

Installation Instructions

Alpha SolarSmart

On Roof Kits for the Installation of Alpha Solar Collectors onto Tile and Slate Type Roofs

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1 INTRODUCTION

The On Roof kits detailed below have been designed to allow either Alpha Landscape or Portrait SolarSmart solar collectors to be fitted directly on top of either tile or slate type roofs. The kits required are as follows:-

On Tile kit, Part No. 6.4000850 - This consists of two kits:-

On Roof Basic kit Part No. 6.4008010

On Roof Tile kit Part No. 6.4008020

Note: The On Roof Tile kit has been designed to fit onto a roof with large inter-locking clay/concrete tiles, or small plain clay/concrete tiles.

On Slate kit, Part No. 6.4000860 - This consists of two kits:-

On Roof Basic kit Part No. 6.4008010

On Roof Slate kit Part No. 6.4008030

Note: The On Roof Slate kit has been designed to fit onto a roof with flat traditional or composite slates.

The same kits are used no matter whether a portrait or landscape collector is used.

Before assembling and installing the collector you should read these instructions carefully together with the Alpha SolarSmart 90 system and associated installation instructions.

Installation of On Roof kits and collectors should be performed by a recognised installer and roofing contractor.

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

2 TECHNICAL DATA

2.1 SOLAR COLLECTOR SYSTEM

Type:		Portrait	Landscape
Dimensions			
Total Surface Area	m ²	2.5	
Aperture Area	m ²	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	40	
Hydraulics			
Maximum Pressure	bar	8	
Absorber			
Aluminium Cover and Copper Pipe (Length x Width x Depth)	mm	2140 x 1030 x 0.5	1030 x 2140 x 0.5
Spectral Selective Layer			
Absorption Coefficient	%	94	
Emission f	%	5	
Glass			
Transparent, Hardened - Thickness	mm	4	
Collector Housing			
Material		Aluminium Pressing	
Insulation			
Thickness	mm	50	
Thermal conduction coefficient	W/mk	0.037	
Cover Frame			
Material		Aluminium Black Powder Coated	
Temperature Sensor			
Type - NTC	Ohm	10 k	
Connections			
Pre-mounted Flexible Hoses	Return to DBU mm	12 mm	
	Flow from DBU mm	15 mm	
Minimum Roof Slope			
		20°	30°
Energy Performance (System with 90L tank)GJ/yr			
3.5			
Zero Loss Collector Efficiency (No)			
74%			
Collector Heat Loss Coefficient (a1)			
	W/m ² k	3.629	
Aperture to Gross Collector Area Ratio			
0.9			

2.2 LOCATION

Min. approximate required area on roof to enable fitting either kit or collector	1200 mm x 2250 mm
Max. Distance Between Top of Solar Collector and Bottom of DBU (see Note below)	3 m
Max. Distance 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 pipe for each of the flow and return between the DBU and collector.

2.3 GENERAL

Max. profile of collector above the tiles	100 mm
Adjustable height of panel	40 mm
On Roof kit material:-	
Brackets and components	Stainless steel
Frame and brackets	Black powder coated
Mounting rail	Zinc plated steel

3 GENERAL INFORMATION

3.1 COLLECTOR LOCATION AND DRAIN BACK UNIT POSITION

(Also refer to the *SolarSmart 90 Installation Instructions*)

On Roof kits and collectors should only be installed on sloped roofs with a minimum angle of 20° for portrait installations and 30° for landscape installations.

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

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

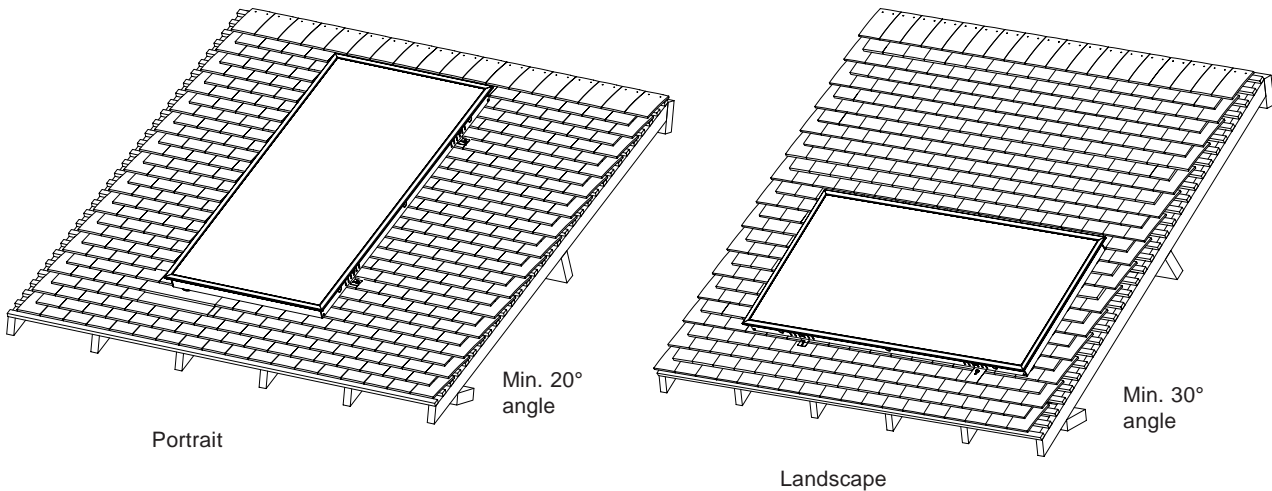


Fig. 1 - Solar collector

The collector and drain back unit should be positioned as near as possible to each other. The lowest edge of the collector must be higher than the top of the drain back unit. The maximum length of pipes (both supply and return) between the drain back unit and the collector is 2 meters. The flexible connections supplied on the collector should always be connected inside the roof space and have a continuous fall to the drain back unit of at least 40 mm per metre.

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

Note: The top and bottom edge of the collector **must** always be level, failure to do so will invalidate the warranty.

