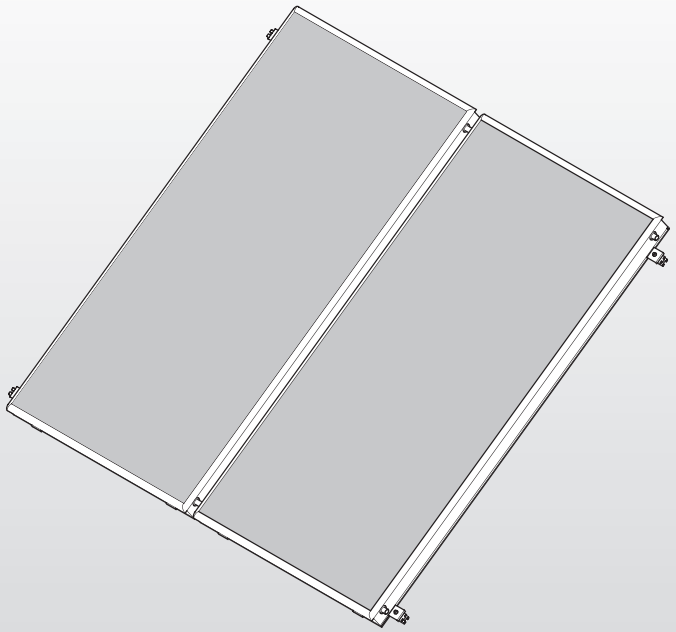
SOLARcomfort
Solar Hot Water Systems
2 & 3 Collector Sets

ARISTON

Installation Instructions

LEAVE THESE INSTRUCTIONS WITH THE END USER



Solar-nu.nl

Country of Destination GB/IE CE

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1. GENERAL INFORMATION

This manual is an integral and essential part of the product. It should be kept with the product.
Please read carefully the instructions and notes about SOLARcomfort contained in this manual as they provide important information regarding the safe installation of the Solar Collectors.

⚠ **IMPORTANT**
Failure to follow these instructions correctly may invalidate the guarantee.

⚠ **IMPORTANT**
Solar domestic hot water heating systems must be installed to comply with the current Building Regulations, British Standards and any applicable local regulations.

1.1 Guarantee

The SOLARcomfort Collectors are guaranteed for 5 years against manufacturing defect - see terms and conditions of guarantee on back page.

1.2 System Contents

The complete SOLARcomfort solar water heating system is supplied in the following consignments:-

1. 800201	Collector	1 per box
2. 3107024/5	Roof Fittings Kit	1 cardboard tube
3. 3820011/2	System Components	1 box
4. 3820001	Tyfocor antifreeze heat transfer fluid	1 x 20l container

1.3 System Instruction Books

The following instruction booklets are supplied with a complete SOLARcomfort solar water heating system:-

1. SOLARcomfort Solar Hot Water Systems Collectors 2 & 3 Collector Set.
   Covers collector installation and plumbing connection.
   Supplied in System Components box.
2. SOLARcomfort Solar Hot Water Systems Pump Group 40/60.
   Covers installation, plumbing connection, system filling, flushing and commissioning.
   Supplied in System Components box.
3. Solar Controller AST 100
   Covers installation, wiring connection and User Instructions.
   Supplied in System Components box.

1.4 SOLARcomfort

SOLARcomfort systems are highly efficient and provide cost savings on the energy used for heating hot water wherever they are used in the UK. However, the savings made will depend on local climate, installation characteristics and the household's domestic hot water requirements.

It is important that the SOLARcomfort system is correctly sized for the local climate condition and the householders requirements.

1.5 Lifestyle

After installation of the SOLARcomfort system, changes to the householders use of hot water will be beneficial. Simple changes such as bathing in the evening instead of the morning and putting automatic washing machines on when free hot water is available by solar energy.

In addition, the timing of the dwelling's boiler controls must be modified to ensure the 'hot water ON' time is set so that the water temperature in the cylinder is at a minimum by the start of the 'solar day'.

1.6 How The System Works

The solar collectors are heated by the sun's rays. The heat generated is stored in a hot water storage cylinder e.g. Ariston Primo twin coil stainless steel cylinder. The system controller continually compares the temperature of the water within the cylinder with the temperature of the solar collectors.

See fig. 1.6A

Whenever the solar collectors are hotter than the water within the cylinder, the controller switches on the system's circulating pump. The temperature differential between the collectors and the cylinder is set via the AST 100 Solar Controller. The heat transfer fluid within the solar system is then circulated through the collectors and the cylinder's heat exchanger, heating the cylinder in just the same way as a central heating boiler.

The cylinder typically has two coils (heat exchangers), the lower coil is heated by the solar system, therefore solar is the primary heat source. The upper cylinder is heated by an auxiliary heat source, typically a central heating boiler, which is used to heat water when there is insufficient heat generated by the solar system. The Ariston Primo Twin cylinder also has two immersion heaters making it suitable for electric only heating systems.

The SOLARcomfort system is a forced circulation sealed system and therefore requires an expansion vessel and a pressure relief valve (PRV), both supplied with SOLARcomfort.

The air separator with an integral manual air vent together with an automatic air vent positioned at the highest point on the system ensures that the sealed system remains free of air.

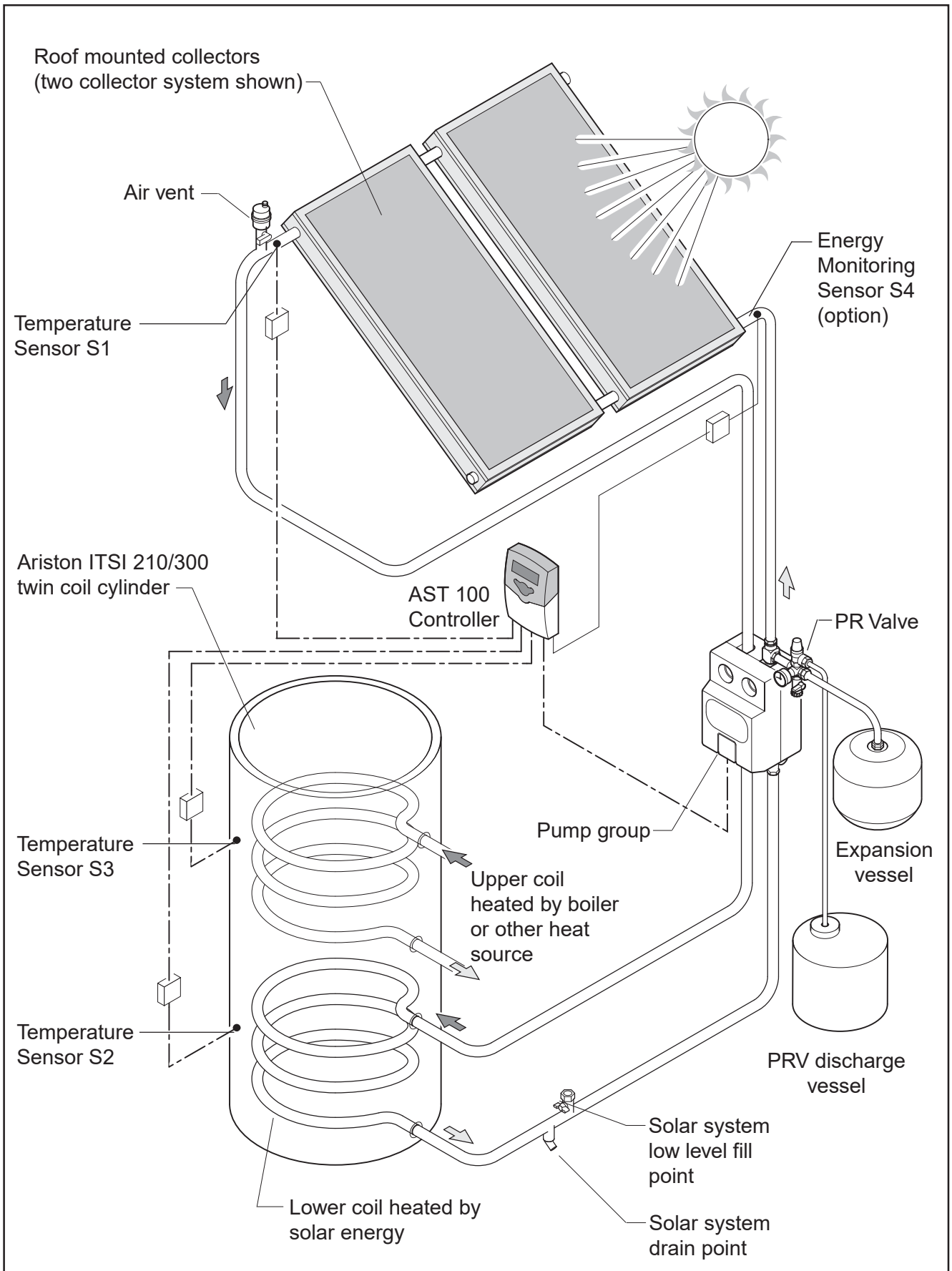


FIG. 1.6A SOLAR BASIC PRINCIPLES

2. SAFETY

Note:
Optional lifting handles are available from Ariston (code 3107023).

