

BAXI

Please read these instructions before installing or commissioning.
The Solarflo - Solar Thermal Domestic Hot Water System should
only be installed by a competent person.
Please leave these instructions with the user for safe keeping.

Installation Guide - Flat roof mounting



Solarflo - Solar Thermal Domestic Hot Water System

© BAXI Heating UK Ltd 2007. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, or stored in any retrieval system of any nature (including in any database), in each case whether electronic, mechanical, recording or otherwise, without prior written permission of the copyright owner, except for permitted fair dealing under Copyrights, Designs and Patents Act 1988.

Applications for the copyright owner's permission to reproduce or make other use of any part of this publication should be made, giving any details of the proposed use to the following address:

The Company Secretary, BAXI Heating UK Ltd, The Wyvern Business Park, Stanier Way, Derby DE21 6BF.

Full acknowledgement of author and source must be given.

WARNING: Any person who does any unauthorised act in relation to a copyright work may be liable to criminal prosecution and civil claims for damages.

- 3** Index
- 4** General
 - Safety information
- 6** Installation of solar collector
 - Lifting the panel
 - General assembly notes
 - Mounting kit parts list
 - Attachment points
 - Mounting system
- 19** Installation of collector panel sensor

1.1 Safety information

In order to reduce the number of deaths and major accidents attributable to work at height, the Health and Safety Executive has introduced comprehensive regulations and guidance that should be followed by all businesses working at height.

We consider in the following paragraphs some of the main features of the regulations and guidance. This is, however, only a limited summary and it is recommended that all businesses planning on undertaking solar water heating installations obtain a copy of the regulations and guidance issued by the Health and Safety Executive and carefully consider the contents.

The regulations and guidance state that you are required to carry out a risk assessment for all work conducted at height and to put in place arrangements for:

- Eliminating or minimising risks from work at height.
- Safe systems of work for organising and performing work at height.
- Safe systems for selecting suitable work equipment.
- Safe systems for protecting people from the consequences of work at height.

The regulations and guidance highlight a hierarchy for safe work at height:

- **Avoid** the risk by not working at height if practicable.
- **Prevent** falls, where it is not reasonably practicable to avoid work at height; you are required to take suitable and sufficient steps to prevent the risk of a fall including selecting the most suitable work equipment (in accordance with the regulations).
- **Mitigate** the consequences of a fall; where the risk of a person or object falling still remains, take suitable and sufficient measures to minimise the distance and consequences of any fall.

Collective protection measures, such as guard rails on scaffold, should be given priority over personal protection measures, such as safety harnesses.

Within the regulations' framework, you are required to:

- 1) Assess the risk to help you decide how to work safely.
- 2) Follow the hierarchy for safe work at height (i.e. avoid, prevent and mitigate).
- 3) Plan and organise your work properly, taking account of weather conditions and the possibility of emergencies.
- 4) Make sure those working at height are competent.
- 5) Make use of appropriate work equipment.
- 6) Manage the risks from working on or around fragile surfaces and from falling objects.
- 7) Inspect and maintain the work equipment to be used and inspect the place where the work will be carried out (including access and egress).

When preparing to install a solar water heating system, it is required that you perform a risk assessment in relation to work at height and plan how you will organise your work, taking into account the site, the weather conditions and the experience and competence of colleagues or contractors who may be working at height with you.

Risk Assessments

The HSE has published a number of very useful free publications that advise how to undertake risk assessments.

Two of these that you should obtain are:

Five Steps to Risk Assessment.

A Guide to Risk Assessment Requirements.

The five steps outlined in the HSE leaflet are:

Step 1: Look for the hazards

This will mean looking at the site and identifying significant hazards. These could be features such as a steep roof, a fragile surface where the collectors may be mounted, uneven ground or obstructions where access to the roof might be required.

Step 2: Decide who may be harmed and how

This might mean considering the particular risks that young workers or trainees might face and thinking about the residents of the household or visitors who could be hurt by your activities.

Step 3: Evaluate the risks and decide which precautions should be made. You should consider how likely it is that each hazard will cause harm, decide which precautions you might take and then assess, after you have taken those precautions, whether the remaining risk will be high, medium or low. Where you identify remaining risks, you should consider which further action you could take to control the risks so that harm is unlikely.

Step 4: Record your findings

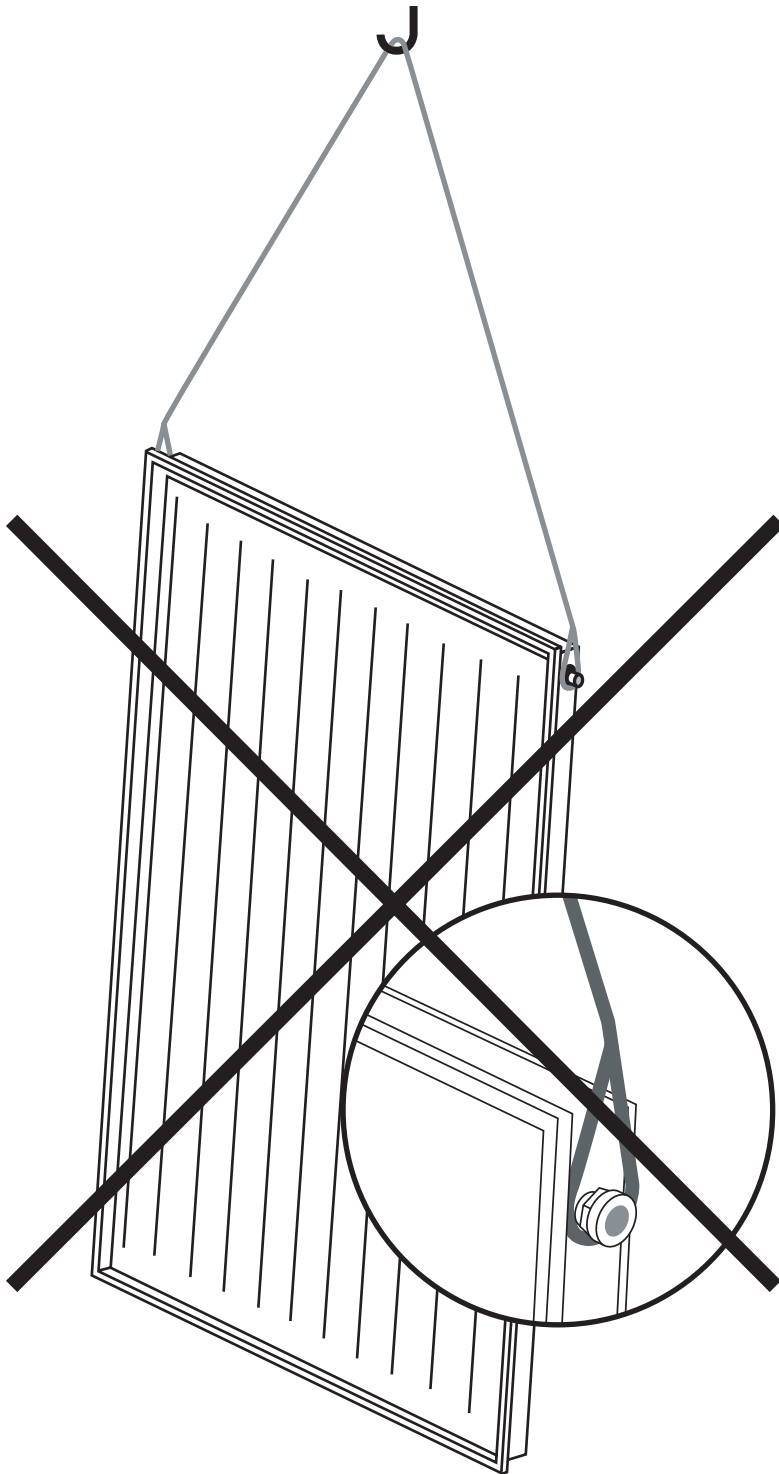
If you have fewer than five employees you do not need to write anything down, though it is useful to keep a written record of what you have done. If you employ five or more people you must record the significant findings of your assessment. You must also tell your employees about your findings. You need to be able to show that a proper check was made, that you considered who might be affected, that you dealt with all the obvious significant hazards, that the precautions you propose are reasonable and that the remaining risk is low.

