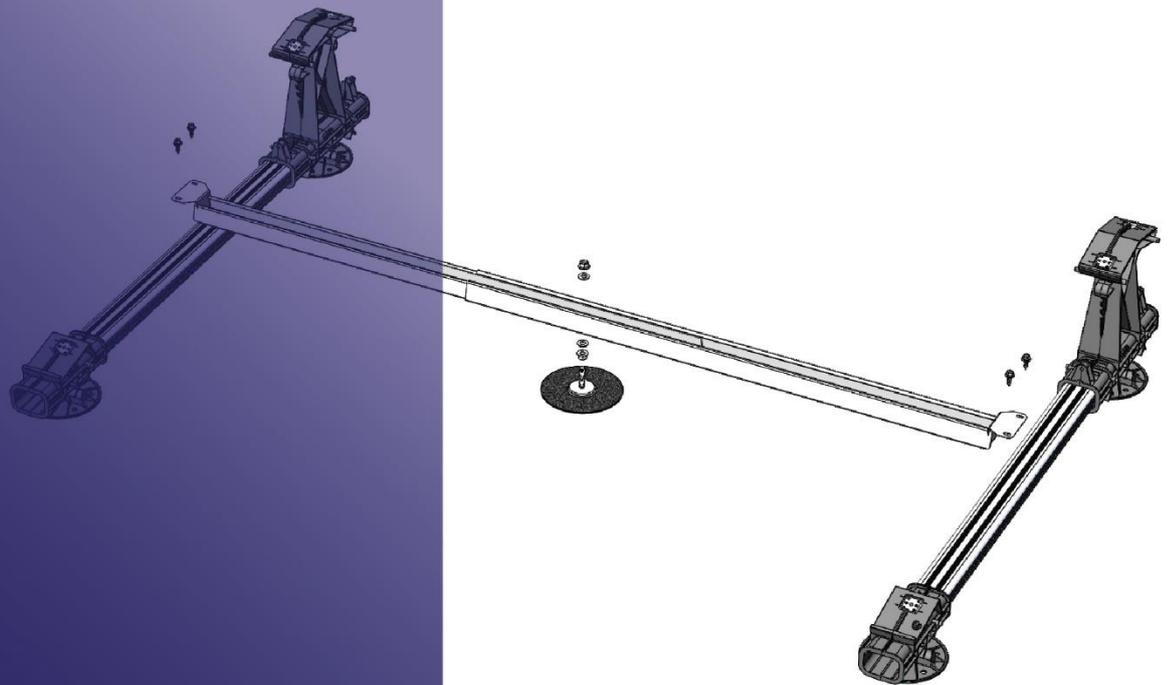


ESDEC

INNOVATIVE MOUNTING SYSTEMS



FLATFIX FUSION ANCHOR BAR

Flat roof mounting
system for solar panels

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THESE INSTALLATION INSTRUCTIONS MUST BE STORED CAREFULLY FOR FUTURE USE!

For the warranty terms and conditions, we recommend contacting your supplier. Please also refer to our General Sales & Delivery Conditions, which are supplied on request.

The manufacturer denies any responsibility for damage or injury as a result of a failure to carefully follow these installation instructions, and failure to take common precautions in the transport, mounting and use of the FlatFix Fusion mounting system.

As a result of our continuous pursuit of improvement, it may occur that the product deviates in detail from that which is described in this manual.

For this reason, the instructions provided serve only as a guideline for installing the product stated in this manual.

This manual is compiled with the greatest possible care, but the manufacturer cannot be held responsible for any errors in this manual or any resulting consequences.

Furthermore, all rights are reserved and nothing in this manual may be copied in any way whatsoever.

1. Introduction

This manual describes the installation of the FlatFix Fusion Anchor Bar for flat roofs (for solar panels in landscape setup).

Read the manual carefully so that you are fully aware of the entire content. Follow the instructions in the manual carefully. Always carry out the actions in the correct order.

Store the manual in a safe and dry location. If you lose the manual, you may always request a copy from Esdec BV or download it from www.esdec.com.

Where there is a reference to the construction plan, we also refer to the FlatFix Calculator that allows you to generate a construction plan.

2. General installation conditions

General

A failure to adhere to the guidelines stated in this document and/or in the construction plan may lead to all warranty and product liability claims lapsing.

The details, comments and recommendations in this document are binding and must be checked to ensure they are complete and up-to-date. Esdec BV retains the right to revise this document without notification.

Stability and condition of the roof

The roof must be in good condition and strong enough to bear the weight of the solar panels, incl. associated materials, ballast, wind and snow load. Check the stability of the roof/structure and where necessary employ a builder to correct it. Make sure the load reserve of the roof is not exceeded either locally or in its entirety.

Insulation / roofing material

The continual pressure loading capacity (point load) of the insulation and the roofing material must be checked thoroughly and found to be sound before installation. The suitability of the roof supports combined with the roofing material must be checked and found to be sound, and if necessary or desirable extra roof supports must be fitted at the required locations. In case of doubt, employ a roofer.

Safety warnings

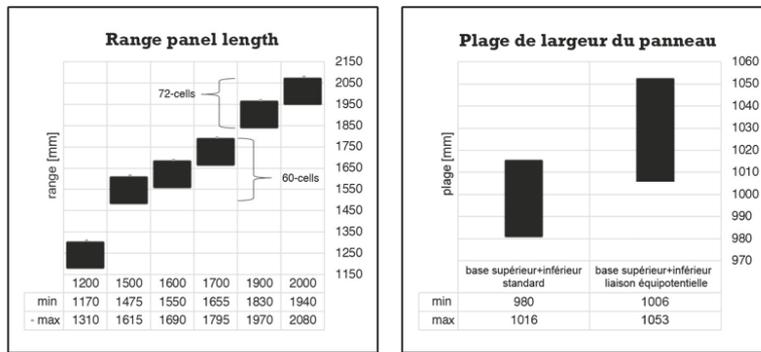
- FlatFix Fusion mounting systems must be fitted as standard by qualified technical personnel (at least two skilled people).
- The addition or omission of parts may have a detrimental effect on the function of the system and is strongly discouraged!
- Before placing the solar panels, the roof must be clean, dry, flat and free of algae and the like.
- Avoid fitting in high winds and a wet, slippery roof surface.
- Fitting of the FlatFix Fusion mounting system may only take place at temperatures between 5° and 40°C (due to the fitments of the plastic parts).
- Always work on a roof using fall protection and safety nets and edge protection where necessary.
- Wear shoes with reinforced toecaps and sturdy anti-slip soles.
- Always wear the proper protective clothing when carrying out the work.
- Always use lifting aids / hoist systems when moving the material (solar panels, etc.).
- Always place a ladder on a sound and stable surface.
- Always place the ladder at an angle of around 75° and ensure it sticks out about 1 meter above the roof edge.
- If possible, fasten the top of the ladder with a rope or strap.

