



**FP-1**  
**Installation Manual**  
**&**  
**Owner's Guide**

*The Best Solar Thermal Systems in the World*



# INDEX

1. LIST OF KIT PARTS .....	2
2. GENERAL INFORMATION .....	3
3. LIGHTENING PROTECTION .....	4
4. INFORMATION ON WIND, SNOW AND MAINTENANCE.....	4
5. ASSEMBLY OF FLAT ROOF STRUCTURES .....	8
6. ASSEMBLY OF PITCHED ROOF STRUCTURES.....	11
7. LAY OUT EXAMPLES .....	15
8. MINIMUM DISTANCES .....	16



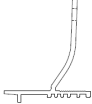
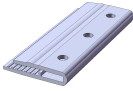



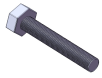
## KIT PARTS

### Flat roof structures

Description	Amount	Length	Image
Hypotenuse Profile	Basic Module: 2 pieces Extension of 1: 1 piece Extension of 2: 2 pieces	2,180 mm 85 7/8 inch	
Vertical Profile	Basic Module: 2 pieces Extension of 1: 1 piece Extension of 2: 2 pieces	1,370 mm 54 inch	
Back Anchor	Basic Module: 2 pieces Extension of 1: 1 piece Extension of 2: 2 pieces	35 mm 1 1/2 inch	
Front Anchor	Basic Module: 2 pieces Extension of 1: 1 piece Extension of 2: 2 pieces	40 mm 1 1/2 inch	
Curved Profile	Basic Module: 2 pieces Extension of 1: 2 pieces Extension of 2: 2 pieces	Basic Module: 1,095 mm (43 1/8 inch) Extension of 1: 1,176 mm (46 1/8 inch) Extension of 2: 2,352 mm (92 5/8 inch)	
Sliding Profile	Basic Module: 1 pieces Extension of 1: 1 piece Extension of 2: 2 pieces	Basic Module: 1,040 mm (41 inch) Extension of 1: 1,276 mm (50 1/4 inch) Extension of 2: 1,276 mm (50 1/4 inch)	
Holding Clamp	Basic Module: 4 pieces Extension of 1: 2 pieces Extension of 2: 4 pieces	40 mm (1 5/8 inch)	
Joining Piece	Basic Module: 0 pieces Extension of 1: 2 pieces Extension of 2: 2 pieces	120 mm (4 3/4 inch)	
Screw M8 x 65	Basic Module: 4 pieces Extension of 1: 2 pieces Extension of 2: 4 pieces	8x65	
Screw M8 x 30	Basic Module: 4 pieces Extension of 1: 6 pieces Extension of 2: 8 pieces	8x30	
Screw M8 x 20	Basic Module: 6 pieces Extension of 1: 4 pieces Extension of 2: 8 pieces	8x20	
Washer & Nut M8	Basic Module: 4 pieces Extension of 1: 12 pieces Extension of 2: 20 pieces	M8	
Lock washer	Basic Module: 14 pieces Extension of 1: 12 pieces Extension of 2: 20 pieces	M8	



## Pitched roof Structure

Description	Amount	Length	Image
Curved Profile	2	Basic Module: 1,095 mm (43 1/8 inch) Extension of 1: 1,176 mm (46 1/8 inch) Extension of 2: 2,352 mm (92 3/8 inch)	
Joining Piece	Basic Module: 0 pieces Extension of 1: 2 pieces Extension of 2: 2 pieces	120 mm (4 3/4 inch)	
Holding Clamp	Basic Module: 4 pieces Extension of 1: 4 pieces Extension of 2: 8 pieces	40 mm (1 5/8 inch)	
Nut & Washer M8	Basic Module: 0 pieces Extension of 1: 4 pieces Extension of 2: 4 pieces	M8	
Lock washer	Basic Module: 0 pieces Extension of 1: 4 pieces Extension of 2: 4 pieces	M8	
Screw M8 x 30	Basic Module: 0 pieces Extension of 1: 4 pieces Extension of 2: 4 pieces	8x30	

## GENERAL INFORMATION

Dear Customer,

You just bought a SolarUS® solar installation. It is one which will give you years of satisfaction and energy savings if it is installed and maintained correctly and in accordance with the instructions which follow.

