

# Flat Plate Solar Collector

## Roof Fixing Instructions

### Models:

LSP20+

LSP20+H



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# **1 INTRODUCTION**

## **1.1 Preliminary Information**

Reproduction, storage or transmission of any part of this publication in any form, without the prior written consent of the Lochinvar Limited, is prohibited.

The collector, to which these instructions refer, is designed to be used for the purposes described and to be operated in accordance with these instructions.

Lochinvar Limited will not be liable for claims for damage caused to persons, animals, material goods or property caused by improper installation, adjustment and maintenance or improper use. Any use not specified in this manual is prohibited.

This document is intended to provide information only and does not form a contract with third parties.

Lochinvar Limited pursues a policy of constant improvement and development of its products and therefore reserves the right to change the specifications and the documentation at any time, without notice and without obligation to update existing equipment.

## **1.2 Aim And Content Of The Manual**

These instructions are intended to provide the information required for the selection, installation, use and maintenance of the collector.

They have been prepared in accordance with the European Union laws and with the technical standards in force at the date of issue of the instructions.

The instructions contain all the necessary information to prevent any reasonably foreseeable misuse.

## **1.3 How To Store The Manual**

The manual must be kept in a suitable place with easy access for users and operators, protected from

dust and damp.

The manual must always accompany the unit during the entire life cycle of the same and therefore must be transferred to any subsequent user.

## **1.4 Manual Updates**

It is recommended that the manual is updated to the latest revision available.

If updates are sent to the customer, they must be added to this manual.

The latest information regarding the use of its products is available by contacting Lochinvar Limited.

## 2 HOW TO USE THIS MANUAL



**THE MANUAL IS AN INTEGRAL PART OF THE SYSTEM.**



**USERS OR OPERATORS MUST CONSULT THE MANUAL BEFORE PERFORMING ANY OPERATION AND ESPECIALLY SO WHEN TRANSPORTING, HANDLING, INSTALLING, MAINTAINING, OR DISMANTLING THE UNIT IN ORDER TO ELIMINATE UNCERTAINTY AND REDUCE RISK.**

**IN THESE INSTRUCTIONS SYMBOLS HAVE BEEN USED (DESCRIBED IN THE FOLLOWING PARAGRAPHS) TO DRAW THE ATTENTION OF OPERATORS AND USERS TO THE OPERATIONS THAT HAVE A HIGHER RISK AND WHICH MUST BE PERFORMED SAFELY.**

### 2.1 Potential Risks

Whilst the manual has been designed to minimise any risk posed to the safety of people working with the equipment, it has not been technically possible to eliminate all risk. **Please ensure suitable PPE is worn** whilst working on the equipment, taking note of all safety precautions within the document.



**THIS MANUAL SHOULD BE READ IN CONJUNCTION WITH THE INSTALLATION MANUAL COVERING THE SOLAR COLLECTOR BEING INSTALLED.**



### 3 GENERAL DESCRIPTION OF SYMBOLS USED

Safety symbols combined in accordance with ISO 3864-2:



#### PROHIBITED (YOU MUST NOT)

A BLACK SYMBOL INSIDE A RED CIRCLE WITH A RED DIAGONAL INDICATES AN ACTION THAT SHOULD NOT BE PERFORMED



#### WARNING

A BLACK SYMBOL ADDED TO A YELLOW TRIANGLE WITH BLACK EDGES INDICATES A HAZARD OR DANGER



#### ACTION REQUIRED

A WHITE SYMBOL INSERTED IN A BLUE CIRCLE INDICATES AN ACTION THAT MUST BE TAKEN TO AVOID RISK



#### HOT SURFACES

THE SYMBOL INDICATES THOSE COMPONENTS WITH A HIGH SURFACE TEMPERATURE THAT COULD CREATE A RISK.



#### RECOVER OR RECYCLE MATERIAL

## 4 SAFETY



**WHEN HANDLING THE COLLECTORS REMEMBER THAT THEY HAVE BEEN DESIGNED TO CONVERT LIGHT INTO HEAT AND ACCORDINGLY PARTS OF THEM WILL GET VERY HOT IF LEFT OUT IN THE SUN EVEN FOR A SHORT PERIOD OF TIME. IF YOU TOUCH PARTS OF THE COLLECTORS AFTER THIS EXPOSURE YOU MAY GET SEVERE BURNS.**



**WHEN WORKING AT HEIGHTS ALWAYS USE A SAFE MEANS OF WORK POSITIONS.**



**ALWAYS ASSESS THE RISKS BEFORE YOU START WORK.**



**TAKE CARE WHEN CARRYING THE COLLECTORS TO A ROOF. CARRYING AND MANIPULATING HEAVY WEIGHTS AND LARGE FRAMES ONTO A ROOF ARE DIFFICULT AND CAN CAUSE YOU TO SLIP. DO NOT LIFT BEYOND YOUR SAFE CARRYING CAPACITY AND REMOVE TRIP HAZARDS.**

## 5 ROOF TYPES

The fixing method will be dependent on your roof type. There are generally three roof types:

### 5.1 Flat Roof



Flat roofs can be made of many different materials such as concrete or metal, generally collectors installed on flat roofs will use an A frame to ensure the collectors sit at the correct angle. A-Frames are available in 3 angles 30°, 45° or 60° .

### 5.2 Sloping



This could be slate, tile or metal, there are in addition specialist roof coverings, which are generally not suited to installing solar thermal. For sloping roofs first determine the roof finish such as tile, slate or metal and then select the correct roof fixing kit.

### 5.3 In-roof



It is possible to install the LSP20+ flat plate solar collector directly into the roof, this give a flush finish to the roof. For this type of fixing method please refer to the separate roof fixing manual available from [www.lochinvar.ltd.uk](http://www.lochinvar.ltd.uk)



## 6 ROOF FIXINGS

### 6.1 Flat Roof

When installing on a flat roof the collectors are mounted on an A-Frame.

The A-Frame needs to be attached to the flat roof and there are 2 options for achieving this:



**The angle of the A-Frame is fixed and is available in 3 set angles - 30°, 45° or 60°. Please make sure you have ordered the correct frame before installing the collectors.**

#### Fixing Points

The **preferred** fixing method is for the roof structure to have suitable fixing points or steels installed which allow the A frames to be bolted down to the roof structure.

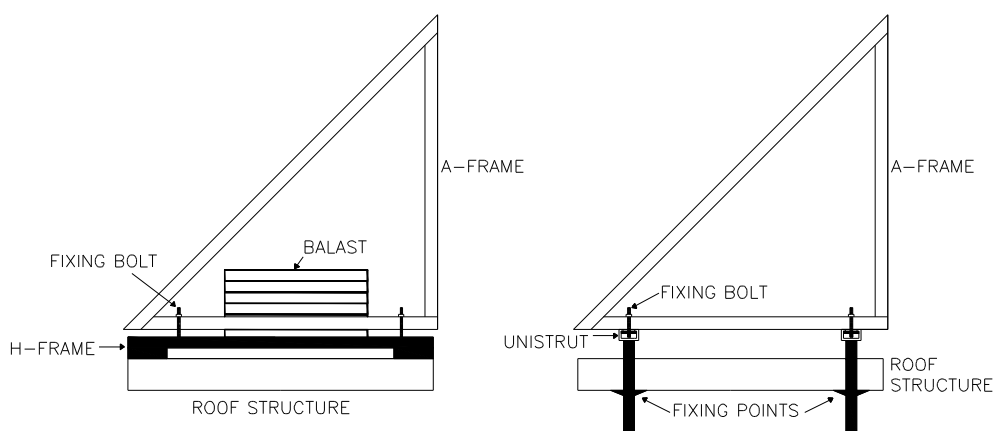
The fixing points are then used to mount channels of unistrut that the A-Frame can be attached.

#### Ballast

If suitable fixing points have not been included within the roof structure or the roof type doesn't allow such fixings then the A-Frame will need to be secured down using ballast. When this method is used then an additional H-Frame is required. The H-Frame should be designed for sitting on a flat roof, it should be fitted with support feet to spread the load of the solar collector(s), the H-Frame will require a channel to insert the required ballast to hold down the frame. When in position the A-Frame is simply secured to the H-Frame.



**Lochinvar do not provide The actual H-Frame or any ballast calculations, the amount of ballast required is subject to site conditions and will be influenced by location, height, type of collector used amongst other considerations. Due to each project location being unique each project should have the ballast requirements calculated by a suitable qualified person such as a structural engineer. Support frame suppliers may also provide this service.**



Diagrams showing A-Frame supported by H-Frame and A-Frame supported by roof fixings and unistrut

## 6.2 A-Frame



The angle of the A-Frame is fixed and is available in 3 set angles - 30°, 45° or 60°. Please make sure you have ordered the correct frame before installing the collectors.

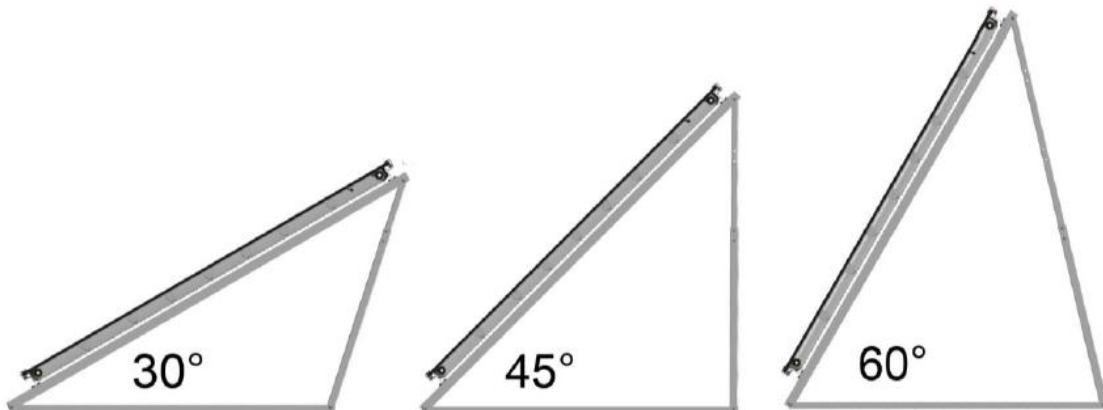
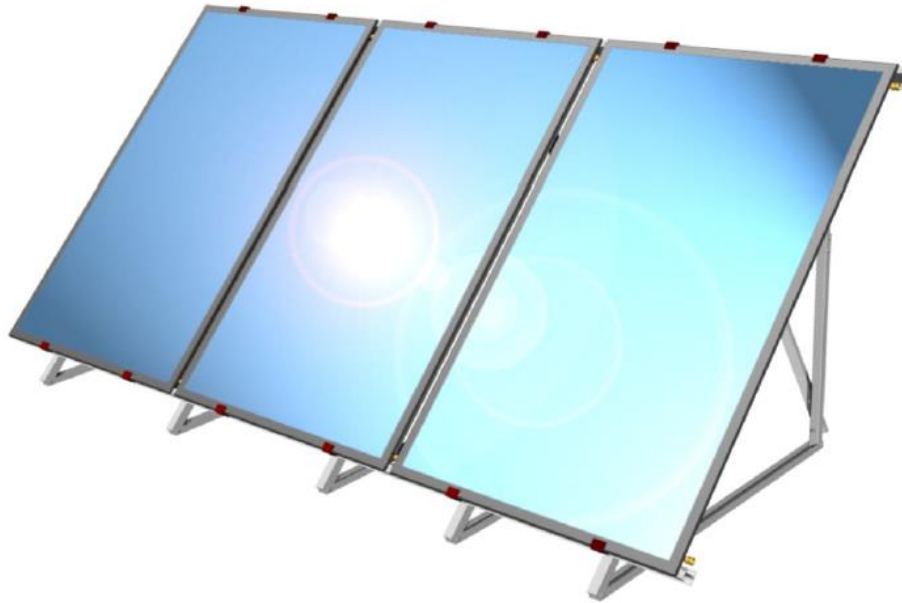


PLEASE ENSURE THE ROOF IS OF A GOOD SOUND CONDITION. PLEASE ALSO ENSURE THE ROOF IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.



IF FITTING AN EXTRA PANEL USE A 1 PANEL EXTENSION FOLLOWING THE SAME PROCEDURE.

