

# ***Installation Instructions***

## **Alpha SolarSmart 150**

### **Roof Integrated Flashing Kit for the Installation of 2, 3 or 4 Alpha Solar Collectors into Tile Type Roofs**

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**SOLAR Key Mark Certified**



**Leave these instructions with the User**

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## 1 INTRODUCTION

The integrated roof flashing kits detailed below have been designed to allow 2, 3 or 4 Portrait or 2 Landscape Alpha SolarSmart solar collectors to be fitted directly into either tile or slate type roofs. The kits required are as follows:-

**Portrait Left (PL)..... Part No. 6.4000760**

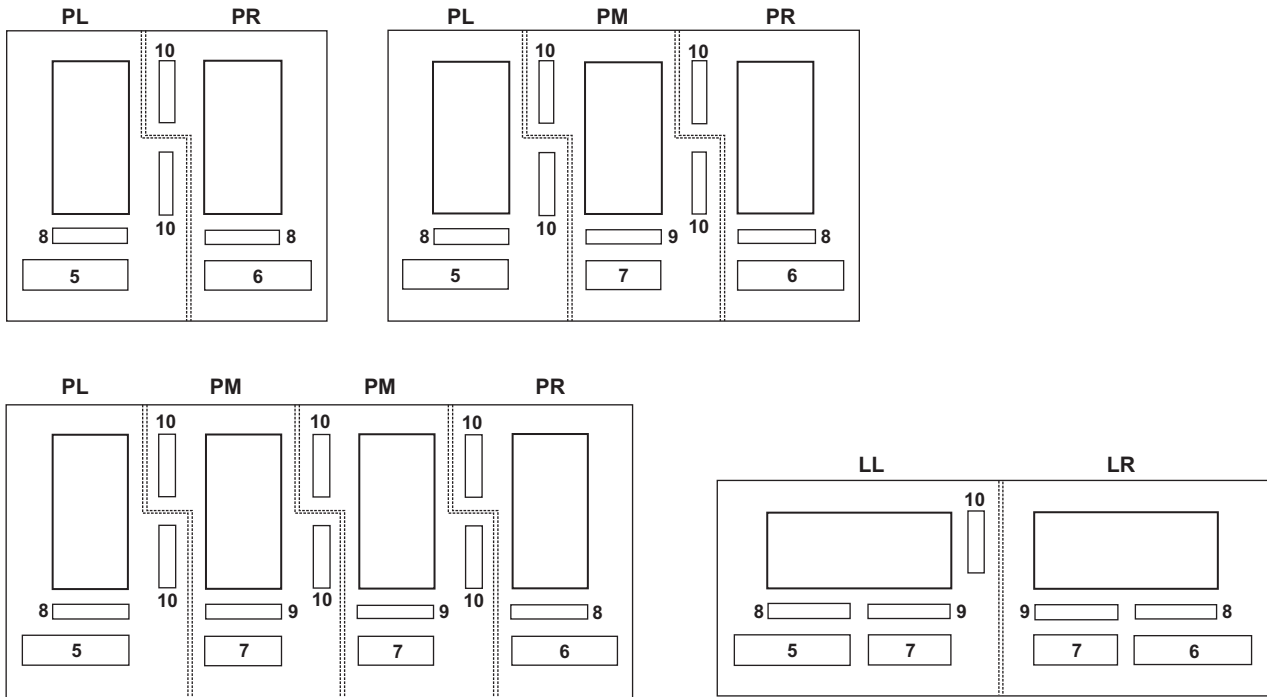
**Portrait Right (PR)..... Part No. 6.4000780**

**Portrait Middle (PM) ..... Part No. 6.4000770**

**Landscape Left (LL)..... Part No. 6.4000660**

**Landscape Right (LR)..... Part No. 6.4000680**

The above five kits allow the collectors to be arranged in the four configurations shown below. Refer to Table in Section 4.1 for a list of the kit parts.



**Note:** The integrated roof flashing kits have been designed to fit into a roof with large inter-locking clay/concrete tiles, or small plain clay/concrete tiles.

Before assembling and installing the collector you should read these instructions carefully together with the Alpha SolarSmart 150 system and associated installation instructions.

Installation of integrated roof flashing kits and collectors should be performed by a recognised installer and roofing contractor.

The manufacturer will not be held responsible for damage resulting from improper installation.

**Notes:** 1. All pipework between the solar collectors, drain back unit and cylinder **MUST** be copper with compression fittings on the collector to drain back circuit and compression fittings onto all cylinder connections.

2. The drain back unit is to be filled only with domestic water.

## 2 TECHNICAL DATA

### 2.1 SOLAR COLLECTOR SYSTEM - Per Panel

Type:		Portrait	Landscape
<b>Dimensions</b>			
Total Surface Area	m <sup>2</sup>	2.5	
Aperture Area	m <sup>2</sup>	2.26	
Length x Width x Thickness	mm	2230 x 1120 x 92	1120 x 2230 x 92
Water Content	L	1.16	1.10
Lift Weight	kg	44 Gross - 41 Nett	
Profile of collector when fitted using an Alpha flashing kit protrudes approximately 30 mm to 60 mm above the tiles (depends upon type of tile used)			
<b>Hydraulics</b>			
Maximum Pressure	bar	8	
<b>Absorber</b>			
Aluminium Cover and Copper Pipe (Length x Width x Depth)	mm	2140 x 1030 x 0.5	1030 x 2140 x 0.5
<b>Spectral Selective Layer</b>			
Absorption Coefficient	%	95	
Emission f	%	5	
<b>Glass</b>			
Transparent, Hardened - Thickness	mm	4	
<b>Collector Housing</b>			
Material		Aluminium Pressing	
<b>Insulation</b>			
Thickness	mm	50	
Thermal conduction coefficient	W/mk	0.037	
<b>Cover Frame</b>			
Material		Aluminium Black Powder Coated	
<b>Temperature Sensor</b>			
Type - NTC	Ohm	10 k	
<b>Connections</b>			
Pre-mounted Flexible Hoses	Return to DBU	mm	12 mm
	Flow from DBU	mm	15 mm
<b>Roof Slope</b>		20° Min (90° Max)	30° Min (90° Max)
<b>Energy Performance (System with 90L tank)</b>		GJ/yr	3.5
<b>Zero Loss Collector Efficiency (No)</b>			74%
<b>Collector Heat Loss Coefficient (a1)</b>		W/m <sup>2</sup> k	3.629
<b>Aperture to Gross Collector Area Ratio</b>			0.9
<b>Collector Pressure Drop</b>			@80 l/h - 9 kPa
<b>Max. Wind and Snow Load</b>		Pitched roof Flat roof	Same as Supporting Roof Structure Wind Speed 27 m/s - Snow Load 1.9 kN/m <sup>2</sup>
<b>Max. Collector Array</b>			4 x 2.3 m <sup>2</sup> = 9.2 m <sup>2</sup>

### 2.2 LOCATION

Min. approximate required area on roof to enable fitting either kit or collector	1200 mm x 2250 mm
Max. Height Between Top of Solar Collector and Bottom of DBU (see Note below)	3 m
Max. Height Between DBU and Bottom of Solar Cylinder	6 m

**Note:** Whenever possible, always fit the DBU to the flexible hoses from the solar collector. If this is not possible, do not use more than 2 m of 15 mm copper pipe (with compression fittings) for each of the flow and return between the DBU and collectors.