Please save all the documentation so that is available whenever necessary during the life of your installation.

SolarUS, Inc.® will NOT be responsible for improper use of the product. None of the material from SolarUS, Inc.® will be covered by the guarantee if it is not installed, used and maintained as indicated in this manual.

The SolarUS, Inc.® collectors should be transported and handled with care to avoid damaging the product. Also, to avoid damaging the solar collector you should try to avoid placing sandy or grainy or abrasive materials on the glass as well as avoiding putting heavy objects on the collector. The collector should not be subject to small bumps to avoid damaging the exterior structure. The collector should always be left on top of flat surfaces as any kind of surface protrusion could dent or perforate the flat plate collector. We recommend handling the collector between two people or with mechanical help to avoid work place risks.

The roof surface where the collector will be placed should be cleaned of any nails, screws, metal and/or cement residue to avoid anything which could damage the collector before, during or after installation.



## **Notes on Installation**

Solar Installations have stringent requirements for water proofing the walls and roofs. It is very important to keep this in mind for the entire building while doing the solar installation. At the same time, all solar installers must adhere to the local laws and rules for preventing workplace accidents pertinent to the location of the solar installation.

The necessary security equipment for the solar installation will not be provided by SolarUS, Inc.<sup>®</sup> and should be acquired before hand by suppliers of safety equipment.

The SolarUS, Inc.<sup>®</sup> flat plate collectors should be installed with a minimal inclination of 5° and a maximum of 90°. The flat roof structures come prepared for an inclination de 35° - 45° or 50° in the installation of the collector. The mounting of Solar systems should only be done by qualified technical personnel who are certified under the local applicable laws.

## **LIGHTENING PROTECTION FOR SOLAR ENERGY INSTALLATIONS**

The installation of the piping in a solar thermal energy installation should have a ground connection according to the low voltage regulations. This connection or the connection of a new solar installation to an existing lightning rod can only be done by authorized technicians and adhering to local regulations.

## **INFORMATION ON WIND, SNOW AND MAINTENANCE**

The SolarUS, Inc.<sup>®</sup> collectors have passed all the tests for shock, hail and meteorological conditions in the DIN EN 12975-2 regulation for using solar thermal energy.

Avoid putting solar installations close to the edge of the roof. In these areas wind gusts generated are stronger and more turbulent. We recommend that there is a minimum of 2 meters (6 feet) between any solar installation and the edge of the roof.

Snow loads of more than 30 cm. (11 inches) on top of the collector should be removed.

The performance of the collector is reduced when the solar glass of the collector is dirty. We recommend that the glass of the collector be cleaned when extremely dirty.

Leaks in the pipes and joints which are not hermetic should be repaired immediately. Preventative maintenance should be carried out as specified in local regulations or if unregulated, at least once a year. This maintenance should look for possible leaks in the solar system, check functioning pressure, check the impulsion pump, verify the impulsion and return temperatures, check the control station, the expansion tank, and the heat carrying liquid in the system.

## **IMPLEMENTATION**

It is necessary that the first start up of the solar installation be done by a solar thermal energy Professional.

It is very important to do a first wash of the installation before the installation is filled. In this way we eliminate all of the metal and welding residues which could obstruct the collector or damage the pump systems of the installation.



This rinse should always be done with a fast pump and using an open tank in such a way that the fluid leaves the bottom of the tank going towards the installation and returns to the top of the tank. This process should last long enough to assure us that all the air has been eliminated from the solar system circuit and that the cleaning has been satisfactorily finished.