6.2.1 Three A-Frames are available from Lochinvar Limited angled at either 30°, 45° or 60°.

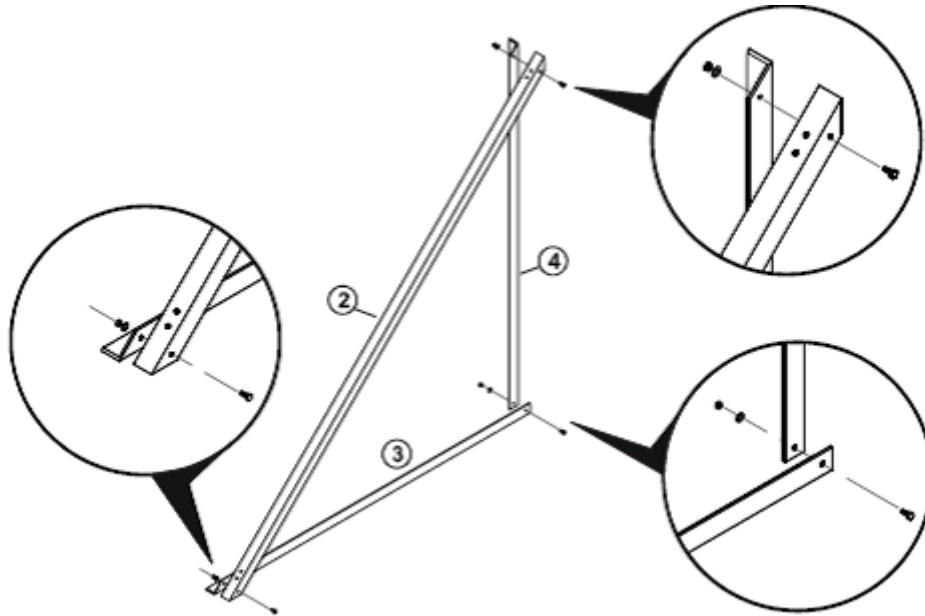


6.2.2 Check all of the kit components are supplied before commencing work. The kit should comprise of the following items;

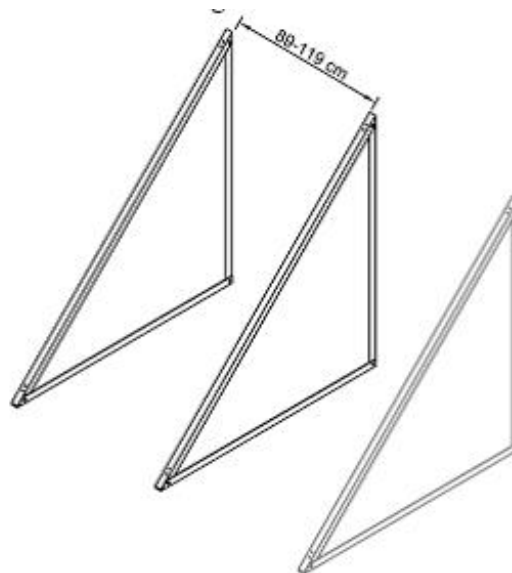
No.	A – frame kit for 2 panels	Quantity
1	Z-rail 2040 mm	2
2	L-rail	2
3	Basic rail	2
4	Support rail	2
5	Cross rail	1
6	Wind clamps	4
	Bolt kit (bolt, nut, washer) M6x16	30

No.	A – frame Extension	QTY
2	L-rail	1
3	Basic rail	1
4	Support rail	1
6	Wind clamp	2
7	Z – rail 1040 mm	2
8	Frame connection (K1141 GB)	1
	Bolt kit (bolt, nut, washer) M6x16	12

**6.2.3 Fit together the basic rail, support rail and L-rail using the nuts and bolts provided. You will create triangular structures as shown in the diagram;**

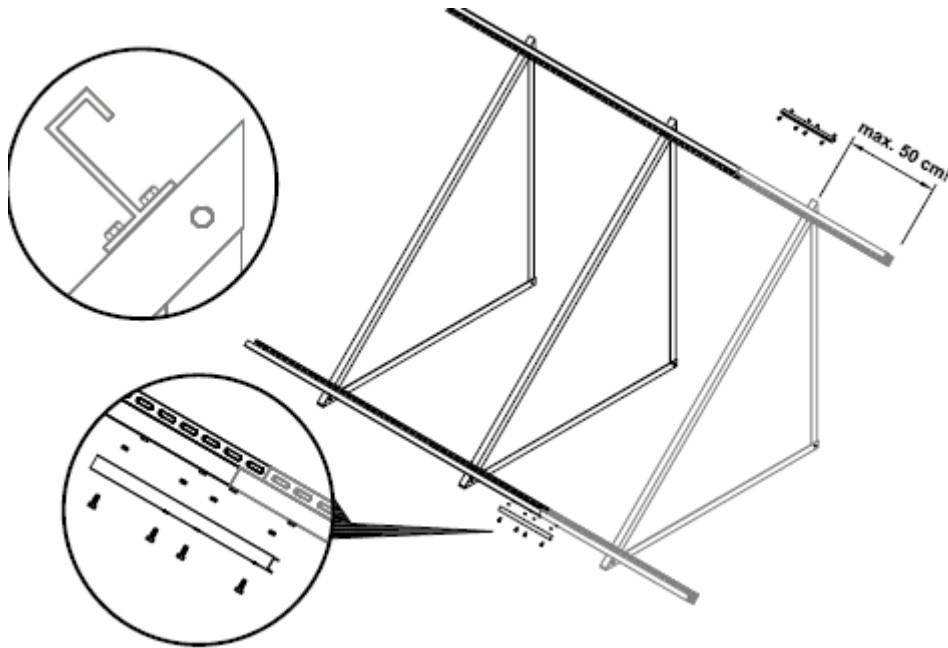


**6.2.4 The distance between each triangle should be between 89-119 cm.**

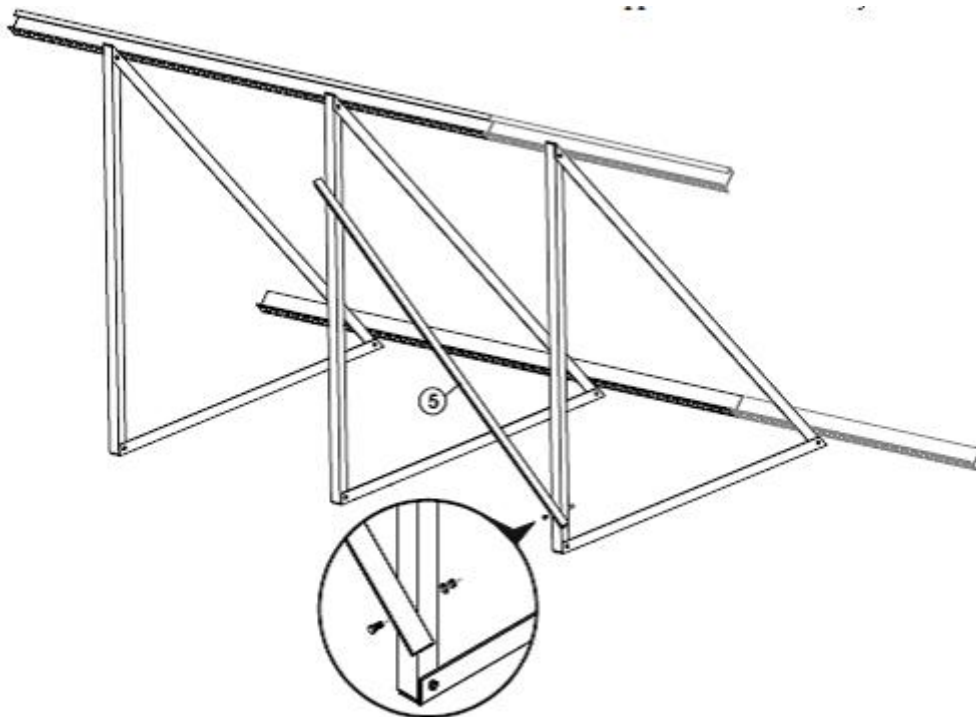


;

**6.2.5 Fit the Z-rail onto the triangles as shown below. To extend a two panel frame fit either another two panel frame or a 1 panel extension. A frame connector must be used to join the adjacent frames.**



**6.2.6 When the Z-rail has been fitted to the triangle, bolt the cross rail on the back of the frame construction. Drill  $\varnothing$  8mm holes into the support rail as necessary.**

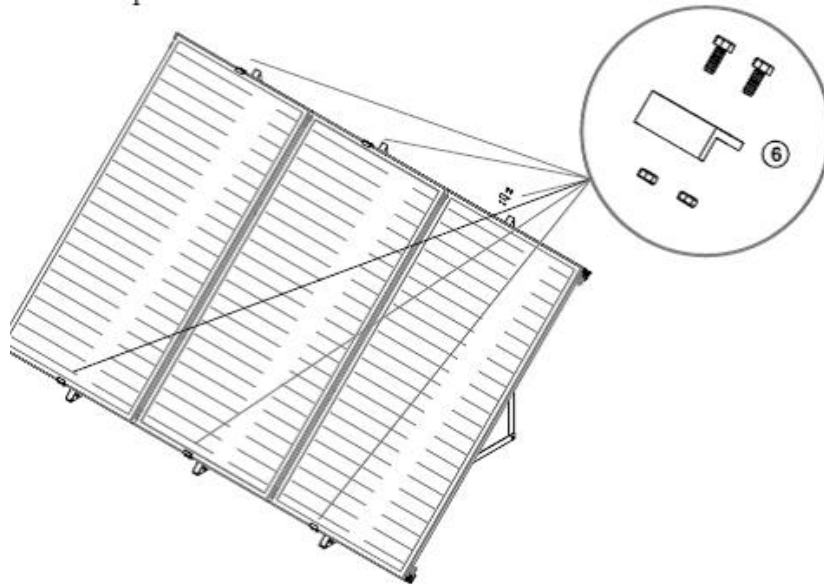


**6.2.7 Fit the panels onto the A-Frame.**

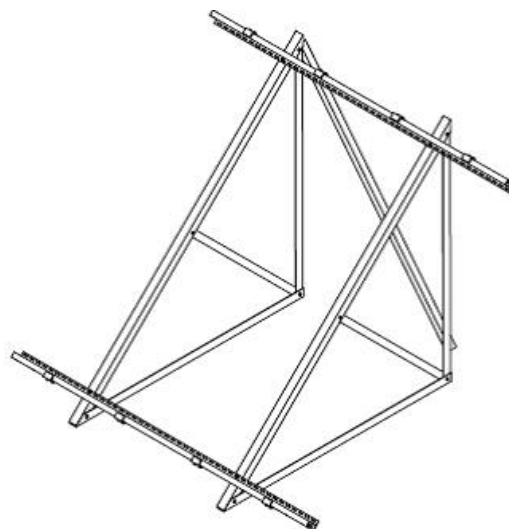


**IF FITTING MORE THAN TWO COLLECTORS TO THE A-FRAME THEN FIT THE MIDDLE COLLECTORS FIRST.**

**6.2.8 After fitting the collectors – fit the wind clamps to secure the collectors against the frame.**

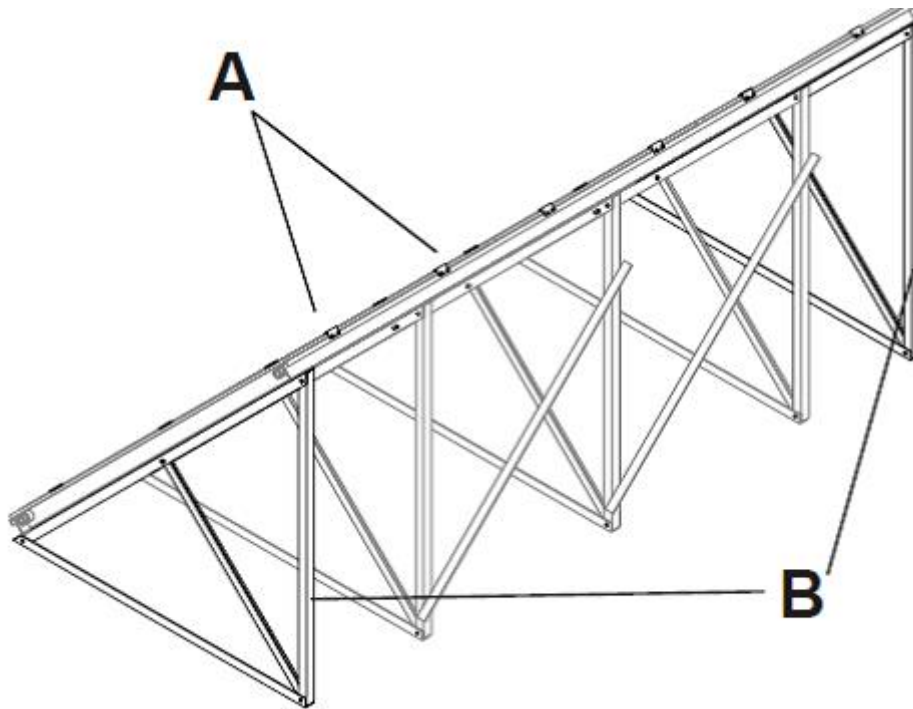


**6.2.9 If the overall length of the A-Frame is more than 8 meters, the frame construction should be supported with an additional support rail as shown below.**





IN AREAS WITH STRONG WIND YOU MUST TAKE INTO ACCOUNT THE POSSIBILITY OF WIND RESISTANCE WHICH MAY CAUSE THE WHOLE FRAME AND PANEL CONSTRUCTION TO VIBRATE. TO PREVENT THIS FIT ONE MORE SUPPORT TRIANGLE AT THE END OF EACH SIDE OF THE FRAME AS SHOWN – THIS WILL MAKE THE WHOLE CONSTRUCTION MUCH STRONGER.