Range of application of FlatFix Fusion Anchor Bar

- Wind zone 1 to 3.

- Roof height (3-12m) If your roof is higher, contact your supplier.
- Type of roofing material: Concrete, bitumen / EPDM / PVC / TPO.
- Roof pitch: maximum 13°. For a roof pitch of over 13°, contact your supplier.
- Setup: Landscape mounting. Angle of inclination solar panels: 13°
- Maximum solar panel dimensions: length 1170-1310 mm, 1475-1615 mm, 1550-1690 mm, 1655-1795 mm, 1830-1970 mm, 1940-2080 mm, width 980-1053 mm, thickness 25-50 mm. (See table on Page 05)

Table of panel dimensions range



Edge zone

The distance of the solar panels to the edge of the roof must be around 1/5 of the height of the building, with a minimum distance of 30 cm (due to the strongly turbulent wind flows in this zone). No solar panels may be fitted to this zone, neither partially nor fully. The edge zone to be observed follows from the FlatFix Fusion calculator.

Ballast

All ballast is removed when anchor bars are used.

Consult the construction plan for the correct placing of the roof anchors.

Exchanging ballasted positions for an anchor bar is not a solution, the plan must be re-calculated.

Standards, guidelines, and regulations

When fitting a mounting system, it is important that you follow the mounting instructions and associated standards to prevent incidents. Especially, considering the following standards, guidelines, and regulations:

- Dutch Building Code
- PPE Personal Protective Equipment
- KEMA Inspection of Electrical Equipment
- DIN 1055 Design loads for buildings
- DIN 18299 General rules applying to all types of construction work
- DIN 18451 Scaffolding works
- NEN EN 1991
- NEN 7250

Removal and dismantling

Remove the product as per local legislation and regulation. At the end of the design life, all materials are recyclable.

The aluminium base profiles are fastened to the base elements using a click system. Use combination pliers to dismantle the base profile.

Warranty

The warranty is subject to the warranty conditions and the general conditions of Esdec BV. These can be found on our website www.esdec.com.

Liability

The manufacturer does not accept any liability whatsoever for damage or injury caused by a failure to (strictly) comply with the safety guidelines and instructions in this manual, or due to negligence during installation of the product stated in this document and any related accessories.

- printing errors reserved

3. Product Description

The anchor bar is used to attach a FlatFix Fusion system to a roof (see requirements for roof anchor) and ensures safe and reliable installation of your system. You can use Esdec's anchor bar for maximum safety of your flat roof solar project, lowering the amount of ballast or make it suitable for installation under bigger roof angles.

The Anchor bar is telescopic and available in 2 sizes covering the whole standard use range of FlatFix Fusion (1600-2080 mm).

The bar is made of Magnelis Steel and is able to accept differences in anchor placement.

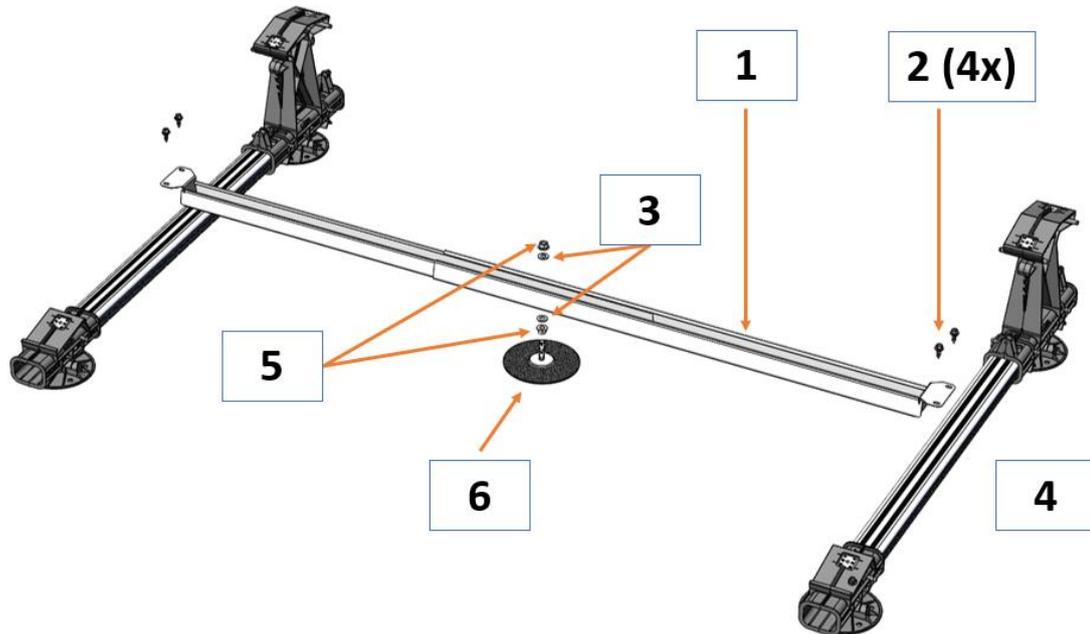
FlatFix Fusion Anchor Bar may be used for all types of roofing material.

Placing roof anchors

Roof anchors aren't provided by Esdec. Please consult a third party or a roofer for placing roof anchors on the designated spots on the roof. Consult the construction plan for correct positioning and amount of the needed roof anchors.