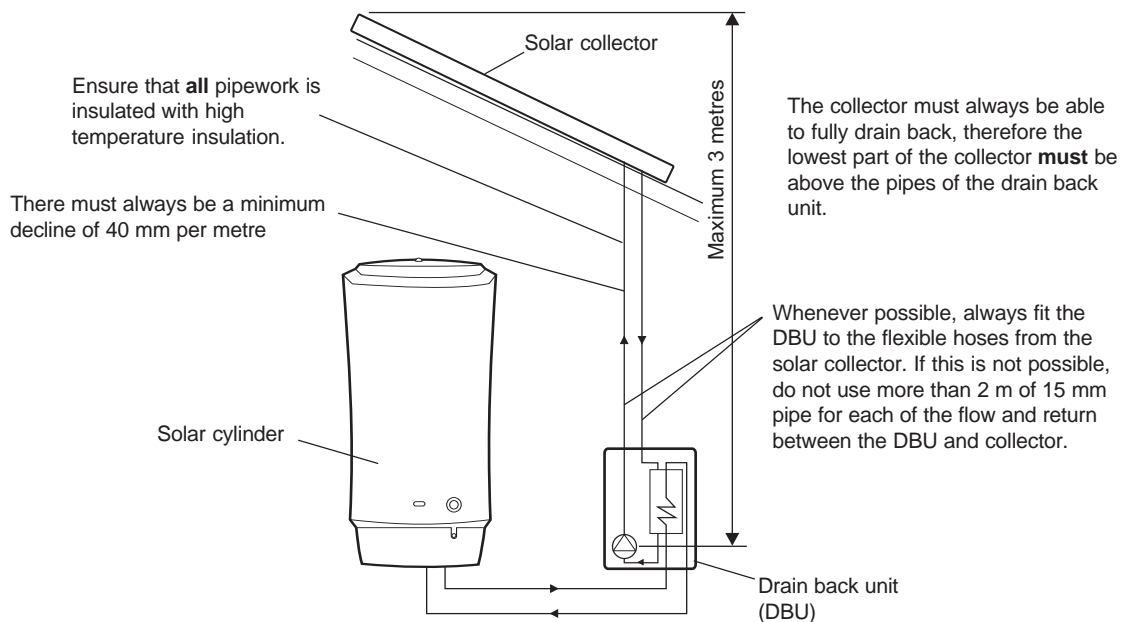
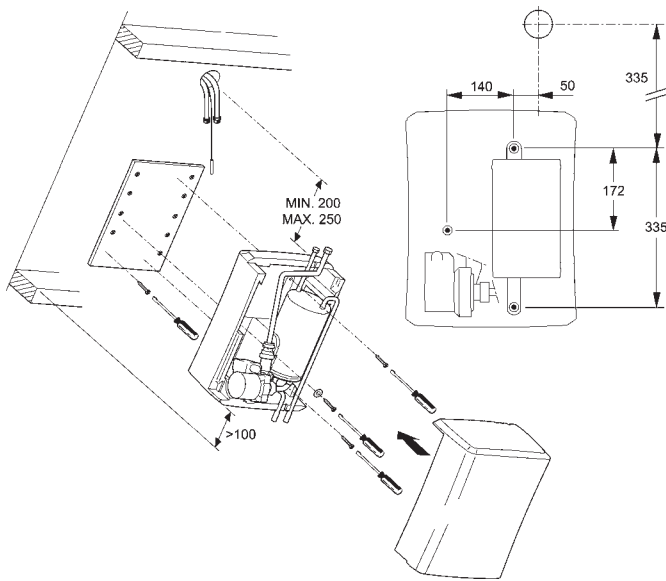
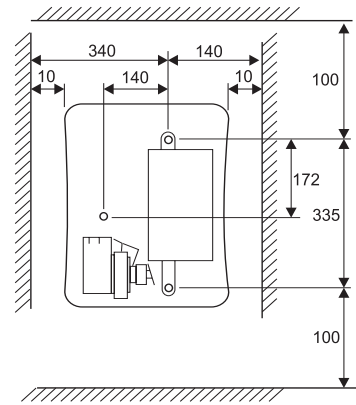


Fig. 2 - Collector and drain back unit



Note: The tubing from the solar collector must always slope down towards the drain back unit (at least 40 mm per metre). There must not be any part of the tubing that will allow water to collect.



Minimum free space required around drain back unit	
Sides	10 mm
Bottom	100 mm
Top	100 mm
Front	*450 mm

* To a closed cupboard door this dimension can be reduced to 13 mm

Fig. 3 - Position and clearances for drain back unit

3.2 POSITIONING THE COLLECTOR ON THE ROOF

Choose a suitable roof location with enough space for the collector and fixings - approximately 1200 mm x 2250 mm.

Landscape bracket positioning details (Fig. 4) - Position the roof brackets (item 10) so that the M8 studs are between 1200 mm and 1550 mm horizontally apart and are between 980 mm and 1150 mm vertically apart (this will depend upon the tile profile and type).

Portrait bracket positioning details (Fig. 5) - Position the roof brackets so that the M8 studs are between 980 mm and 1150 mm horizontally apart, depending on whether the brackets are to be inside or outside the frame and are between 1200 mm and 1550 mm vertically apart.

Note: The brackets have to be positioned between 320 mm and 400 mm lower than where the top edge of the collector will finish.

All the dimensions above apply to both tile and slate roofs.



Fig. 4 - Landscape brackets



Fig. 5 - Portrait brackets

4 INSTALLATION - TILED ROOF

4.1 ON TILE KIT - Unpacking

The On Tile kit is supplied in two boxes.