## 6.3 Sloping roof

Depending on the roof finish this will determine the correct roof fixing.



**THE COLLECTORS MUST BE POSITIONED AT A MINIMUM ANGLE OF 15°. IF THE ROOF PITCH DOESN'T MEET THIS ANGLE THEN UP- STANDS MUST BE FITTED TO THE RELEVANT FIXING KITS TO ACHIEVE THE MINIMUM ANGLE.**

### **ON ROOF TILE KIT**

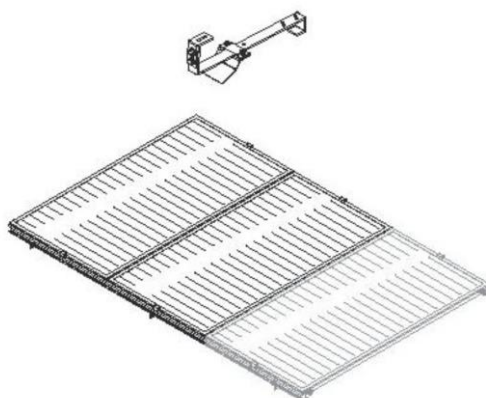
The on roof hook installation kit is designed for use on pitched tiled roofs – it may be unsuitable for certain types of tile and slate as the tile may not sit back over the hook. If this is the case then use the on roof slate kit or use a flashing tile in place of the regular tile/slate.



**PLEASE ENSURE THE ROOF IS OF A GOOD SOUND CONDITION AND THAT THE BATTENS ARE SOUND. PLEASE ALSO ENSURE THE ROOF IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.**

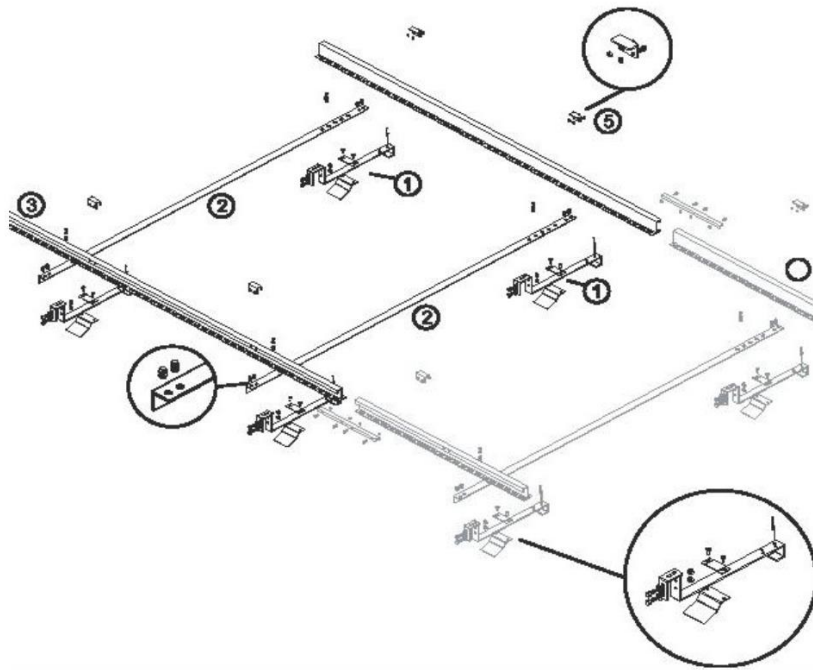


**IF FITTING AN EXTRA PANEL USE A 1 PANEL EXTENSION FOLLOWING THE SAME PROCEDURE.**

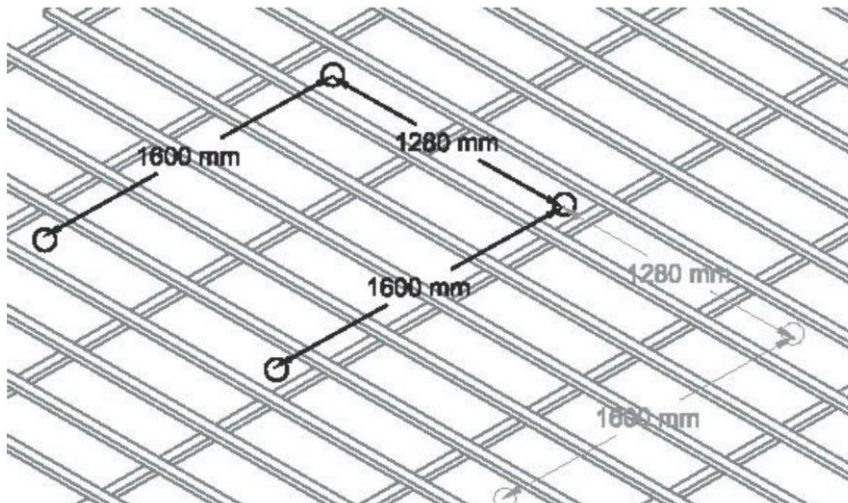


**6.3.1 Check all of the kit components are supplied before commencing work. The kit should comprise of the following items;**

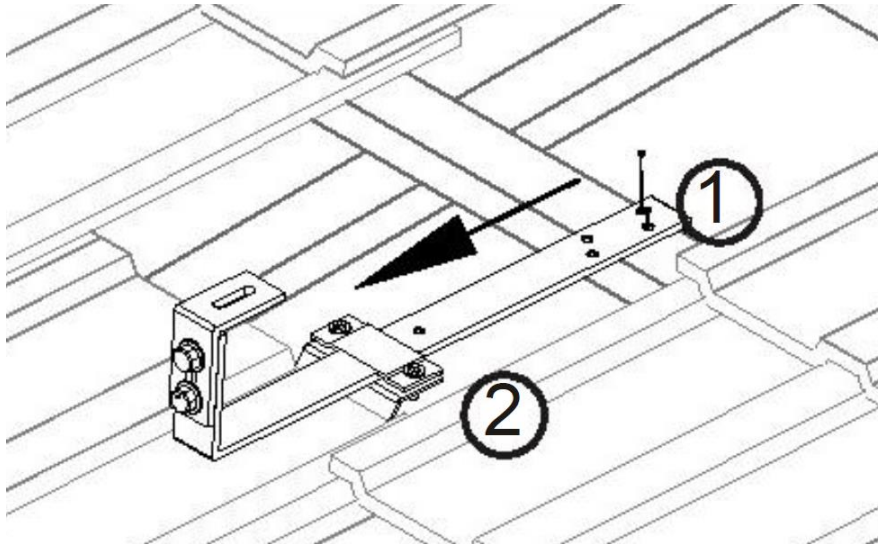
Item Number	2 panel on roof kit items	Quantity
1	Roof Hook	4
2	L-Rail	2
3	Z-Rail 2000mm	2
5	Wind Clamp	4
	Bolt Kit (bolt,nut,washer) M6X16	20
	Long Wood Screw	8
	1 panel extension on roof kit items	
1	Roof Hook	2
2	L-Rail	2
4	Z-Rail 1000mm	1
5	Wind Clamp	2
	Frame Connector	2
	Bolt Kit (bolt,nut,washer) M6X16	12



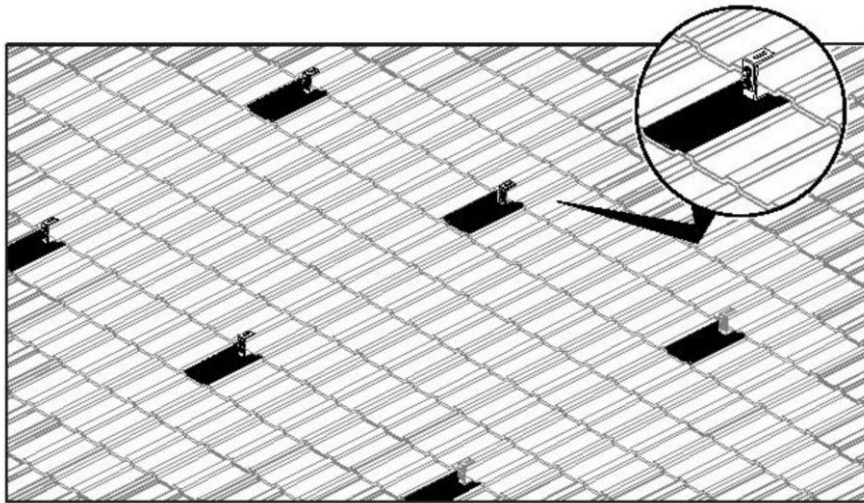
**6.3.2 Check the roof battens for stability. The battens must not show any signs of deterioration. If the battens to be used are smaller than 30 x 50 mm they will need additional strength by fixing additional wood screws (not supplied).**



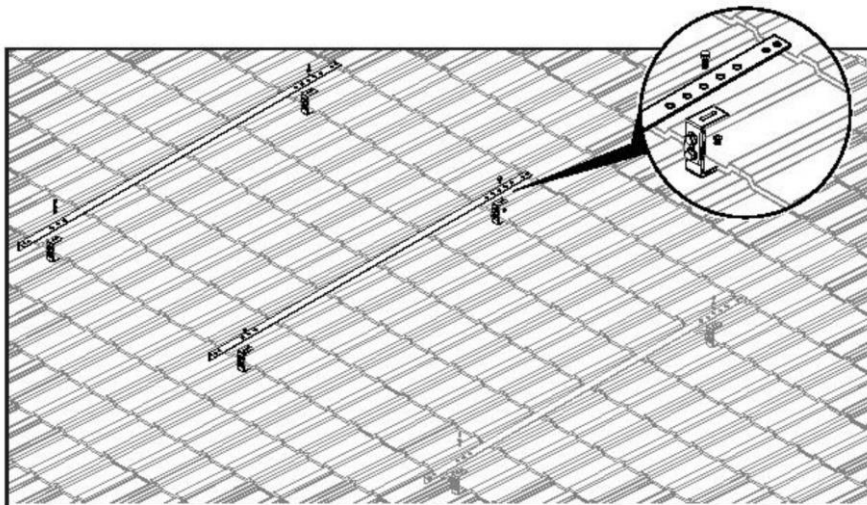
**6.3.3 Place the roof hooks (item 1) as shown using 2 wood screws (4 x 30 mm). Fix the tile blade (2) under the lower roof batten. In case of roof tiles that are unusually thick then you should carefully bend the blade of the roof hook in order to fit under the batten and not just under the roof tile. The length of the roof hook should then be adjusted so that the hook part of it is the only part protruding after the roof tile is fitted over the hook. If necessary, file or grind part of the roof tile so that the hook has no contact with the tile.**



**WARNING IN AREAS WITH HEAVY SNOWFALL, EACH ROOF TILE THAT COVERS THE ROOF HOOK SHOULD BE REPLACED WITH A METAL TILE. IF NOT THE TILE MAY BREAK UNDER HEAVY SNOW LOADS.**



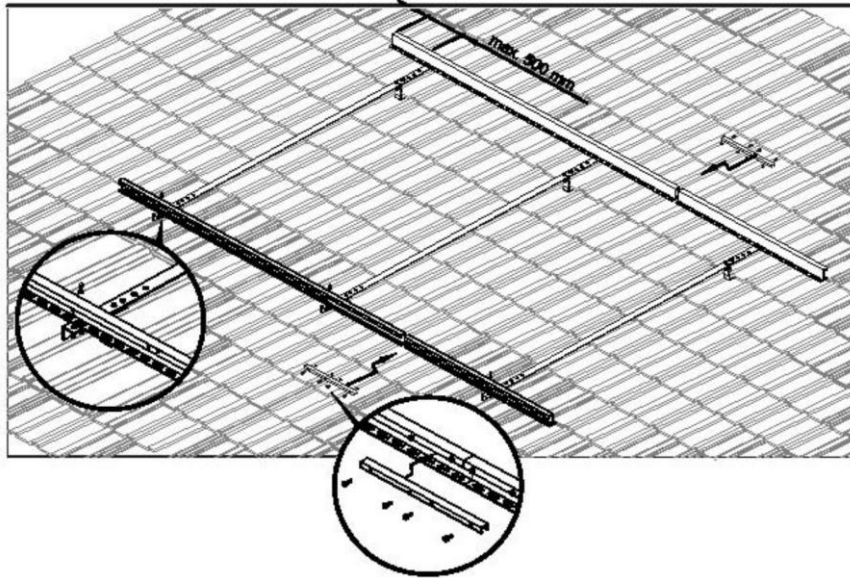
**6.3.4 Use screw kit M8 x 20 to connect the L-Rails to the roof hooks. Ensure that the L-Rails are mounted with the five holes (8.5mm) positioned at the highest part of the roof.**



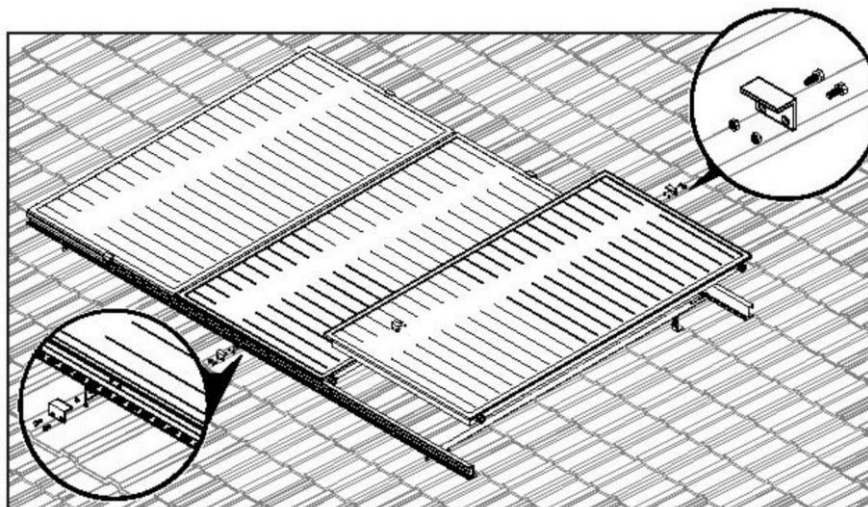
6.3.5 The Z-rail then fixes to the L-rails using the bolt kit M6.