This cleaning process and the subsequent filling of the system should always be done when the installation is cold; with no solar radiation or with the collectors covered. After filling the system the pressure of the circuit must be checked to be sure it stays constant.

After the solar installation has been functioning several days, it is important to check if it has to be purged again. If the pressure of the system has gone down, fill the system with heat carrying liquid and purge again.

After each process of purging the system, shut the purging valve to avoid vapor leaks and the deterioration of the purging valves.

The normal operating pressure of the installation should be 1.0 bar plus 0.1 bars per meter of static pressure when the installation is cold. The expansion tank must be able to evacuate the entire volume of liquid from the collectors when stagnation of the system is produced.

Special attention should be taken not to let any occluded air into the solar installation. This would cause the performance of the installation to be considerably reduced and generate circulation problems of the heat carrying liquid.

Once the initial filling of the system is done and all the possible occluded air has been purged from the system, the automatic purging valves should be closed. So that the solar installation is protected from extreme temperatures in hot weather, it is important that the solar installation not be disconnected in summer or when on vacation.

If the solar installation ever has to be emptied, it should never be done with a vacuum system (or having it pulled out).

The dilution of the heat carrying liquid with water reduces the protection offered for the solar system against freezing and corrosion. For that reason we recommend that if the solar system must be rinsed that it be done with the heat carrying liquid to be used in the system. SolarUS, Inc.<sup>®</sup> recommends the use of our heat carrying liquid.

Never use an automatic filling of the solar system as that masks possible leaking problems and you will be permanently diluting the heat carrying liquid.

## MAINTENANCE OF THE SOLAR INSTALLATION

The maintenance plan must comply with the current regulations of the area where the solar system installation is located.

SolarUS, Inc.<sup>®</sup> proposes this minimum maintenance plan for your solar installation which can never be inferior to the established current regulations in regards to elements and/or cadence.

ELEMENTS	FREQUENCY	POINTS TO CHECK
Collectors	12 months	Cleaning the collectors, cracks and deformations, fluid leaks, joint degradation, not water tight
Primary Circuit	6 months	Leaks, water tight, deterioration of the insulation, air bags
Secondary Circuit	6 months	Leaks, water tight, deterioration of the insulation, air bags
Storage Tanks	12 months	Presence of sludge at the bottom, oxidation, wear, damp spots
Electrical Systems	12 months	Functioning properly
Heat carrying liquid	12 months	PH, change in color



Expansion Tank	6 months	Pressure testing, absence of corrosion, degradation of the membrane.
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## TIPS TO BE AWARE OF BEFORE DOING AN INSTALLATION

Before starting your installation, we ask you to carefully read these instructions.

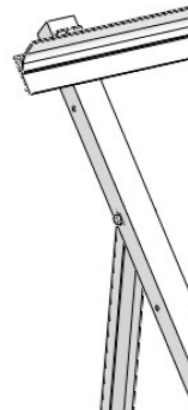
1. The equipment for the solar installation can be used on a flat or pitched roofs, flat terracing, and gardens (yards) but should be installed as close as possible to the sanitary hot water connections. It is VERY IMPORTANT to assure that the surface where the solar equipment will be installed is firm (strong), resilient and capable of bearing the weight of the solar collector. Additionally, it is fundamental that the surface allows a very strong anchorage of the structure of the collector with that surface. Lastly, it is important to install the collectors in an area where the collectors will not receive shadows from near-by objects, whether they are buildings, trees or any other object which impedes the transmission of solar rays to the collector. The appropriate orientation for the solar collector for locations in the Northern Hemisphere is for the solar glass of the collector to face SOUTH. Variations of +/- 25° with respect to the south will not significantly affect the performance of the installation. The slope can vary from 30° to 50°.
2. It is very important to use sufficient insulation for the hot water pipes from the collector leading to the points where the water is used.
3. **IMPORTANT: It is very important that the primary circuit of the installation be filled before the sun comes up or after it has set. If it must be filled during daylight hours, be sure to cover the collector with cardboard and that the collector remains cold. It must be done this way so that the heat carrying liquid doesn't suffer a "thermal shock" when filling the circuit of the collector and evaporates.**
4. Once the solar installation is finished, do not forget to remove any excess material, loose objects and garbage which could cause damage to people, animals or things. Comply with the current safety regulations while doing the installation. **DO NOT TAKE ANY RISKS, TAKE ALL NECESSARY SAFETY PRECAUTIONS.**
5. **IMPORTANT:** SolarUS, Inc.® will not take any responsibility for defective installations or damage caused by incorrect handling of any of the elements used in the installation.