WARNING - RISK TO LIFE

Correct procedures must be followed when lifting the collectors.

To satisfy Health and Safety requirements relating to the construction industry, the use of a crane or other lifting device may be required.

Take appropriate precautions to prevent accidents and falls when working on roofs.

Ensure correct personal protective clothing and safety equipment are used when working on roofs.

Ensure that collectors lifted onto the roof or scaffold are always secured to prevent them slipping and falling off the roof. Serious injury or death may result from collectors falling.

WARNING

The collectors must be correctly secured to the roof. The roof must be of adequate structure to support the collectors.

WARNING

During operation and commissioning the temperature of the heat transfer fluid within the system and collectors can reach temperatures high enough to present a risk of scalding. Never loosen fittings or open vents when the system is hot.

WARNING

TYFOCOR LS Heat Transfer Fluid.

Although non-toxic it should not be swallowed.

Refer to label on its container for storage and safety information.

A detailed technical specification is available from Ariston on request.

Caution

SOLARcomfort should be installed and commissioned by approved contractors. Failure to do so may invalidate the warranty.

Caution - Risk of damage to collectors

IMPORTANT! Always keep the glass side of the collectors fully covered until the system is filled and ready for operation.

Always transport the collectors in an upright position. Never position the collectors with the glass side facing down.

Leave collectors in their packaging until the time of installation. Do not allow the bottom side of the collectors to be damaged by sharp objects.

Never leave the collectors with the glass side down when they could be exposed to the weather, as rainwater could infiltrate the collector and cause condensation within the collector.

3. TECHNICAL DATA

COLLECTORS	
Weight - each - empty	38kgs
Total surface area - each	2m²
Aperture area - each	1.83m²
Absorber area - each (evaluated according to EN12975:2001)	1.76m²
Capacity - each	1.5l
Maximum operating pressure	6Bar
Pressure loss	10mbar
Output - each	100l/h
Plate absorption	95%
Plate emission	5%
*Stagnation temperature	167°C
Inlets/Outlets - copper	Ø22mm
Frame	Grey aluminium UV resistant

*The stagnation temperature was calculated for:-

Insolation level of 1000W/m²

Atmospheric temperature value 30°

EXPANSION VESSEL	
2 collector system	25l
3 collector system	25l

HEAT TRANSFER FLUID	
Type	Tyfocor LS
Use undiluted	100%
Weight	1.04kg/l
Frost Protection	to -28°C

3.1 TEMPERATURE / PRESSURE

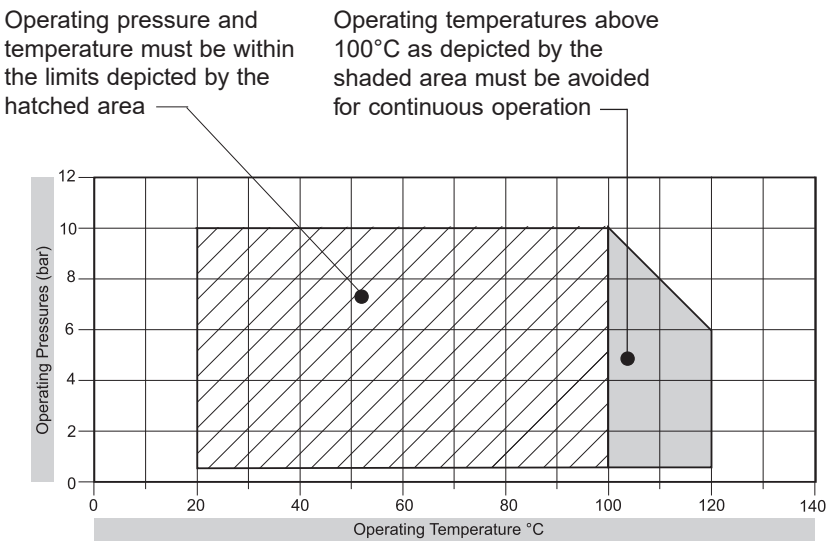
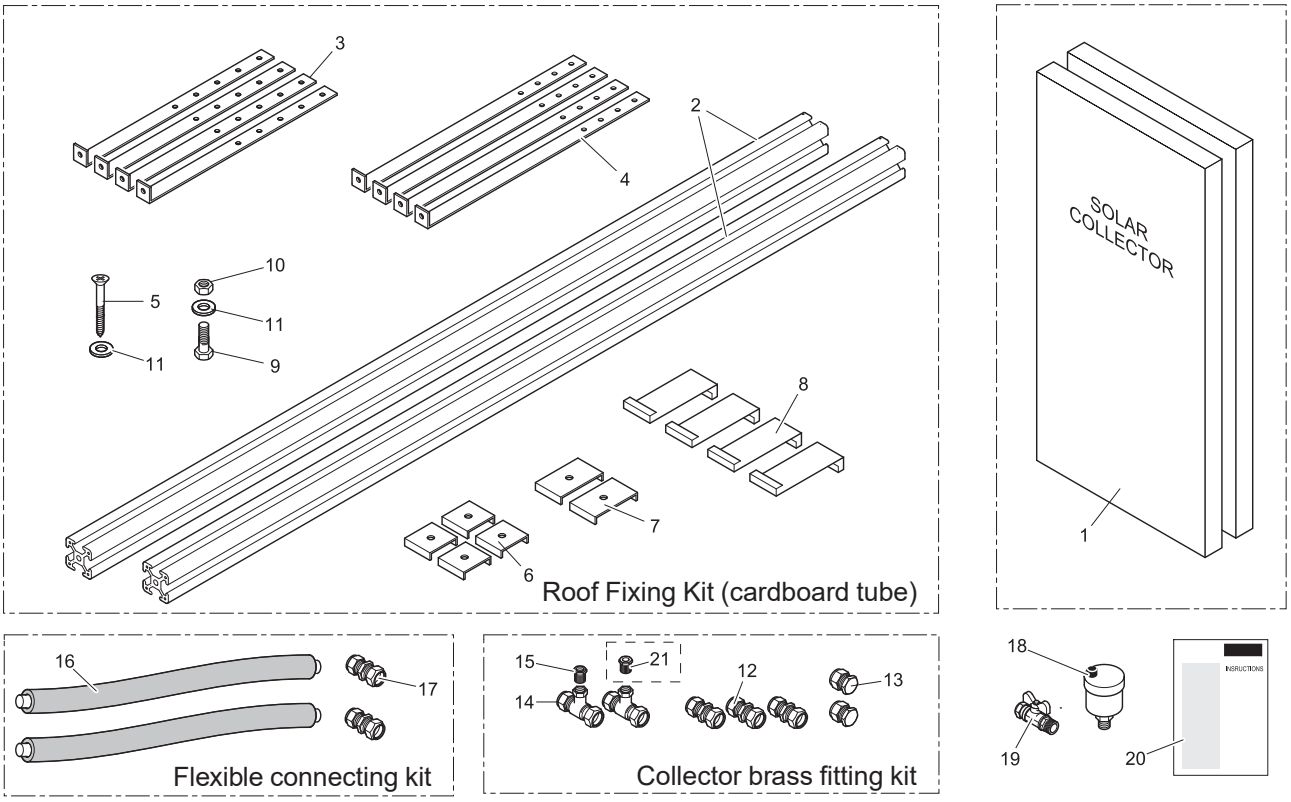


FIG. 3.1A TEMPERATURE PRESSURE DIAGRAM

3.2 Component List for 2 Collector System

Listed below are all the components required to fit the collectors for the SOLARcomfort 2 collector system.