4. Parts overview

4.1 Exploded view



4.2 Parts list



1. **FFF Anchor Bar**
Item no: 100-7270 (L1590-1800)
100-7271 (L1800-2080)



2. **Self-tapping screw 6.0x25**
Item no: 100-3010



3. **PA washer – M10**
Item no: 100-7272



4. **FlatFix Fusion system**

5. **M10 nut**

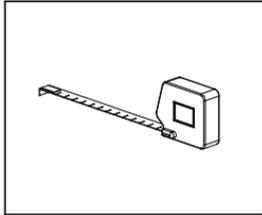
6. **Roof anchor**
Specifications for the roof anchor are shown in *Chapter 2. General installation conditions.*

5. Mounting preparation

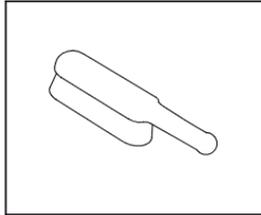
5.1 Check of tools and accessories

Below is a list of necessary tools/aids:

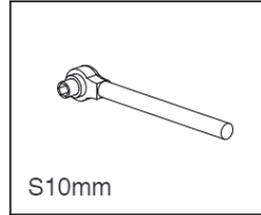
Tape measure



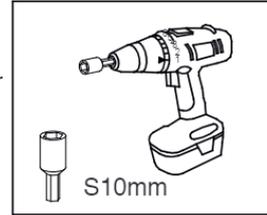
Brush



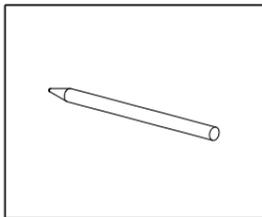
Ratchet with hexagon head



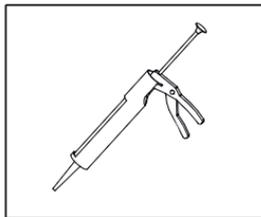
Powered screwdriver



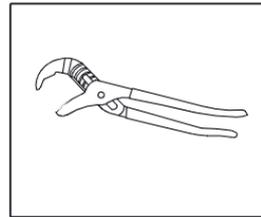
Marker/chalk



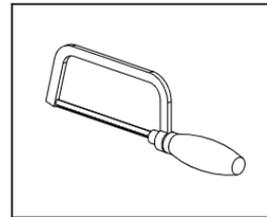
Sealant pistol optional
for roof pitch > 2°/3°



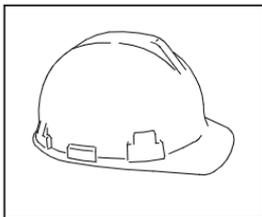
Water pump pliers



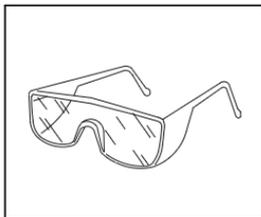
Metal saw



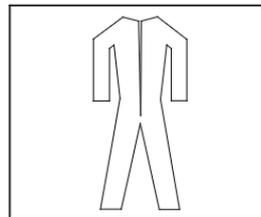
Safety helmet



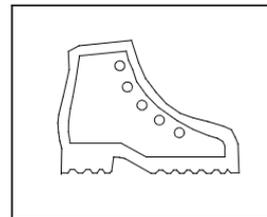
Safety goggles



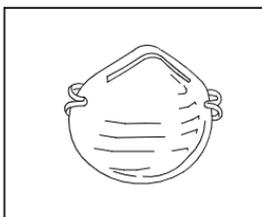
Protective clothing



Safety shoes



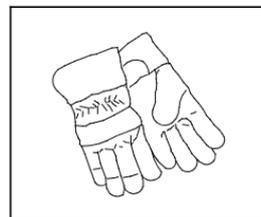
Dust mask



Ear protection



Safety gloves



Scaffold or stable safe ladder

5.2 Roof anchor requirements

First check if the project meets the following requirements.

Project requirements:

F_{max} Lift Panel does not exceed 1,667 kN

F_{max} Sheer Panel does not exceed 0,983 kN

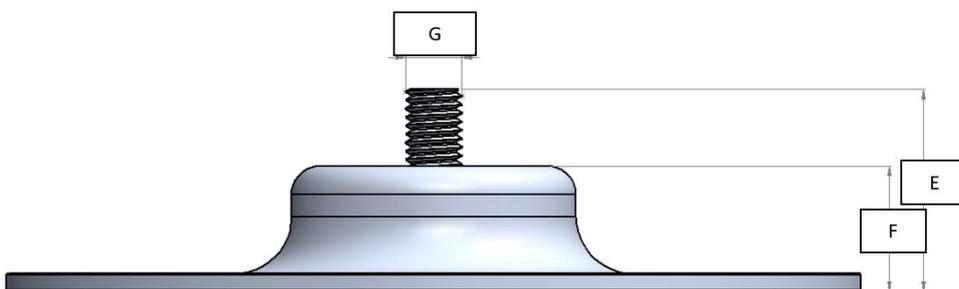
Panel size is between 1590 and 2080 mm

Roof pitch is between 0 and max. 13 degrees.

Values are to be determined through our Project Engineering department.

Only when the project meets these requirements, the anchor bar can be used.

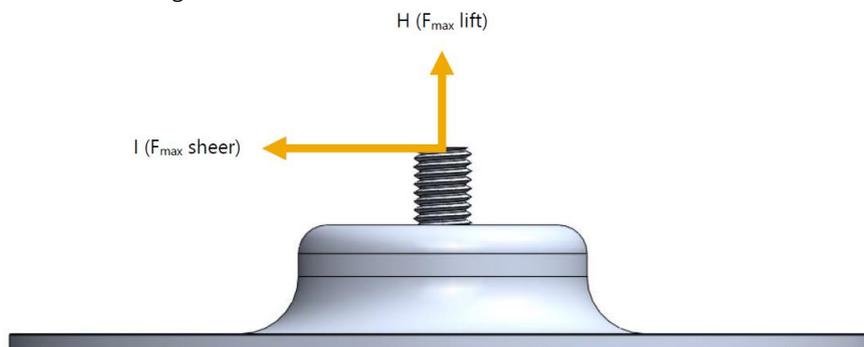
Anchor requirements:



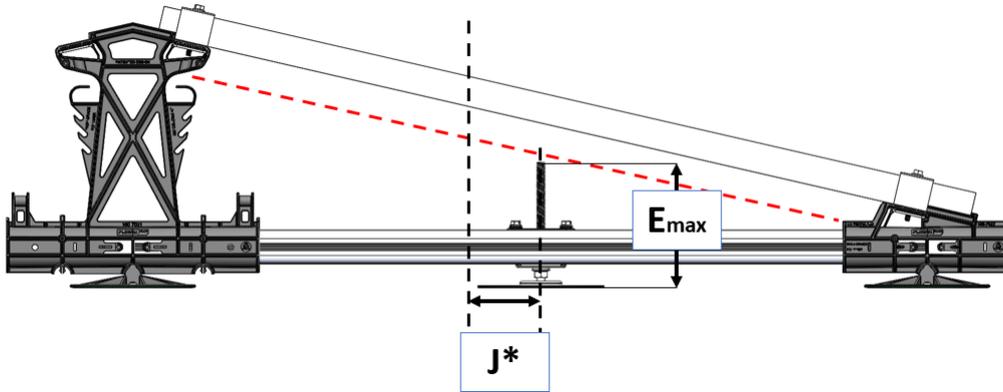
The dimensions of a roof anchor should always be within range defined in the table below. The above figure shows the positions of these dimensions.

Dimension	Requirement
E	35,5mm <= Height of anchor thread <= 130mm
F	0 mm <= Height of anchor base* <= 21,5 mm
G	Thread dimension: M10
H	F _{max} Lift Anchor > 4,4 kN
I	F _{max} Sheer Anchor > 2 kN
J	0 mm <= Precision of anchor placement <= 100 mm

* When the gap between the anchor base and the bottom of the Anchor Bas is smaller than 10mm , rings should be used to level the interface of the anchor with the interface of the Anchor Bar. When the gap is larger than 10mm, a flange nut with serration can be used underneath the Anchor Bar to level the interface.

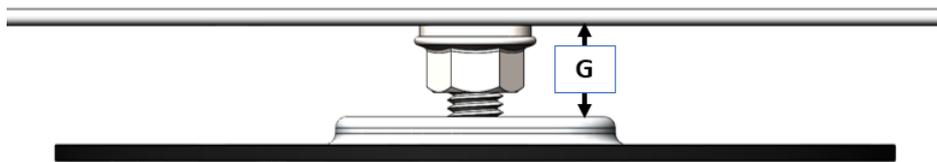


The tip of the anchor bolt should never be above the red line shown in the figure below. When a solar panel sags in case of high pressure (snowload/windload) the back of the sheet of the solar panel could touch the tip of the bolt and cause damage.

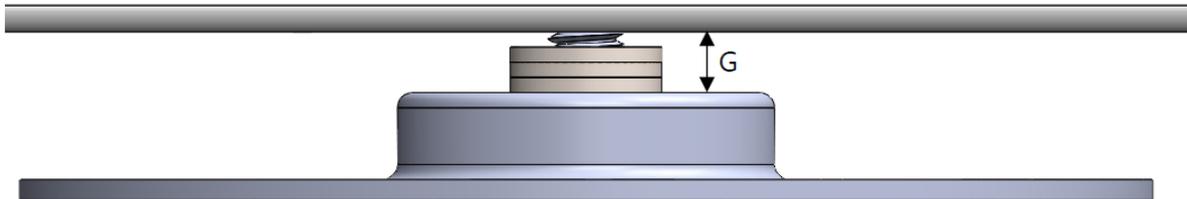


The height of the anchor base should not exceed 21,5 mm. If it does, the anchor will lift the Anchor Bar and the FFF system from the roof and make the system more vulnerable for wind sheers resulting in damage to the panels and system.

When dimension G in the figure below is larger than 10mm, a M10 flange nut with serration can be used to level the interface of the anchor with the bottom of the anchor bar.

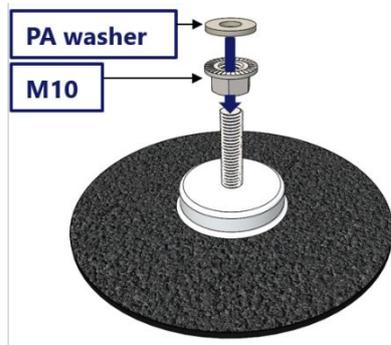


When dimension G is smaller than 10mm, rings should be used to level the interface of the anchor with the bottom of the anchor bar.



Only M10 threaded anchors can be used with the anchor bar.

A PA M10 washer should always be the interface between the roof anchor and the FFF anchor bar.



5.3 List of accepted anchors

Brand	Article number	Description
 Fixnordic Fixnordic	DMJU220062-1xx	For steel roofs, 1 layer of bitumen
	DMJU230062-1xx	For steel roofs, 2 layers of bitumen
 Fixnordic Fixnordic Fixnordic Fixnordic	DMJU2100742250	DirectFix Trapeziumanchor – 250 mm
	DMJU2100742500	DirectFix Trapeziumanchor – 500 mm
	DMJU2100742700	DirectFix Trapeziumanchor – 700 mm
	DMJU21007421000	DirectFix Trapeziumanchor – 1000 mm
 Fixnordic Fixnordic	DMJU220062-1xx	For concrete roofs, 1 layer of bitumen
	DMJU230062-1xx	For concrete roofs, 2 layers of bitumen
 Fixnordic Fixnordic Fixnordic Fixnordic	DMJU210074250	Concrete anchor DirectFix – 250 mm
	DMJU210074500	Concrete anchor DirectFix – 500 mm
	DMJU210074700	Concrete anchor DirectFix – 700 mm
	DMJU2100741000	Concrete anchor DirectFix – 1000 mm

Brand

Brand	Article number	Description
Fixnordic	DMJU210074-250	Cellular concrete anchor DirectFix – 250 mm
Fixnordic	DMJU210074-500	Cellular concrete anchor DirectFix – 500 mm
Fixnordic	DMJU210074-700	Cellular concrete anchor DirectFix – 700 mm
Fixnordic	DMJU210074-1000	Cellular concrete anchor DirectFix – 1000 mm
CW Lundberg Weland	M-082 1807 GB MA1008	