Box 1 - On Roof Basic Kit

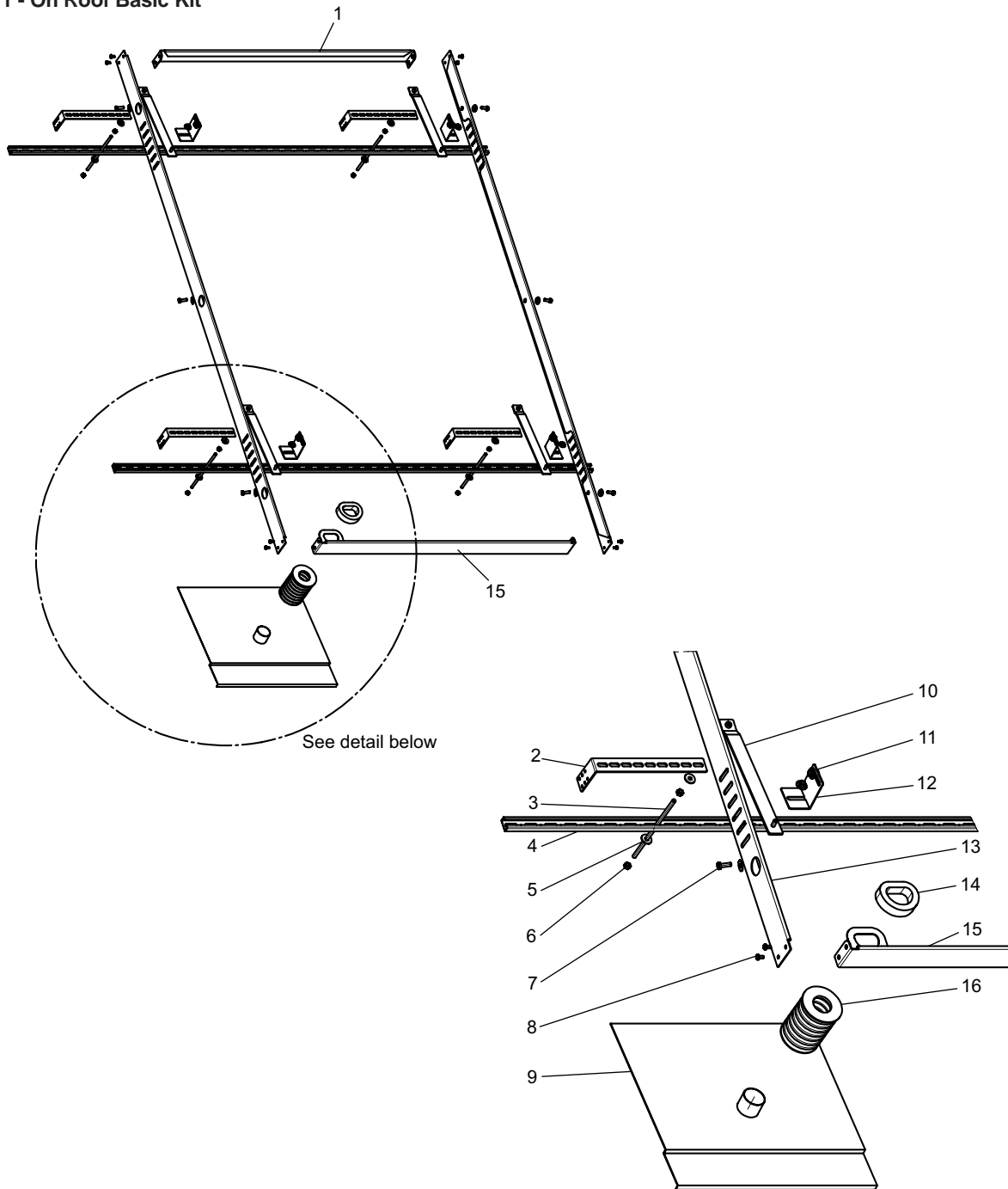


Fig. 6 - Exploded view of parts in On Roof Basic kit

Contents

Item No.		Qty.	Item No.		Qty.
1	Frame short side strip	1	10	Support bracket	4
2	Rafter bracket	4	11	Bolt M8 x 16 hex hd	4
3	Stud M8 x 220 stainless	4	12	Angle bracket	4
4	Channel	2	13	Frame long side strip	2
5	Washer M8 stainless	26	14	Foam seal	1
6	Nut M8 stainless	16	15	Frame short side strip with loop	1
7	Bolt M8 x 25 hex hd	6	16	Flexible rubber gasket	1
8	Bolt M6 x 12 pozidrive	8	17	Screw No.8 x 45 stainless	16
9	Flashing	1	-	Installation instructions	1

Box 2 - On Roof Tile Kit

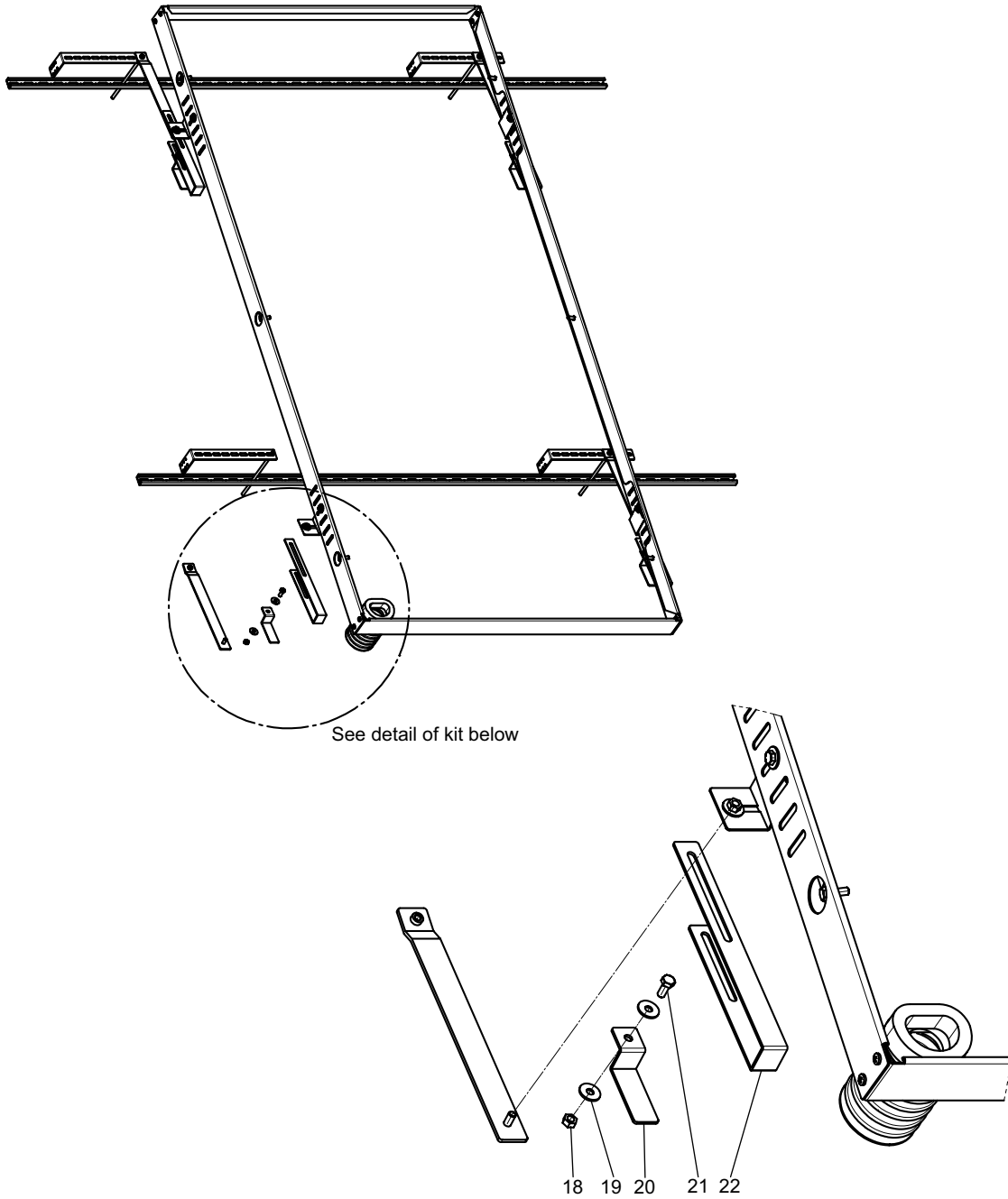


Fig. 7 - Exploded view of parts in On Roof Tile kit

Contents

Item No.		Qty.
18	Nut M8 stainless	4
19	Washer M8 stainless	8
20	Batten clamp	4
21	Bolt M8 x 20 stainless	4
22	Additional support bracket	4

4.2 INSTALLATION ONTO TILED ROOF

Assemble the four pieces of the black powder coated frame (with the folded edge uppermost) as shown in Fig. 6, using the eight M6 x 12 long pozidrive bolts (item 8). Place it to one side in a safe position.