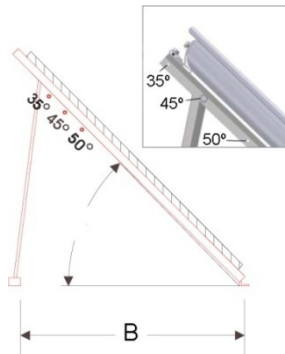
## ASSEMBLY OF THE FLAT ROOF STRUCTURES (Base Module)

When putting the structures together it is very important to use the screws and stainless steel lock washers which come with the kit. By doing this you will avoid the loosening of the screws with the passage of time. In any case, SolarUS, Inc.<sup>®</sup> recommends at least an annual check and tightening of all of the screws in the structure which may have been loosened.

Assembly of the structure begins by joining the vertical profile (No. 3 in figure 1) with the hypotenuse profile (No. 2 en figure 1). This is done using **two screws M8x20**, one for the attaching each side of the profile. Put the screws in the second lateral hole of the top of the hypotenuse profile. In this position the structure will give us a 45° slope for the collector (Figure 6). The structure allows slope angles for the collector of 35°, 45° or 50° depending on if the vertical profile is joined to the hypotenuse profile in the hole on the top of the hypotenuse profile, in the middle hole or in the bottom hole. For every degree of slope the distance between the front leg and the back leg will vary; see distances in table 1.



**Figure 6**



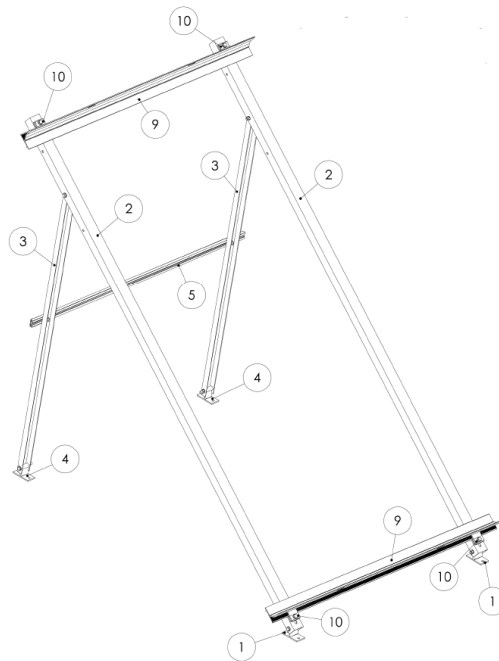
On the bottom side of the hypotenuse profile (No. 2 in figure 1) you will attach the 40 mm (1 ½ inches) wide front anchor (No. 1 in figure 1) with the through bolt 8x65mm.

On the bottom side of the vertical profile (No. 3 in figure 1) you will attach the 35 mm (1 ⅓ inches) wide back anchor (No. 4 in figure 1) with the through bolt 8x65mm.

To achieve the desired slopes, the distances between the center of the front anchor and the center of the back anchor are given in table 1.

	35 °	45°	50°
<b>B (inch)</b>	54 ⅓	62 ¼	91 ½
<b>B (mm)</b>	1380	1580	2325

**Table -1**



**Figure 1**

You will repeat this process for the second supporting leg of the structure.