Step 5: Review your assessment if necessary

Each solar water heating installation may bring its own challenges and present its own particular hazards. You should therefore be careful not to rely on a "standard" risk assessment for installing a solar water heating system in a house, but review the particular hazards for each new situation. The issue of work equipment must be considered, but at the preparation stage you should consider where scaffold or other access equipment might be positioned and look out for any obvious obstacles to this, such as a conservatory or porch.

In addition to the risks associated with work at height, you should also consider the risks associated with lifting and carrying solar collectors, using electric drills and using blow lamps or blow torches for soldering. This is not an exclusive list and you should consider all aspects of the proposed installation to assess whether there are additional risks that need to be taken into account.

Fig. 1



2.1 Lifting the panel

Do not lift the collectors by the connections.

Refer to Section 2.2 of the Installation Guide Solar Collector Panel specifications for details of the dimensions and weight of each panel. Carrying/lifting straps must be securely fastened to the main framework of the panel. Point impact and loading of the glass panel must be avoided. The collector must not be installed if the glass panel is damaged in any way.

2.2 General assembly notes

These instructions relate to the installation of the Baxi Solarflo flat plate solar collector panels onto a flat roof using the Baxi Solarflo Flat Roof Mounting Frame. These instructions must be followed rather than those contained in the Baxi Solarflo On roof Flat Plate Solar Collector Mounting Installation Guide. All other equipment must be installed as per detailed in the Baxi Solarflo Installation Guide.

The Flat Roof Mounting Frame may be used to mount the Baxi Solarflo collector panels at ground level if required. In these instances particular attention should be paid to anchoring any mounting beams used to the ground. Also, during use, some surfaces of the collector panels and connecting pipework may become very hot so consideration must be given to prevent access to children, infirm, aged or unauthorised persons.

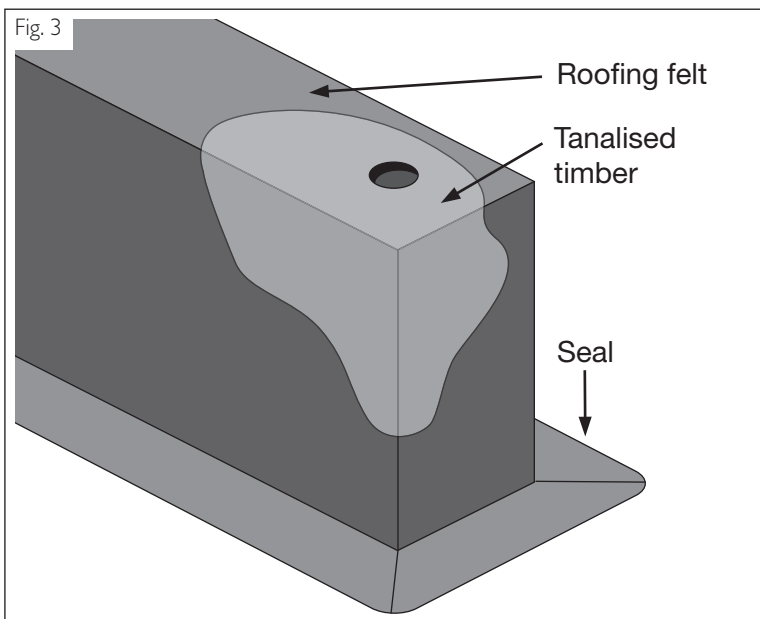
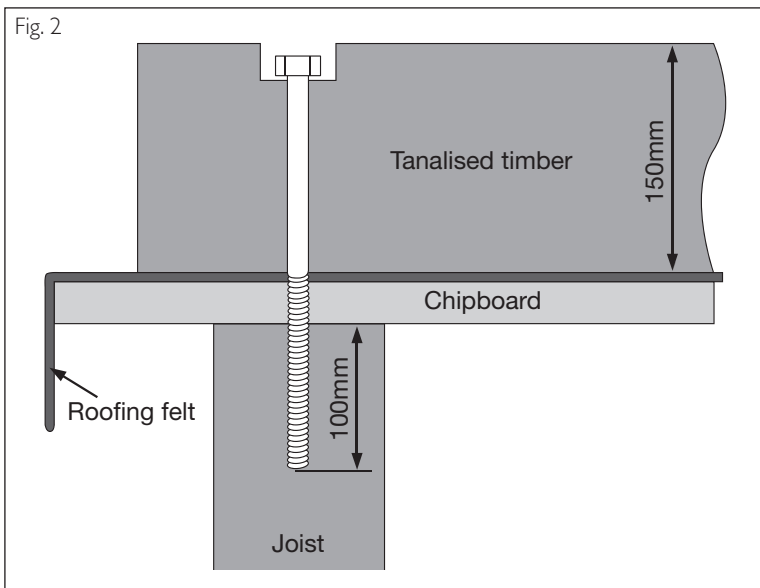
Use only Baxi Solarflo mounting systems. Use of other brackets/mounting systems will invalidate the warranty and may result in an insecure and dangerous panel installation.

It is recommended that the Bench Screws for mounting the panel mounting framework are fixed to additional wooden structural bearers which in turn are attached to the roof structural members. They must never be fixed directly to roofing laths or boarding. If suitably positioned structural members are not available, or of a section that may be weakened by the insertion of the Coach Screws, additional noggins should be inserted between the structural members. These should be at least the same cross section as the structural member. The timber bearers should be tanalised and typically have a minimum section of 150mm x 75mm and be of suitable length to accommodate the mounting frame (see Fig. 2).

The bearers should be attached to the roof with corrosion resistant coach screws of sufficient length to penetrate the main roof support timbers by at least 100mm. The underside of the timber bearers should be liberally coated with melted tar or liquid bitumen before fixing in place. At least four fixing points per bearer must be used. The bearers should be countersunk or bored to accept the head of the coach screws. When in place the bearers should be covered using good quality roofing felt and melted tar or liquid bitumen (see Fig. 3).

If mounting at ground level the timber bearers must be anchored to the ground into concrete using suitable corrosion resistant fixings. The timber bearers must also be treated against long term exposure to weather conditions.

When assembling the Mounting Frame use only corrosion resistant fixings supplied. Holes through any roof water-proofing materials should be sealed with an appropriate weather resistant sealant.