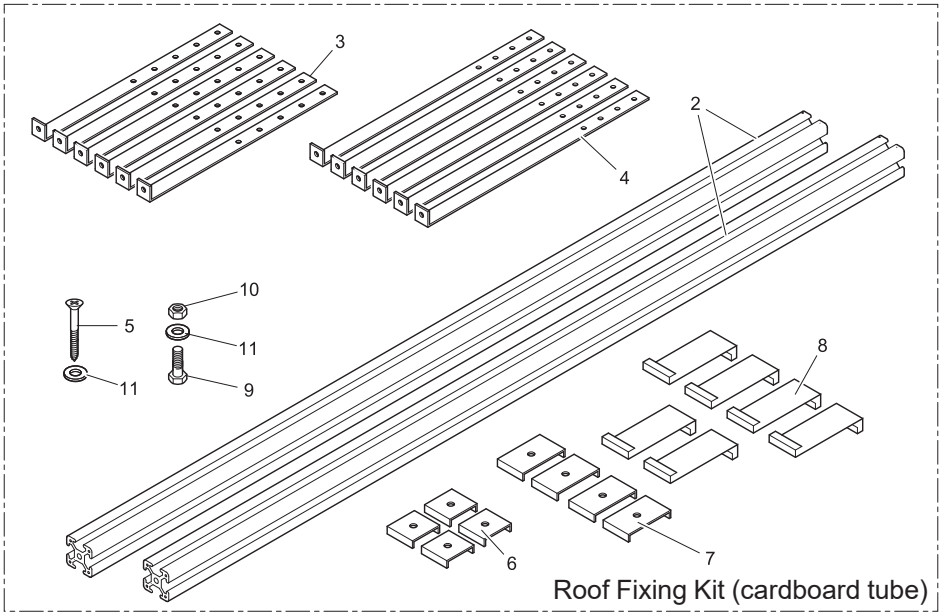


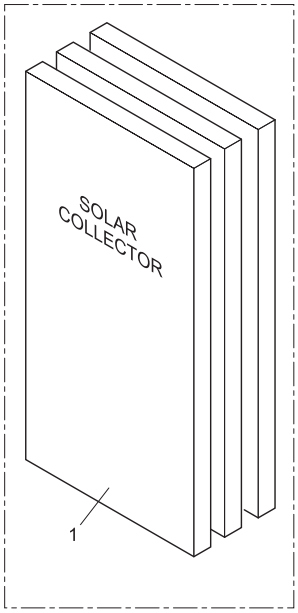
Ref	Description	Qty	Consignment	Packed
1	Collectors 1000mm x 2000mm	2	1 per box	Individual
2	Support Rails length 2200mm	2	Roof fixing kit	1 Cardboard tube
3	Short fixing straps	4		
4	Long fixing straps	4		
5	Strap fixing screws Ø6 x 50 (No.12 x 2")	12		
6	Outer clamps (short)	4		
7	Inner clamps (long)	2		
8	Collector bottom brackets	4		
9	M8 x 25 hex stainless steel bolts	12		
10	M8 hex stainless steel nuts (inc 6 spare)	18		
11	M8 stainless steel washers (inc 12 for wood screws)	24		
12	Compression coupling 22mm	3	Collector brass fittings kit	Packed in System Components box
13	Compression stop end 22mm	2		
14	Compression T 22mm x ½" x 22mm	2		
15	½" to 3/8" Reducer bush	1		
16	Insulated flexible pipe 22mm x 1m	2	Flexible connection kit	Packed in System Components box
17	Compression coupling 22mm	2		
18	Automatic air vent	1		Packed in System Components box
19	Isolating valve 3/8"F x 3/8"M	1		
20	Collector Instructions	1		
21	½" Thermostat pocket	1	Packed in with AST 100 Controller	

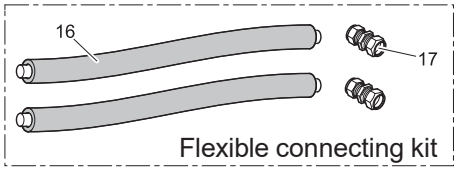
Fig. 3.2a 2 Collector System Component List

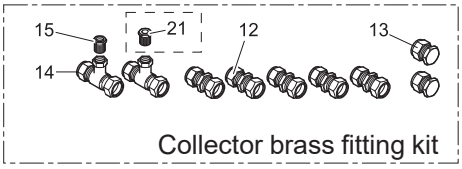
3.3 Component List for 3 Collector System

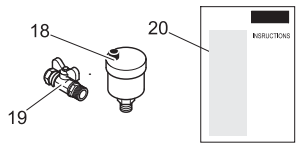
Listed below are all the components required to fit the collectors for the SOLARcomfort 3 collector system.











Ref	Description	Qty	Consignment	Packed
1	Collectors 1000mm x 2000mm	3	1 per box	Individual
2	Support Rails length 3300mm	2	Roof fixing kit	1 Cardboard tube
3	Short fixing straps	6		
4	Long fixing straps	6		
5	Strap fixing screws Ø6 x 50 (No.12 x 2")	18		
6	Outer clamps (short)	4		
7	Inner clamps (long)	4		
8	Collector bottom brackets	6		
9	M8 x 25 hex stainless steel bolts	24		
10	M8 hex stainless steel nuts (inc 8 spare)	24		
11	M8 stainless steel washers (inc 18 for wood screws)	34		
12	Compression coupling 22mm	5	Collector brass fittings kit	Packed in System Components box
13	Compression stop end 22mm	2		
14	Compression T 22mm x ½" x 22mm	2		
15	½" to 3/8" Reducer bush	1		
16	Insulated flexible pipe 22mm x 1m	2	Flexible connection kit	Packed in System Components box
17	Compression coupling 22mm	2		
18	Automatic air vent	1		Packed in System Components box
19	Isolating valve 3/8"F x 3/8"M	1		
20	Collector Instructions	1		
21	½" Thermostat pocket	1	Packed in with AST 100 Controller	