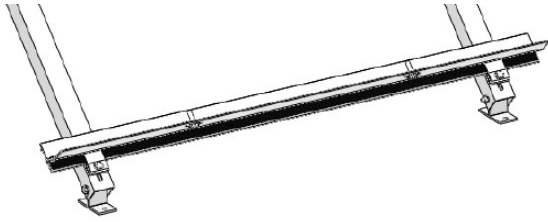
Once you have the hypotenuse profiles (Profile No.2) joined to the vertical legs (No. 3) using the chosen holes for the desired inclination of the solar collector and each one of these profiles joined to the corresponding leg (Numbers 1 y 4), then we will proceed to attaching all the legs to the installation surface using M8 screws and following the distances dictated in table 1.

Next, we will join the horizontal profile (No. 5) to the vertical profile (No 3) using 8x20 screws. This profile allows you to regulate the distance between the two legs to be able to reach the anchorage points desired on the roof surface.

The distance between the centers of the vertical legs can vary from 800 a 1000 mm (31 ½ inches y 39 ½ inches) for the base module and 800 a 1230 mm (31 ½ inches y 48 ½ inches) for the extension modules.

**IMPORTANT: It is extremely important that the legs of the supporting structure are anchored to the structure of the home or to the structure which supports the solar installation using structurally very strong anchorage materials and materials resilient to weather conditions (not supplied in this kit). These structural elements have to be able to anchor the supporting structure in a place which has high force loads.**

Once the structure is anchored, we proceed to join the curved profiles (No. 9) to the hypotenuse profile (No. 2) with the holding clamps (No. 10). We will attach the holding clamps to the bottom of the hypotenuse profile using the M8x30 screws. DO NOT tighten the screw. Then put the curved profile underneath the holding clamps as shown in Figure 2 and Figure 3.

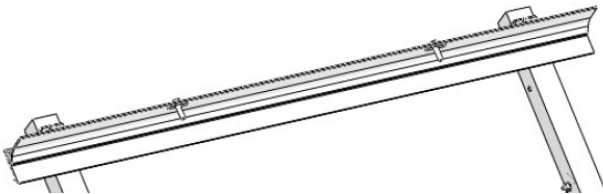


**Figure 2**

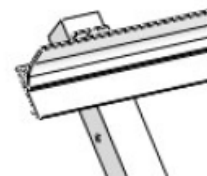


**Figure 3**

We will not yet tighten the screws and proceed to do the same operation on the top side of the hypotenuse profile.



**Figure 4**

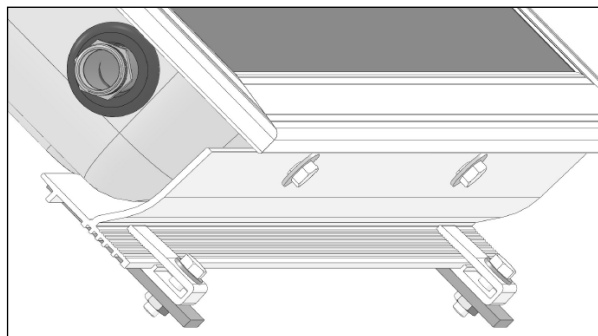


**Figure 5**

Here also we will not yet tighten the screws to be able to facilitate the positioning of the collector.

Once the structure is assembled, we can proceed to place the collector between the curved profiles. To do that we will:

1. Take out the 4 screws and 4 washers embedded in the collector.
2. Place the collector on top of the structure.
3. Screw in the joining screws to attach the collector to the curved profile (Figure 7)



**Figure 7**

**IMPORTANT: When the installation is done, one has to check all the screws to make sure they have all been well tightened. A 16 Nm to 19 NM torque is recommended.**



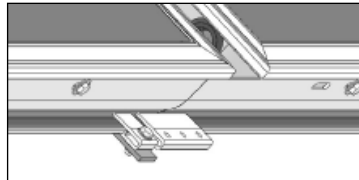
## **ASSEMBLY OF PITCHED ROOF STRUCTURES** **(Extensions for one and two collectors)**

For the extension for one collector module you will find two curved profiles and profiles to assemble one leg.