From the outside slide the support bracket (item 10) (the end without the stud) under the tiles until the cranked part drops over the top edge of the tile into the roof space. In most cases it is not necessary to remove the tiles. For 265 mm x 165 mm plain tiles the bracket will need to go over the batten of the tile above, positioned in the centre of the above tile between the tile lugs. Repeat for all four support brackets spaced according to the dimensions given in Section 3.2.

Note: It may be necessary to remove the nibs on the tile to allow it to lay flat.

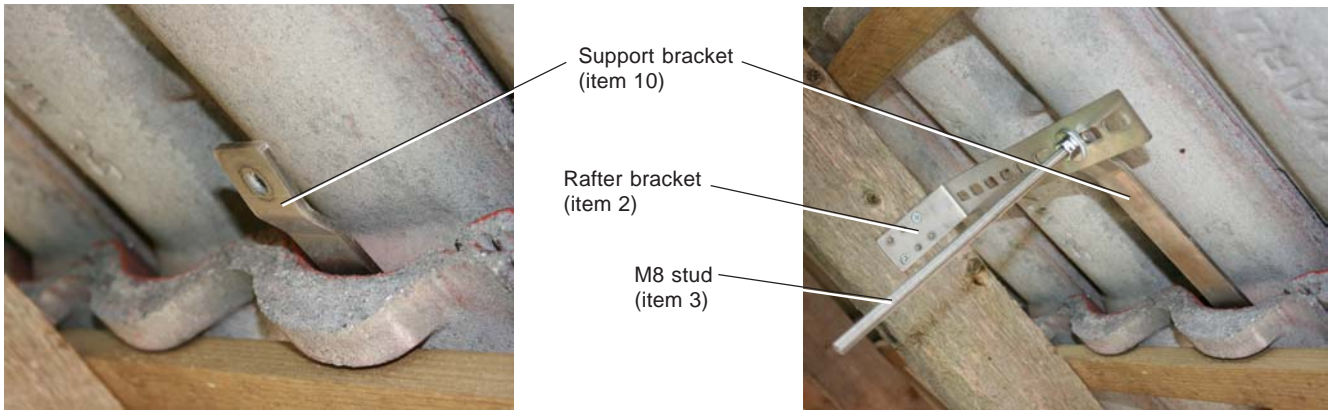


Fig. 8 - Support bracket under tile

Fig. 9 - Rafter bracket

From inside the roof space attach the rafter bracket (item 2) to the nearest rafter at the correct level using the screws provided (item 17) where the support bracket comes over the tile. (You may need to carefully cut the roof lining to reveal the support bracket). Screw the M8 stud (item 3) through the rafter bracket (item 2) and into the nut on the tile support bracket (item 10) and secure together using an M8 nut (item 6) and washer (item 5). Screw a second nut followed by a washer onto the stud at a level in line with the back of the rafters.



Fig. 10 - Channel and Rafter brackets

Position the channel (item 4) across the back of the rafters and clamp with an M8 nut (item 6) and washer (item 5). Tighten sufficiently to support without the brackets distorting and lifting the tiles. If required, cut off the excess stud with a saw.



Fig. 11 - Additional support bracket (item 22)



Fig. 12 - Additional support bracket (item 22)



Fig. 13 - Batten clamp

The additional support brackets (item 22) can now be fitted. Slide the shorter section under the tile below until the elongated slot locates over the M8 stud of the bracket above. Slide the bracket up until it stops on the bottom edge of the tile - See Figs 11 and 12.

From inside the roof fit the batten clamp (item 20) over the batten and secure using an M8 bolt, washer and nut (items 18, 19 and 21) - See Fig. 13.

Repeat this for all four additional support brackets (item 22), positioning them so that they align with the lower mountings of the collector frame. See Section 3.2.



Fig. 14 - Angle bracket

Position the angle brackets (item 12) over the M8 studs of the support brackets and loosely retain with the nuts (Item 6) and washers (item 5).

Position the collector frame over the angle brackets, (depending on the tile types the brackets can be positioned either inside or outside the frame). However, ideally every attempt should be made to locate the angle brackets inside the frame. Ensure that the loop welded to the frame is located at the bottom right hand corner for landscape collectors and bottom left hand corner for portrait collectors. Loosely retain the frame in position using the four M8 bolts (item 11), washers (item 5) and nuts (item 6).



Fig. 15 - Loop in corner of frame

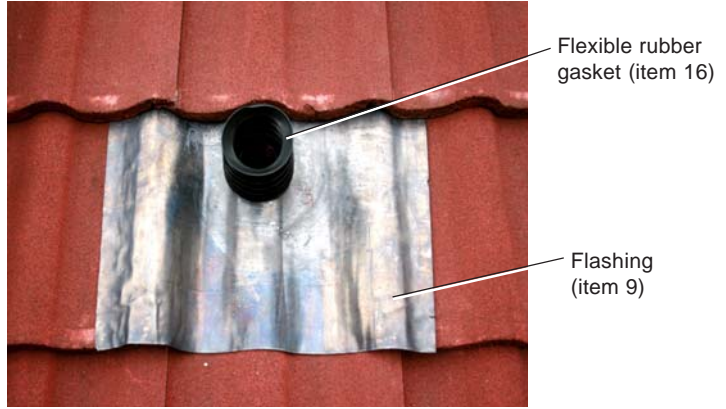


Fig. 16 - Flashing and flexible seal

The loop at the corner of the frame dictates the position for the pipe entry point through the roof. Either completely remove or make a hole in the tile for the two collector pipes and sensor lead to pass through. Fit the flashing (item 9) under the tile above and over the tile below and line up the spigot with the frame loop. Seal the gap between the flashing and the frame using the flexible rubber gasket (item 16) supplied.