Fig. 3.3a 3 Collector System Component List

3.4 Collector Dimensions

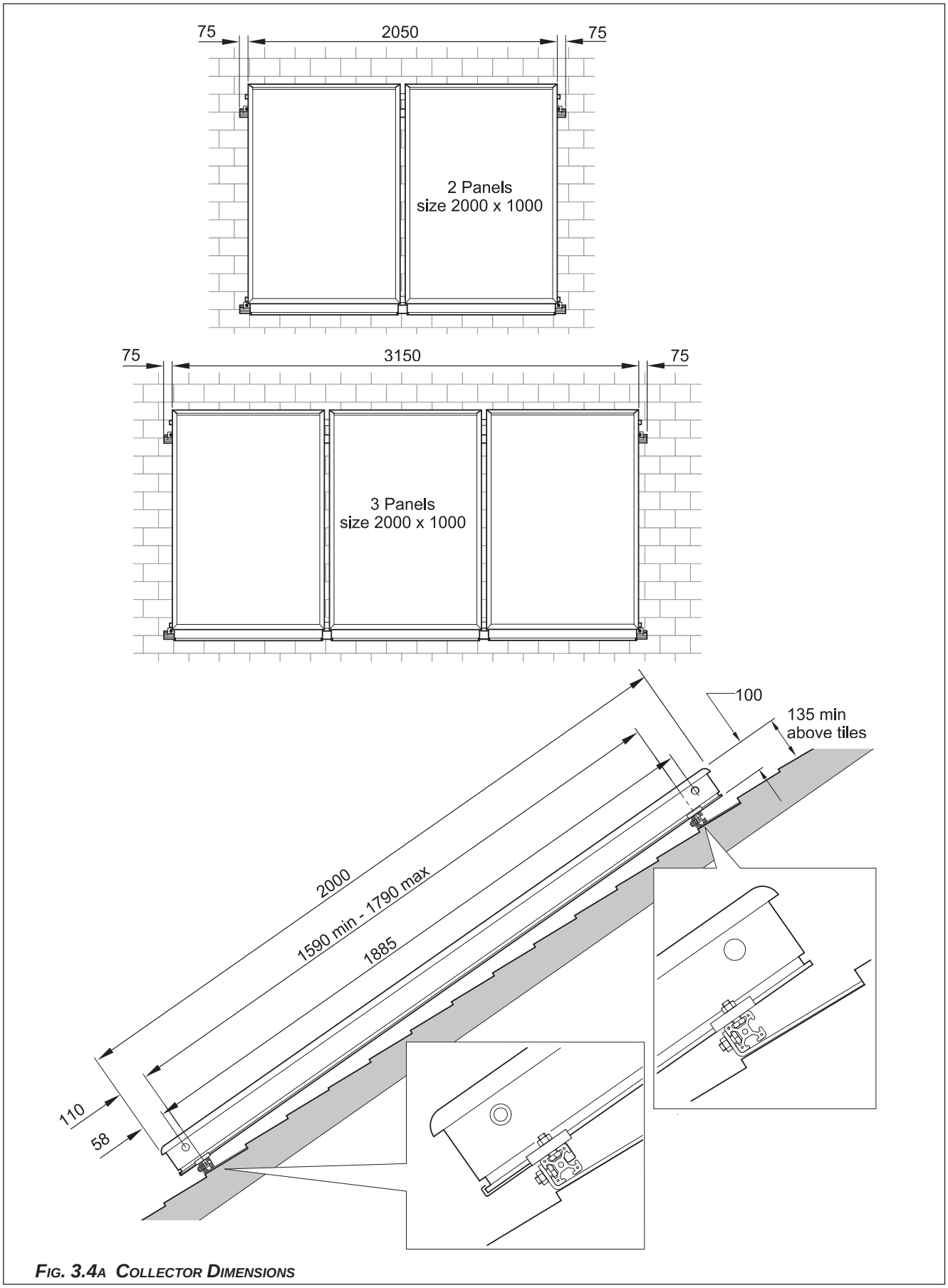


Fig. 3.4a Collector Dimensions

3.5 Fixing Straps Dimensions

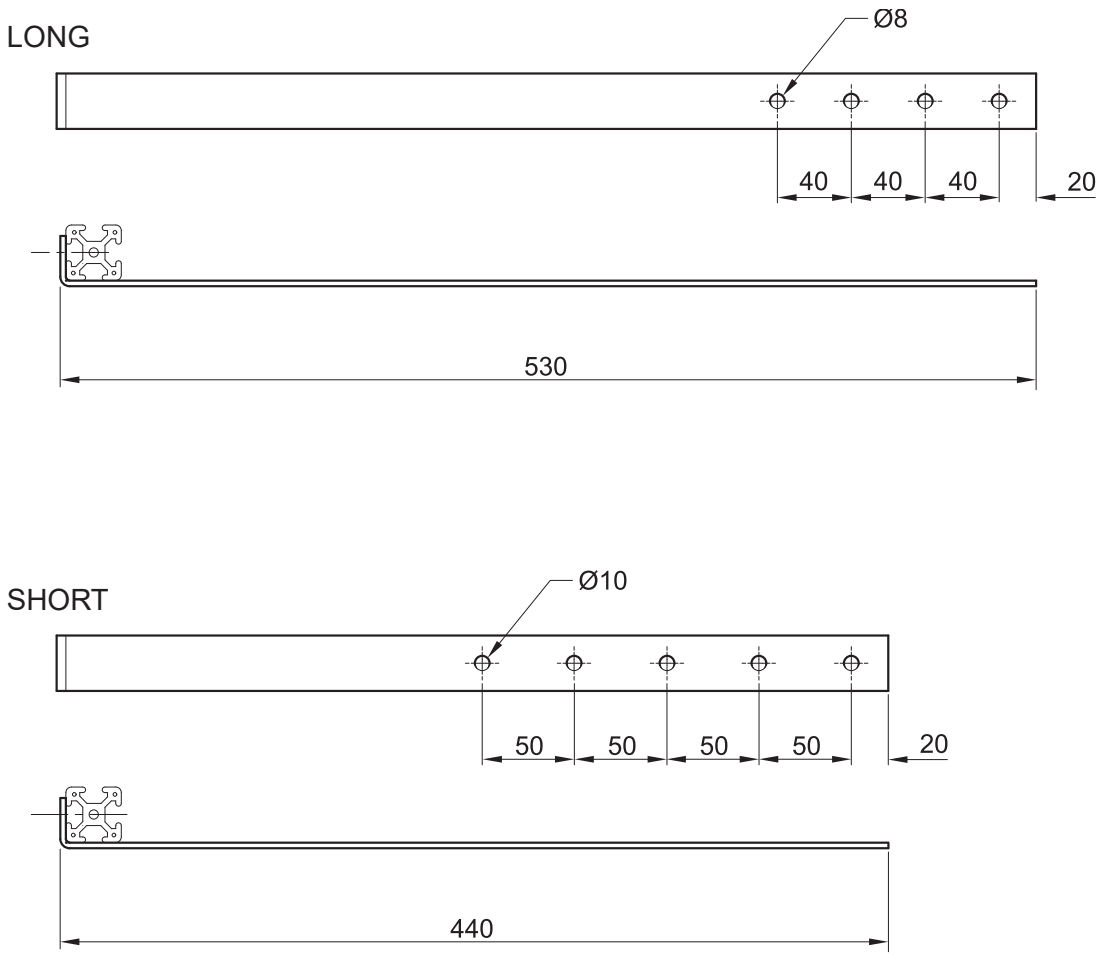


Fig. 3.5a Fixing Strap Dimensions

4. REGULATIONS & STANDARDS

SOLARcomfort hot water heating systems should be installed in compliance with the following standards and regulations.

4.1 Water Regulations

Water Supply (Water Fittings) Regulations 1999 / www.wras.co.uk

These regulations (bye-laws in Scotland) ensure a good supply of wholesome water and that only approved materials, pipes and fittings are used to convey water.

4.2 Building Regulations

These are statutory documents and take priority over all other regulations and recommendations. The installation of an unvented hot water storage cylinder is classified as a "Controlled Service" and Regulation G3 applies. To meet the requirements of the Regulations, installation of an unvented system should be undertaken by a "competent installer".

All installations of unvented hot water storage systems having a capacity of more than 15 litres should be notified to the relevant Local Authority by means of a building notice or by the submission of full plans. It is important to note that it is a criminal offence to install an unvented hot water storage system without notifying the Local Authority. The installation of the unvented cylinder and hot water system must comply with BS 6700 and the HSE Legionella Code of Practice.

4.3 General Guidance

Current guidance notes do not cover the connection of a solar thermal circuit to an unvented storage vessel (cylinder). However, if guidance is sought for compliance with current regulations the fundamental principle is to provide a fail-safe means of shutting off the solar input to the heat exchanger if the cylinder temperature should rise above the set temperature of the cylinder's energy cut out. (See Note 1).

As with all unvented hot water systems, notification of intention to install should be given to your local building control.

Option A. A non self-resetting mechanical shut-off should be installed on the solar primary flow to the cylinder. The mechanical shut-off should be suitable for use with a solar primary circuit (i.e. high temperature and glycol resistant). The mechanical shut-off should be integrated electrically with the cylinder energy cut out/s and if necessary the solar circuit temperature control, please refer to the solar controller manufacturer for further information.

Option B. Where the solar controller and hydraulic system demonstrate that by no lesser means the requirement in Option A is satisfied by other means; certification by an approvals body is required to demonstrate that in the event of the stored water going over temperature, the heat input to the cylinder is isolated by physical means and is non self-resetting.

These systems should be clearly identified with reference to the approvals body. (See Note 2).

Note 1 : Whilst most solar cylinders use a coil type heat exchanger other options such as external plate to plate devices, external annulars or 'tank in tank' systems may be used but the same control options always apply.

Note 2 : Current approved bodies include the British Board of Agrèment (BBA), WRc-NSF Limited, or KIWA.

4.4 British & European Standards

Connection of thermal solar heating systems

EN 12976: Thermal solar heating systems and their components (prefabricated systems).

ENV 12977: Thermal solar heating system and their components (bespoke systems).

BS5918: Latest version: Solar heating systems for domestic hot water.

Installation and equipment of DHW cylinders

BS5546: 2000 Specification for installation of hot water supplies for domestic purposes, using gas-fired appliances of rated input not exceeding 70 kW.

BS6700: 1997 Specification for design, installation, testing and maintenance, of servicing, supplying water for domestic use within buildings and their curtilages.

The local water company by-laws.

Electrical connection

Current IEE wiring regulations.

Health and Safety document No 635 (Electricity at Work Regulations)

4.5 UK Regulations particularly relevant for water heating equipment

The Pressure Equipment Regulations (PED) 1999 - www.eurodyn.com

The Building Regulations (L1 A&B) 2006 and Domestic Heating Compliance Guide - www.communities.gov.uk

The Building Regulations (P) 2005 - www.communities.gov.uk

Control of Substances Hazardous to Health Regulations (COSHH) 1994 - www.hse.gov.uk

4.6 UK Regulations particularly relevant for construction

Further details available from: www.hse.gov.uk

Health & Safety At Work Act (HSW) 1974

Work at Height Regulations 2005.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995.

Management Health & Safety at Work Regulations (MHSWR) 1999.

Noise at Work Regulations 1989.

Construction (Health, Safety & Welfare) Regulations (CHSWA) 1996.

Electricity at Work Regulations 1989.

Construction Regulations (Head Protection) 1989.

Control of Substances Hazardous to Health Regulations (COSHH) 1994.

Construction (Design and Management) Regulations (CDM) 1994.

Personal Protective Equipment at Work Regulations 1992.

Lifting Operations and Lifting Equipment Regulations (LOLER) 1998.

Confined Spaces Regulations 1997.

Manual Handling Operations Regulations 1992.

The Workplace (Health, Safety and Welfare) Regulations 1992 (WHSWA).

Provision and Use of Work Equipment Regulations (PUWER) 1998.

Health and Safety (First Aid) Regulations 1981.

LZC - Low or zero carbon energy sources: strategic guide.

4.7 EU Directives

Further details available from: www.europa.eu.int

Construction Directive: 89/106/EEC

Electromagnetic: 89/336/EEC

Low voltage: 73/23/EEC

Machinery Directive: 98/37/EC

4.8 Other publications

Preventing hot water scalding in bathrooms: using TMVs (IP 14/03).

DTI testing of solar systems (SP300275 1-3).

Review of issues related to active solar heating systems (SP300246).

Active solar performance and data review (SP300270).

Solar heating systems for hot water (BS 5918).

Hard water scale in hot water storage cylinders (IP13/93).

Heating systems in buildings – design for water-based heating systems (PrEN 12828).

Building log books (GPG 348).

Solar heating (CIBSE DBSP WGG).

Sun in Action II (ESTIF – Sun in Action II).

Minimising the risk of legionnaires' disease (TM 13).

BRE Digest 489.

Energy Saving Trust - www.est.org.uk

CE131 Solar Water Heating Systems - Guidance for professionals, conventional indirect models.

4.9 Electrical Connection

BS7671 2001 Amended 2004

APD P:

P1 - Design, Installation, Inspection and Testing

P2 - Provision of information

4.10 Thermal Insulation

Thermal Insulation Standard TIMSA (Thermal Insulation Manufacturers and Suppliers Association).

5. INSTALLATION

The following topics should be considered prior to installing the SOLARcomfort system.

5.1 Town & Country Planning

In general Solar Thermal Systems tend to be looked upon favourably by Local Authority Planning Departments, although there are implications for listed buildings and sensitive front elevations in some conservation areas. Some Local Authorities may consider solar panels as 'Permitted Development' and therefore not requiring formal Planning Permission.

This may not be the case in all circumstances and contact with the local Planning Authority is vital to determine the authority's policy.

Permitted development rights do not necessarily apply in Areas of Outstanding Natural Beauty, Conservation Areas, Sites of Special Scientific Interest and National Parks.

5:2 House Insurance

The householder should ensure that they are covered for the modifications. The Home Information Pack (HIP) may have specific requirements regarding the installation of solar panels.