THE MAXIMUM DISTANCE FROM A ROOF HOOK TO THE END OF A Z-RAIL MUST BE NO MORE THAN 500MM ON EACH SIDE.



6.3.6 Place the collectors in position in the centre of the completed frame. In case of systems with more than two panels mount the middle panel first. Mount the wind clamps to protect the panels using the nuts and bolts provided.

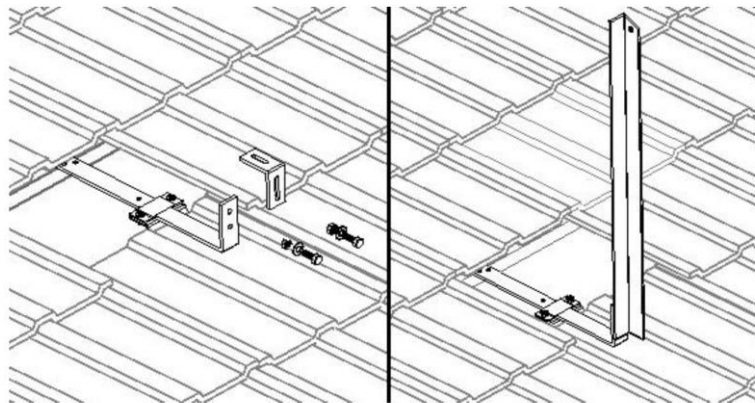


### 6.3.7 Option to raise the collector pitch

6.3.8 On roofs that don't meet the required minimum pitch for the collectors (15°) it is possible to lift this angle by fitting extension frames (ordered separately). The extension frames come in 2 different sizes as follows;

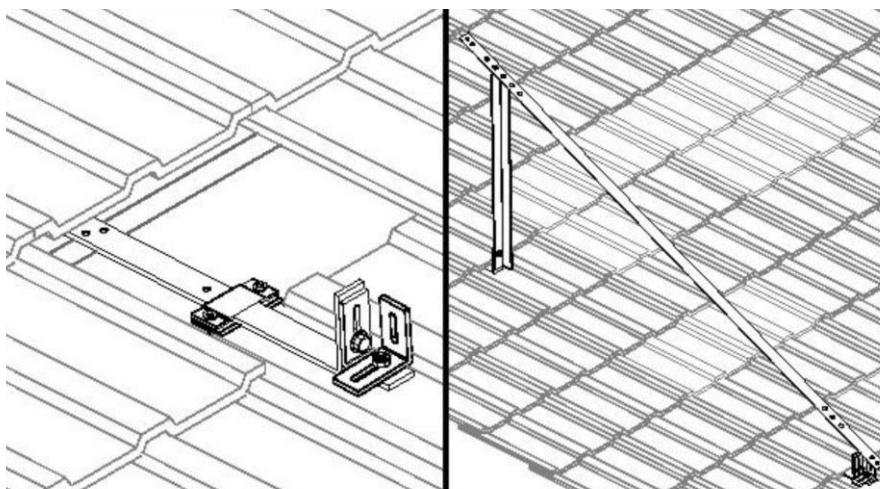
Part Number	Extension Frame Height	Alters Pitch By
LSP EXT	500mm	15°
LSP EXT 2	750mm	21°

6.3.9 Remove the adjustable angle from the upper roof hooks. Fit the extension rails onto the upper roof hooks using the nuts and bolts provided.



6.3.10 Mount the adjustable angles as shown. Connect the L-rails on the lower side to the roof hook and onto the extension rails.

If necessary drill appropriate holes into the rails.



## 6.4 ON ROOF SLATE KIT

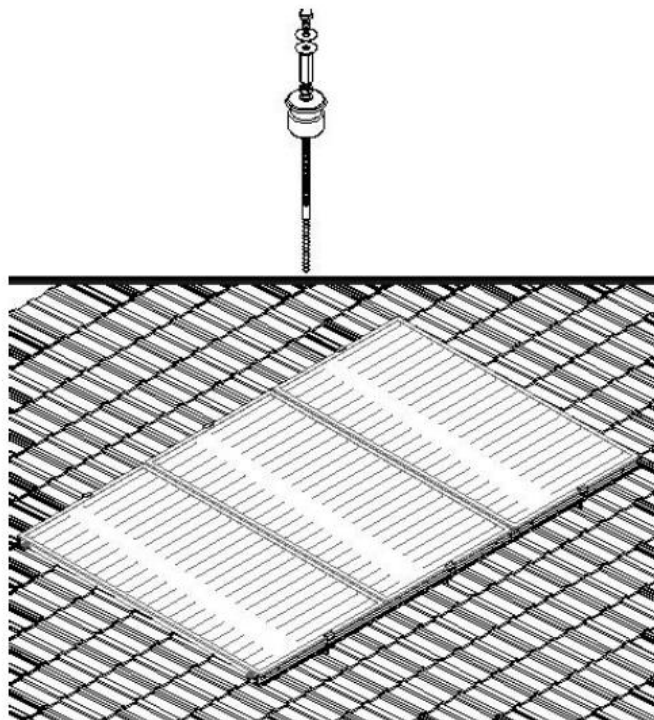
The slate roof mounting kit is suitable for slate and concrete roofs. It is also suitable for roofs that have the roof tiles cemented permanently onto the roof structure.



**PLEASE ENSURE THE ROOF IS OF A GOOD SOUND CONDITION AND THAT THE BATTENS ARE SOUND. PLEASE ALSO ENSURE THE ROOF IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.**



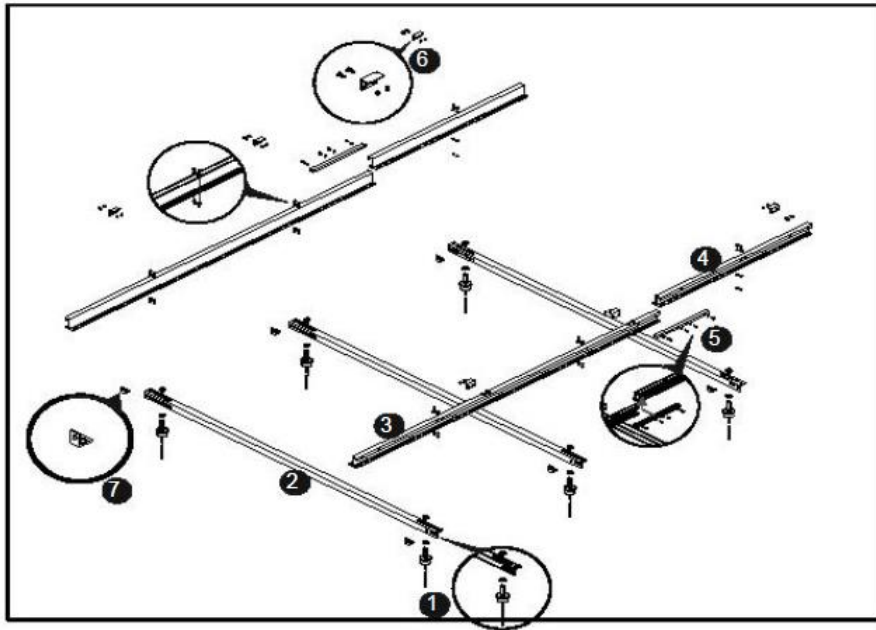
**IF FITTING AN EXTRA PANEL USE A 1 PANEL EXTENSION FOLLOWING THE SAME PROCEDURE.**





**6.4.1 Check all of the kit components are supplied before commencing work. The kit should comprise of the following items;**

Item Number	2 panel on roof slate items	Quantity
1	Self Sealing Screw Fitting	4
2	L-Rail	2
3	Z-Rail 2000mm	2
6	Wind Clamp	4
7	Right Angle Connector	4
	Bolt Kit (bolt,nut,washer) M6X16	30
	1 panel extension on roof slate items	
1	Self Sealing Screw Fitting	2
2	L-Rail	1
4	Z-Rail 1000mm	1
5	Frame Connector	2
6	Wind Clamp	2
7	Right Angle Connector	2
	Bolt Kit (bolt,nut,washer) M6X16	20



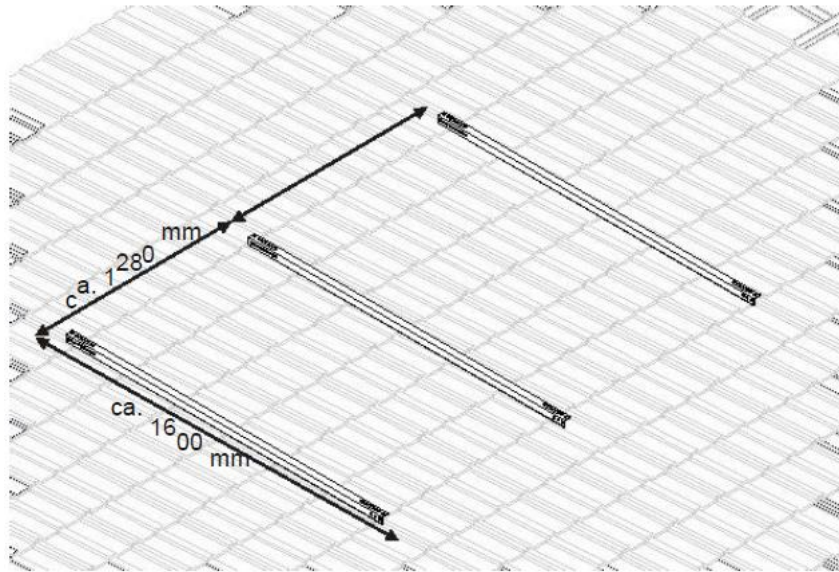
**6.4.2** Locate the rafters under the slates. Mark the slates where the holes should be drilled so that the hole penetrates the centre of a rafter. Use the angle rail as a template.