With the flashing and flexible seal in position tighten the M8 nuts and bolts securing the collector frame to the angle brackets.

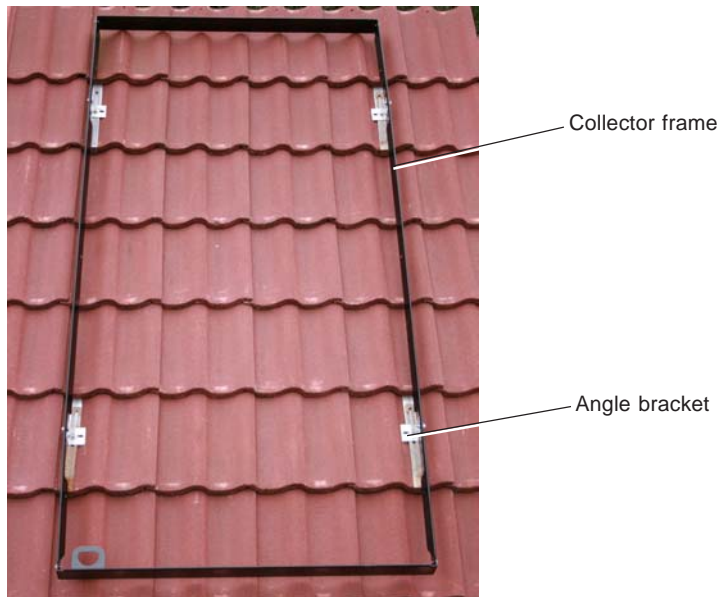


Fig. 17 - Frame on roof with angle brackets on inside

Check that the frame is level and tighten the four nuts securing the angle brackets to the support brackets. Ensure that the frame is moved as close as possible to the tiles, but ensuring a small gap is left between the tile and the frame.

Secure the foam seal (item 14) in position on the frame loop (the foam has a self adhesive backing).

Refer to Section 6, Installing the Collector

5 INSTALLATION - SLATE ROOF

5.1 ON SLATE KIT - Unpacking

The On Slate kit is supplied in two boxes.

Box 1 - On Roof Basic Kit

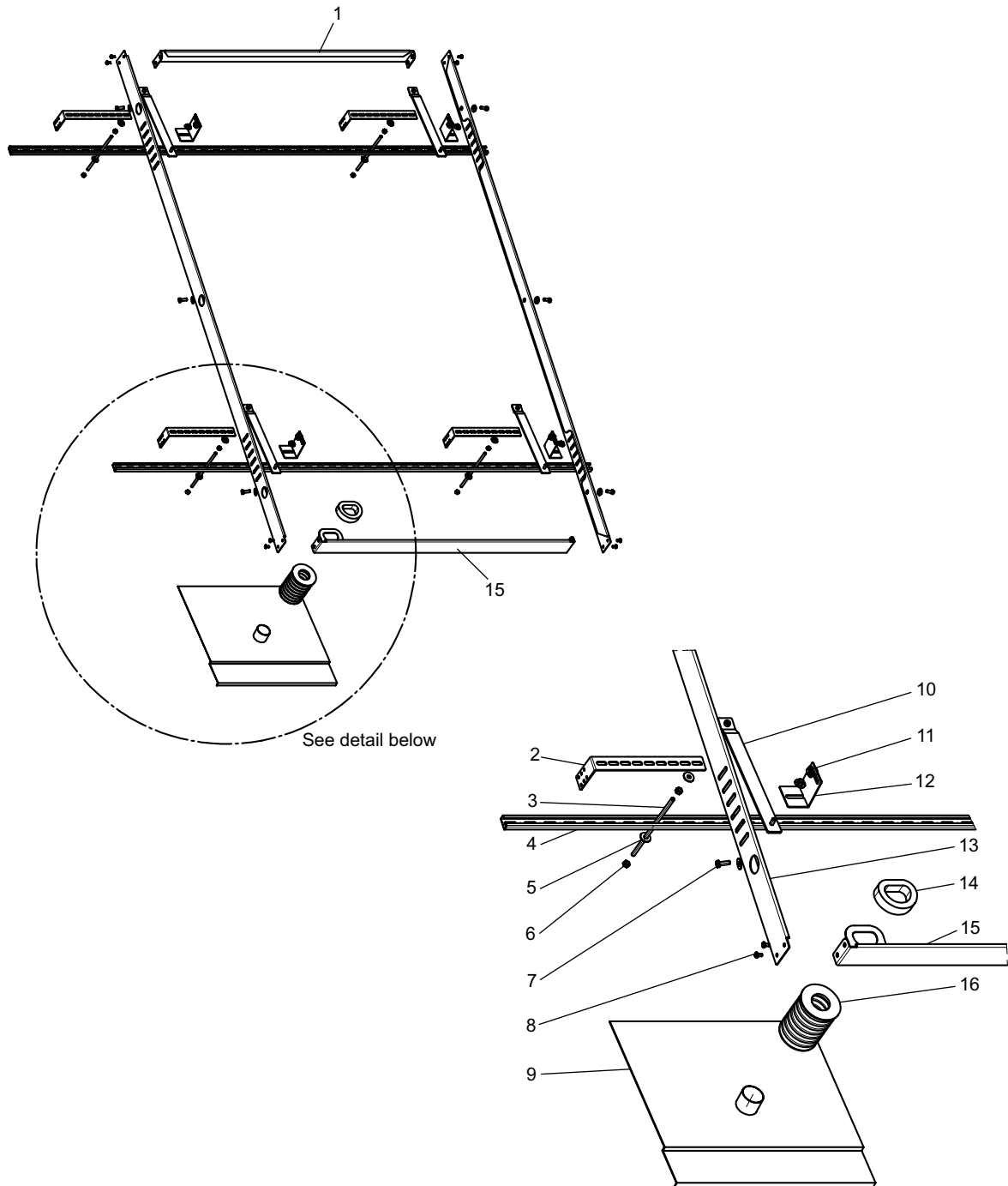


Fig. 18 - Exploded view of parts in On Roof Basic kit

Contents

Item No.		Qty.	Item No.		Qty.
1	Frame short side strip	1	10	Support bracket	4
2	Rafter bracket	4	11	Bolt M8 x 16 hex hd	4
3	Stud M8 x 220 stainless	4	12	Angle bracket	4
4	Channel	2	13	Frame long side strip	2
5	Washer M8 stainless	26	14	Foam seal	1
6	Nut M8 stainless	16	15	Frame short side strip with loop	1
7	Bolt M8 x 25 hex hd	6	16	Flexible rubber gasket	1
8	Bolt M6 x 12 pozidrive	8	17	Screw No.8 x 45 stainless	16
9	Flashing	1	-	Installation instructions	1