Structure

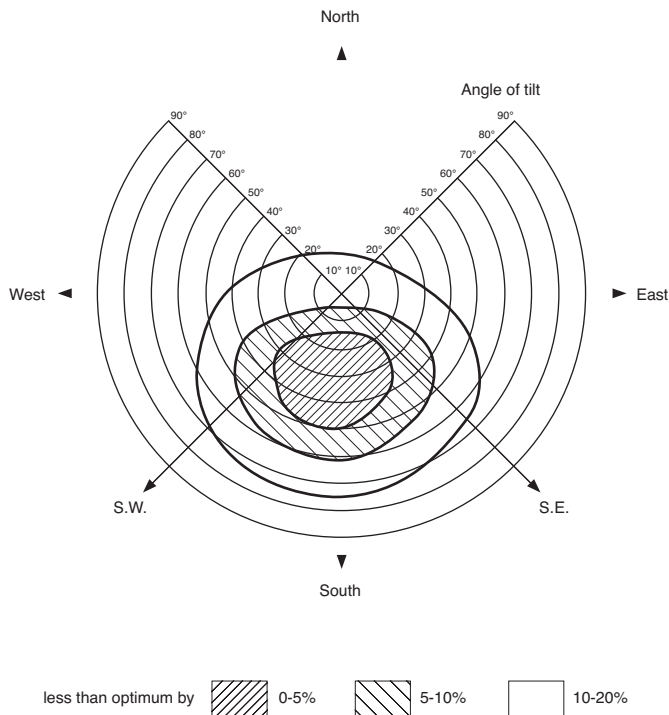
The collectors may only be mounted on sufficiently load-bearing roof surfaces and substructures. It is essential that the structural load-bearing capacity of the roof and the substructure must be assessed before mounting the collectors. Particular attention should be paid to the quality of the (timber) substructure in terms of the stability of the screw joints necessary for installing the collector mountings. Anchor screws must be bolted into support with a minimum depth of 150mm. Where roof structure is not strong enough, noggins must be inserted to accept anchor screws. The roof structure must be able to take the wind and snow loads that can occur. (Note: 1m² powder snow ~ 60kg / 1m² wet snow ~ 200kg). The assessment should also take into account any special features of the particular site that could lead to increased loads (air jets or eddy formations, etc). There must be at least 1m distance from roof ridging or edges.

Lightning protection / Equipotential bonding of the building

It is not necessary to connect collector arrays to the lightning protection of the building. For installations on metal substructures at the installation site, authorised lightning protection specialists must be consulted. The metal pipes of the solar circuit must be earth bonded to the main earthing circuit by means of a conductor (green/yellow) with a cross-section of at least 6mm².

2.0 Installation of solar collector

Fig. 4



Collector panels must be connected in series. The left hand connection is threaded $\frac{3}{4}$ " BSP male. The right hand connection has a $\frac{3}{4}$ " BSP female union connection. This enables the panels to be directly connected to each other. N.B. ensure the sealing washer provided is inserted between the male and female connections. All connecting pipe work and fittings must be of a suitable metal; either copper, brass or stainless steel. Soft soldered joints must not be used. Any seals or sealing compounds must be resistant to temperatures of up to 150°C and be resistant up to a 50% glycol/water mix.

Connections

When tightening the connections, always apply counter-pressure with a wrench or another spanner to prevent damage to the absorber.

Collector inclination

The mounting frame will mount the collector panels at an angle of 45°. The frame should be orientated such that the collector panel(s) ideally face South, however orientations between 30° East and 40° West of South are acceptable. Fig. 4 shows the efficiency loss for varying angles of inclination and panel orientation.

Solar fluid

The Baxi Solarflo collector panels **MUST** be protected with a water/glycol heat transfer fluid. Use only the fluid supplied with the system which is supplied pre-mixed to a concentration of 40% glycol / 60% water. Top ups can be made with water but the glycol concentration must not be allowed to fall below 30% or inadequate frost protection will be given. Systems found to have lower glycol concentrations will not be covered by the warranty.

2.0 Installation of solar collector

2.3 Mounting kit parts list

	1 panel	2 panels	3 panels
A. Bench screw	4	4	6
B. Attachment bracket	4	4	6
C. Rubber seal	4	4	6
D. Clamping piece	-	1	2
E. Clamping piece extension	-	2	4
F. Mounting part top	2	2	2
G. Mounting part extension	-	1	2
H. M8 washer	12	17	27
I. M8x30 hammer-head bolt	6	6	8
J. M8 hex nut	12	17	27
K. Support rail	2	4	6
L. Mounting jig	-	1	1
M. Sealing washer	2	3	4
N. M12 nut	12	12	18
O. M12 washer	12	12	18
P. M8 Hex head bolt	6	6	9
Q. Rear support bracket	2	2	3
R. Front support bracket	2	2	3

NOTE: 1 sealing washer is supplied with each solar collector panel. 2 sealing washers are supplied with the flexible connection pipes.