Eyecatcher

EC-SFX-L20

Solarfix Low 20mm



Eyecatcher

EC-SFX-L20

Solarfix Low 20 mm with PVC coating



Eyecatcher

EC-SFX-S

Solarfix Steel (RVS)

Brand

Eyecatcher

EC-SFXL-MA-10-400

Solarfix Concrete anchor M10x400, in combination with Solarfix Anchorplate



Eyecatcher

EC-SFXL-MA-10-500

Solarfix concrete anchor M10x500, in combination with Solarfix Anchorplate



Eyecatcher

EC-SFXL-TP-10-400

Toggle anchor M10x400, in combination with Solarfix Anchorplate



Eyecatcher

EC-SFXL-TP-10-500 Toggle anchor M10x500, in combination with Solarfix Anchorplate



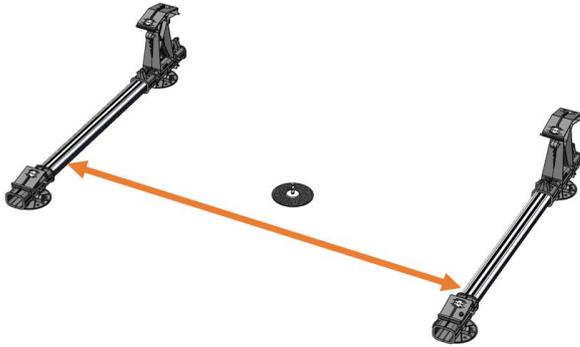
Eyecatcher

EC-SFXL-B-10-100 Solarfix bolt M10x100, in combination with Solarfix Anchorplate

6. Installation

6.1 Determining and measuring position of roof anchors

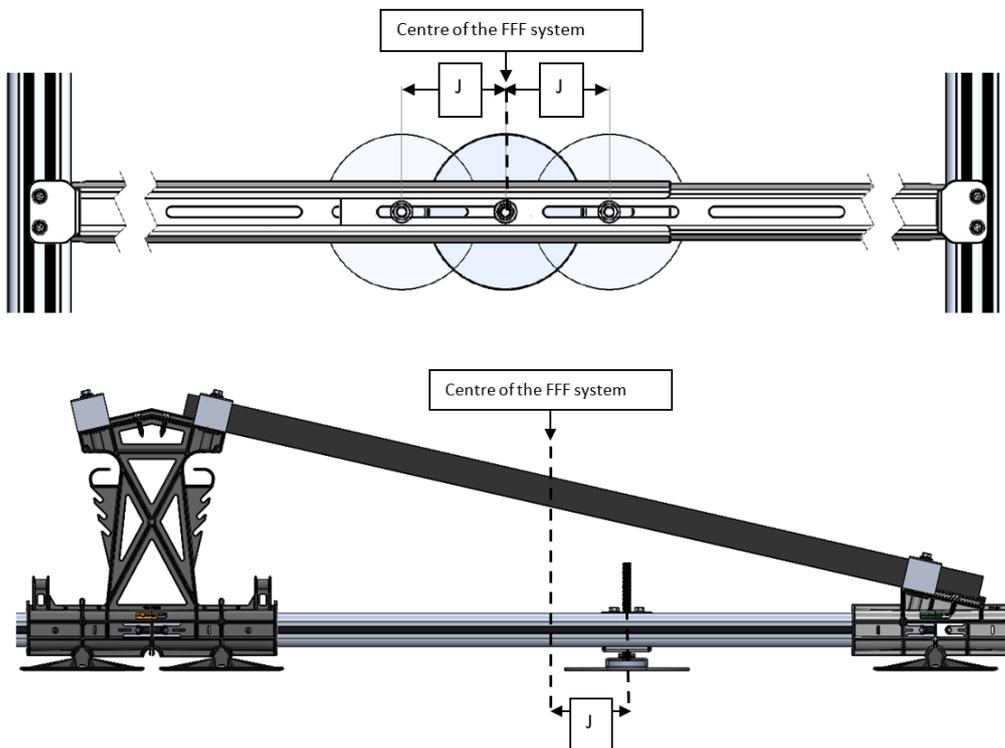
Measuring and marking out:



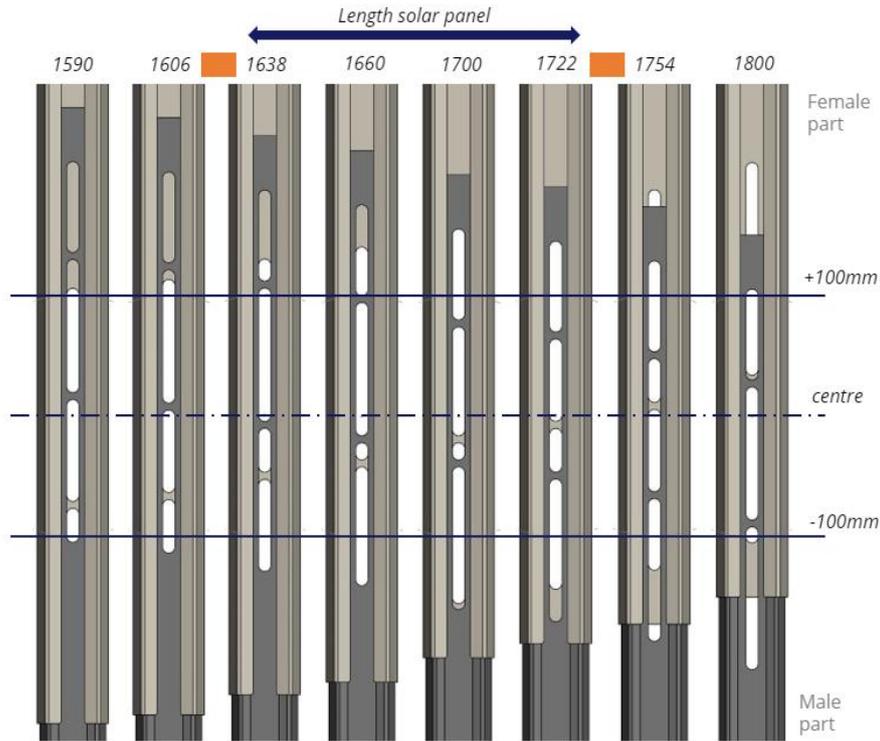
Make sure the system is aligned correctly for the right panel size.
Mark the outlines of the panel field on the roof with chalk or a marker.