### 3 GENERAL INFORMATION

#### 3.1 COLLECTOR LOCATION AND DRAIN BACK UNIT POSITION (Also refer to the SolarSmart 150 Installation Instructions)

The collectors should be installed on a roof slope with a minimum angle of 20° for portrait installations and 30° for landscape installations.

The collectors should be positioned on a roof facing South East to South West. In order to achieve the best system performance the collectors should ideally be mounted facing South.

Avoid locations that may have shaded areas or shadows from surrounding trees or buildings.

The collectors and drain back unit should be positioned as near as possible to each other. The lowest edge of the collectors must be higher than the top of the drain back unit.

The maximum distance of the pipes (both supply and return) between the drain back unit and the collector is 10 m for 2 collectors, 5 m for 3 collectors and 1 m for 4 collectors. The flexible connections supplied on the collector should always be connected inside the roof space.

The maximum vertical height from the bottom of the drain back unit to the top edge of the collector is 3 meters.

The top and bottom edge of the collectors **must** always be level.

The pipework from the collectors to the DBU **must always** fall by a minimum of 40 mm per metre and **must be** insulated with high temperature pipe insulation.

The dimensions of the DBU and clearances required for servicing are shown in Fig. 1.

The connections at the top and bottom of the DBU are shown in Fig. 1.

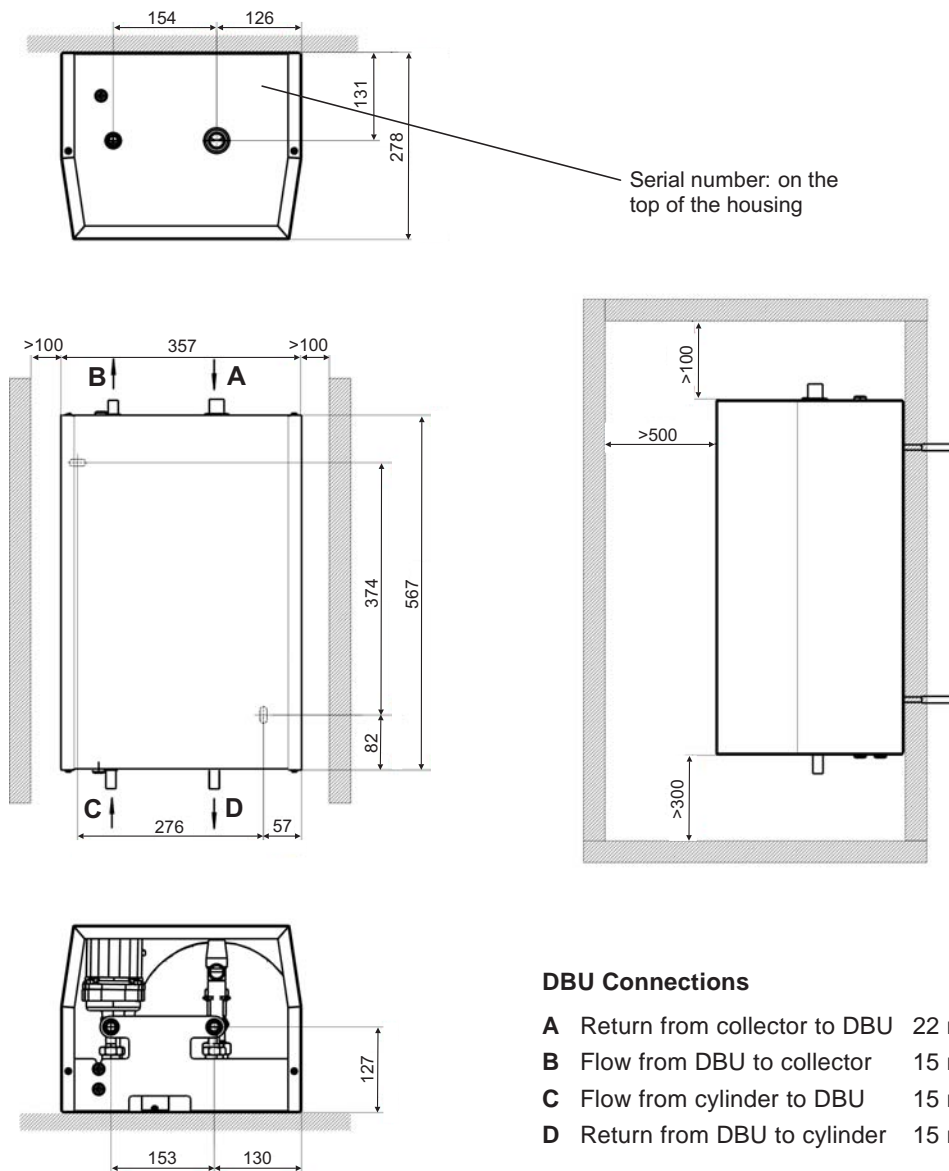


Fig. 1 - Drain back unit (connections and dimensions)

#### 4 Integrated Flashing kit for Alpha SolarSmart 150 - General Information

## 4 PORTRAIT FLASHING KITS

### 4.1 COMPONENTS FOR PORTRAIT FLASHING KITS - 2, 3 or 4 Collectors

Item	Description
1	Portrait collector ( <b>not included in this package</b> )
2	Roof integrated flashing sheet (to mount portrait collector at L/H side)
3	Roof integrated flashing sheet (to mount portrait collector in middle)
4	Roof integrated flashing sheet (to mount portrait collector at R/H side)
5	Lower sealing apron - 1450 mm (to seal portrait collector at L/H side)
6	Lower sealing apron - 1245 mm (to seal portrait collector in middle)
7	Lower sealing apron - 1400 mm (to seal portrait collector at R/H side)
8	Horizontal finishing strip (with 8 holes) - 1300 mm (PL and PR kits)
9	Horizontal finishing strip (with 6 holes) - 1195 mm (PM kit)
10	Vertical finishing strip (without holes) - 1195 mm
11	Bolt - M8 x 25 mm (to secure collectors to flashing kits)
12	Washer - M8 (for use with M8 bolts for mounting collectors)
13	Torx screw - 5 x 70 mm (to secure flashing kits to rafters)
14	Torx screw - 5 x 30 mm (to secure finishing strips to flashing kits)

Refer also to Section 1 for various kits and layouts.

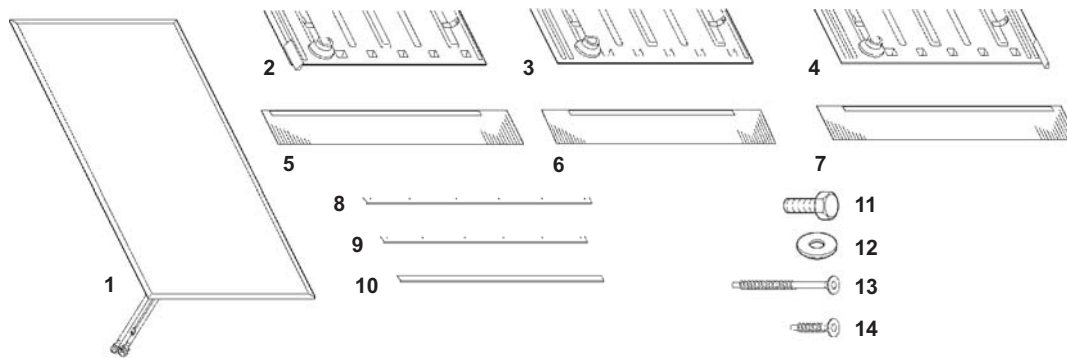


Fig. 3 - Components for Portrait kits

### 4.2 ASSEMBLY AND INSTALLATION OF PORTRAIT KIT

- Choose a suitable location - Refer to Section 2.  
Remove an area of roof tiles approximately 1500 x 2500 mm (width x height) for each panel. See Fig. 4. Note that there is to be no tiles between the panels.