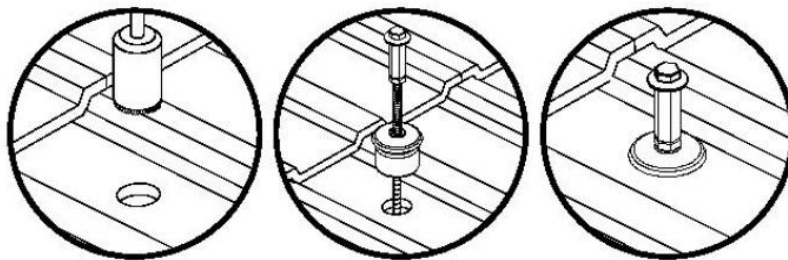
**PLEASE ENSURE THE ROOF IS OF A GOOD SOUND CONDITION AND THAT THE BATTENS ARE SOUND. PLEASE ALSO ENSURE THE ROOF IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.**



**IF FITTING AN EXTRA PANEL USE A 1 PANEL EXTENSION FOLLOWING THE SAME PROCEDURE.**



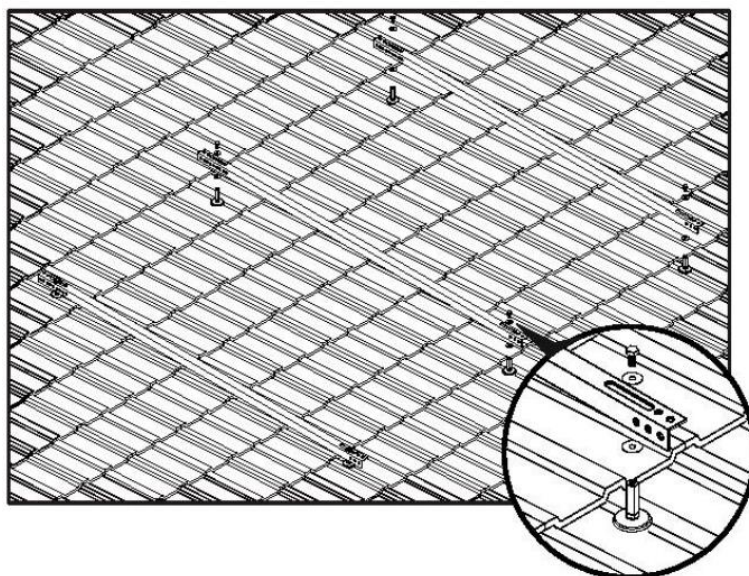
**6.4.3 Drill the holes on each marked position using a high quality 25mm masonry bit. Make sure the drill doesn't spin too fast or you may break the slate. Do not penetrate beyond the slate. After drilling the holes into the slates use an 8mm wood bit to make a hole through the rafters at each position. Bolt the bottom part of the self sealing screw fitting into each drilled hole.**



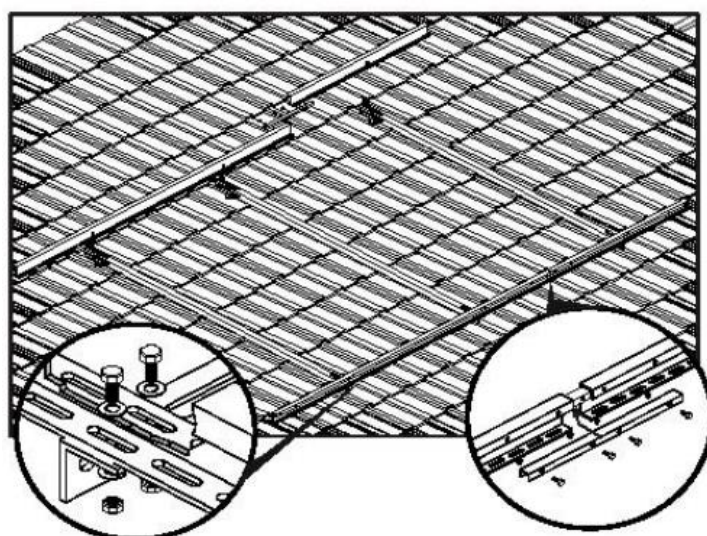
6.4.4 Use the bolt kit M6X6 to connect the L-Rails to the self sealing screw kit fitting.



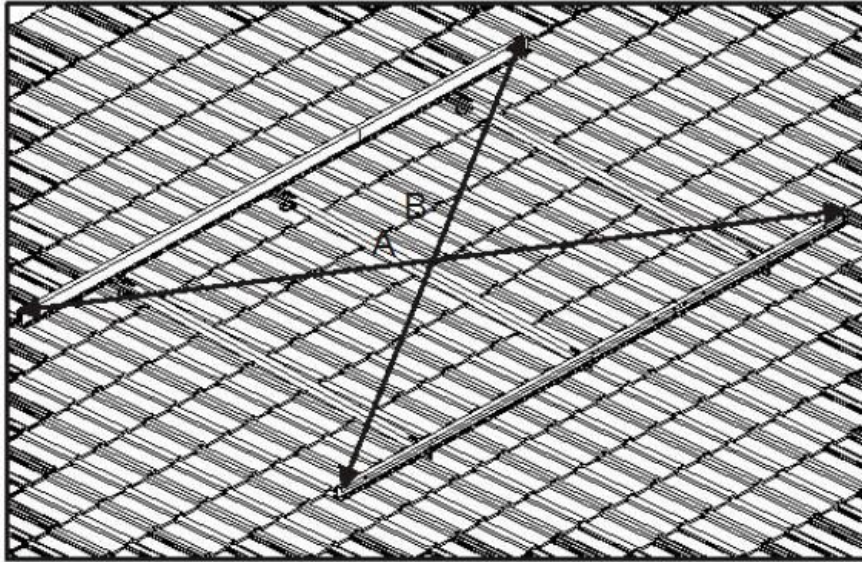
THE L-RAILS MUST BE MOUNTED INTO THE LONG ADJUSTABLE SLOT.



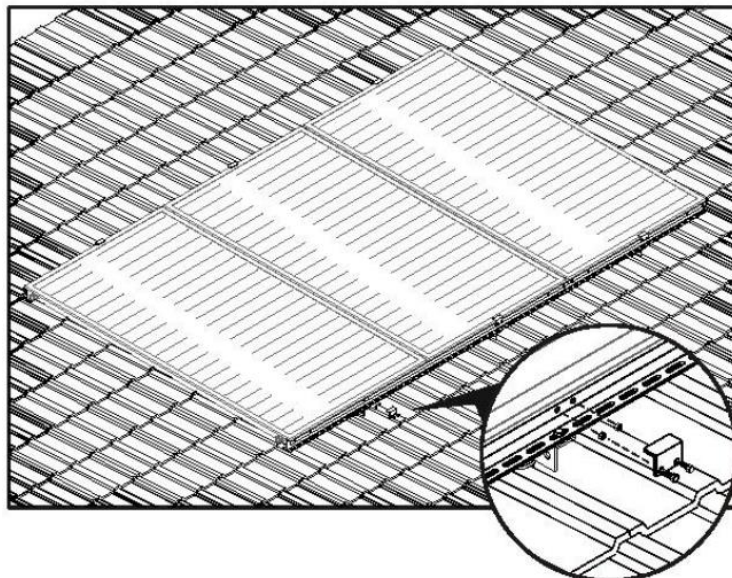
6.4.5 The Z-Profile must be fitted to the L-Rail using the bottom two holes that are below the long adjustable slot. Do not tighten fully.



**6.4.6 Cross measure along the diagonals and check that they are equal. Once you are satisfied that each distance (A and B on the drawing) are equal, tighten fully.**



**6.4.7 Place the collectors in position in the centre of the completed frame. In case of systems with more than two panels mount the middle panel first. Mount the wind clamps to protect the panels using the nuts and bolts provided.**



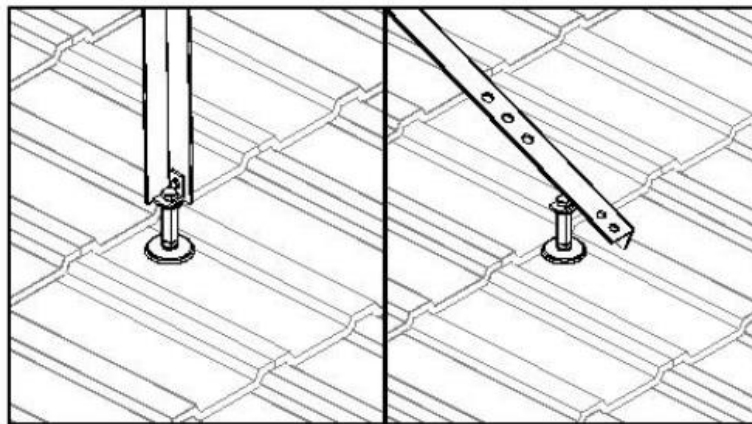
### 6.4.8 Option to raise the collector pitch.

On roofs that don't meet the required minimum pitch for the collectors (15°) it is possible to lift this angle by fitting extension frames (ordered separately). The extension frames come in 2 different sizes as follows;

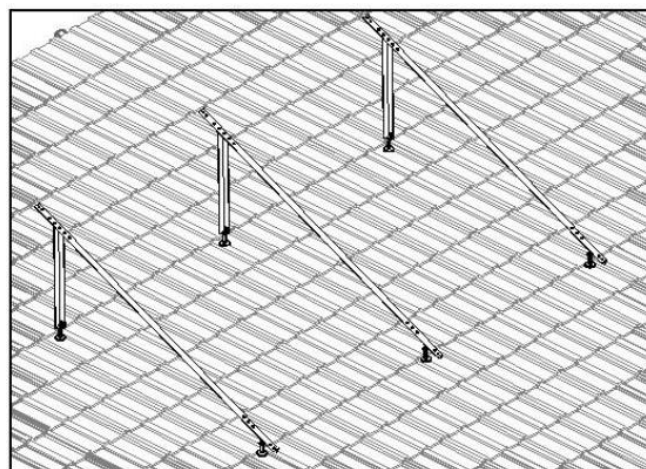
Part Number	Extension Frame Height	Alters Pitch By
LSP EXT	500mm	15°
LSP EXT 2	750mm	21°

Fit the right angle connector on the top of the self sealing screw fitting to the upper side screw extension rails.

Fit the right angle connector to the top of the self sealing screw fitting to the Lower L-Rail.



Fit the L-Rail to the top of the extension rail and to the bottom of the right angle connection.



## 6.5 ON ROOF METAL KIT

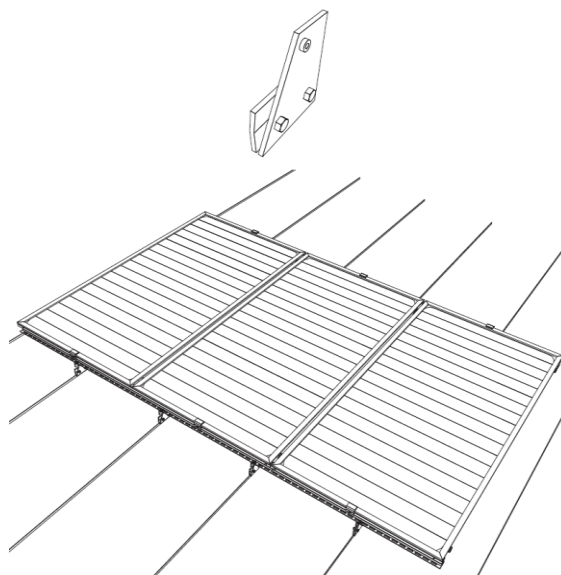
The metal roof mounting kit is suitable for flat or pitched metal roofs that have standing seams. The kit relies on the roof having sufficient standing seams. If the roof doesn't have enough seams to hold the clamps then unistrut may need to be used - fixing the unistrut to the roof using alternative standing seam clamps, see end of this section - (not of Lochinvar supply).



**PLEASE ENSURE THE ROOF IS OF A GOOD SOUND CONDITION. PLEASE ALSO ENSURE THE ROOF IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.**