6.2 Precision of installation

The roof anchor can be used for anchoring when it is positioned within a radius of [J] mm from the center of the FlatFix Fusion system, as illustrated in the figures below. Esdec can't guarantee that the system will be strong enough to withstand extreme weather conditions when dimension [J] is exceeded. Maximum value for J = 100 mm.

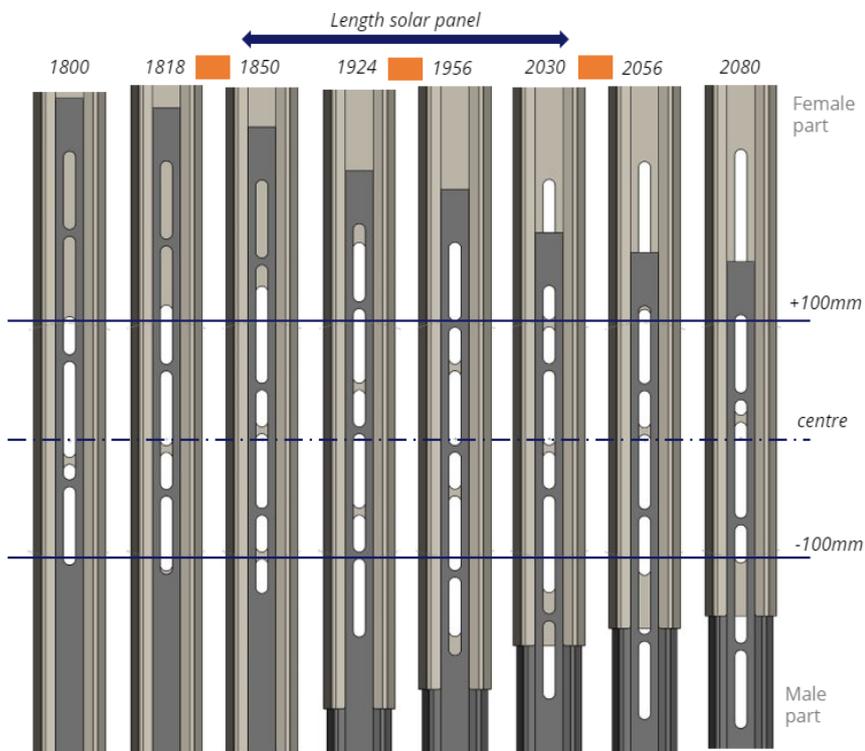


Anchor Bar 1590-1800 Range of accepted panel sizes;



Conflicting panel lengths are: 1606 to 1638 mm and 1722 to 1754 mm.

Anchor Bar 1800-2080 Range of accepted panel sizes:



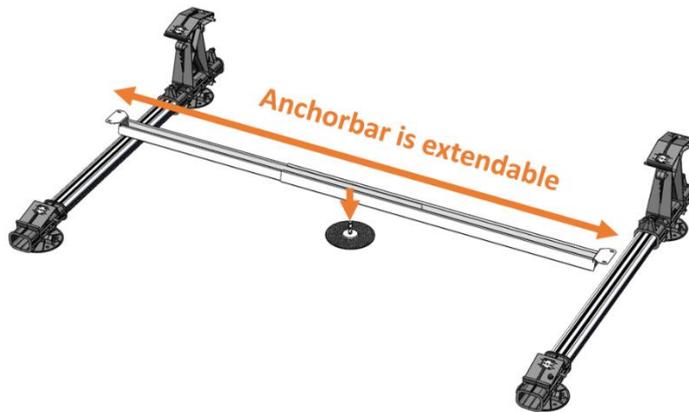
Conflicting panel lengths are: 1818 to 1850 mm and 1924 to 1956 mm.

To solve these conflicting range of panels, placing the anchor bars off center could fix this.

6.3 Mounting anchor bar to base elements

As standard, the high base element is placed on a single roof support.

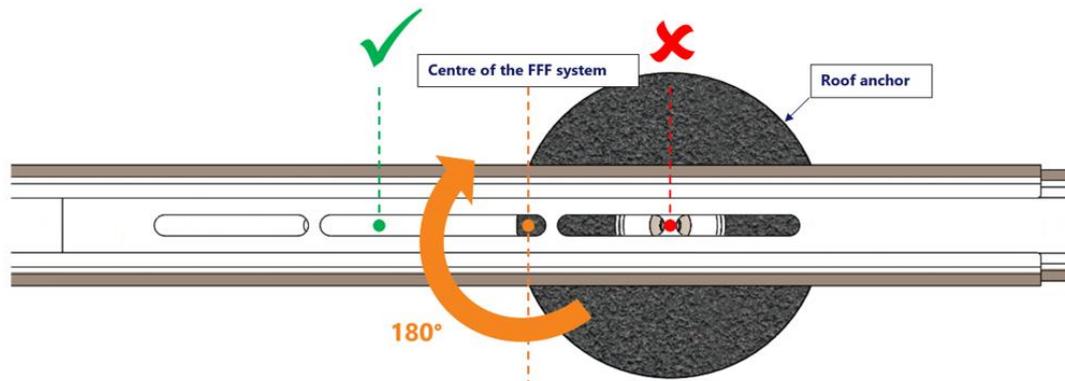
1. Secure the roof support to the high base element using the click connector. Use the center click connector to the underside of the high base element for this.
Optional: In situations where ballast is to be placed, two roof supports are secured under the high base element. Use the two click connectors at the center (1A) for this.
2. Secure the roof support to the low base element using the click connectors.