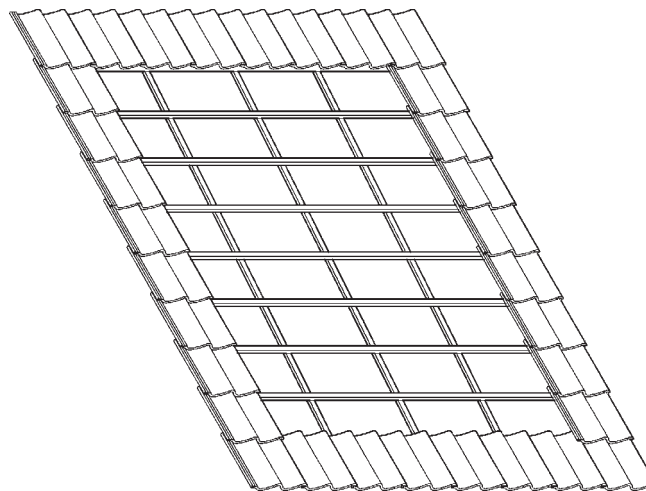
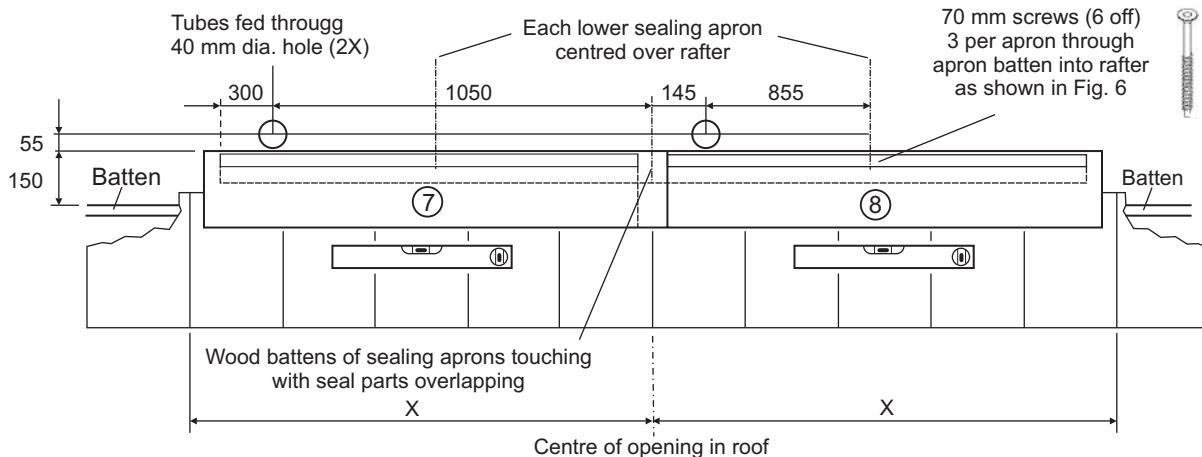


Fig. 4 - Portrait roof opening

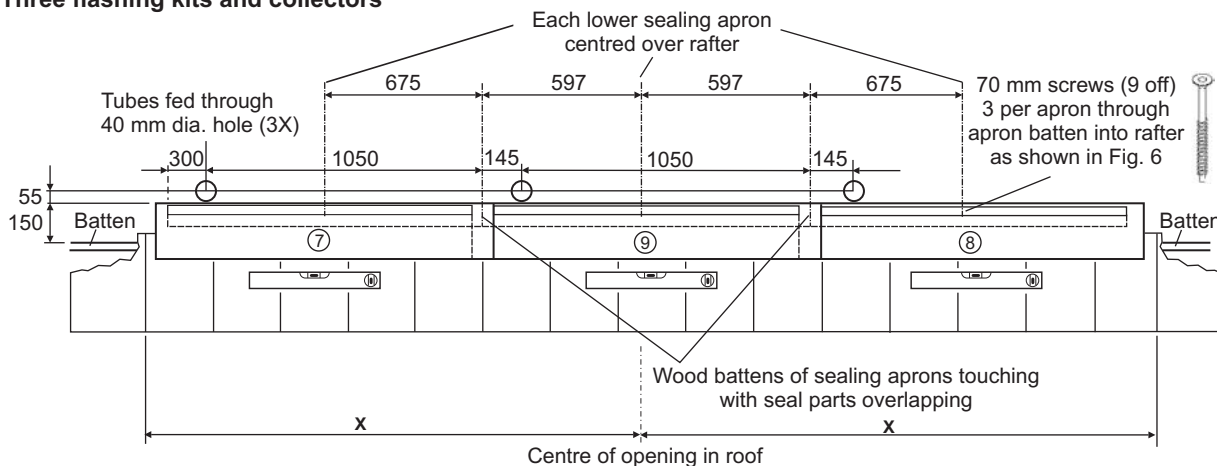
2. Refer to Fig. 5a,5b or 5c for the details of the lower sealing aprons when using 2, 3 or 4 collectors.

**Two flashing kits and collectors**



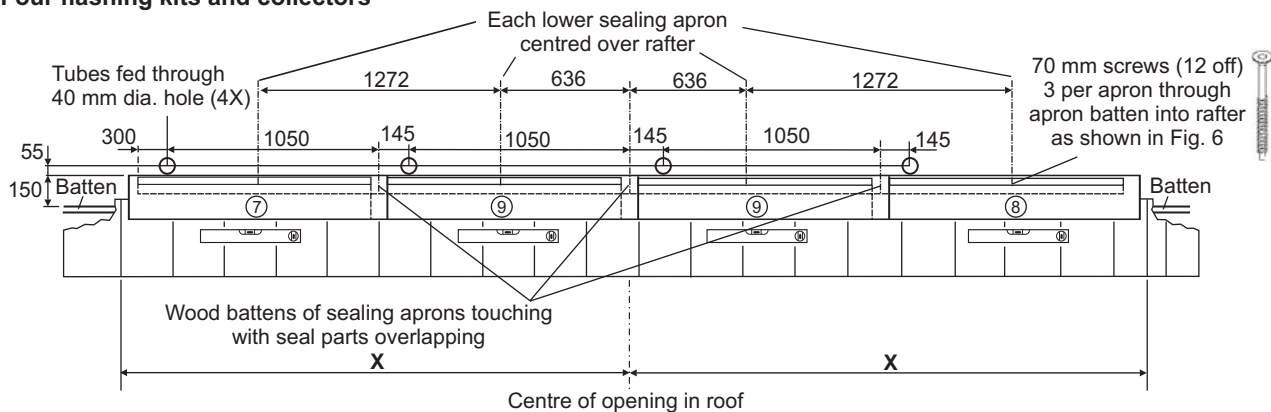
**Fig. 5a - Lower sealing aprons (two portrait collectors)**