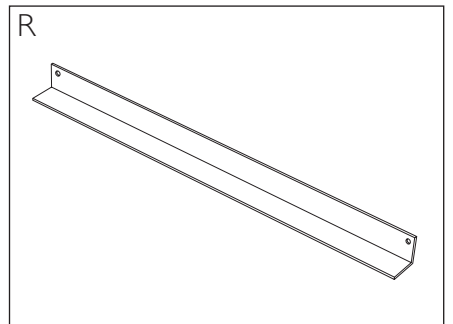
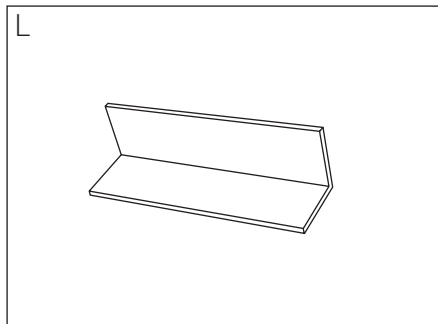
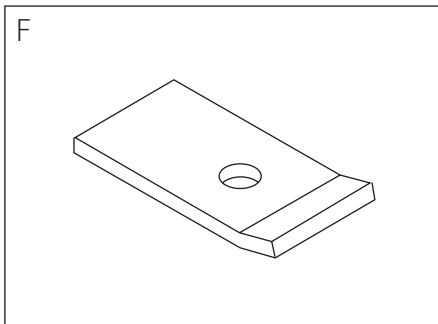
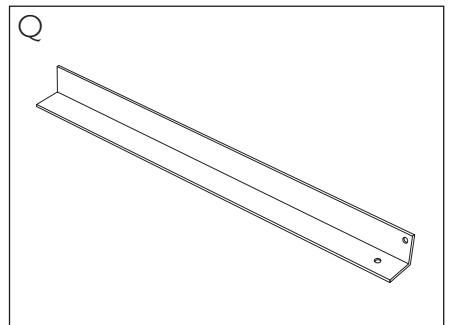
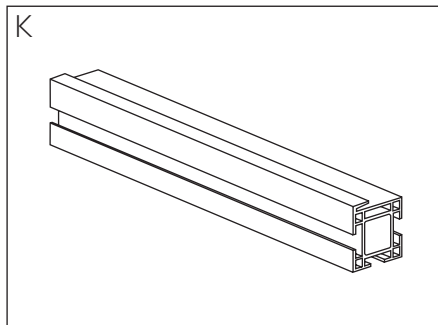
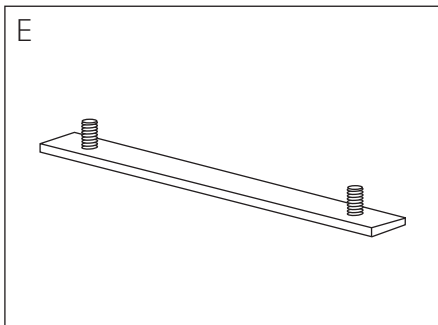
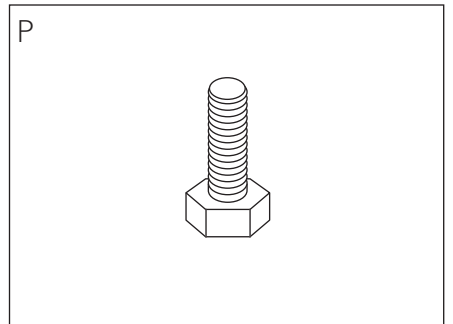
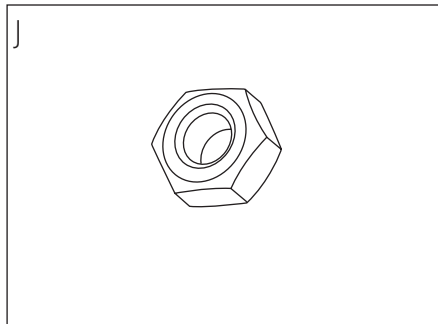
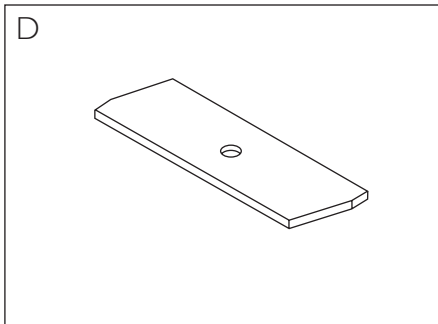
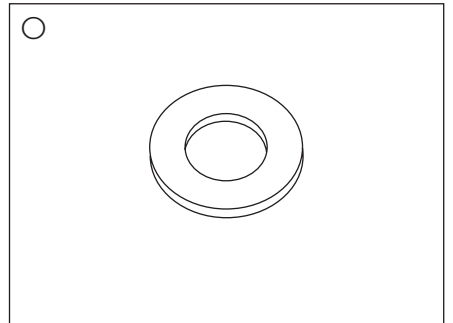
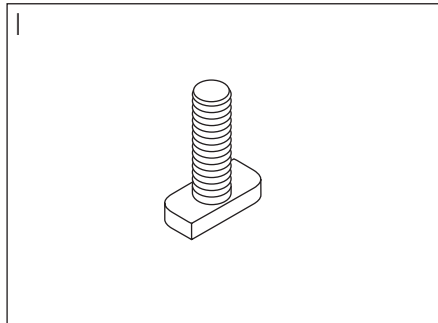
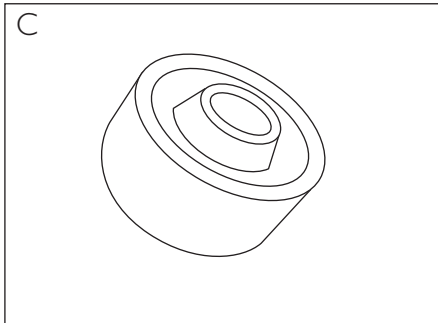
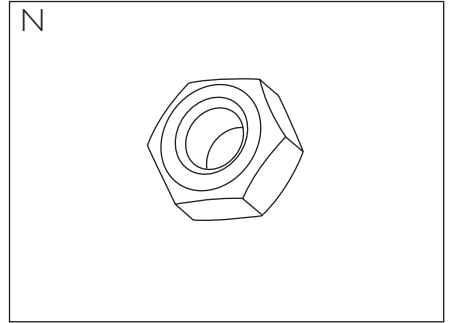
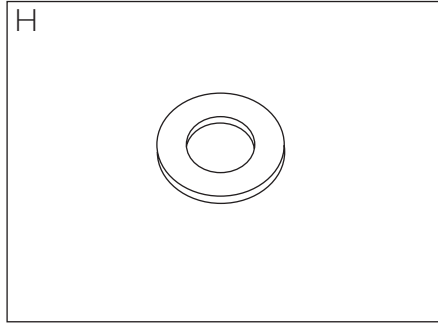
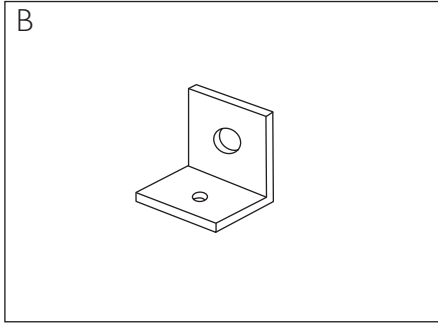
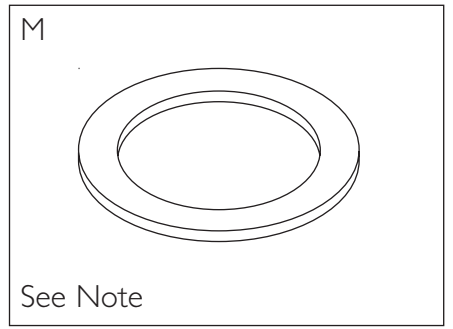
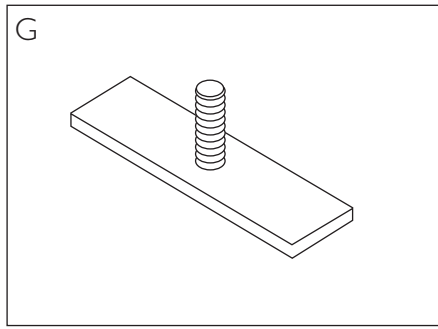
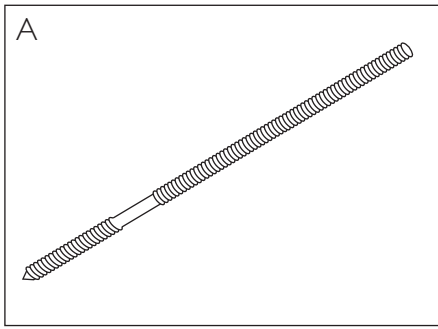
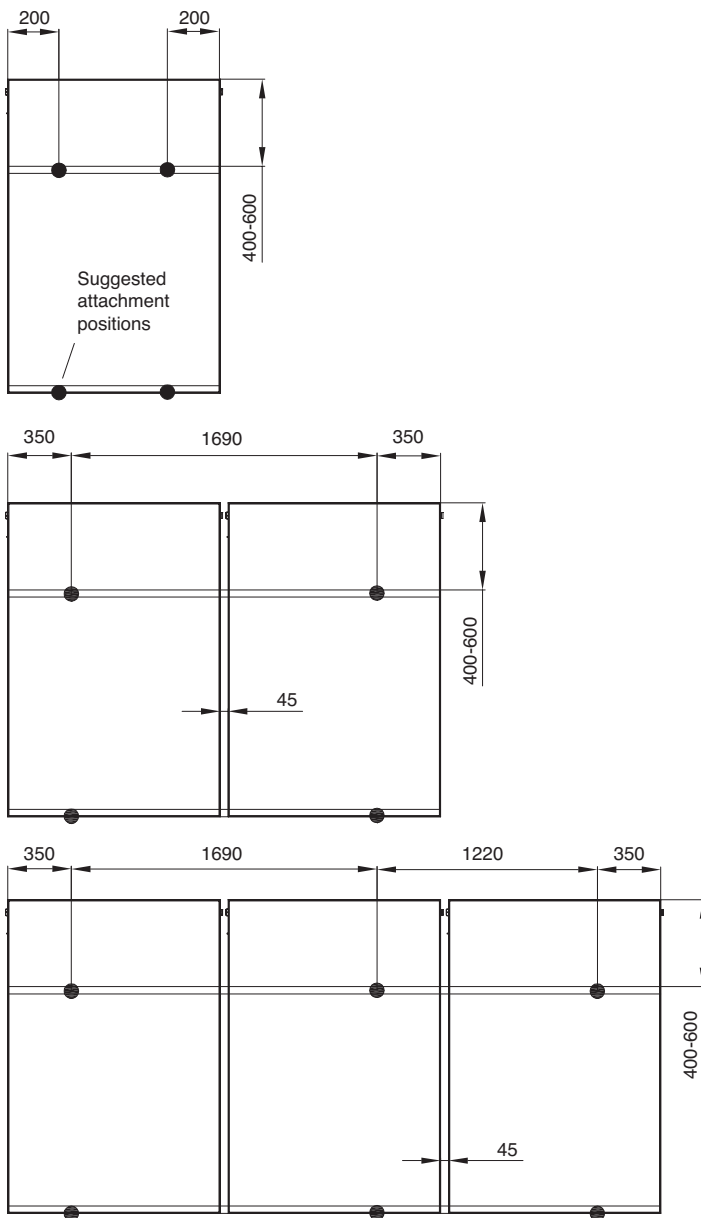