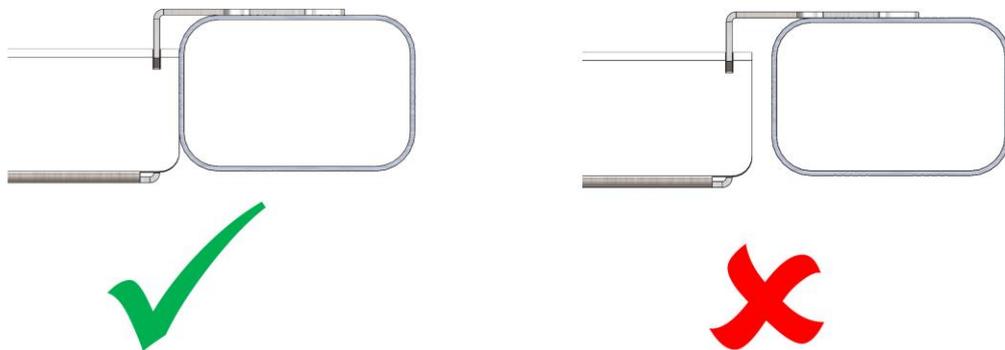
Extend the anchor bar to fit between the two rails.

In case of a conflict, rotate the anchor bar 180 degrees to make it fit properly.

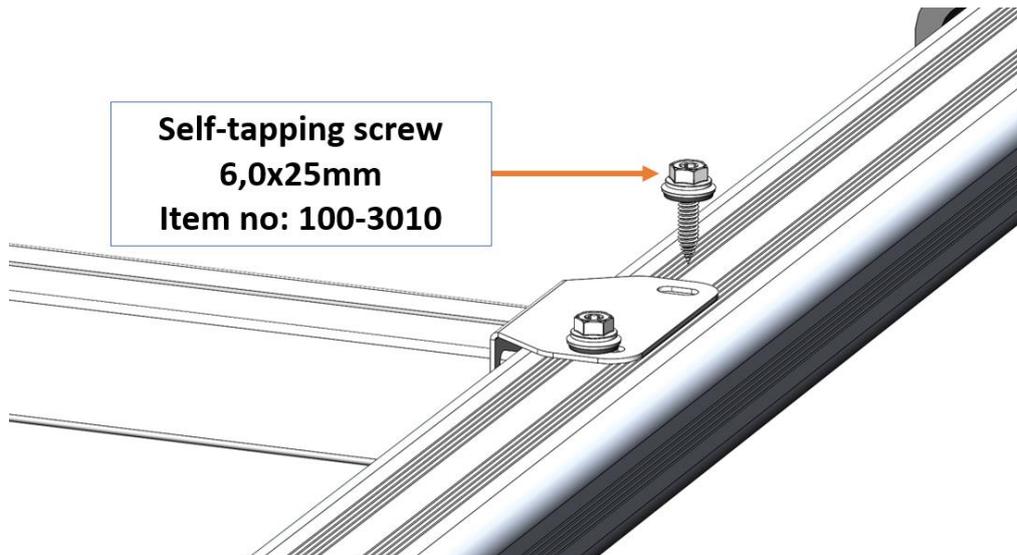
For some panel ranges this step is necessary, see the tables under 6.2 for measurements.



Make sure the front side of the anchor bar is always touching the FlatFix Fusion profile.



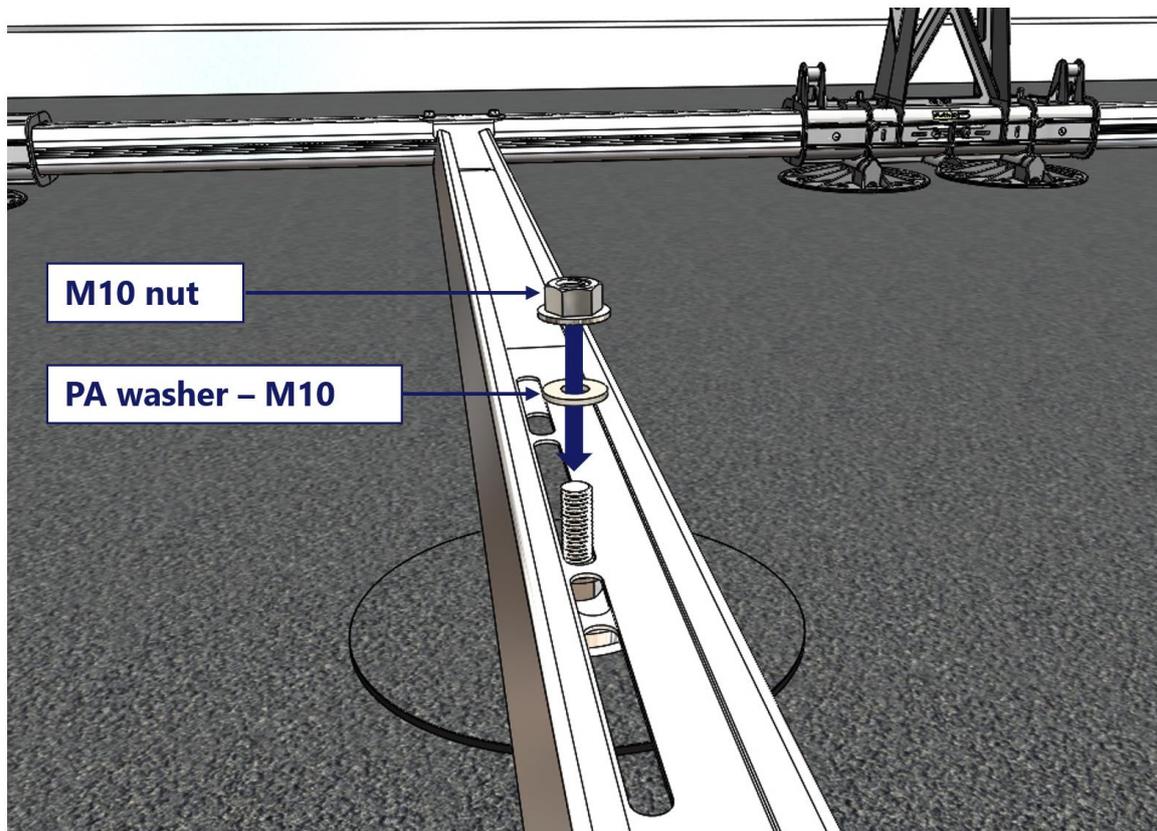
Mount the anchor bar to the FFF profiles.



Fasten the anchor bar to the roof anchor.

Minimum mounting torque is 10 Nm.

Also, a PA M10 washer should always be placed between the anchor bar and the roof anchor.