**Three flashing kits and collectors**

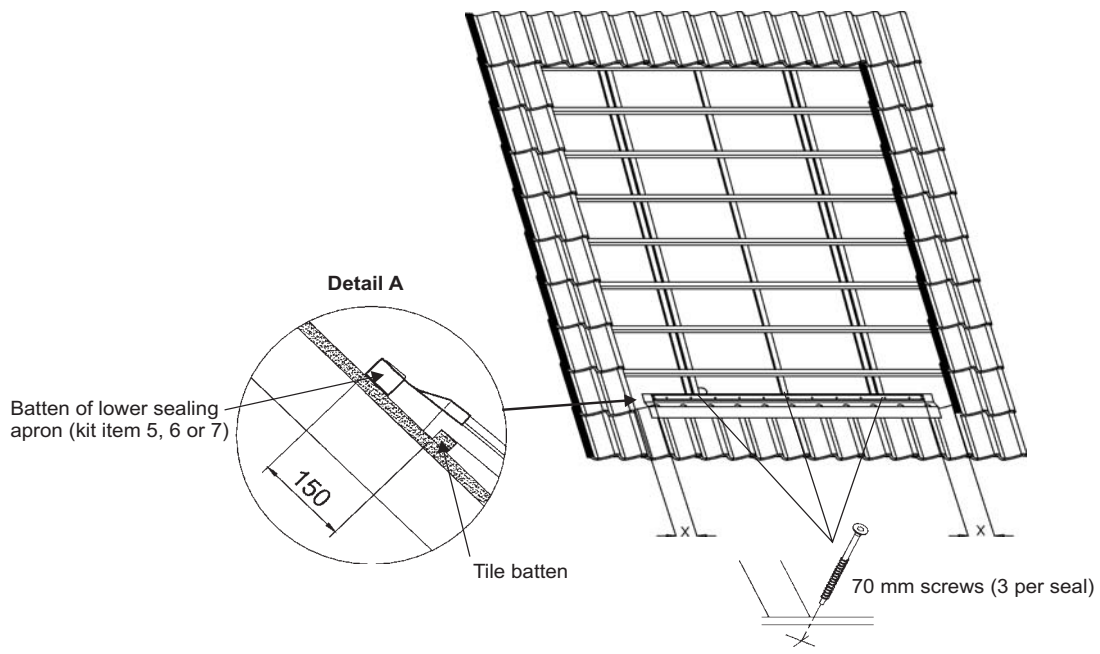


**Fig. 5b - Lower sealing aprons (three portrait collectors)**

**Four flashing kits and collectors**



**Fig. 5c - Lower sealing aprons (four portrait collectors)**



**Fig. 6 - Lower sealing aprons**

- Lower apron seals (kit items 7, 8, and 9 as required) are used for portrait installations, these should be laid side by side, overlapped (left over right) and pushed tight together with the wood battens touching as shown in Figs 5a, 5b, or 5c.

**Note: The left seal must always overlap the right seal and all seals must be level.**

Position the apron seals centrally leaving an equal gap at each end (X).

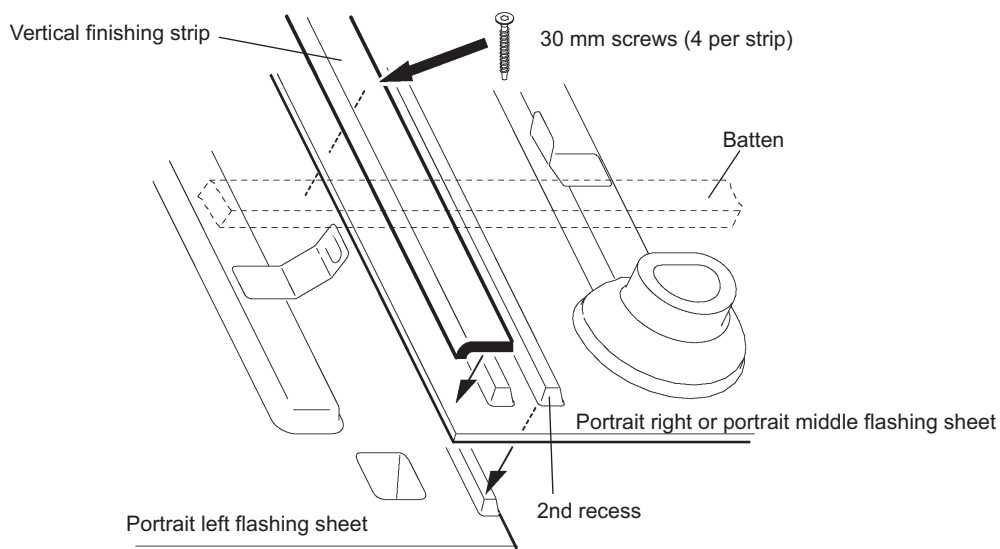
Secure the apron seals (starting with the righthand one) above the batten for the tiles below as shown in Fig. 6, detail 'A', making sure they are level and overlap (left over right). Use three of the 70 mm screws provided (kit item 13) for each seal. See Fig. 6.

- Roll out and position the lefthand flashing sheet, the pre-formed ridges at the bottom should rest against the batten of the lower apron seal as shown in detail 'B', Fig. 8. Before securing the sheet, mark the position of the pipe inlet hole required and carefully cut the underlay or board for the pipes and sensor cable (only use the sensor cable from the collector in the most shaded position). Secure the lefthand side of the flashing sheet to the battens/rafters using six of the 70 mm screws supplied (kit item 14) into the roof battens as shown in Fig. 8.

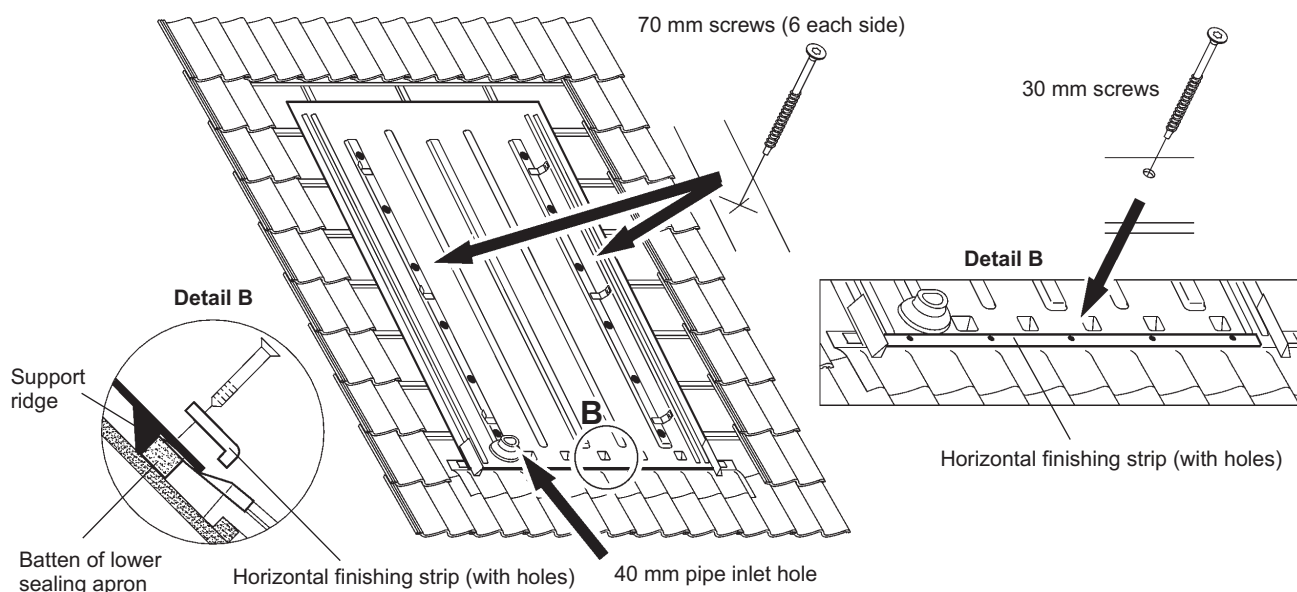
Position the next flashing sheet so that it overlaps the first one to form a seal, as shown in Fig. 7. Mark the position of the pipe inlet hole required and carefully cut the underlay or board for the pipes and sensor cable (only use the sensor cable from the collector in the most shaded position).