For the extension for two collectors module you will find two curved profiles and profiles to assemble two legs.

The extension modules are ALWAYS used together with the base module.

We will proceed in the same way we did to assemble the basic module and then the extension modules will be attached to the base module with the joining piece.



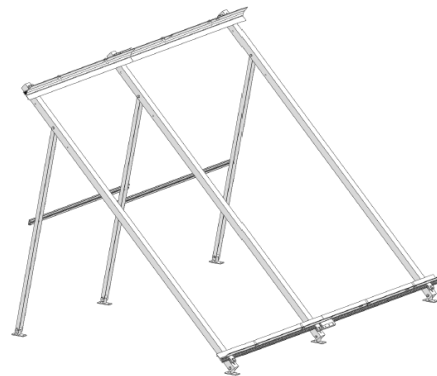
**Figure 8**

The joining piece will join the two curved profiles using 8x30 screws and will be put in the holes on the two outside edges of the clamp leaving the middle hole free if needed later to join the collector structure to the supporting structure.

Examples of Structures:



**Base structure + Extension Module for 2**



**Base structures + Extension Module for 1**

**IMPORTANT: When the installation is done, one has to check all the screws to make sure they have all been well tightened. A 16 Nm to 19 NM torque is recommended.**



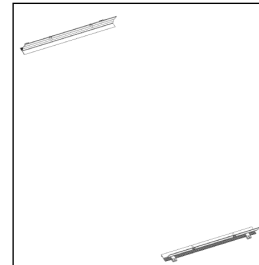
## **ASSEMBLY FOR PITCHED ROOF STRUCTURES** **(Base Module)**

For assembly it is very important to use the screws and stainless steel lock washers provided. In any case, SolarUS, Inc.® recommends at least an annual check and tightening of all of the screws in the structure which may have been loosened.

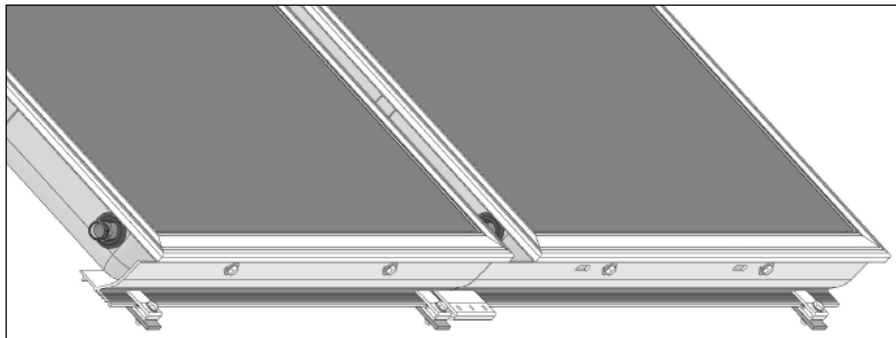
In the mounting kit you will find two curved profiles and four joining clamps.

You should proceed to anchor the curved profile of the bottom of the structure to the roof by using the holding clamps. The holding clamps will be attached to the roof and at the same time allow for the tightening which makes a strong connection between the curved profile and the holding clamp. (Figures 9 and 10). We recommend using a wide washer (28mm) on the bottom side of the clamp and another one on the top side of the clamp to achieve a better distribution of the torque on the joining clamp.