5.3 Risk Assessment

A risk assessment covering construction, water quality and bacterial risks must be made before work starts. A site visit is required to assess the risks to workers, householders, members of the public and animals.

5.4 Roof Condition

Prior to installation, the current condition of the roof must be assessed to ensure that it is capable of withstanding the additional weight of the solar collectors and roof mounting system. Where necessary, specialist personnel should be contacted to verify the suitability of the roof structure.

5.5 Positioning Collectors

The solar collectors offer maximum energy performance when the glass surface faces directly south. The angle of the dwelling in relation to the sun and site restrictions may lead to variations to this optimum south position, a maximum recommended variation is 30° from due south.

A collector facing east side of south will give better performance in the morning than in the afternoon.

A collector facing west side of south will give better performance in the afternoon than in the morning.

5.6 Considerations for Positioning Collectors

Consideration should be given to the following when selecting a position for collectors.

1. The collectors must not be in the shade during daylight hours. The trimming or felling of trees may be advised.
2. In positions where exposure to high winds are likely, extra or alternative collector mountings should be considered.
3. The collectors should be placed as close as possible to the storage cylinder to keep pipe runs to a minimum.
4. Collectors and the in loft pipework must be accessible for all necessary maintenance work.
5. The possibility of bird or animal droppings fouling the surface of the collectors e.g. overhead cables or branches.

5.7 Collector Inclination

Collectors mounted on a pitched roof should always be parallel to the tiles i.e. at the same angle as the roof. There is no exception to this rule.

Collectors can be mounted on a flat roof or the ground, for such applications a special inclined angle fixing set is available - see section 7.

5.8 Pipework and Fittings

Taking into account that the heat transfer fluid within the system may reach high temperatures, the primary circuit should be copper, stainless steel (rigid and flexible) or carbon steel braided high temperature hose. Pipe joints and connections with other system components should also be able to withstand the working temperatures and pressures. Thought should be given to preventing corrosion due to dissimilar metals in contact.

All copper pipework must be Kite Marked BS EN1057 1996 Table X half hard copper tube.

All fittings must be quality brass BS864-2 compression type.
Brass olives are recommended as they produce a better seal.

Brazed or silver soldered joints are acceptable.

The use of joint compounds such as 'Fernox White' is recommended for compression joints.

Owing to the high temperatures of the solar system, plastic pipe and fittings must not be used.

All fittings and components fitted must be able to withstand temperatures in excess of 150°

Soldered and push fit fittings should not be used.

Galvanised steel pipe should not be used.

5.9 Insulation

All external pipework, connections and fittings must be insulated with suitable high temperature, vermin resistant and UV resistant insulating materials.

All internal pipework (excluding pipework to the expansion vessel) must be insulated with suitable high temperature insulating materials.

Insulation of the pipework must only be undertaken after tightening of the compression fittings and completion of a pressure test - see Pump Group Manual.

5.10 Sizing of Pipes

The flow rate in the circuit is between 0.5 and 1.5 litres/min. for each collector.

The flow velocity in the circuit should not exceed 1.5m/sec otherwise the system may be noisy during operation.

As a guide only: for systems with total pipework of less than 50 metres, 15mm diameter pipe should allow flow conditions to be met for systems with up to four collectors.

When the total pipework is over 50 metres, then 22mm pipe should be used.

An assessment of the specific installation requirements must be undertaken.

5.11 Pipework

The installation of pipework must be made in accordance with good plumbing practice, the following points should be considered when installing pipework.

1. Pipe runs should be chosen to give the shortest most direct route to the storage cylinder, with minimum bends. Tight bends should be avoided.
2. The falls of pipes should be arranged to allow the system to be drained and vented.
   Low points, when unavoidable, should be fitted with a drain.
   High points, when unavoidable, should be fitted with a vent.
3. Where possible, all pipe runs should have a continuous slight incline up to the highest point in the system to allow for natural venting of air from the system.
4. The automatic air vent supplied with the system should be fitted to the highest point i.e. near the flow connection of the collectors.
5. Adequate support and fixing should be provided for all pipework to ensure that inclines are maintained and sagging is prevented.
6. Owing to the high temperature differentials within the solar circuit consideration should be given to the expansion of the pipework, expect up to 12mm on a 5 metre run. Pipes should be fitted with brackets and devices that allow for expansion and contraction, rigid fixings should be avoided.
7. A drain point must be fitted at the lowest point of the solar circuit. It must be positioned at the down side of the non-return valve to ensure the system can be fully drained.

5.12 Collector Couplings

Collectors are jointed together and connected to the pipework by 22mm compression fittings.

These fittings connect to the 22mm spigots projecting each side of the collector. The spigots are not fixed and can move in and out in relation to the side panel of the collector to allow for alignment of the collectors. Owing to this movement it is important to ensure each spigot penetrates the fitting fully so that a correct join is made.

It is advised to make a pencil mark on each spigot 22mm from the end. When the fittings are in position, these marks will show that the spigots have fully penetrated the fitting - see fig. 5.12A.

This also applies to the two stop ends fitted to the collectors.

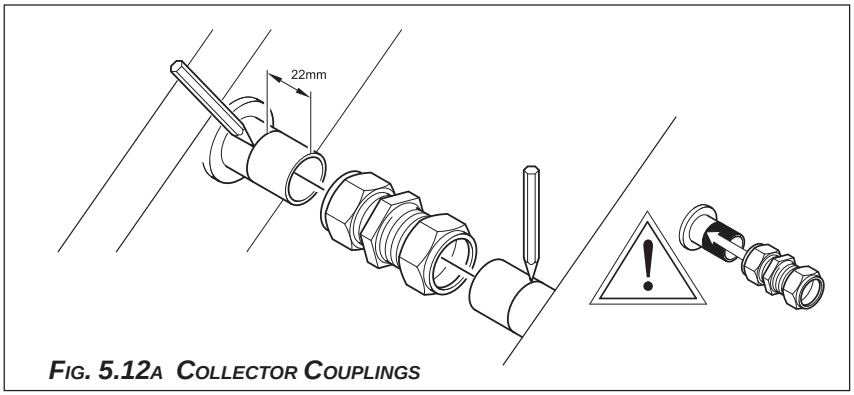


Fig. 5.12a Collector Couplings

5.13 Collector Configurations

Two to seven collectors can be connected in series. When more than seven are installed we recommend the panels are installed in a parallel configuration. Connection in series is recommended when a limited output and high domestic hot water temperature is required.