Fig. 5



All dimensions shown in mm

2.4 Suggestion for attachment points

NOTE: Some variation may be necessary depending on the pitch of the roof structural support bearers.

2.0 Installation of solar collector

2.5 FLAT roof Mounting system, parallel

1: Measure the mounting points (for suggested positions see fig 5) and mount support bearers as recommended in Section 2.2.

Dimension A = Recommended pitch of supports for 1 and 2 panel system

Dimension B = Recommended pitch of additional support for 3 panel system

Dimension C = 1460mm (Front to back mounting positions to give 45° panel inclination).

2: Drill fixing points into bearers using an 8mm diameter drill (minimum depth 100mm).

3: Fasten bench screws into fixing points, minimum screw depth $\geq 100\text{mm}$. Attach rubber seal and tighten using M12 washer and M12 nut.

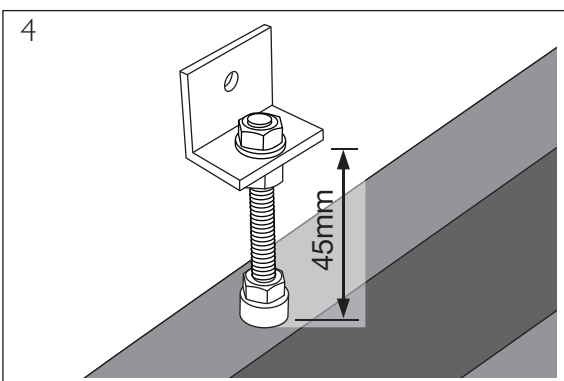
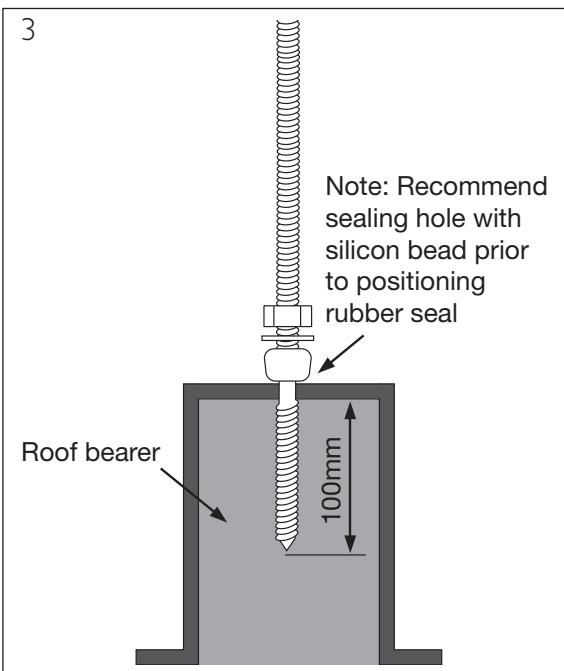
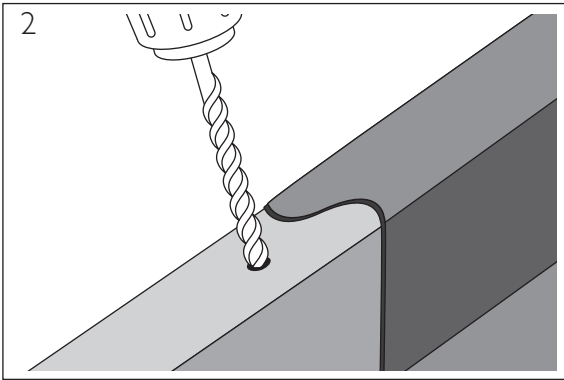
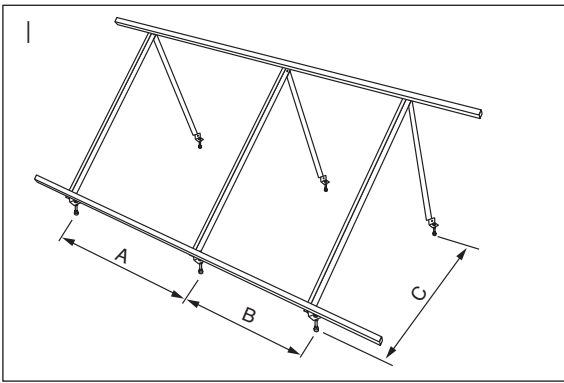
Order:

- Bench screw
- Rubber seal
- M12 washer
- M12 nut

4: Assemble attachment brackets onto bench screws as shown.

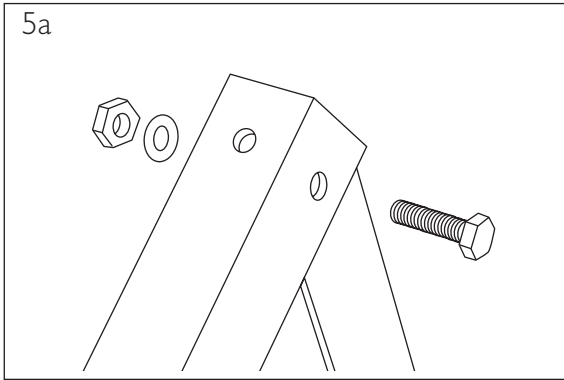
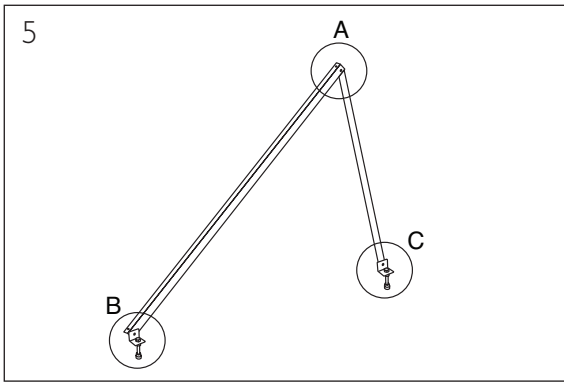
Order:

- M12 nut
- M12 washer
- Attachment bracket
- M12 washer
- M12 nut



2.0 Installation of solar collector

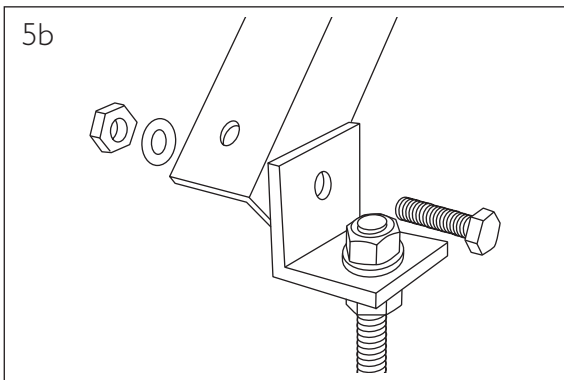
5. Install first mounting frame as follows:



5a. Attach front support bracket to rear support bracket as shown and loosely tighten

Order:

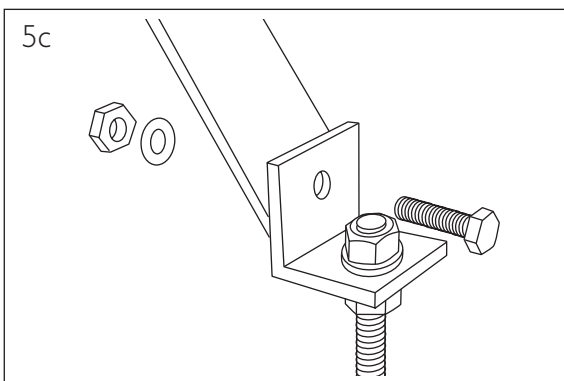
- M8 bolt
- Front support bracket
- Rear support bracket
- M8 washer
- M8 hex nut



5b. Attach front support bracket to front attachment bracket as shown. NOTE position of front support bracket to attachment bracket, placing the wrong side of the attachment bracket will prevent correct assembly.

Order:

- M8 bolt
- Attachment bracket
- Front support bracket
- M8 washer
- M8 hex nut

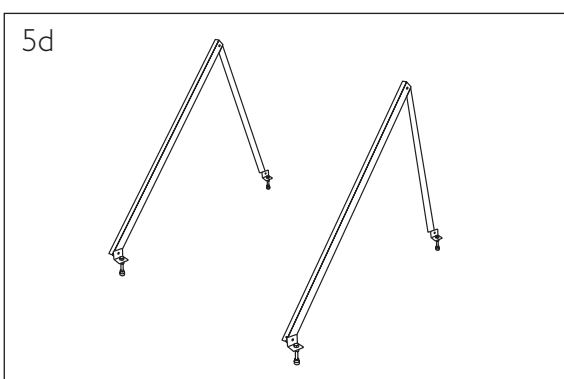


5c. Attach rear support bracket to rear attachment bracket as shown. NOTE position of rear support bracket to attachment bracket, placing the wrong side of the attachment bracket will prevent correct assembly.

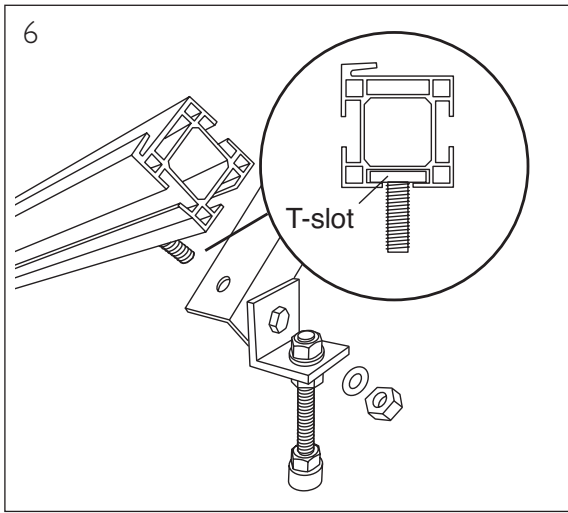
Order:

- M8 bolt
- Attachment bracket
- Rear support bracket
- M8 washer
- M8 hex nut

Tighten each attachment point.



5d. Repeat steps above for each mounting frame.



2.0 Installation of solar collector

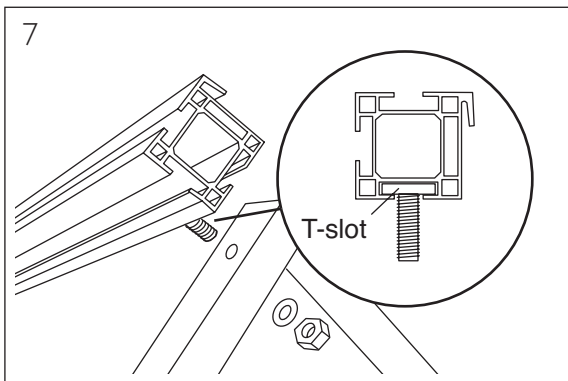
6. Attach lower mounting rails as shown in 6 with the hammerhead bolts engaged in the T-slot of the rail.

Order:

- Mounting rail
- Hammerhead bolt
- Front support bracket
- M8 washer
- M8 nut

Ensure rail is horizontal using a spirit level.

NOTE: for 2 panel systems, first join 2 mounting rails together as shown in steps 8 and 9 before attaching to the mounting frame support brackets. Attention must be paid to the correct orientation of the mounting rails to ensure correct panel mounting.



7. Attach upper mounting rails as shown in 7 with the hammerhead bolts engaged in the T-slot of the rail.

Order:

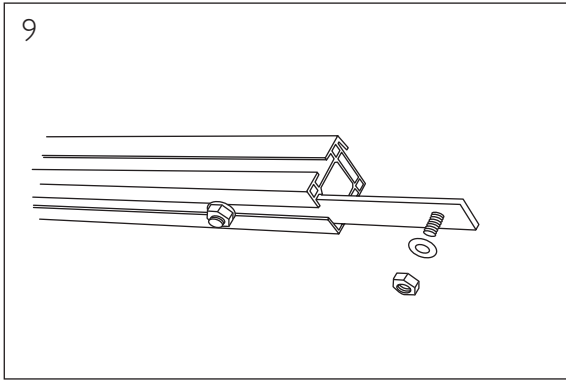
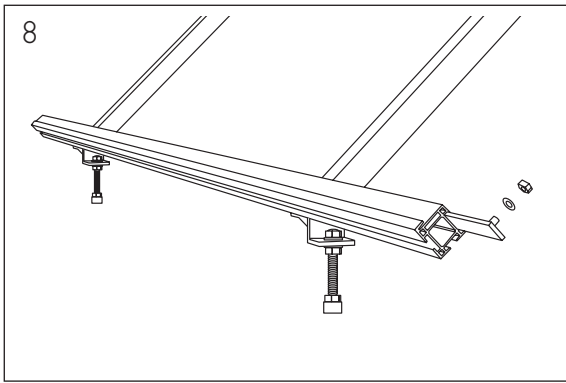
- Mounting rail
- Hammerhead bolt
- Front support bracket
- M8 washer
- M8 nut

Ensure rail is horizontal using a spirit level.