Box 2 - On Roof Slate Kit

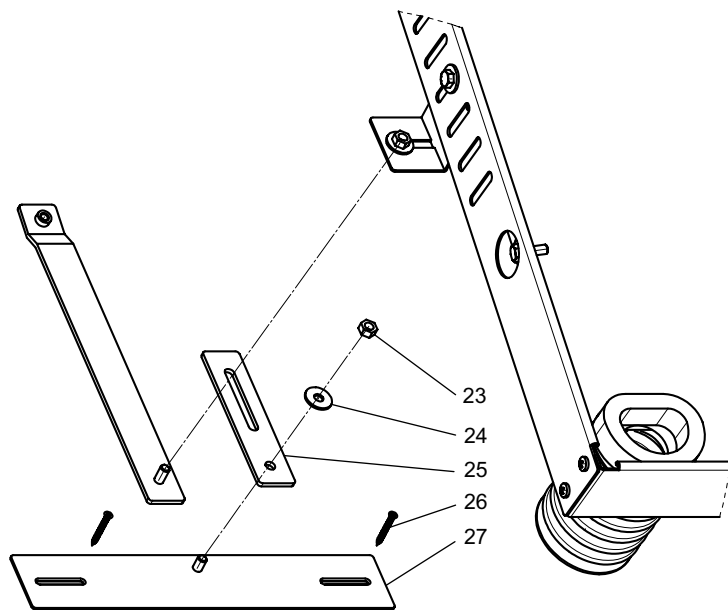
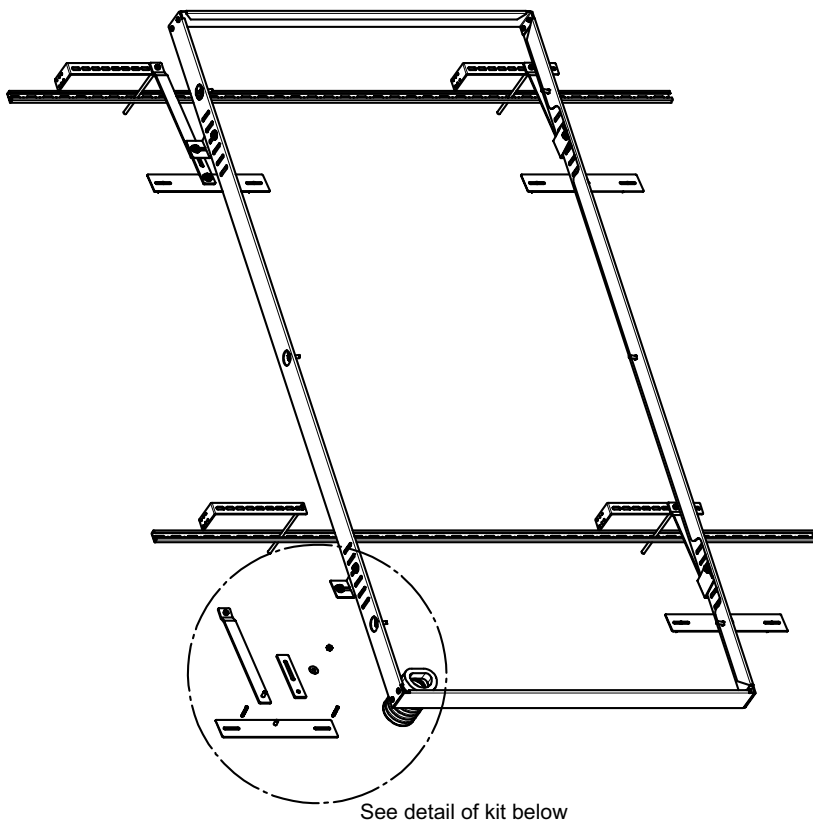


Fig. 19 - Exploded view of parts in On Roof Slate kit

Contents

Item No.		Qty.
23	Nut M8 stainless	4
24	Washer M8 stainless	4
25	Short support bracket	4
26	Woodscrew No. 4 x 40	8
27	Long support bracket	4
28	Tingle (not shown)	10

5.2 INSTALLATION ONTO SLATE ROOF

Assemble the four pieces of the black powder coated frame (with the folded edge uppermost) as shown in Fig. 18, using the eight M6 x 12 long pozidrive bolts (item 8). Place it to one side in a safe position.

When fitting to a slate roof the fitting brackets will need to be positioned between a join in the slates and the slates will need to be cut for the bracket to lie flat.

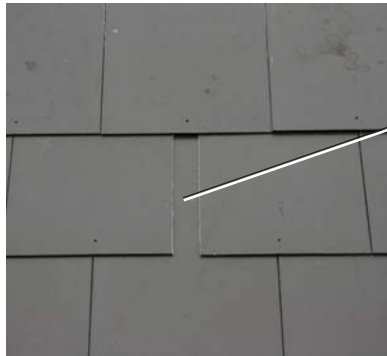


Fig. 20 - Cut slates

Minimum
30 mm gap

Support bracket
(item 10)

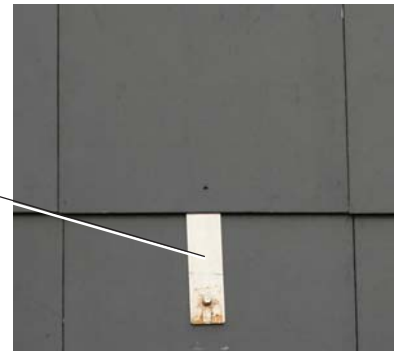


Fig. 21 - Slide in support bracket

Refer to the bracket spacing described in Section 3.2 and choose a suitable position for the brackets to be fitted. Remove the slates and cut the slates to allow the brackets to be fitted between them. (The brackets require a minimum gap of 30 mm, this can be achieved by cutting either one slate or both slates). Slide the brackets (item 10) into the gap so that the cranked part drops over the top edge of the slate into the roof space.



Fig. 22 - Support bracket

Support bracket
(item 10)

Rafter bracket
(item 2)

Channel
(item 4)

M8 stud
(item 3)



Fig. 23 - Channel and Rafter bracket

From inside the roof space, attach the rafter bracket (item 2) to the nearest rafter at the correct level using the screws provided (item 17) where the support bracket comes over the tile. You may need to carefully cut the roof lining to reveal the support bracket.