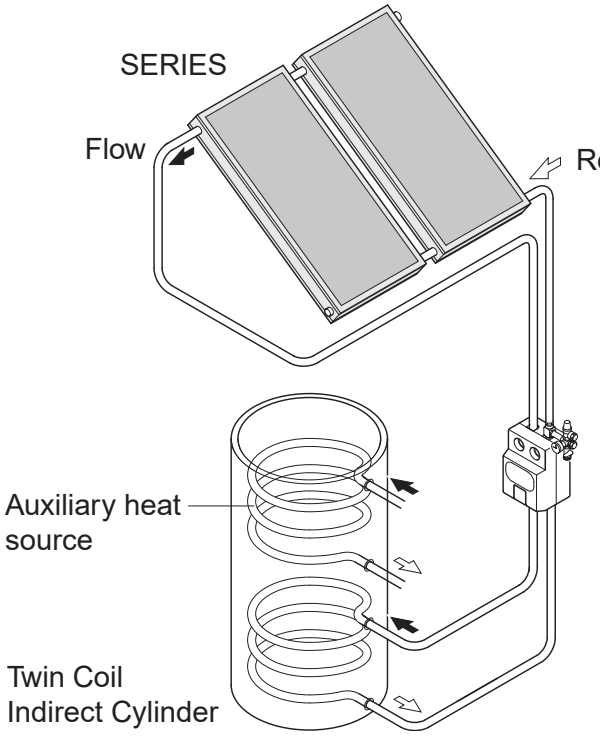


Fig. 5.13a Collector Series Configuration

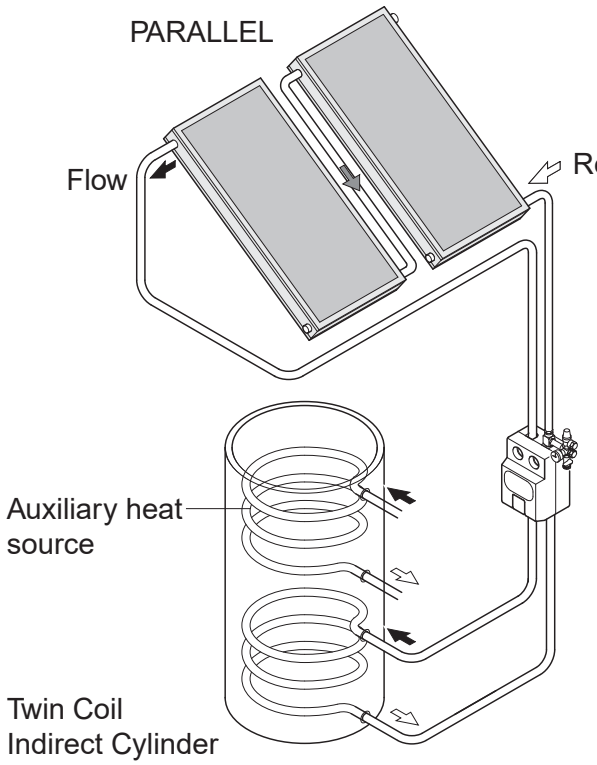
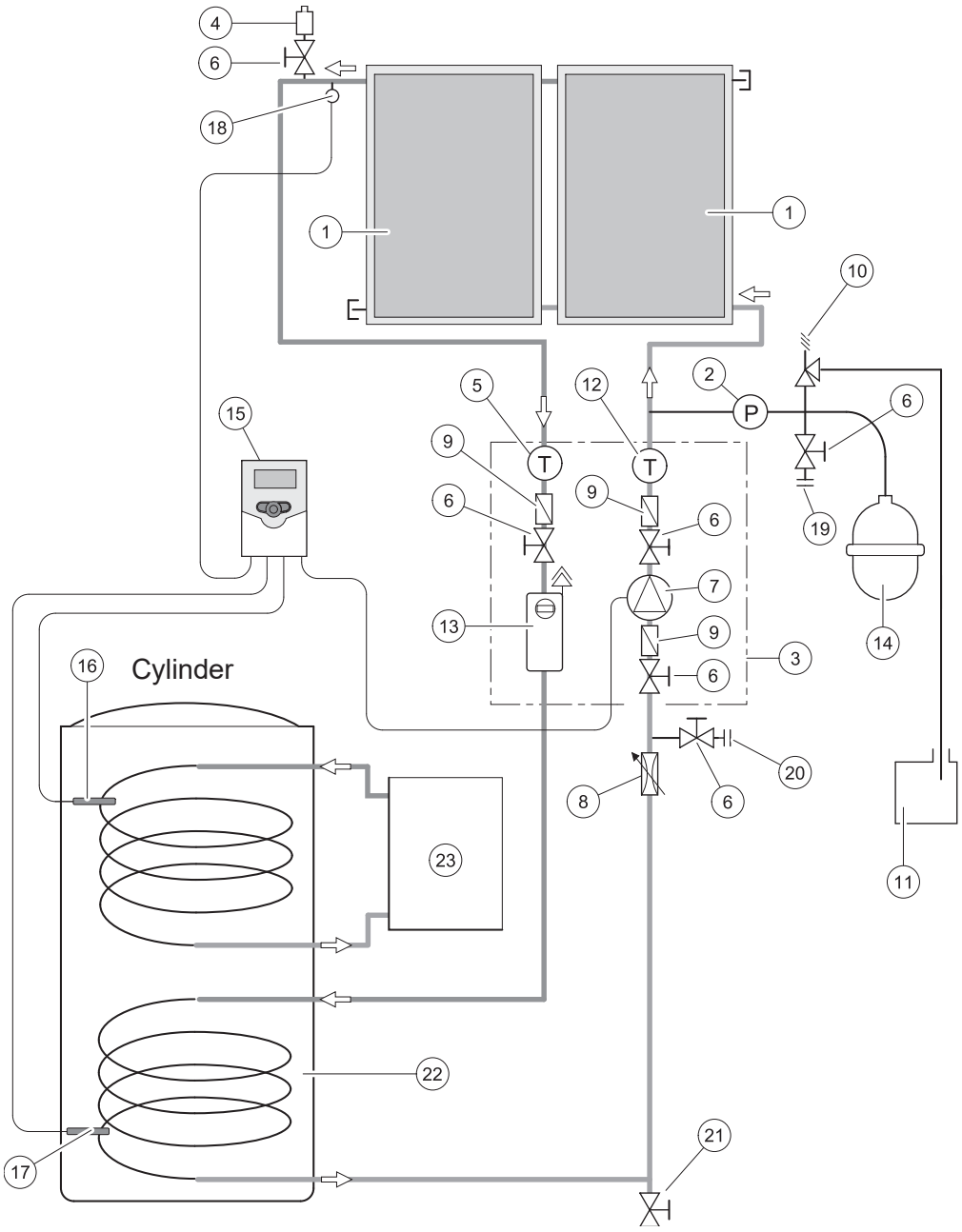


Fig. 5.13b Collector Parallel Configuration

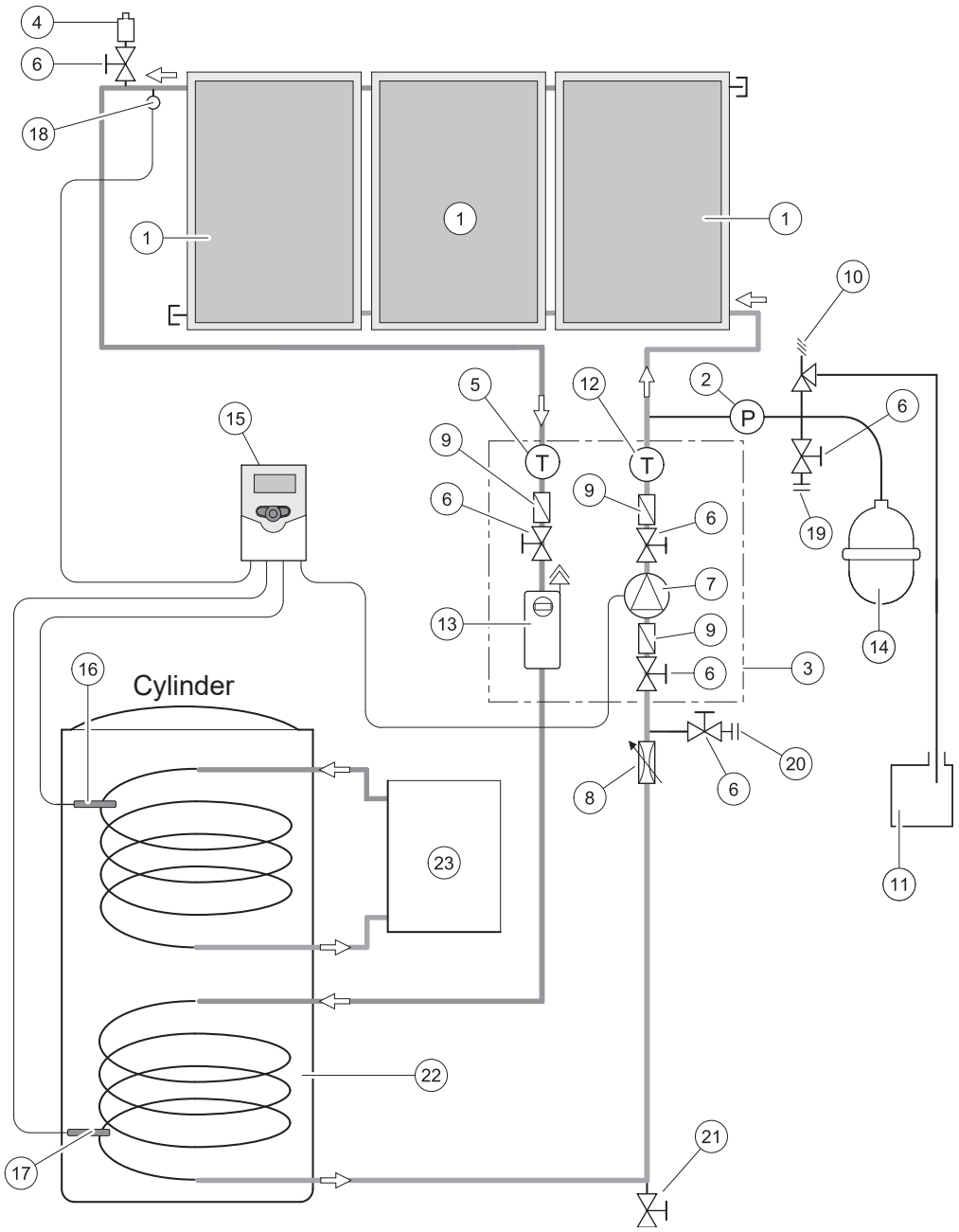
5.14 Two Collector Schematic



1. Collector
2. System Pressure Guage
3. Pump Module
4. Automatic Air Vent
5. Flow Temperature Gauge
6. Shut Off Valve
7. Circulating Pump
8. Flow Limiter
9. Non-Return Valve
10. Pressure Relief Valve (PRV)
11. PRV Discharge Vessel
12. Return Temperature Gauge
13. Air Separator with manual air vent
14. Expansion Vessel
15. Solar AST 100 Controller
16. Upper Cylinder Temperature Sensor (S3)
17. Lower Cylinder Temperature Sensor (S2)
18. Collector Temperature Sensor (S1)
19. System Fill Point (flow)
20. System Fill Point (return)
21. System Drain
22. Cylinder - twin coil shown
23. Boiler (auxiliary heat source)

Fig. 5.14a Two Collector Flow Diagram

5.15 Three Collector Schematic



1. Collector
2. System Pressure Guage
3. Pump Module
4. Automatic Air Vent
5. Flow Temperature Gauge
6. Shut Off Valve
7. Circulating Pump
8. Flow Limiter
9. Non-Return Valve
10. Pressure Relief Valve (PRV)
11. PRV Discharge Vessel
12. Return Temperature Gauge
13. Air Separator with manual air vent
14. Expansion Vessel
15. Solar AST 100 Controller
16. Upper Cylinder Temperature Sensor (S3)
17. Lower Cylinder Temperature Sensor (S2)
18. Collector Temperature Sensor (S1)
19. System Fill Point (flow)
20. System Fill Point (return)
21. System Drain
22. Cylinder - twin coil shown
23. Boiler (auxiliary heat source)

Fig. 5.15a Three Collector Flow Diagram

5.16 Fixing Straps

Two types of Fixing Strap are supplied, long and short - for dimensions see fig. 3.5A.