Seal and secure the sheets together two vertical sealing strips (kit item 10) and four 30 mm screws (kit item 14) per strip into the battens as shown in Fig. 7). If required a bead of silicone sealant may be applied before overlapping the sheets.

Repeat for additional flashing sheets as required. On the final sheet secure the righthand side to the battens/rafters using six of the 70 mm screws supplied (kit item 14) into the roof battens as shown in Fig. 8.



**Fig. 7 - Sealing portrait flashing sheets together**

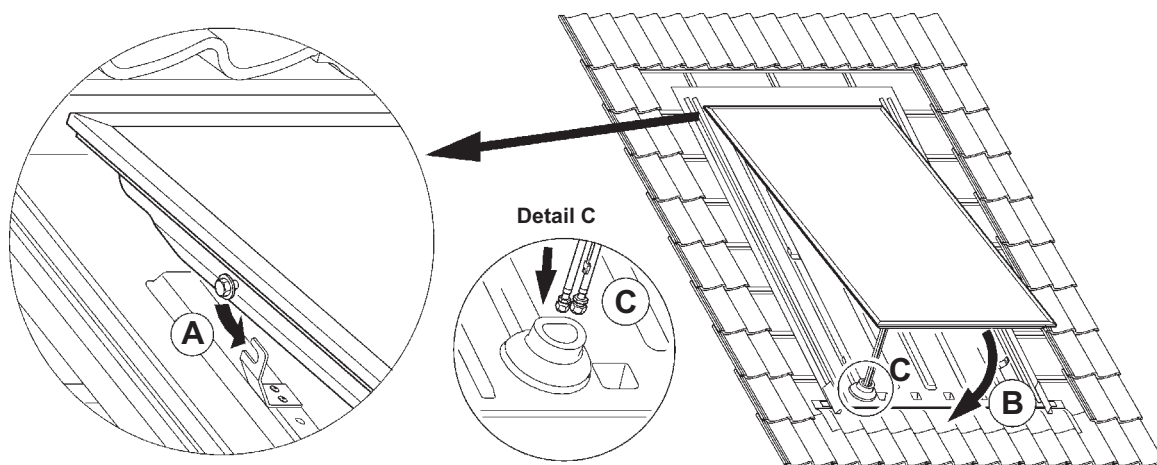


**Fig. 8 - Flashing sheet and finishing strip**

5. Position the lower finishing strips (kit items 8 and 9) along the bottom edge of the flashing sheet and seal to the lower apron batten using the 30 mm screws supplied (kit item 14) as shown in detail 'B', in Fig. 8 (16 screws for 2 flashing kits, 22 screws for 3 kits or 28 screws for 3 kits).

Remove the lining paper from the back of the sealing aprons and neatly press into position over the tiles to form a wind and waterproof seal.

If required you can secure the extreme edges of the flashing sheet using clout nails or short screws - not supplied.



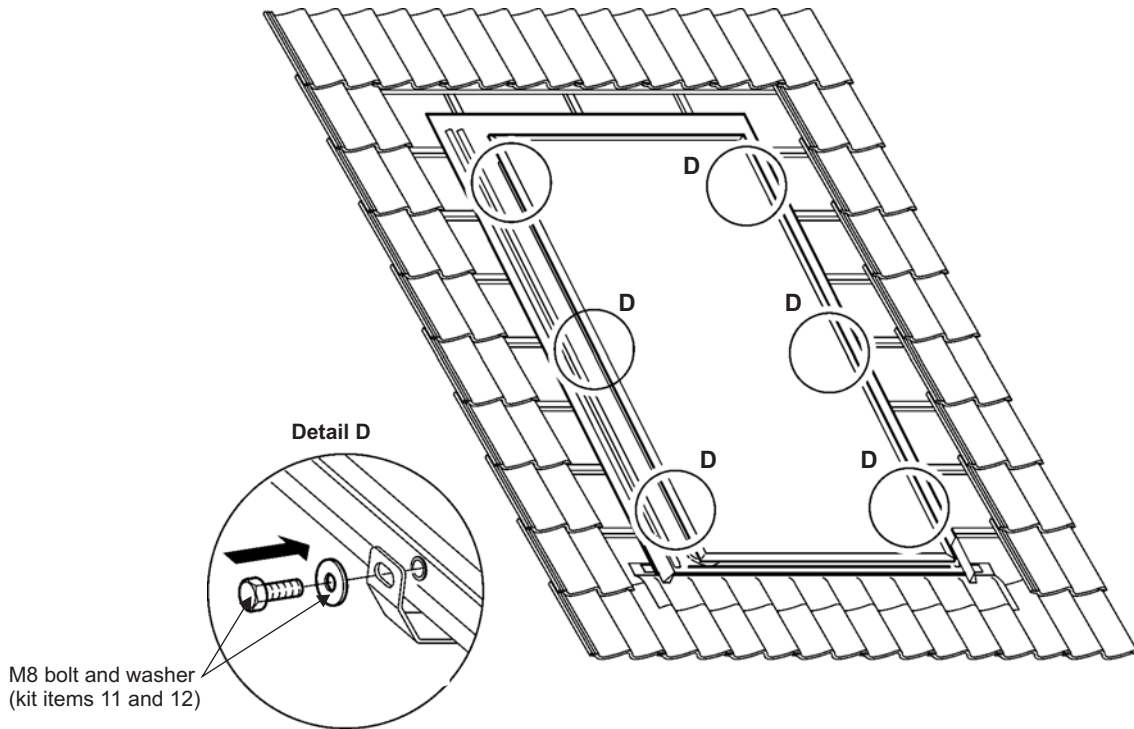
**Fig. 9 - Fit the collector**

6. Portrait collectors have an M8 bolt screwed loosely into the top left hand fixing hole, this is to aid safe fitting of the collector. Keeping the bottom of the collector elevated to avoid damaging the pipes and sensor cable, hook the top left pre-fixed M8 bolt on the collector into the mounting plate on the flashing sheet 'A' as shown in Fig. 9.

Guide the collector pipes and sensor cable (only use the sensor cable from the collector in the most shaded position) through the boss on the flashing sheet and into the roof space as shown in detail 'C' in Fig. 9, whilst lowering the bottom of the collector into position 'B' as shown in Fig. 9.