**IMPORTANT: It is extremely important that the holding clamps for the structure are anchored to the home or to the solar supporting structure using structurally very strong anchoring materials and materials resilient to weather conditions (not supplied in this kit). These structural elements have to be anchored to the given structure in a place which has high force loads.**



**Figure 9**



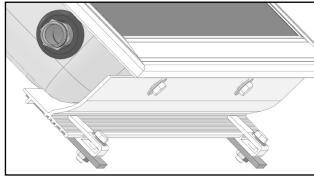
**Figure 10**

Once the bottom of the structure is assembled, we can proceed to place the collector onto the lower curved profile. For that we need too:

1. Take out the 4 screws and 4 washers embedded in the collector.
2. Place the collector on top of the lower curved profile and
3. Screw in the joining screws to attach the collector to the curved profile (Figures 10 & 11)

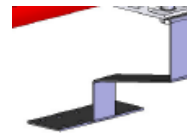
Once the collector is positioned we will proceed to put the top curved profile and its corresponding holding clamps in place. The curved profile will be joined to the collector with the corresponding screws and

washers and the clamps will be attached to the roof.



**Figure 11**

The following anchoring devices can be used for anchoring onto a pitched roof made from either wooden beams or a cement slab. The installer will always make the final decision about which anchoring device to use.

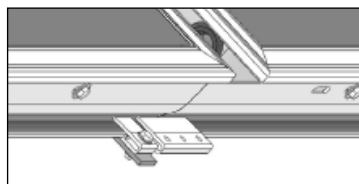


### **ASSEMBLY OF PITCHED ROOF STRUCTURES** **(Extensions for one or two collectors)**

For the extension module for one collector you will find two curved profiles, two joining clamps and the four anchoring clamps necessary.

For the extension module for two collectors you will find two curved profiles, two joining clamps and the eight anchoring clamps necessary.

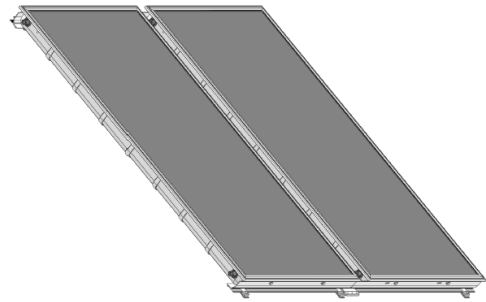
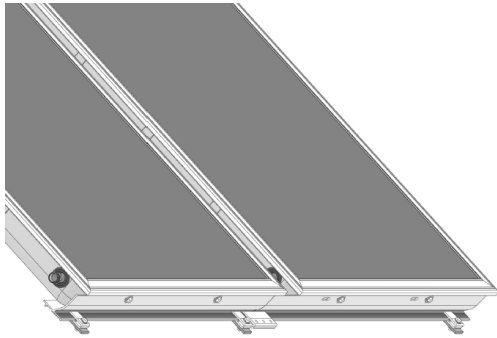
The extension modules will ALWAYS be used with the base model. You can proceed in the same manner as for the assembly of the base module and then join the extension modules to the base module using the joining piece.



**Figure 8**

This joining piece will be attached to the curved profile using two 8x30 screws which will be put in the two outside edges of the joining piece leaving the middle hole free to be used later to join the collector structure to the roof if it was necessary in this place.

Examples of Structures:



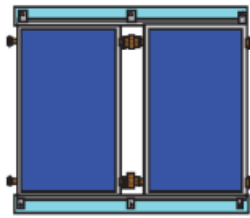
**IMPORTANT: When the installation is done, one has to check all the screws to make sure they have all been well tightened. A 16 Nm to 19 NM torque is recommended.**



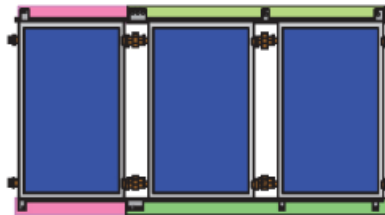
## Examples of possible collector compositions