Screw the M8 stud (item 3) through the rafter bracket (item 2) and into the nut on the tile support bracket (item 10) and secure together using an M8 nut (item 6) and washer (item 5). Screw a second nut followed by a washer onto the stud at a level in line with the back of the rafters. Position the channel across the back of the rafters and clamp with an M8 nut (item 6) and washer (item 5). Tighten sufficiently to support the brackets without distorting or lifting the slates. If required, cut off excess stud with a saw.

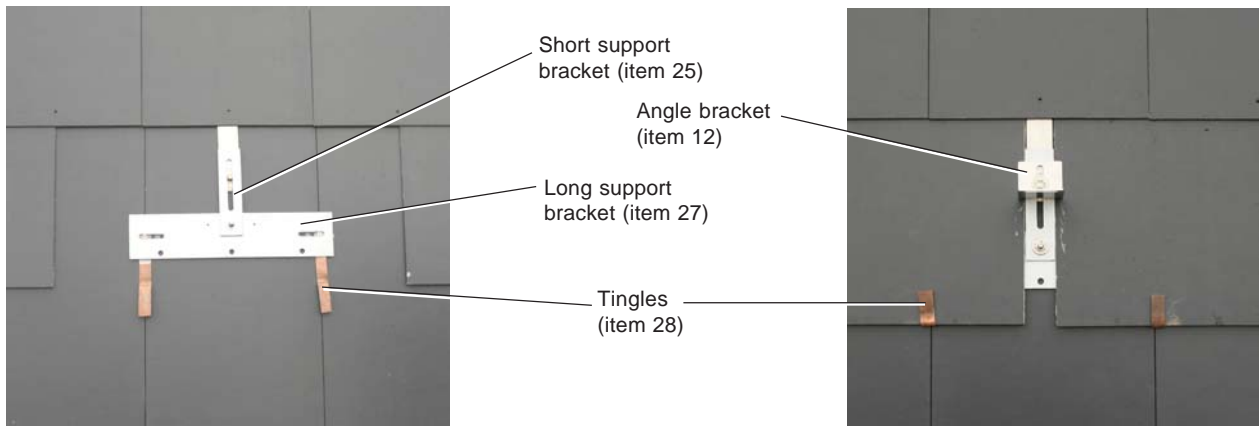


Fig. 24 - Slate support bracket and Tingles

Fig. 25

The slate support brackets and tingles can now be fitted. Referring to Figs 24 and 25 lay the long slate support bracket (item 27) across the slate so that the screw slots are inline with the batten underneath. Slide two tingles (item 28) under the bracket and inline with the joint in two adjacent tiles. Secure the bracket and tingles to the batten using two of the No. 4 x 40 woodscrews (item 26) supplied. Position the short support bracket (item 25) over the two M8 studs. Secure using an M8 nut (item 23) and washer (item 24) to the lower stud.

Repeat this for all four support brackets, positioning them so that they align with the mountings of the collector frame. See Section 3.2.

Replace the slates, retaining them using the tingles by bending them over the bottom edge of each tile.

Note: Do not replace the slates where the flashing kit is to be fitted.

Position the angle brackets (item 12) over the M8 studs of the support brackets and loosely retain with the nuts (Item 6) and washers (item 5).

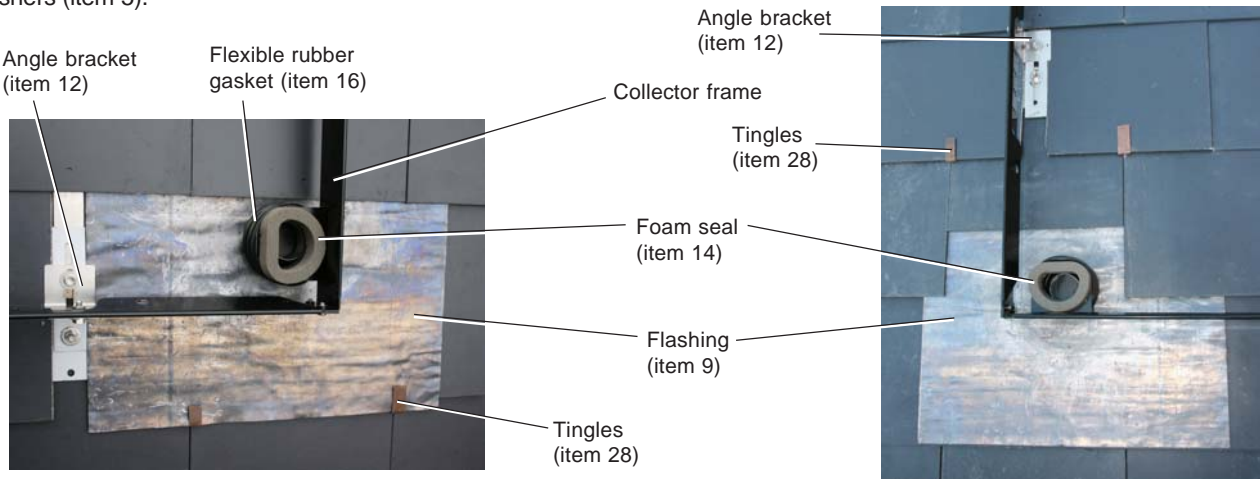


Fig. 26 - Landscape

Fig. 26 - Portrait

Position the collector frame over the angle brackets, (depending on the slate joints the brackets can be positioned either inside or outside the frame) However, ideally every attempt should be made to locate the angle brackets inside the frame.

Ensure that the loop welded to the frame is located at the bottom right hand corner for landscape collectors and bottom left hand corner for portrait collectors. Loosely retain the frame in position using the four M8 bolts, washers and nuts.

The loop at the corner of the frame dictates the position for the pipe entry point through the roof. Completely remove or cut the top slate and make a hole in the slate below for the two collector pipes and sensor lead to pass through. Secure two tingles to the batten underneath using two of the No. 4 x 40 woodscrews (item 26) through the joints between the slates. Fit the flashing (item 9) under the slate above and over the slate below and line up the spigot with the frame loop. This may be in a position adjacent to a mounting bracket. Bend the tingles over the flashing to hold it in position if required. Seal the gap between the flashing and the frame using the flexible rubber gasket (item 16) supplied.

With the flashing and flexible seal in position tighten the M8 nuts and bolts securing the collector frame to the angle brackets.

Check that the frame is level and tighten the four nuts securing the angle brackets to the support brackets. Ensure that the frame is moved as close as possible to the tiles, but ensuring a small gap is left between the tile and the frame.