NOTE: for 2 panel systems first, join 2 mounting rails together as shown in steps 8 and 9 before attaching to the mounting frame support brackets. Attention must be paid to the correct orientation of the mounting rails to ensure correct panel mounting.

2.0 Installation of solar collector

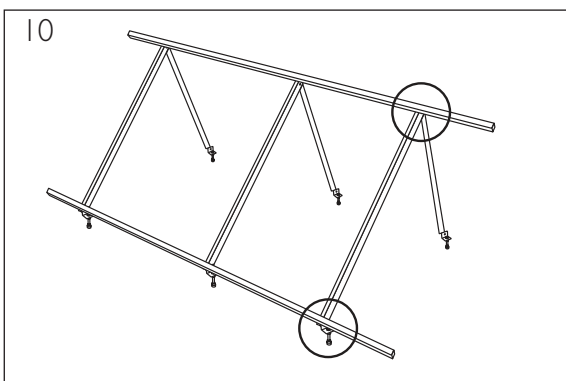
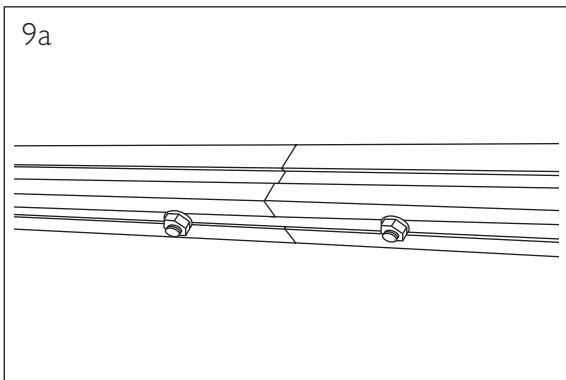
8. For 3 panel systems join the additional mounting rails as shown in steps 9 and 10.



9. Push the clamping piece extension halfway into the T-slot of the mounting rails (upper and lower) and tighten.

Order:

- Mounting rail
- Clamping piece extension
- M8 washer
- M8 hex nut



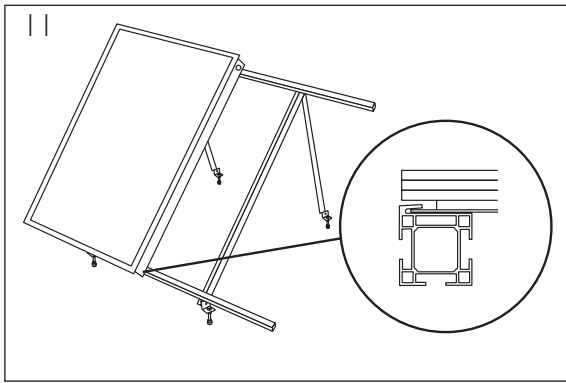
10. Attach the additional mounting rails (upper and lower) to the mounting frame support brackets.

Order:

- Mounting rail
- Hammerhead bolt
- Front support bracket
- M8 washer
- M8 nut

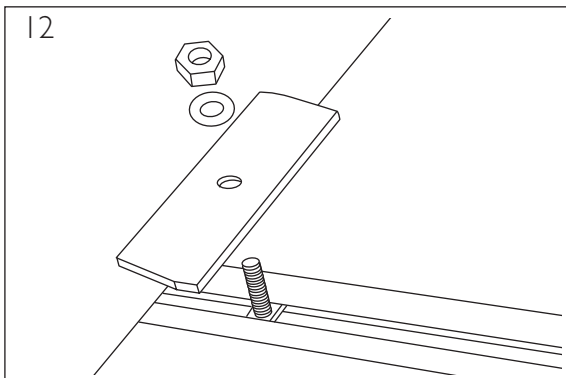
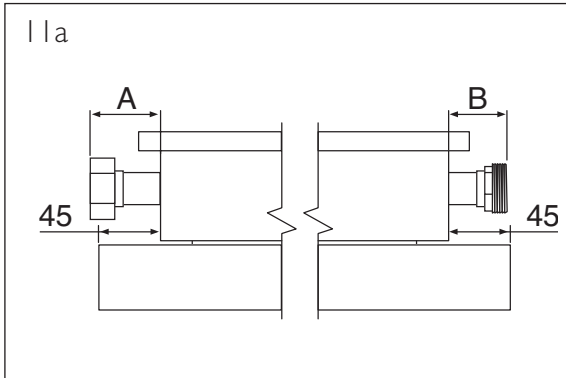
Repeat procedure for all mounting points.

2.0 Installation of solar collector



11: Hang the first collector in the lower mounting rail and adjust its position so that the frame is 45mm from the end of the rail as shown.

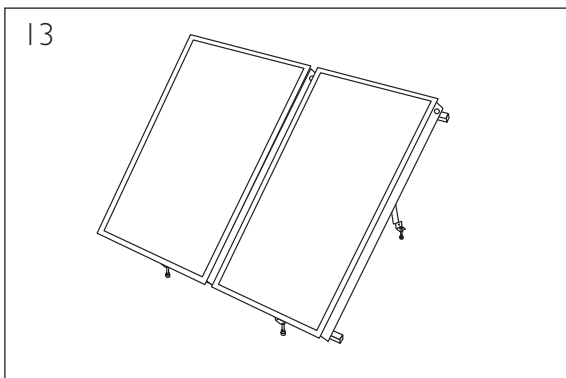
N.B. Ensure collector panel locating lip is correctly positioned in the support slot of the lower mounting bracket.



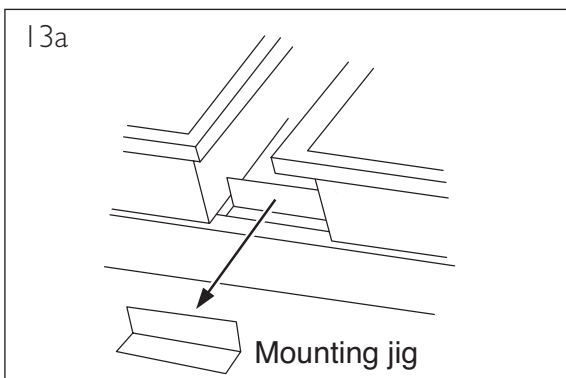
12: If mounting 2 or more panels place the clamping piece on the upper mounting rail and hand tighten for now.

Order:

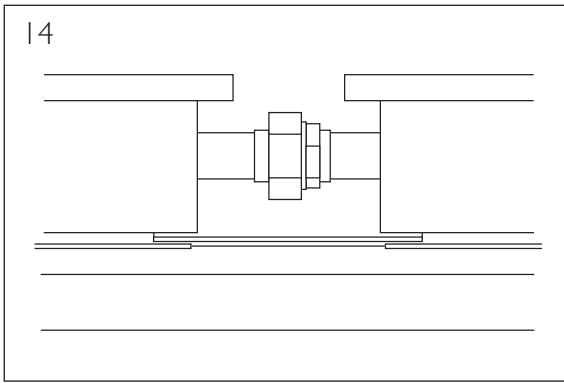
- upper mounting rail
- mounting part extension
- clamping piece
- M8 washer
- M8 nut



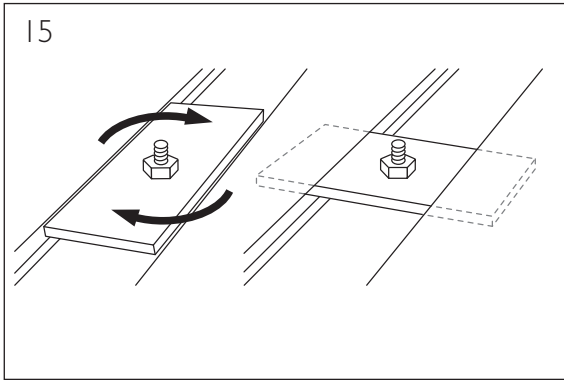
13: Using the mounting jig to aid correct positioning mount the next collector panel. Ensure jig is removed after fitting (see 13a).