Make sure that the foam rubber seal around the pipe boss is held firmly between the collector and the flashing sheet.

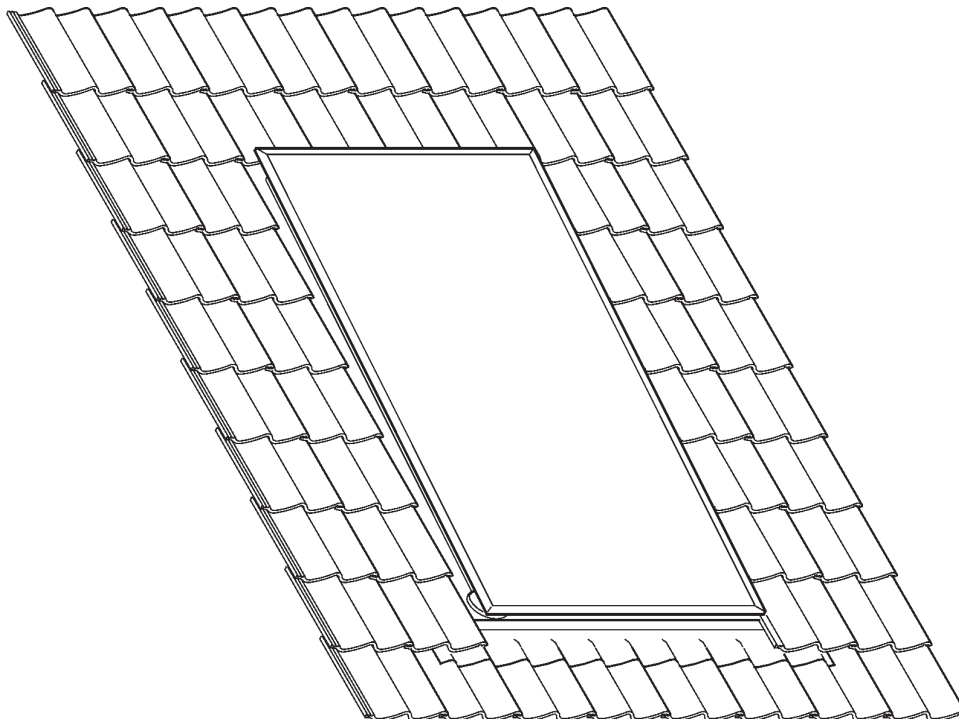




**Fig. 10 - Secure the collectors**

7. Secure each collector to the mounting plates on the flashing sheets using the five M8 bolts and washers supplied (kit items 11 and 12) as shown in detail 'D' in Fig. 10. Tighten all six bolts.

**Note:** Do not over tighten (max. torque 7 Nm) - the collector rear casing is made from aluminium.



**Fig. 11 - Replace the roof tiles**

8. Replace the roof tiles at the sides of the collectors. To allow the tiles to lie correctly over the flashing sheet, you may need to remove the tile nibs closest to the collector side. Secure each tile using nails or screws. If required you can secure through the flashing sheet making sure the nail or screw goes through the raised ribs. Replace the remaining tiles above the collector - these should overlap the flashing sheet by at least 100 mm.

## 5 LANDSCAPE FLASHING KITS

### 5.1 COMPONENTS FOR LANDSCAPE FLASHING KIT - 2 Collectors

Item	Description
1	Landscape collector ( <b>not included in this package</b> )
2	Roof integrated flashing sheet (to mount landscape collector at L/H side)
3	Roof integrated flashing sheet (to mount landscape collector at R/H side)
4	Lower sealing apron - 1450 mm (to seal landscape collector at L/H side)
5	Lower sealing apron - 1245 mm (to seal landscape collector in middle)
6	Lower sealing apron - 1400 mm (to seal portrait collector at R/H side)
7	Horizontal finishing strip (with 8 holes) - 1300 mm (outer left and outer right)
8	Horizontal finishing strip (with 6 holes) - 1195 mm (2 in centre)
9	Vertical finishing strip (without holes) - 1195 mm
10	Bolt - M8 x 25 mm (to secure collectors to flashing kits)
11	Washer - M8 (for use with M8 bolts for mounting collectors)
12	Torx screw - 5 x 70 mm (to secure flashing kits to rafters)
13	Torx screw - 5 x 30 mm (to secure finishing strips to flashing kits)

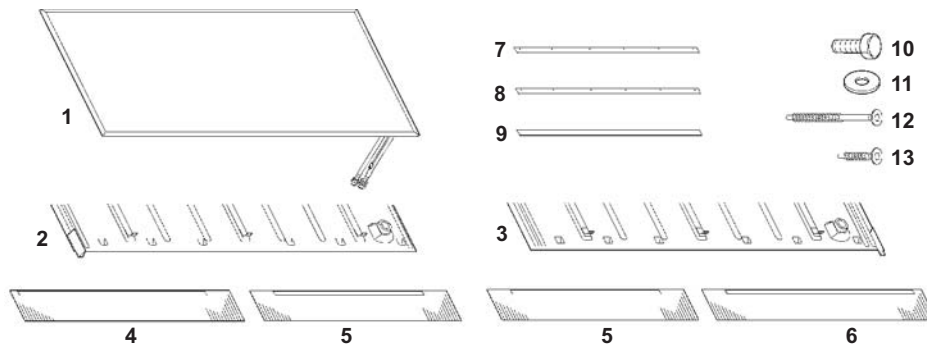


Fig. 12 - Landscape kit contents

### 5.2 ASSEMBLY AND INSTALLATION OF LANDSCAPE KIT

1. Choose a suitable location - Refer to Section 2.  
Remove an area of roof tiles approximately 2500 x 1500 mm (width x height). See Fig. 13.

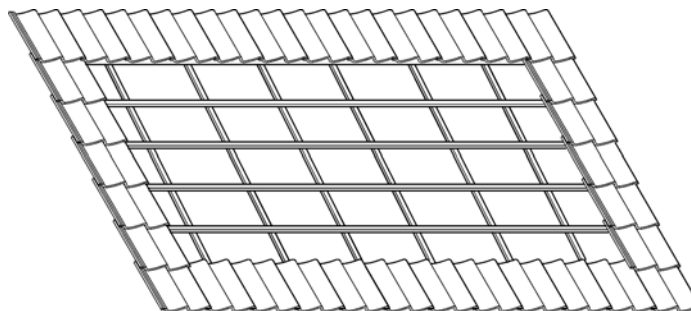
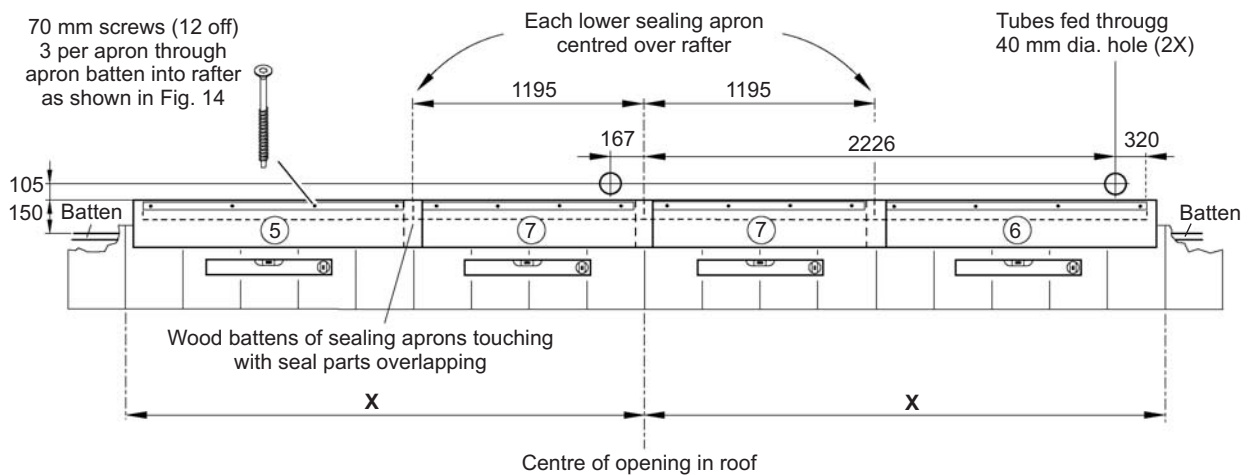