The construction of the roof, batten spacing and type of tile will determine which of the fixing straps is most suitable for the installation.

Where appropriate, an optional rafter bar is available (code:). The rafter bar allows the fixing strap to penetrate the roof and be attached to a bar affixed between the rafters (see separate data sheet).

Long Fixing Straps
These are generally suitable for roofs with tiles up to a maximum length of 500mm e.g. large slate tiles.

Short Fixing Straps
These are generally suitable for roofs with small clay tiles.

The fixing straps are made of stainless steel and are pliable enough to be bent to shape around the fixed tiles, so that their top end lays flat on the felt/membrane directly over rafters.

Rafters should be in sound condition. Rafters that have deteriorated due to age and decay should be made sound, reinforced or replaced.

It is important that each strap is secured to a sound rafter with at least three screws which have at least 45mm length in the rafter, washers are supplied for the screws.

Always pre-drill the rafter before screwing to prevent splitting.

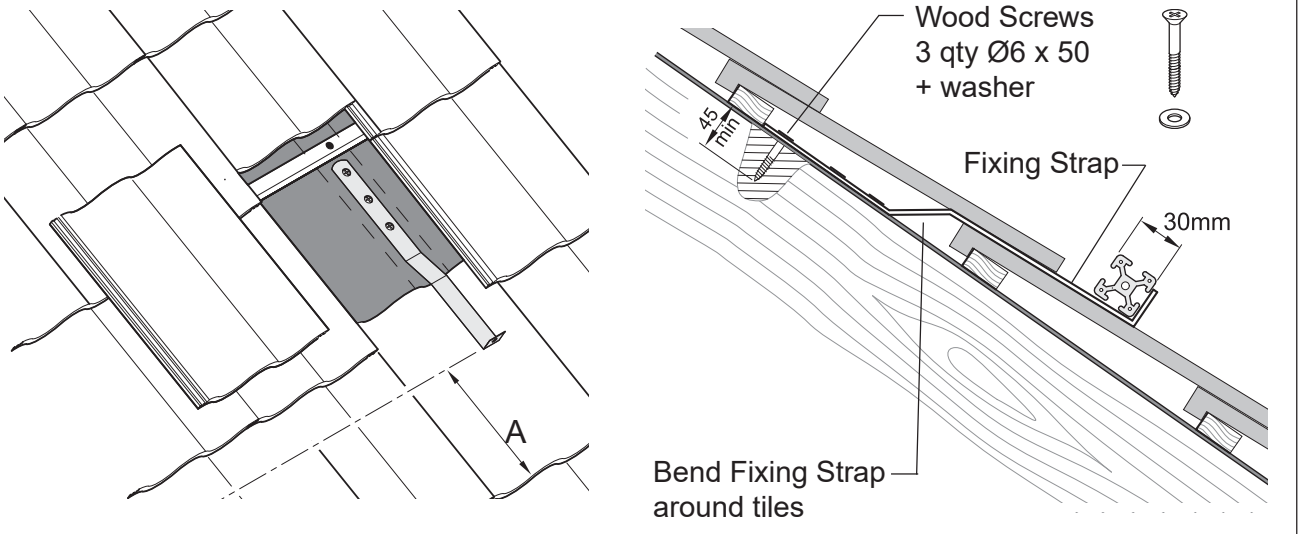


Fig. 5.16A Fixing Strap

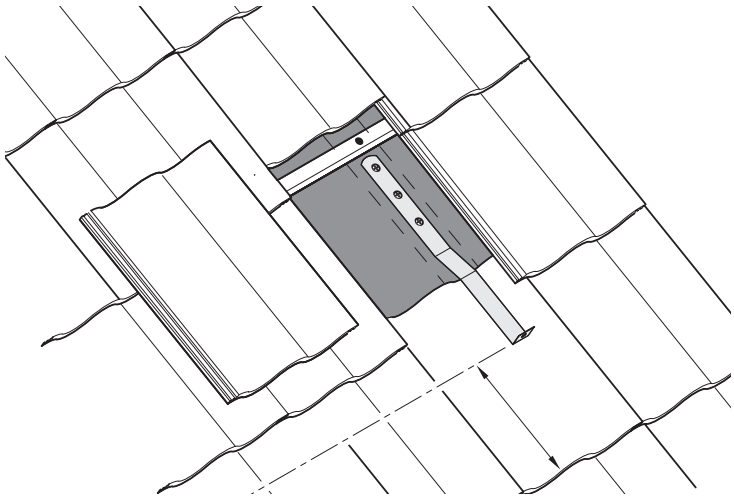
For best appearance the collectors should be fitted so that they are square with the tiles.

To achieve this ensure that the bottom pair of fixing straps are positioned using the edge of the tiles as a datum - dimension 'A' in fig. 5.16A.

WARNING

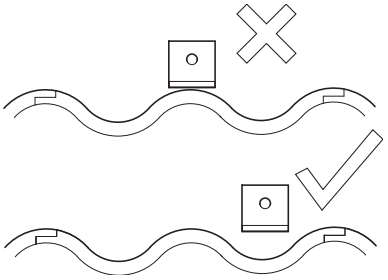
The collectors must be correctly secured to the roof. The roof must be of adequate structure to support the collectors.

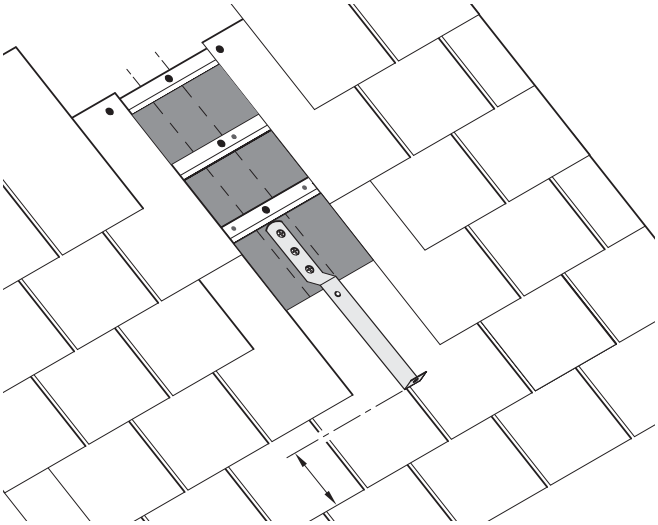
5.17 Roof Types



INTERLOCKING PROFILED TILES

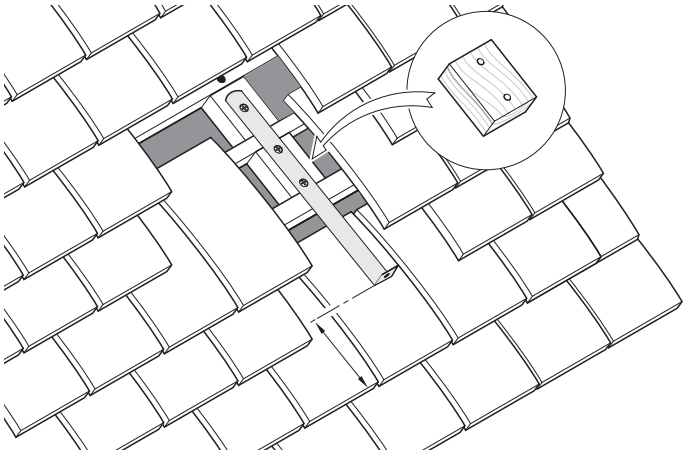
For all profiled tiles, straps should be fixed to align with the troughs in the tiles as opposed to the peaks, as shown.





FLAT TILE / SLATES

Bend the fixing strap to ensure a secure fixing on the rafter. The exposed part of the strap must be beyond the edge of the tile.



CLAY PLAIN TILED

For shorter tiles the tile battens can be too close together and bending the roof brackets to suit will be difficult.

Wood spacers can be fitted as shown.

Screws must be passed through spacers and penetrate at least 45mm into the rafter.

An alternative method is to loosen the battens and slide the fixing straps under the battens. Care must be taken to ensure the resulting roof structure is sound.

Fig. 5.17a Roof Types Fixing

5.18 Collector Fixings

IMPORTANT

After installation check all clamp nuts are tight.

The two aluminium collector support rails are bolted directly to the roof fixing straps.

Collector bottom brackets hook over the rails on the front edge of the collectors to prevent the collectors sliding down.

The extruded section of the support rails is designed to accept M8 hexagon bolt heads, these are slid in from the end and will remain captive.

The collectors are clamped to the top of the support rails with clamp plates.