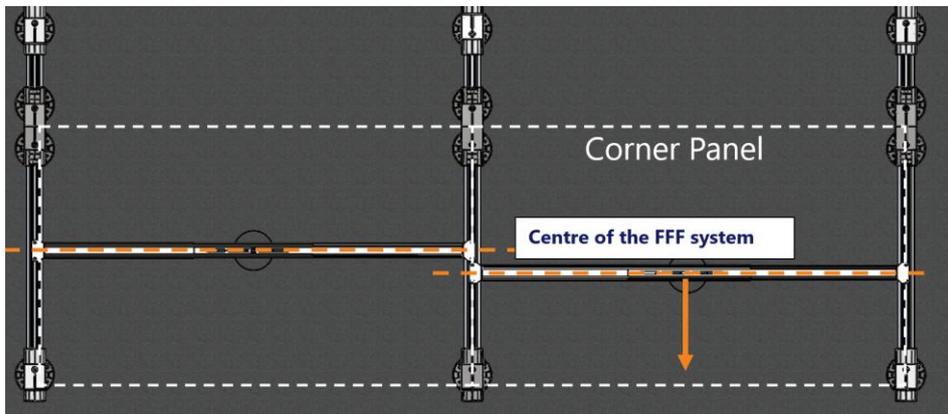
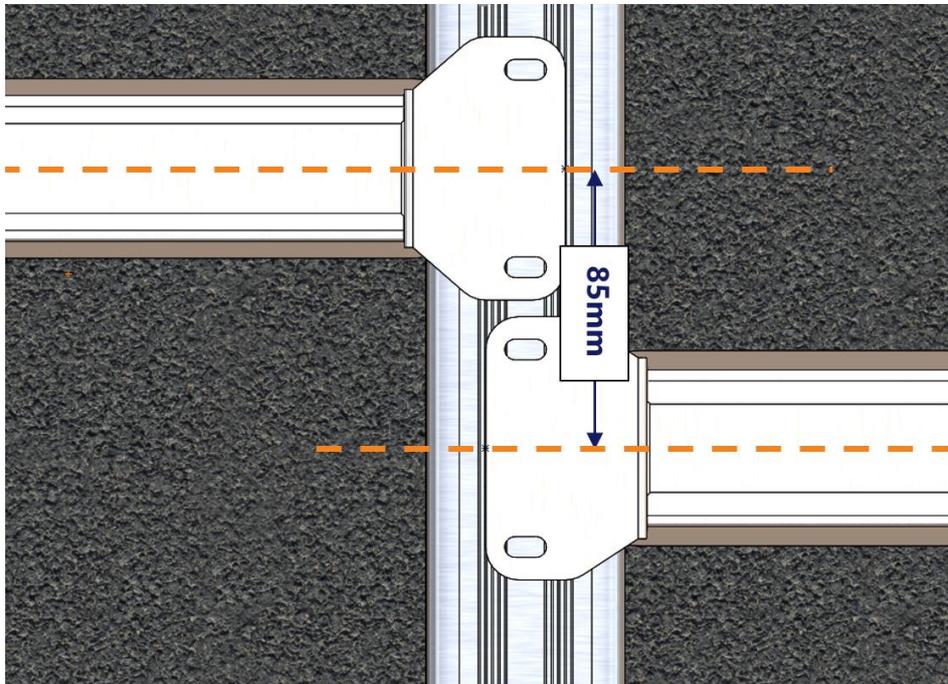


6.4 Double anchor bar

In cases where there are two anchor bars needed under adjacent panels, the anchor bars meet each other in the middle.

Place the anchor of the most outer panel 85 mm towards the perimeter side of the field.

Illustrated below.

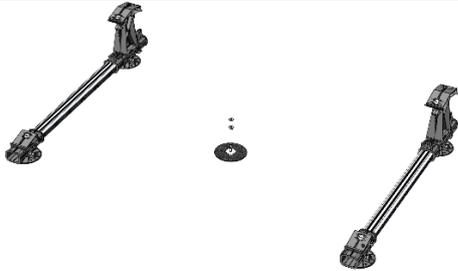


6.5 Summary

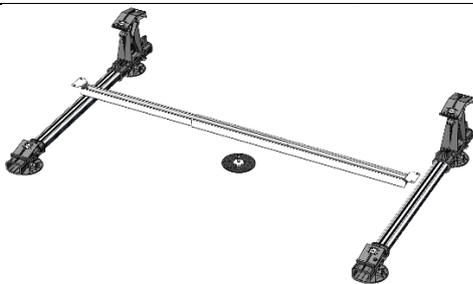


1. Measure and mark out the segments on the roof and the exact placement of the roof anchors.

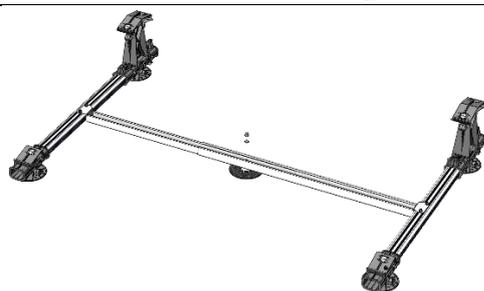
2. Place roof anchors.



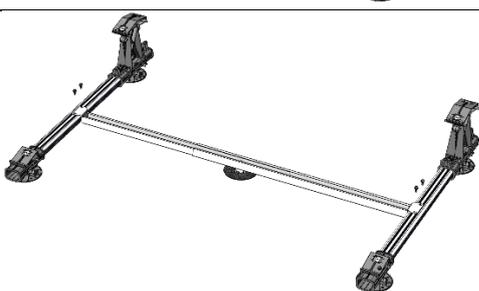
3. Add M10 washer and M10 nut to the roof anchor



4. Place the extendable anchorbar, make sure the anchorbar is extended in full and touches the FlatFix Fusion frame completely, leaving no gaps.



5. Fix the anchorbar with a M10 washer and nut.
Min. torque is 10Nm.



6. Fix the anchorbar to the FlatFix Fusion profiles with 4x screw 6,0x25mm. Art. Nr. 100-3010.



7. Finished. Double check if the anchor bar has washers under and below the anchor bar and there are no gaps between the anchor bar and the Fusion profiles.