Fig. 13 - Landscape roof opening

- Refer to Fig. 14 for the details of the lower sealing aprons when using 2 collectors.



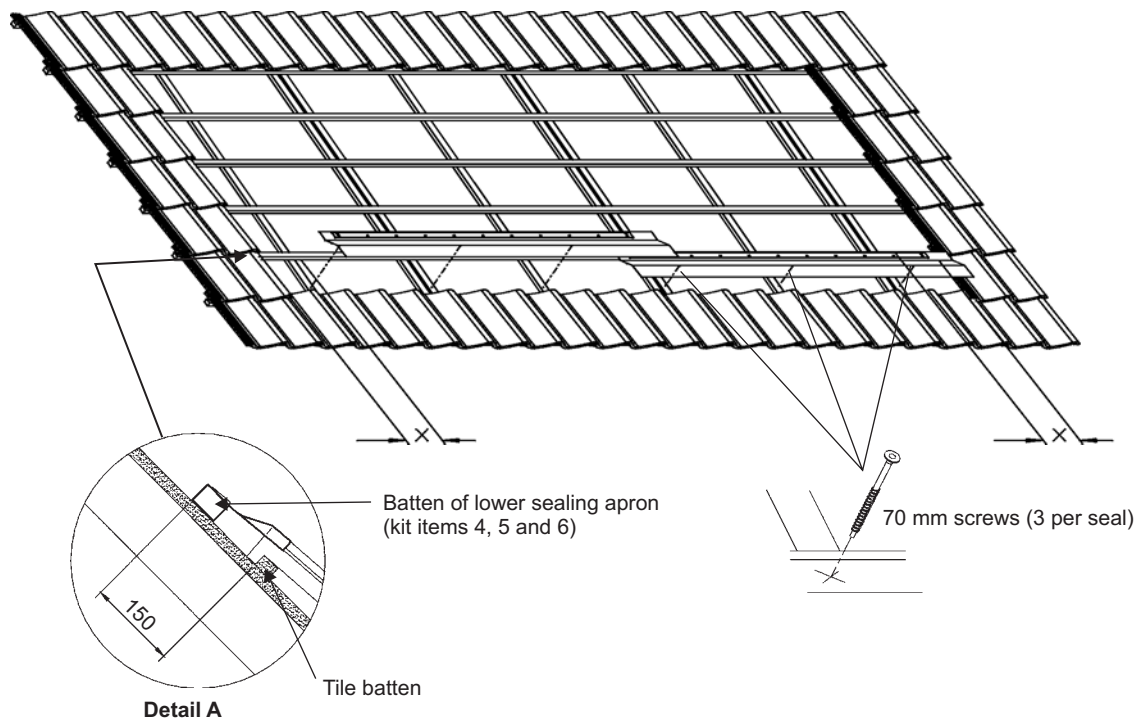
**Fig. 14 - Lower sealing aprons (two landscape collectors)**

- Four lower apron seals (kit items 4, 5, and 6) are used for landscape installations, these should be laid side by side, overlapped (left over right) and pushed tight together with the wood battens touching as shown in Fig. 14.

**Note: The left seal must always overlap the right seal and all seals must be level.**

Position the apron seals centrally leaving an equal gap at each end (X).

Secure the apron seals (starting with the righthand one) above the batten for the tiles below as shown in Fig. 15, detail 'A', making sure they are level and overlap (left over right). Use three of the 70 mm screws provided (kit item 12) for each seal. See Fig. 15.



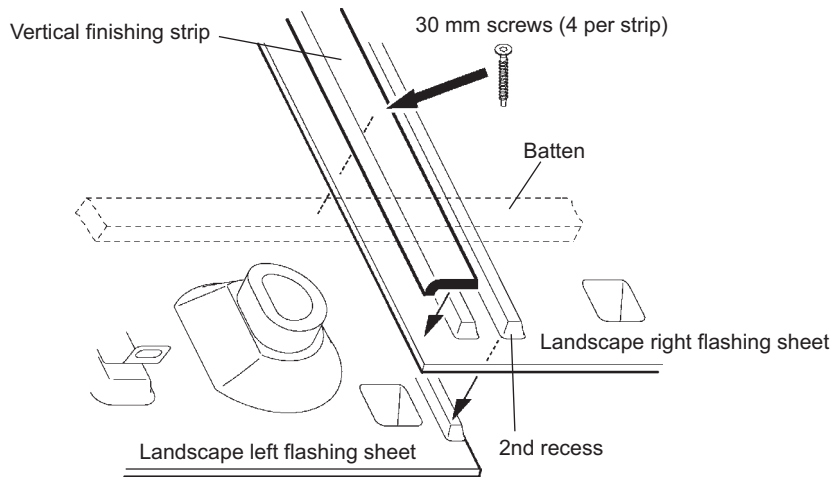
**Fig. 15 - Lower sealing aprons**

- Roll out and position the lefthand flashing sheet, the pre-formed ridges at the bottom should rest against the batten of the lower apron seal as shown in detail 'B', Fig. 17. Before securing the sheet, mark the position of the pipe inlet hole required and carefully cut the underlay or board for the pipes and sensor cable (only use the sensor cable from the collector in the most shaded position). Secure the lefthand flashing sheet to the battens using nine of the 70 mm screws supplied (kit item 12) into the roof battens/rafters as shown in Fig. 17.

Position the righthand flashing sheet so that it overlaps the the lefthand one to form a seal, as shown in Fig. 16. Mark the position of the pipe inlet hole required and carefully cut the underlay or board for the pipes and sensor cable (only use the sensor cable from the collector in the most shaded position).

Seal and secure the sheets together a vertical sealing strip (kit item 9) and four 30 mm screws (kit item 13) into the battens as shown in Fig. 16). If required a bead of silicone sealant may be applied before overlapping the sheets.

Secure the righthand sheet to the battens/rafters using nine of the 70 mm screws supplied (kit item 12) into the roof battens as shown in Fig. 17).