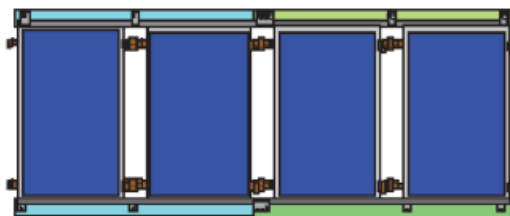
Basic Module



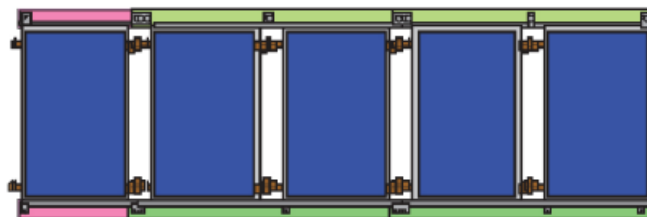
Basic Module + Extension of 1



Basic Module + Extension of 2



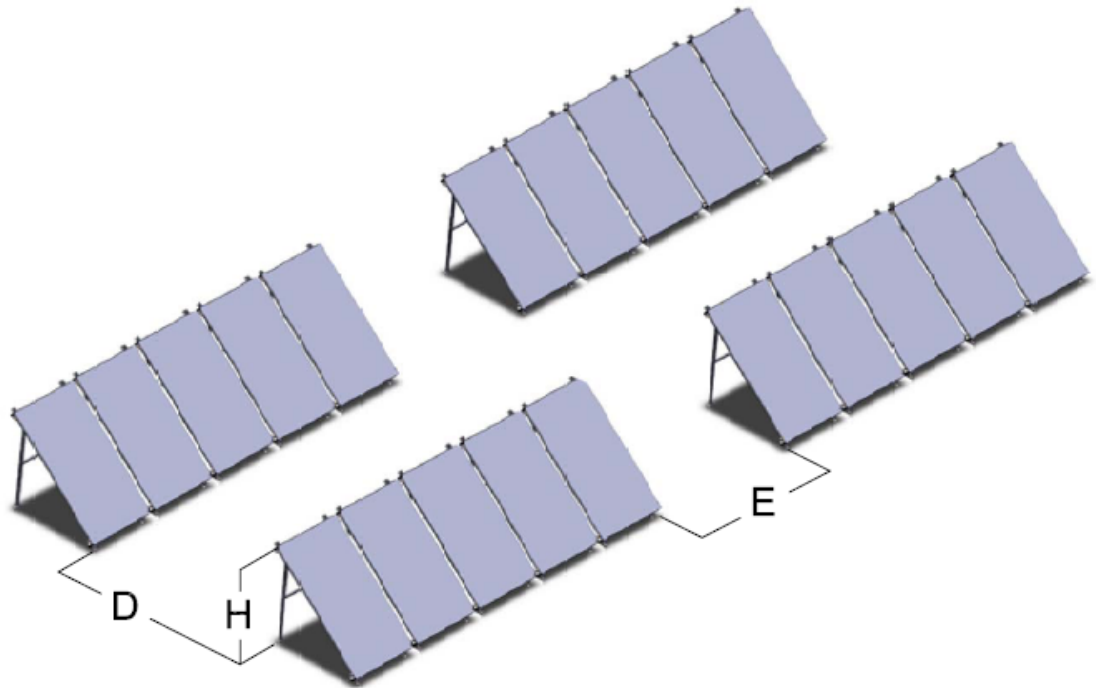
Basic Module + Extension of 1 + Extension of 2



Basic Module + Extension of 2 + Extension of 2



## Recommended minimum Distances between batteries



	35°	45°	50°
D	2346 mm 92 1/2 inch	2627 mm 103 2/5 inch	2896 mm 114 inch
H	1294 mm 51 inch	1360 mm 53 1/2 inch	1470 mm 57 1/2 inch
E	500 mm 20 inch	500 mm 20 inch	500 mm 20 inch

**IMPORTANT NOTE:** These values are given only as reference values and are calculated for latitude of 40°. Every solar installation should calculate its own optimal values for its own situation.