Secure the foam seal (item 14) in position on the frame loop (the foam has a self adhesive backing).

Refer to Section 6, Installing the Collector

6 INSTALLING THE COLLECTOR

FIT THE COLLECTOR ONTO THE FRAME

Place the top edge of the collector into position, the collector pipes and sensor lead should be guided through the loop on the frame and into the roof space whilst lowering the bottom edge of the collector into position. See Figs 29 and 30.

Secure the collector to the frame using the six M8 x 20 bolts (item 7) and washers (item 5).

Tighten all six bolts. - Do not over tighten.

Note: Ensure the collector is level, i.e. within 2 mm per metre, after the bolts have been tightened. Failure to do so will invalidate the warranty.

The position of the collector can be adjusted slightly by loosening the bolts and moving the collector as required.



Fig. 28

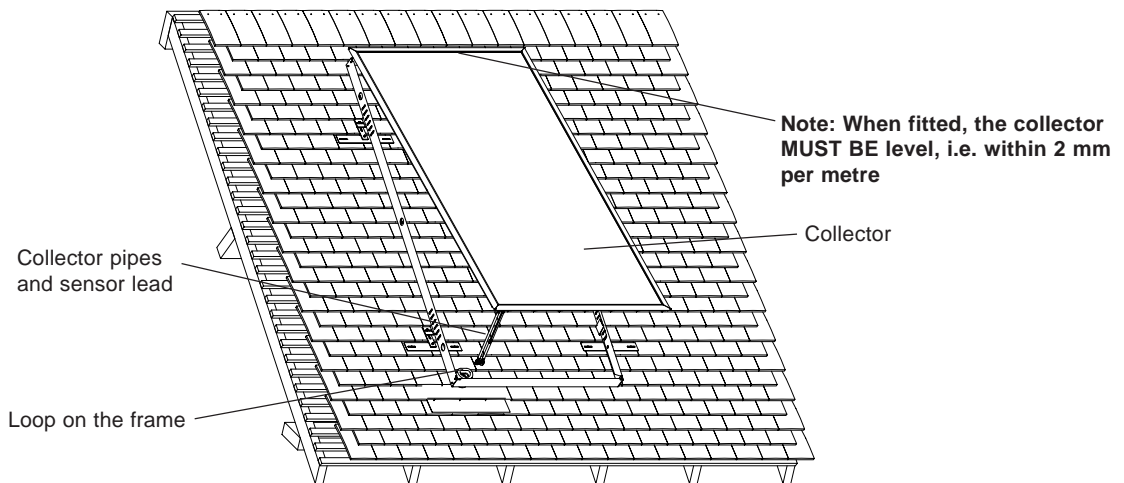


Fig. 29 - Portrait

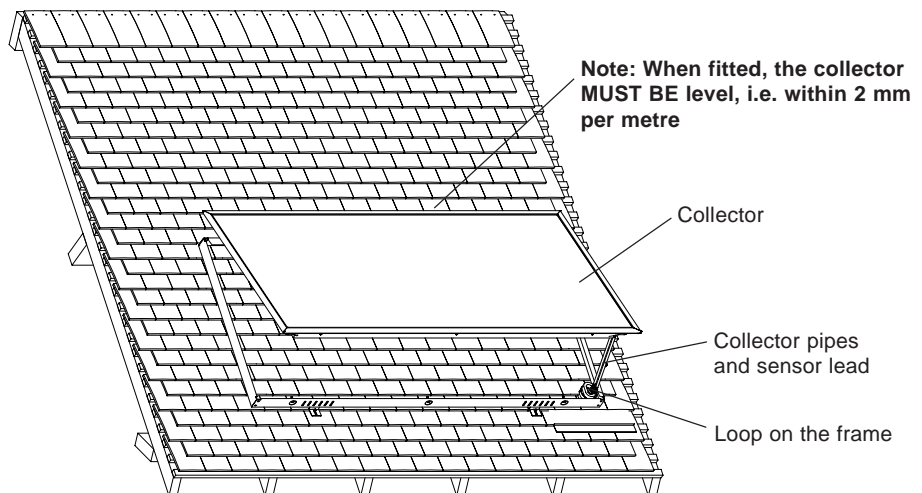


Fig. 30 - Landscape

7 PARTS LIST

Reference No.	Item No.	Description	Qty.	Alpha Part No.
Fig. 6, Fig. 18	1	Frame short side strip	1	4.704-0107
Fig. 6, Fig. 18	2	Rafter bracket	4	4.704-0112
Fig. 6, Fig. 18	3	Stud M8 x 220 stainless	4	4.704-0116
Fig. 6, Fig. 18	4	Channel	2	4.704-0118
Fig. 6, Fig. 18	5	Washer M8 stainless	26	4.704-0016
Fig. 6, Fig. 18	6	Nut M8 stainless	16	4.221-0033
Fig. 6, Fig. 18	7	Bolt M8 x 25 hex hd	6	4.704-0015
Fig. 6, Fig. 18	8	Bolt M6 x 12 pozidrive	8	4.704-0117
Fig. 6, Fig. 18	9	Flashing	1	4.704-0110
Fig. 6, Fig. 18	10	Support bracket	4	4.704-0108
Fig. 6, Fig. 18	11	Bolt M8 x 16 hex hd	4	4.704-0119
Fig. 6, Fig. 18	12	Angle bracket	4	4.704-0109
Fig. 6, Fig. 18	13	Frame long side strip	2	4.704-0106
Fig. 6, Fig. 18	14	Foam seal	1	4.704-0017
Fig. 6, Fig. 18	15	Frame short side strip with loop	1	4.704-0103
Fig. 6, Fig. 18	16	Flexible rubber gasket	1	4.704-0111
Fig. 6, Fig. 18	17	Screw No.8 x 45 stainless	16	4.704-0135
Fig. 7	18	Nut M8 stainless	4	4.221-0033
Fig. 7	19	Washer M8 stainless	8	4.704-0016
Fig. 7	20	Batten clamp	4	4.704-0128
Fig. 7	21	Bolt M8 x 20 stainless	4	4.200-0334
Fig. 7	22	Additional support bracket	4	4.704-0129
Fig. 19	23	Nut M8 stainless	4	4.221-0033
Fig. 19	24	Washer M8 stainless	4	4.704-0016
Fig. 19	25	Short support bracket	4	4.704-0104
Fig. 19	26	Woodscrew No. 4 x 40	8	4.704-0132
Fig. 19	27	Long support bracket	4	4.704-0105
-	28	Tingle (not shown) - pack of 10	1	4.106-0920

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