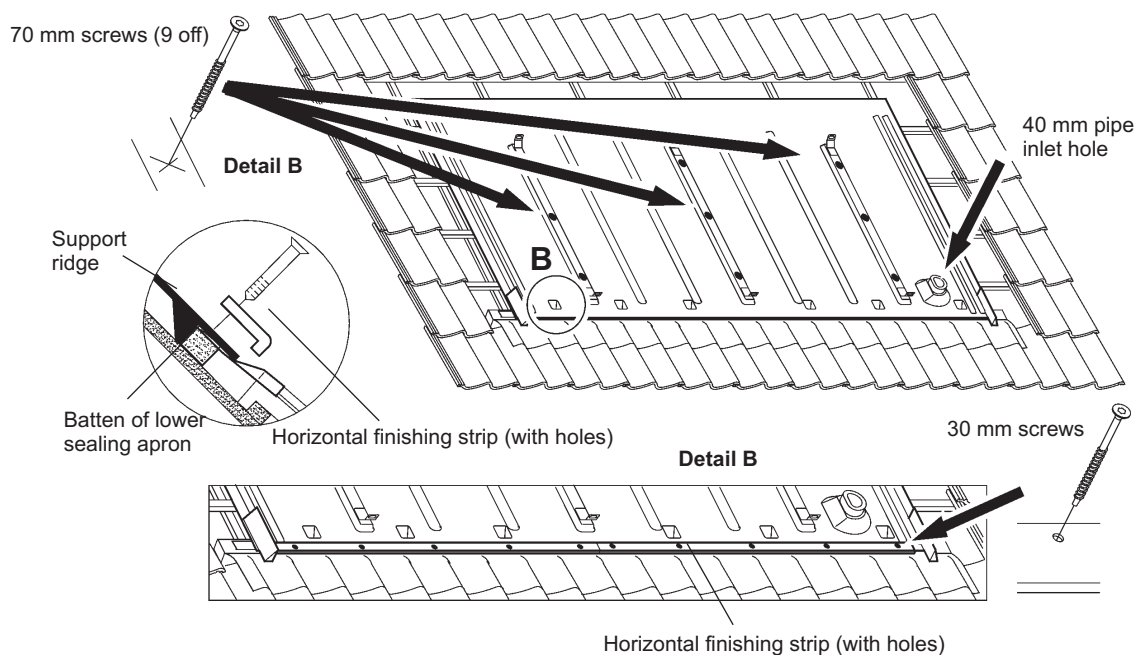


**Fig. 16 - Sealing landscape flashing sheets together**

- Position the lower finishing strips (kit items 7 and 8) along the bottom edge of the flashing sheet and seal to the lower apron batten using the twenty two of the 30 mm screws supplied (kit item 13) as shown in detail 'B', in Fig. 17.

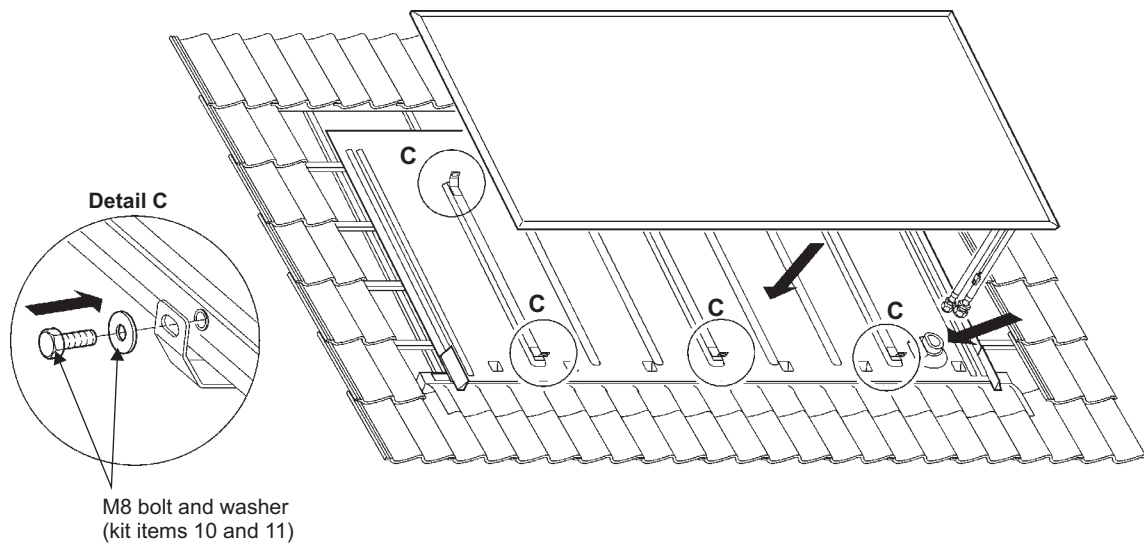
Remove the lining paper from the back of the sealing aprons and neatly press into position over the tiles to form a wind and waterproof seal.

If required you can secure the extreme edges of the flashing sheet using clout nails or short screws - not supplied.

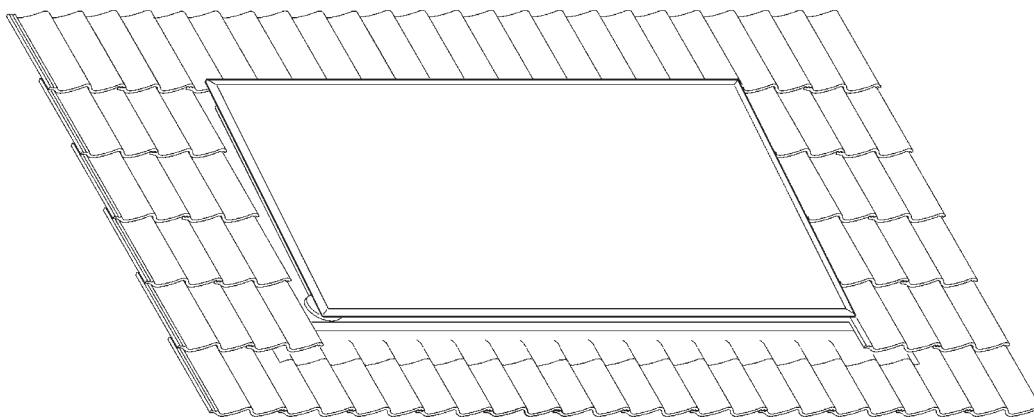


**Fig. 17 - Flashing sheet and finishing strip**

6. Place the top edge of the collector into position, guide the collector pipes and sensor cable (only use the sensor cable from the collector in the most shaded position) through the boss on the flashing sheet and into the roof space as shown in Fig. 18, whilst lowering the bottom edge of the collector into position.  
 Make sure that the foam rubber seal around the pipe boss is held firmly between the collector and the flashing sheet.  
 Secure the collector to the mounting plates on the flashing sheet using the six M8 bolts and washers supplied (kit items 10 and 11) as shown in detail 'C' in Fig. 18. Tighten all six bolts.  
**Note:** Do not over tighten (max. torque 7 Nm) - the collector rear casing is made from aluminium.
7. Replace the roof tiles at the sides of the collectors. To allow the tiles to lie correctly over the flashing sheet, you may need to remove the tile nibs closest to the collector side. Secure each tile using nails or screws.  
 If required you can secure through the flashing sheet making sure the nail or screw goes through the raised ribs.  
 Replace the remaining tiles above the collector - these should overlap the flashing sheet by at least 100 mm.



**Fig. 18 - Secure the collector**



**Fig. 19 - Replace the roof tiles**

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