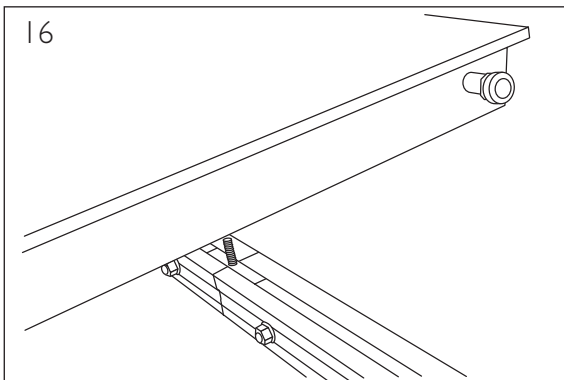
2.0 Installation of solar collector



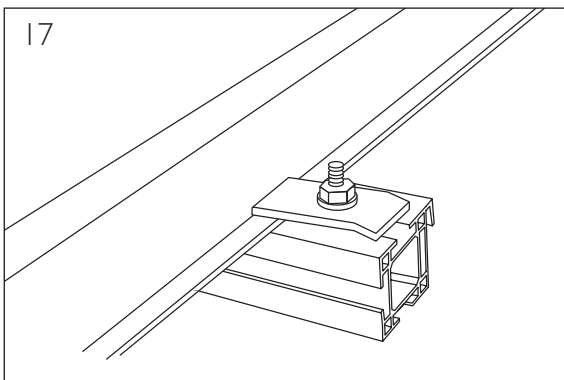
14: Connect the collector panel flow/return pipe together. Ensure the fibre washer is inserted between the male and female connections. Support the pipes when tightening nut.



15: Rotate the clamping piece by 90° so it locates in the Collector panel locating lip and screw it tight using a long socket wrench.



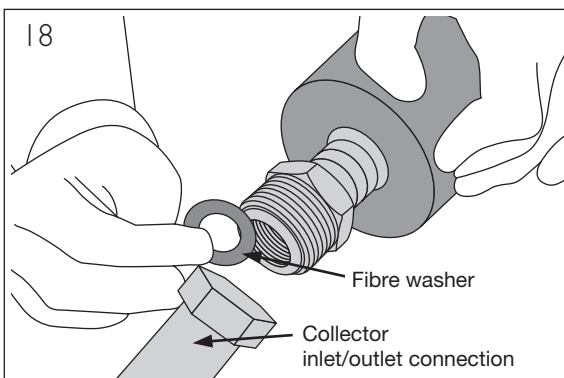
16: Attach additional clamping pieces / collectors as described in points 11-15.



17: Attach the top mounting part on the upper left and right end of the collector.

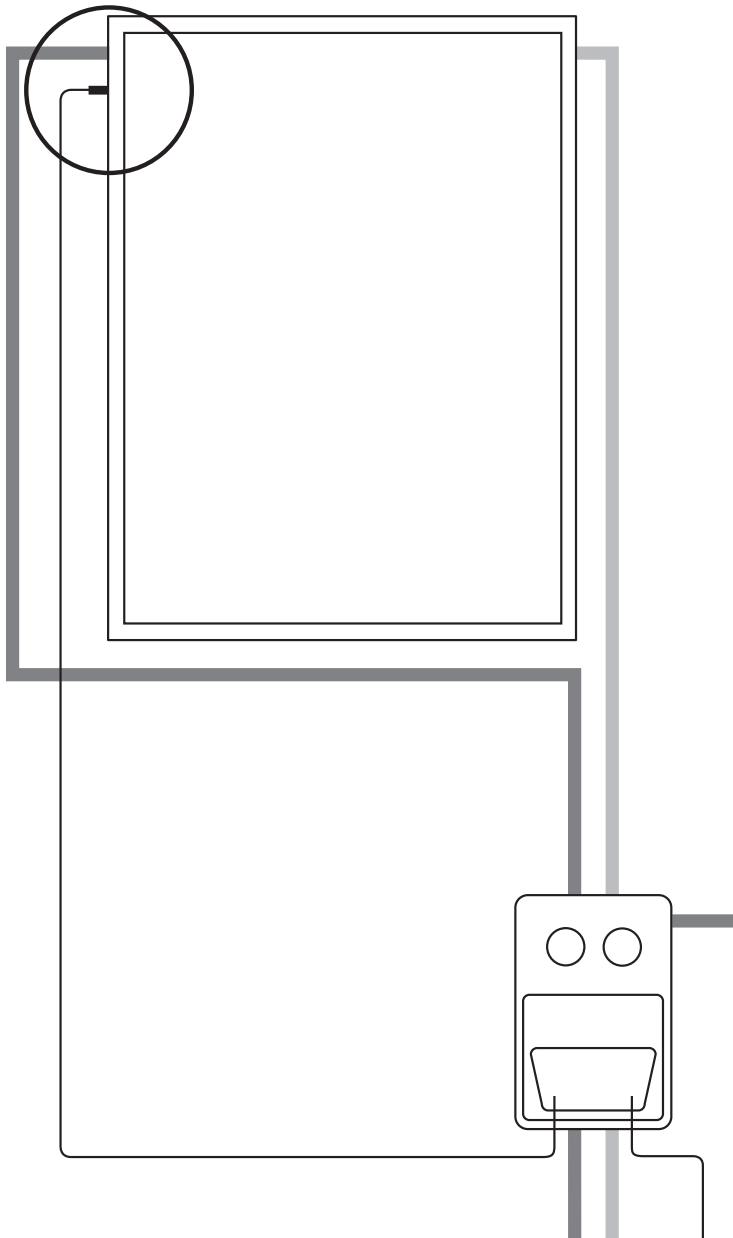
Order:

- mounting rail
- hammer-head bolt
- top mounting part
- M8 washer
- M8 nut



18: Connect flexible connection pipes to collector panel inlet and outlet connections. Ensure fibre washer is used between connection pipe and connections.

Fig. 6



The Collector panel temperature sensor should be installed in the sensor pocket nearest to the collector array flow. It should be secured in the pocket by inserting through the rubber gland provided. All materials used for installing temperature sensors (sensor element, conducting compound, cables, sealing and insulating materials) must be suitably temperature resistant (up to 250°C).

All descriptions and illustrations provided in this leaflet have been carefully prepared but we reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this leaflet. All goods are sold subject to our standard Conditions of Sale which are available on request.

BAXI

A Trading Division of Baxi Heating UK Ltd, a division of Baxi Group.

Brooks House, Coventry Road, Warwick. CV34 4LL

After Sales Service and Technical Enquiries 08700 603261

Our contact centre is open Monday to Friday 8am to 6pm,

Weekends and Bank Holidays 8.30am to 2pm.

We are closed Christmas Day and New Years Day.

Website www.baxi.co.uk

Comp No 3600 5975 - Issue 1 - 5/07

A division of **BAXI GROUP**