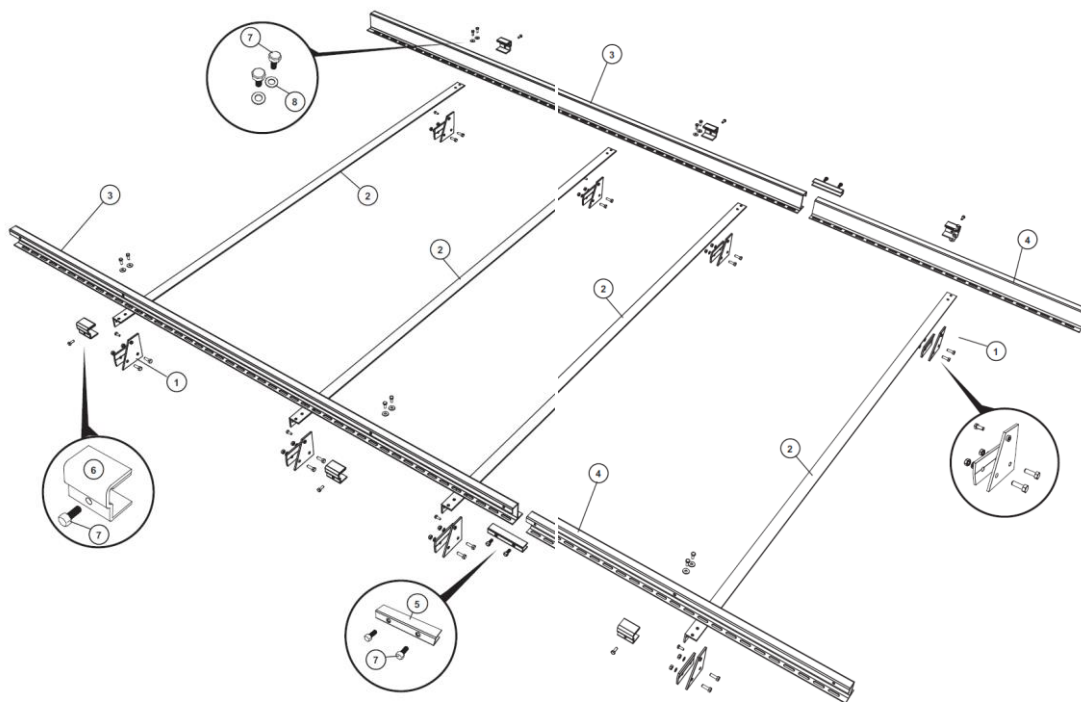


**IF FITTING AN EXTRA PANEL USE A 1 PANEL EXTENSION FOLLOWING THE SAME PROCEDURE.**



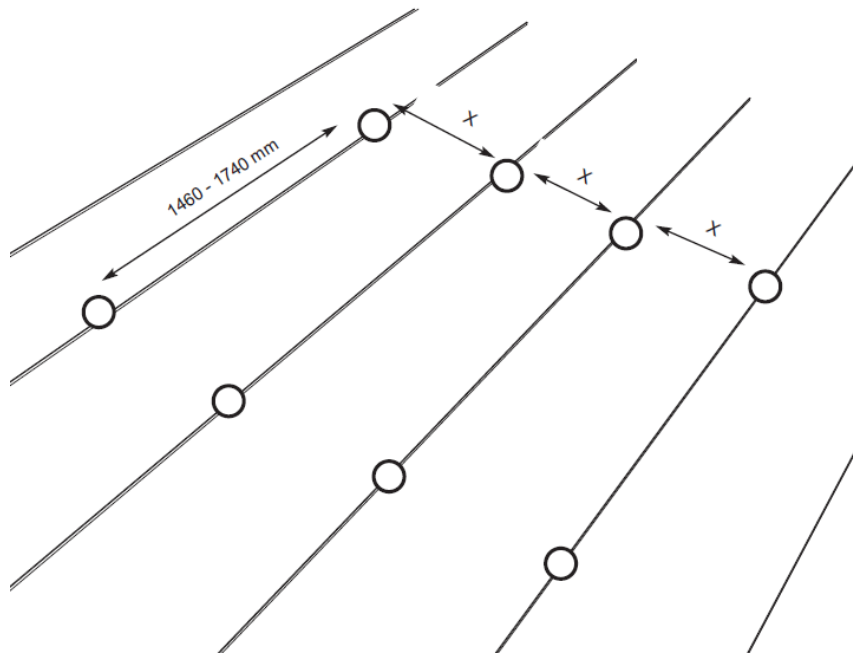
Check all of the kit components are supplied before commencing work. The kit should comprise of the following items;

2 panel on roof metal kit			1 panel extension on roof metal items		
Item Number	Item Description	Quantity	Part Number	Item Description	Quantity
1	Metal Roof Clamp	6	1	Metal Roof Clamp	2
2	L-Rail	2	2	L-Rail	1
3	Z-Rail Long	2	4	Z-Rail Short	2
5	Frame Connector	-	5	Frame Connector	-
6	Wind Clamp	4	6	Wind Clamp	2
7	Screw M67 x 16	12	7	Screw M67 x 16	7
8	Washer Big 6,4	8	8	Washer Big 6,4	5

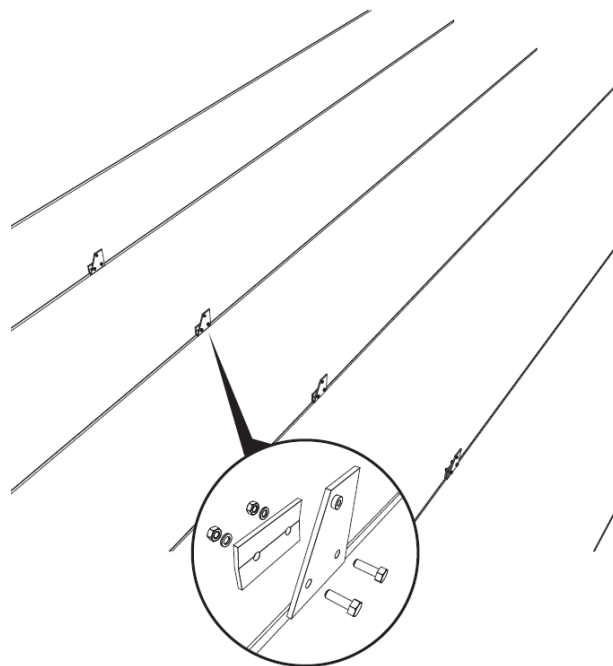




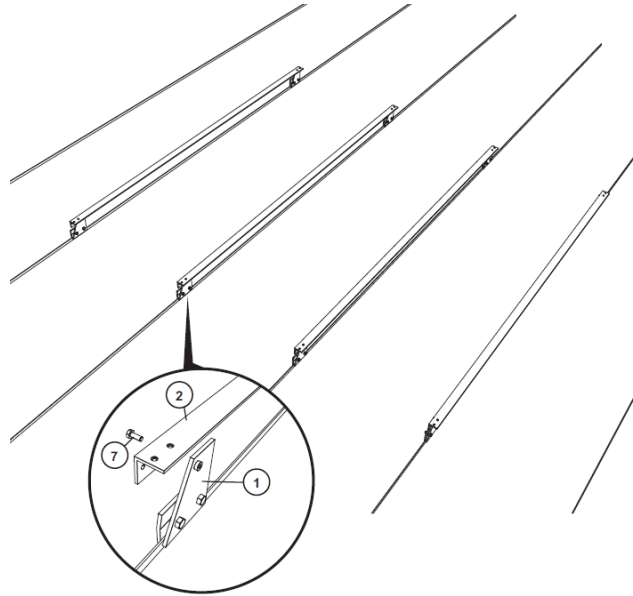
**6.5.1 Divide Measurement X according to the number of collectors and clamps equally.**



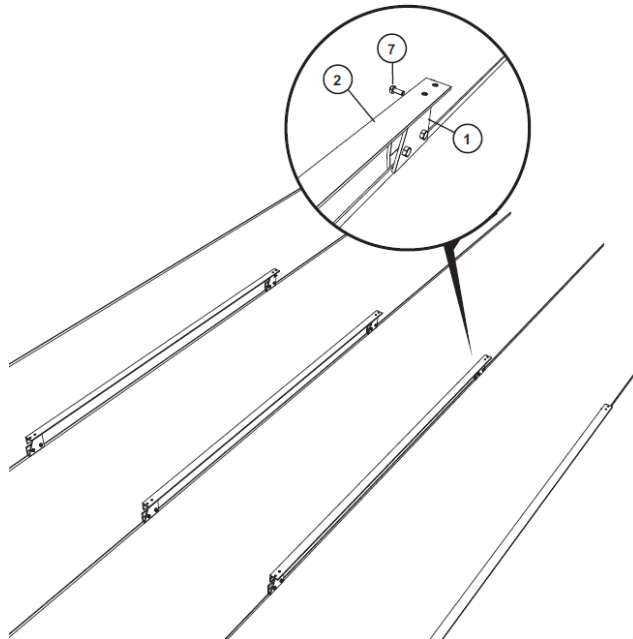
**6.5.2 Divide Measurement X according to the number of collectors and clamps equally**



**6.5.3 Mount the L-Rail to the lower clamps, this will now automatically give you the distance to the top clamps.**



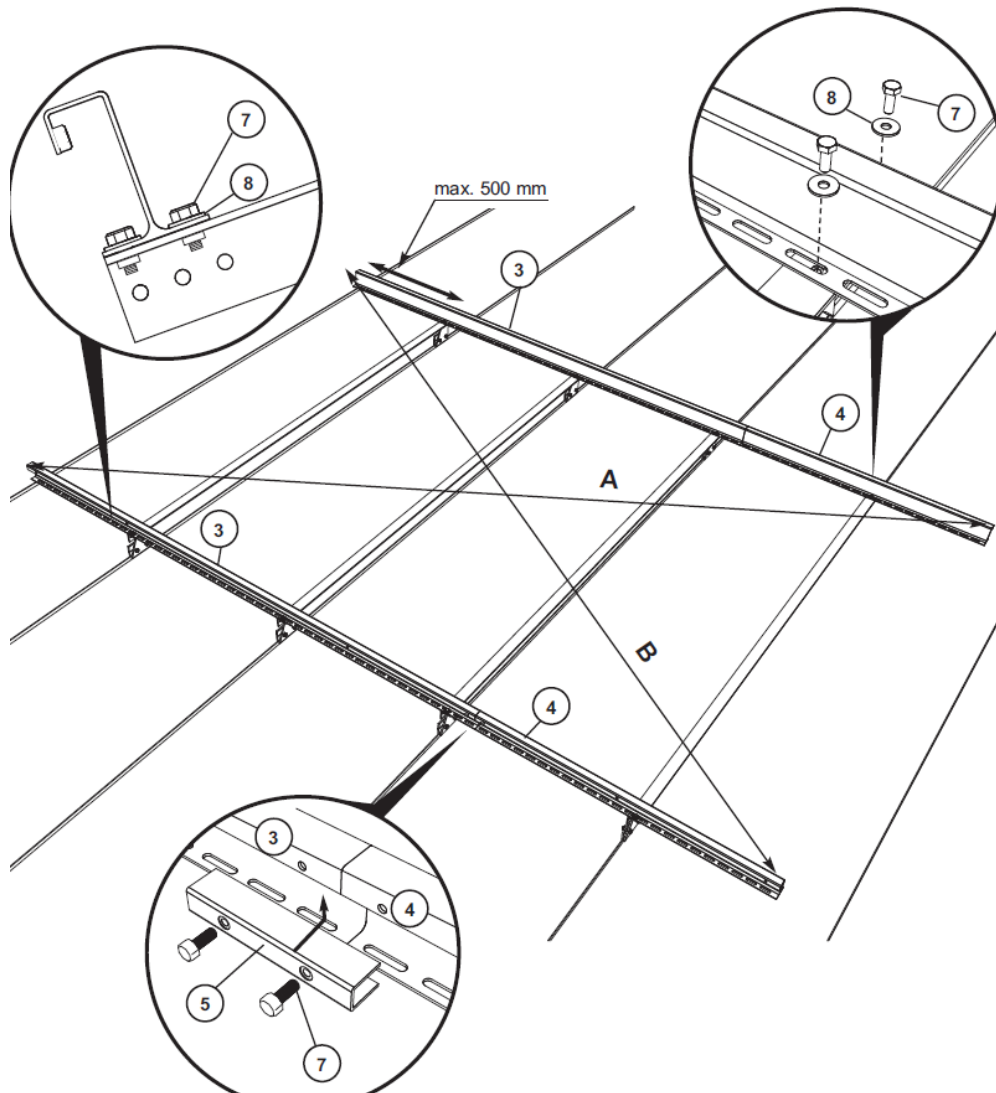
**6.5.4 Mount the top clamps to the L-Rail and then to the upstanding seam.**



6.5.5 Screw the Z-Rails to the L-Rails using the M6 bolts supplied.



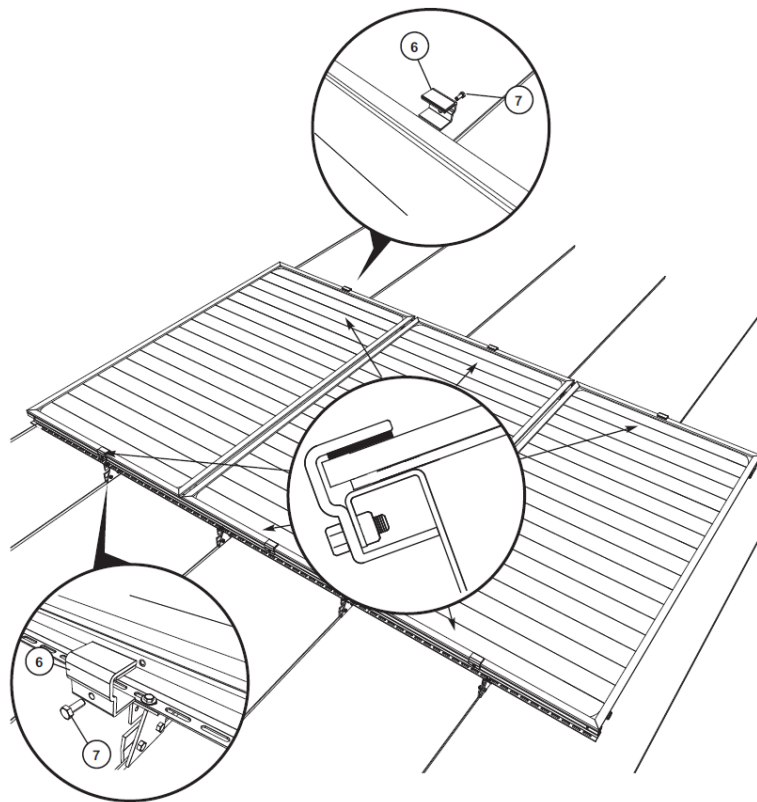
THE MAXIMUM DISTANCE FROM A ROOF HOOK TO THE END OF A Z-RAIL MUST BE NO MORE THAN 500MM ON EACH SIDE.



**6.5.6 Place the collectors in position in the centre of the completed frame. In case of systems with more than two panels mount the middle panel first. Mount the wind clamps to protect the collectors using the nuts and bolts provided.**



**4 WIND CLAMPS PRE PANEL MUST BE USED IF USING HORIZONTAL PANELS.**



### 6.5.7 Option to raise the collector pitch

On roofs that don't meet the required minimum pitch for the collectors (15°) it is possible to lift this angle by fitting extension frames (ordered separately). The extension frames come in 2 different sizes as follows;

Part Number	Extension Frame Height	Alters Pitch By
LSP EXT	500mm	15°
LSP EXT 2	750mm	21°

Top – mount the extension rail to the top L-Rail using the M6 bolt supplied.

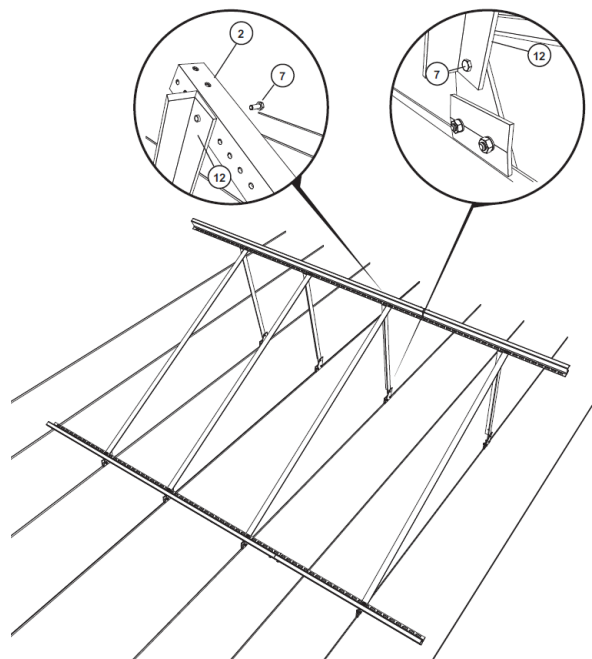
Bottom – Mount the other end of the extension rail to the metal roof clamp using the M6 bolt supplied.



**2 EXTENSION RAILS MUST BE USED IF USING HORIZONTAL PANELS.**

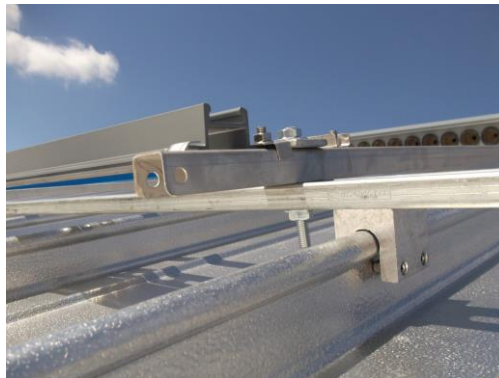
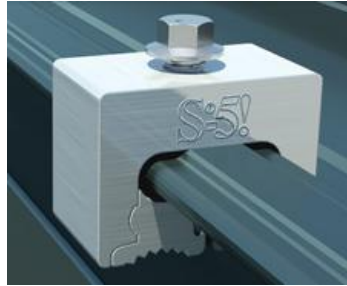
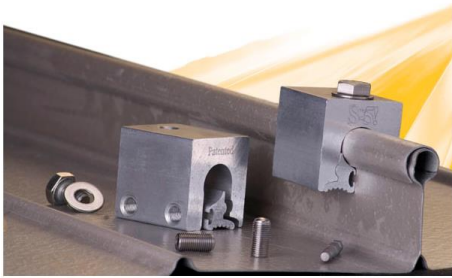
Mount the adjustable brackets to the lower hook. Screw the L-Rail to it using the M6 Screws

Fit the right angle connector to the top of the self sealing screw fitting to the Lower L-Rail.



### 6.5.8 ALTERNATIVE METAL ROOF FIXINGS

If the roof clamps provided with the metal roof kit are unsuitable for the type of metal roof used then alternative clamps may be used (not of Lochinvar supply). When these clamps are used then unistrut should be fitted to the clamps allowing the frame to then be mounted to the channels of unistrut.



## 6.6 IN ROOF KIT

The in roof mounting kit is designed to accommodate 2/3 panel systems and is suitable for most type of roof tiles except slate roofs.



**PLEASE ENSURE THE ROOF IS OF A GOOD SOUND CONDITION AND THAT THE BATTENS ARE SOUND. PLEASE ALSO ENSURE THE ROOF IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.**



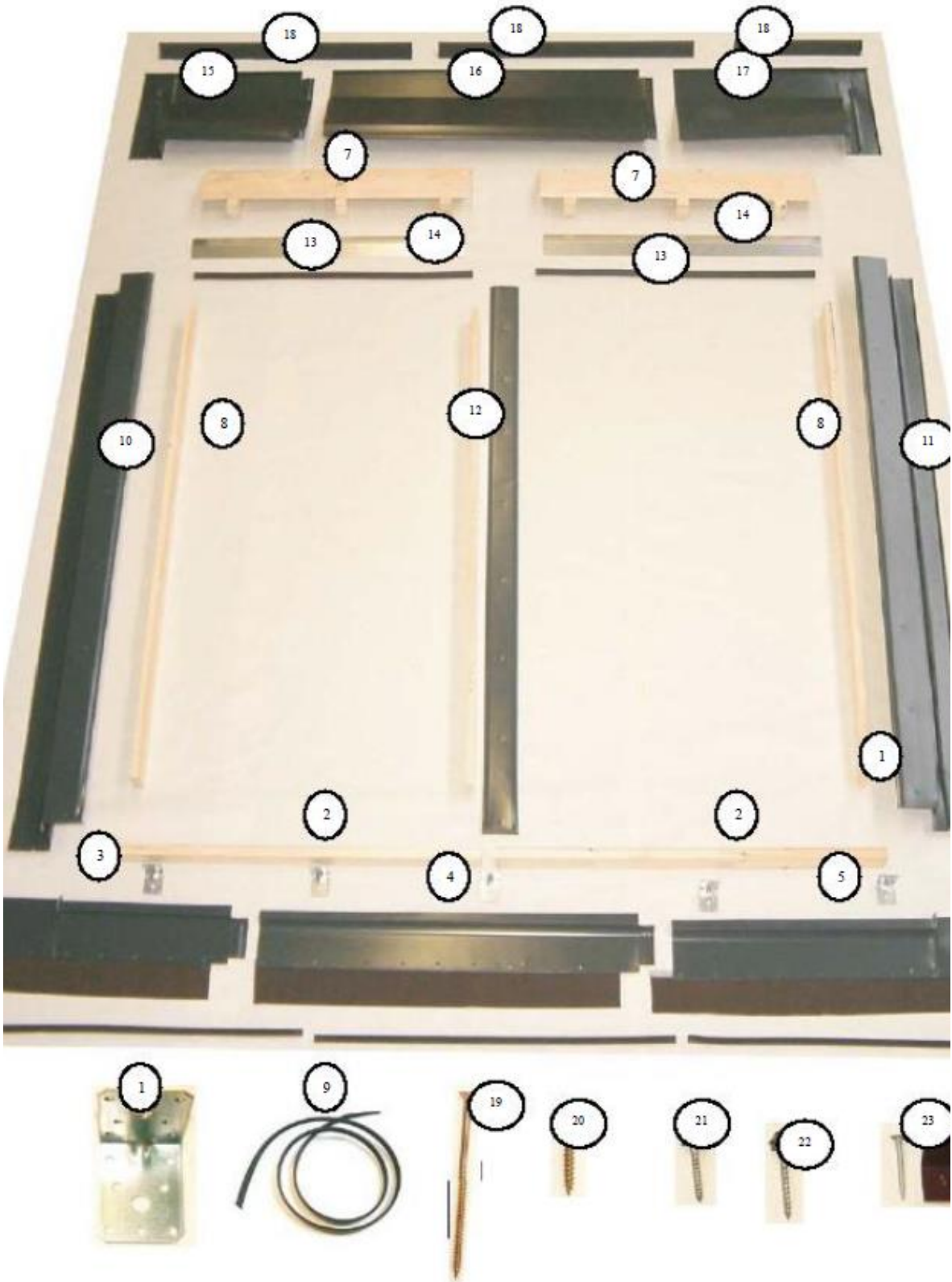
**IF FITTING AN EXTRA PANEL USE A 1 PANEL EXTENSION FOLLOWING THE SAME PROCEDURE.**



Check all of the kit components are supplied before commencing work. The kit should comprise of the following items;

In roof kit						
Item Number	Item Description	Quantity		Item Number	Item Description	Quantity
1	Angle Iron	1		13	Upper seal strip	1
2	Lower wooden slat	1		14	Wind retaining rail	1
3	Lower left flashing	1		15	Upper left flashing	1
5	Lower centre flashing	1		16	Upper centre flashing	1
6	Lower right flashing	1		17	Upper right flashing	1
7	Lower seals strip	1		18	Triangular seal	1
8	Upper wedge	1		19	Wood screws (5x110)	-
9	Side slat	1		20	Wood screws (4x30)	-
10	Side seal strip	1		21	Screws with washer and seal small	<b>1</b>
11	Left side flashing	1		22	Screws with washer and seal small	<b>1</b>
12	Right side flashing	1		23	Nail straps	<b>1</b>





**6.6.1 Determine where the panels will be mounted and check the roof tile alignment.**

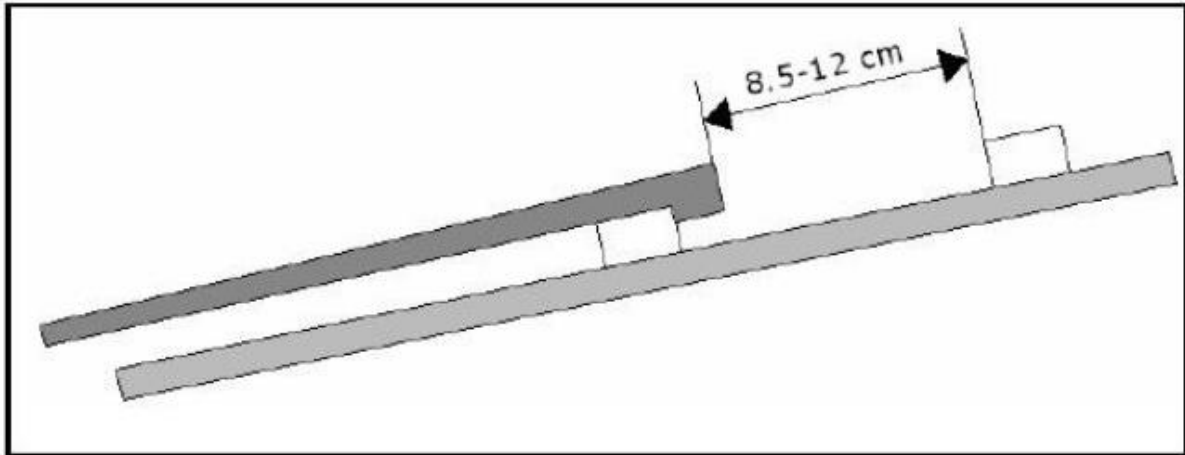


**6.6.2 Remove the tiles from the roof according to the size of the system you are fitting. For a two panel installation a tiled area of 2600 x 2600 should be removed. For every additional panel remove a further tiled area of 1100 x 2600.**

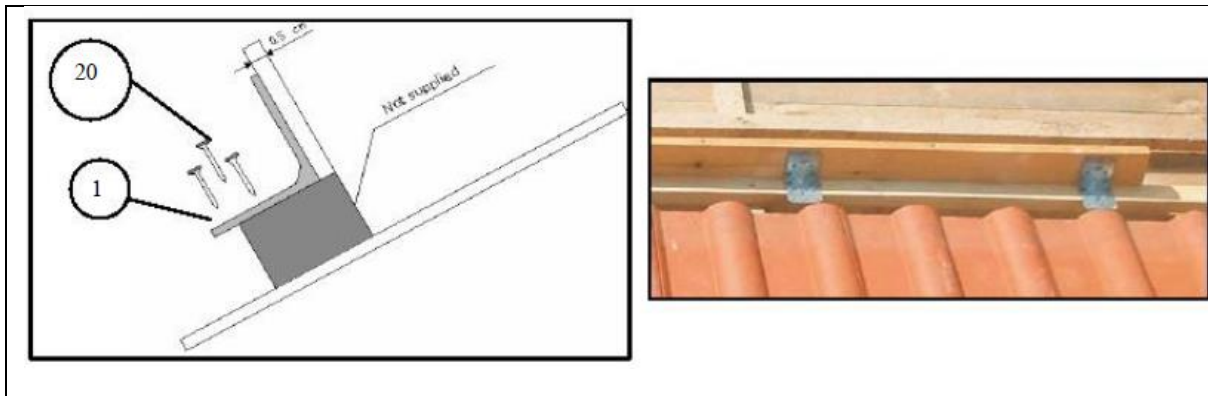


**6.6.3 Attach a lower support batten. Screw the lower support batten to the rafter along where the panels are going to be placed. Use wood screws (4.5 x 80).**

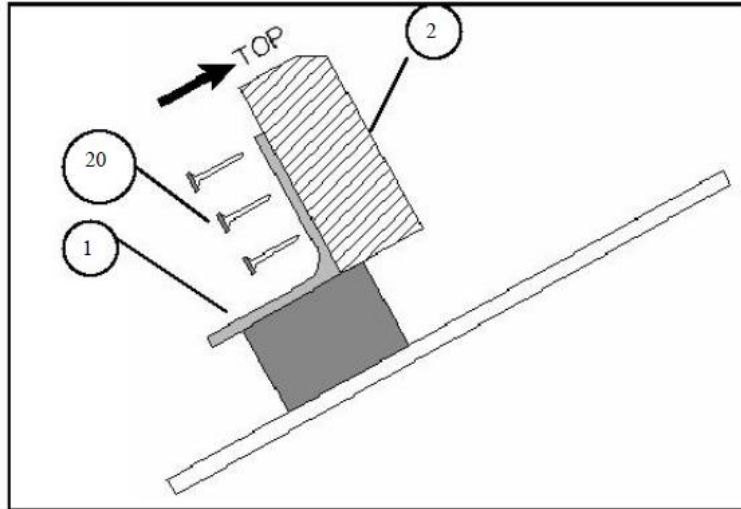
**Note these battens and screws are not supplied by Lochinvar ltd.**



**6.6.4 Attach the angle irons (1) to the lower support batten at equal distances using 3 screws, 4x30 (20). If more than two panels are to be installed, fit the first and the last angle. Tighten a cord between them and place the rest of the angle irons along the cord.**



**6.6.5 Attach the lower wooden slat (2) with the cut off edge placed toward the panel as shown. Use 4x30 (20) screws. Note - the slats in the in-roof installation kit are longer than the ones in the extension kit. The slats should be placed on the left and right side of the area.**



**BEFORE THE SIDE, MIDDLE AND TOP FLASHING SECTION IS INSTALLED MAKE SURE YOU HAVE;**



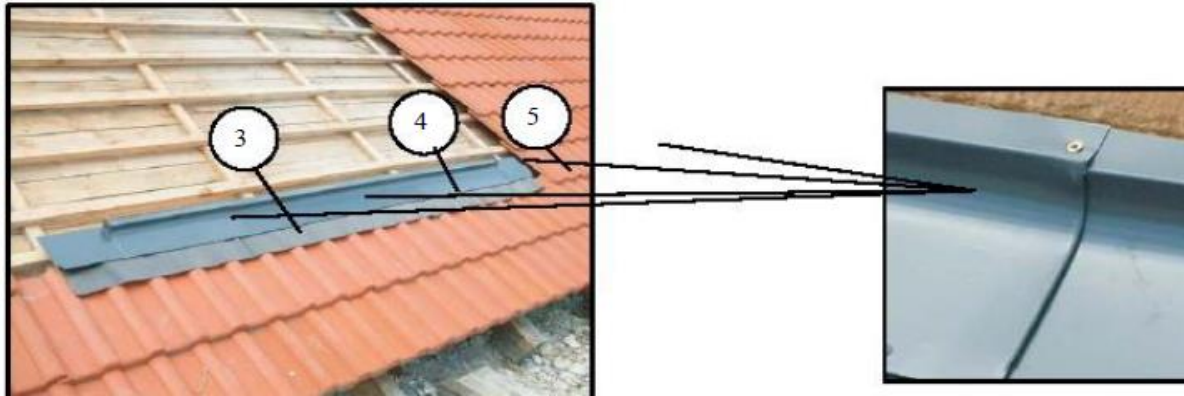
- **PRESSURE TESTED THE HYDRAULIC CONNECTIONS TO THE PANELS**
- **FITTED THE TEMPERATURE SENSOR TO THE END PANEL**

**ONCE THE PANELS ARE FITTED IN THE FLASHING KIT NEITHER OF THESE TASKS WILL BE POSSIBLE.**

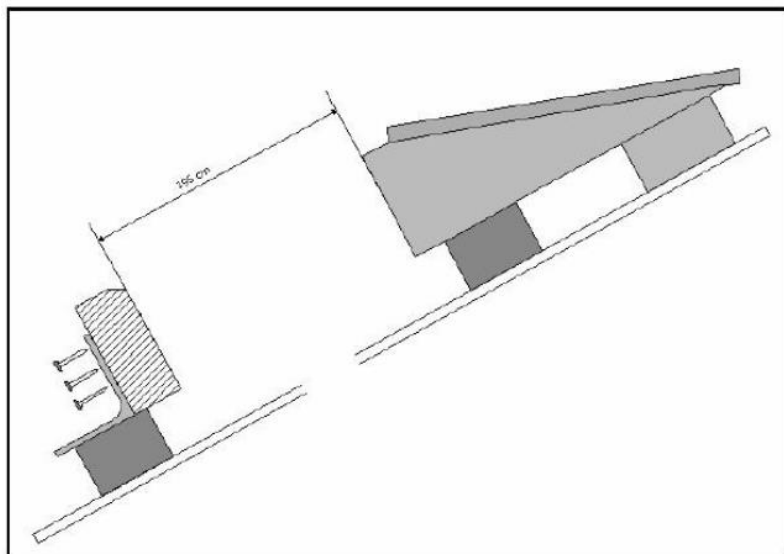
**6.6.6 Fitting the lower left flashing - Starting from the left side, place the lower left flashing (3) onto the slat and screw it 4x30 (20) at the top left corner as shown.**



**6.6.7** Continuing from the left to the right side, place the lower flashings (4) and (5) onto the slat by pushing them on the lap together and place a screw 4x30 (20) on each connection.



**6.6.8** Attach the upper support batten so that the distance between the lower slat (2) and the upper wedge (7) is 1950mm. The upper wedge must be supported by at least two battens.



**6.6.9** Seal strip – stick the seal strip (6) along the whole edge of the lower flashing (3), (4) and (5). Place the panels and align them. The distance on each side of the field should be 10 cm.



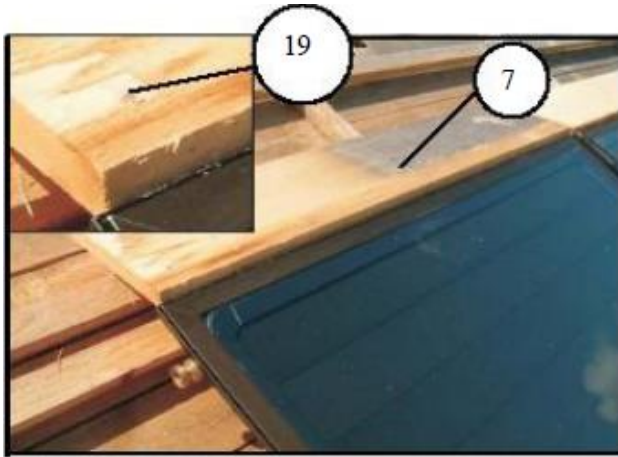
**IT IS IMPORTANT TO CHECK THE DIAGONAL MEASUREMENT SO THAT  $A = B$**



**PANELS SHOULD BE 10CM FROM THE EDGE OF BOTTOM FLASHING**



**6.6.10 Mounting the upper wedge - place the upper wedge (7) under the panels. Align them and use screws 5X10 (19). Tighten them to the batten.**



**6.6.11 Connect the panels together hydraulically.**

**For connection of the panels see separate Installation Manual for the LSP20+ panel.**

**6.6.12 Insert the temperature sensor.**



**6.6.13 Mounting the middle and side wooden rafters.**



**6.6.14 Paste the adhesive backed black strip to the side panel edge and fix the middle flashing kit on the middle wooden rafter using the coloured screws.**

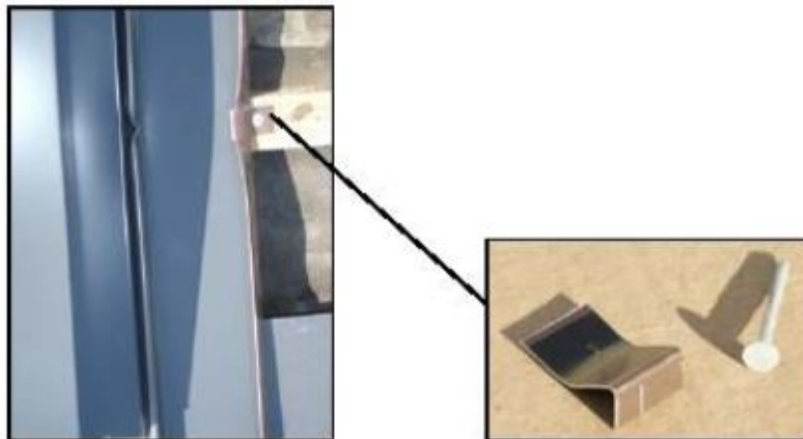




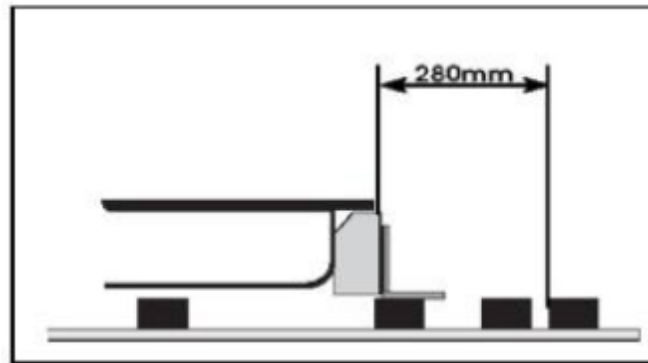
**6.6.15 Fix the left and right hand edge flashing using the capped coloured screws as shown.**



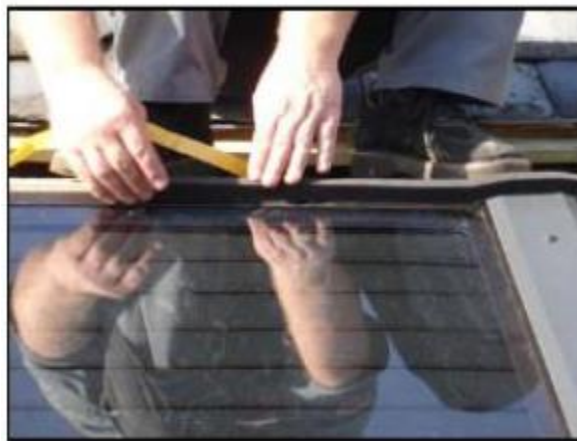
**6.6.16 Using the nails and clips shown below (1), secure the side flashing to the tile lathes by hooking the clips over the outside edge of the flashings and nailing into the lathe as shown below (2).**



**6.6.17 Fix another timber rail (not supplied) across the top of the array, 280mm above the bib flashing support rail fixed earlier. See below figure.**



**6.6.18 Paste the adhesive backed black strip.**



**6.6.19 Screw the wind retaining rail onto the timber rail.**



**6.6.20 Fix the top flashing kit – left section.**



**6.6.21 Fix the middle part of the flashing – slide below the left section.**



**6.6.22 When all the flashing has been firmly fixed into position the roof tiles can again be fitted.**



## 7 ALTERNATIVE FIXINGS

### 7.1 GREEN ROOFS

When installing panels onto a green roof it is important to plan this early as if this is only considered after the roof is laid, it is unlikely that a solution will be found for mounting the panels. The most common method on a green roof would be to have steel work protruding from the roof – a unistrut frame can then be constructed onto this that the panel mounting frame can fix to. The below pictures show a green roof before and afterwards (picture shows evacuated tube collectors, however the principal is just the same).



Steel work on roof



Collectors fitted to steel work

## 7.2 FACADE INSTALLATION

Another method to mount the collectors is to fit them to a wall, the collectors can be fitted to a wall by fixing the A-Frame fixing kit to the wall or one of the roof mounting kits directly to the wall.



**PLEASE ENSURE THE wall IS OF A GOOD SOUND CONDITION. PLEASE ALSO ENSURE THE WALL IS CAPABLE OF BEARING THE WEIGHT OF THE COLLECTORS.**



LSP20+ Collectors fitted directly to a wall



LSP20+H (horizontal collectors) fitted to a wall

## 7.3 FIXINGS NOT SHOWN IN MANUAL

Please contact Lochinvar Technical Support for advice if a fixing method being used isn't covered within this manual.



**The warranty will be invalid if a Lochinvar LTD supplied frame is not used, or a fixing method not approved by Lochinvar LTD is adopted.**







## IMPORTANT INFORMATION

These instructions must be read and understood before installing, commissioning, operating or maintaining the equipment.