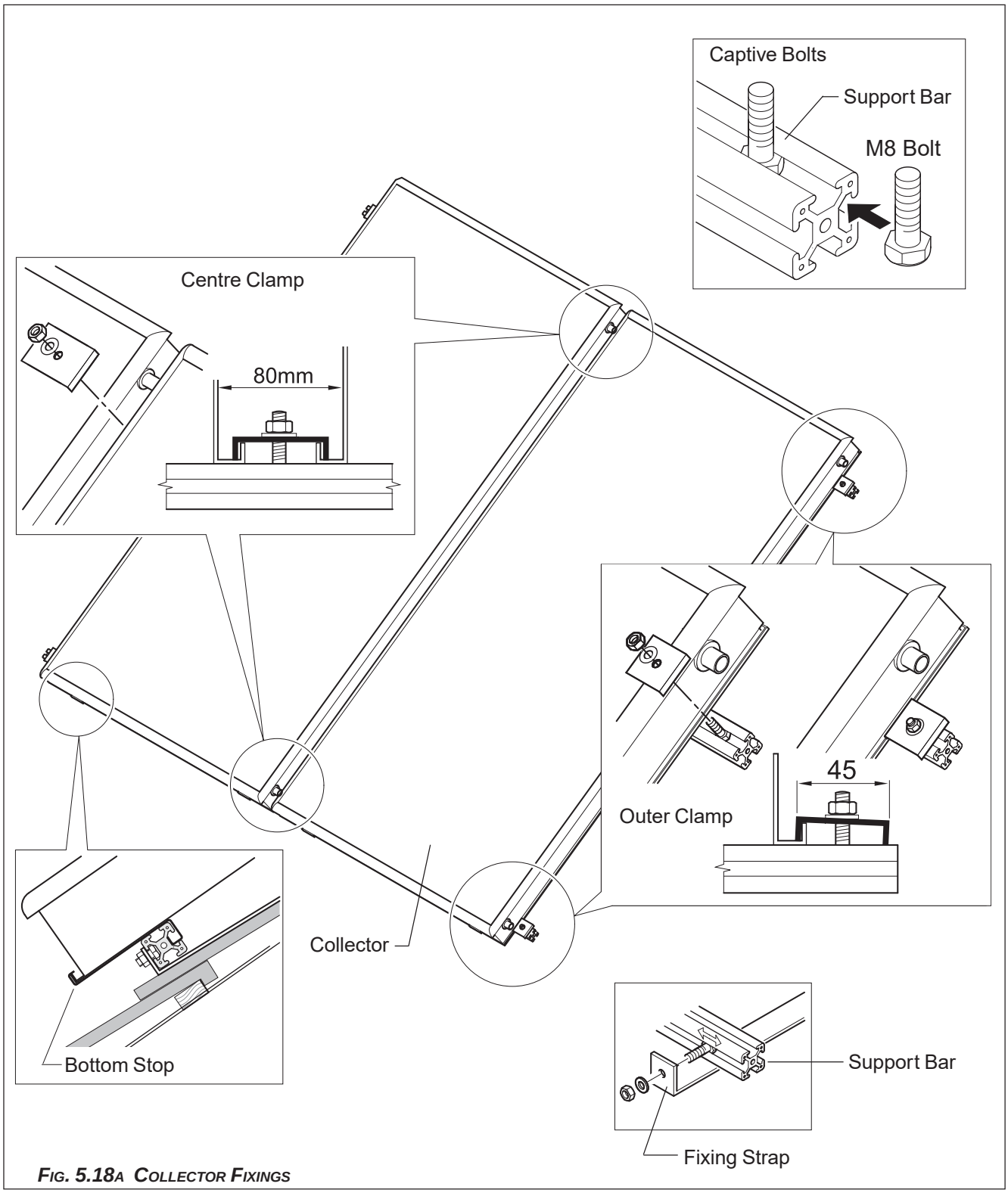


Fig. 5.18a Collector Fixings

5.19 Collector Fitting Procedure

1. Fix lower fixing straps to rafters using the Ø6 x 50 screws provided, three screws minimum per strap. Rafters must be sound and screws must penetrate the rafters by at least 45mm.
   Two straps for 2 Collectors, three straps 3 Collectors.
2. Slide bolts along one of the support rails to align with lower fixing straps.
3. Locate bolts in the holes in the fixing straps, fit nuts with washers, align bar in required position and tighten nuts.
4. Measure for top rail.
5. Fit top fixing straps to rafter.
   Two straps for 2 Collectors, three straps 3 Collectors.
6. Fit top support rail.
7. Slide on two bottom support brackets for first collector.
8. Unpack both collectors and cover glass side.
9. Lower first collector and locate the two bottom support brackets in the bottom edge of the collector.
10. Slide in 1 bolt into outer end of each rail approx. 75mm.
11. Fix collector outer edge using one outer (short) clamp on each rail.
12. Slide 1 bolt from the other end of each rail to 50mm of the collector.
13. Attach 22mm compression coupling to both collector inner pipes.
    Ensure that the pipes enter the couplings by 22mm - see 5.12.
14. Slide on two bottom support brackets for next collector.
15. Lower next collector on – take care not to damage under side of collector.
    Ensure that the pipes enter the couplings by 22mm - see 5.12.
16. Fit two inner (long) clamps between the collectors.
17. Fully tighten both centre pipe couplings.

For three collector system repeat No.11 to No. 17.

18. Slide 1 bolt from the end of each rail.
19. Fix second collector outer edge using one outer (short) clamp on each rail.
20. Tighten all clamps.
21. Fit stop ends to the two connecting pipes not required.
22. Fit 22mm compression T to collector flow (top of collector). Fit collector sensor S1 with ½" thermostat pocket, then fit flexible pipe to open end of T - also see fig. 5.20A.
23. Connect the remaining insulated flexible pipe to the return spigot using 22mm compression coupling.
24. Make suitable weatherproof flashing where the pipes enter the roof space.

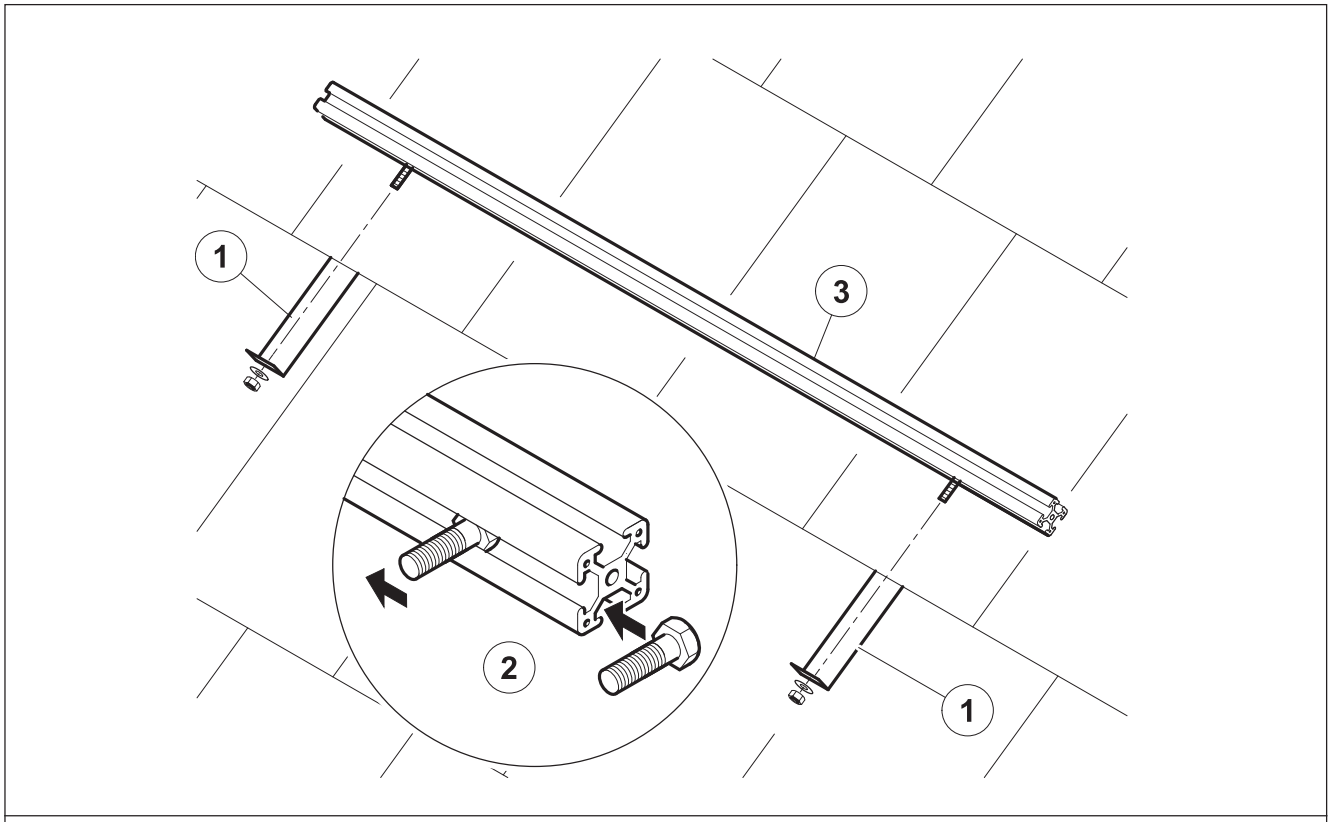
CAUTION

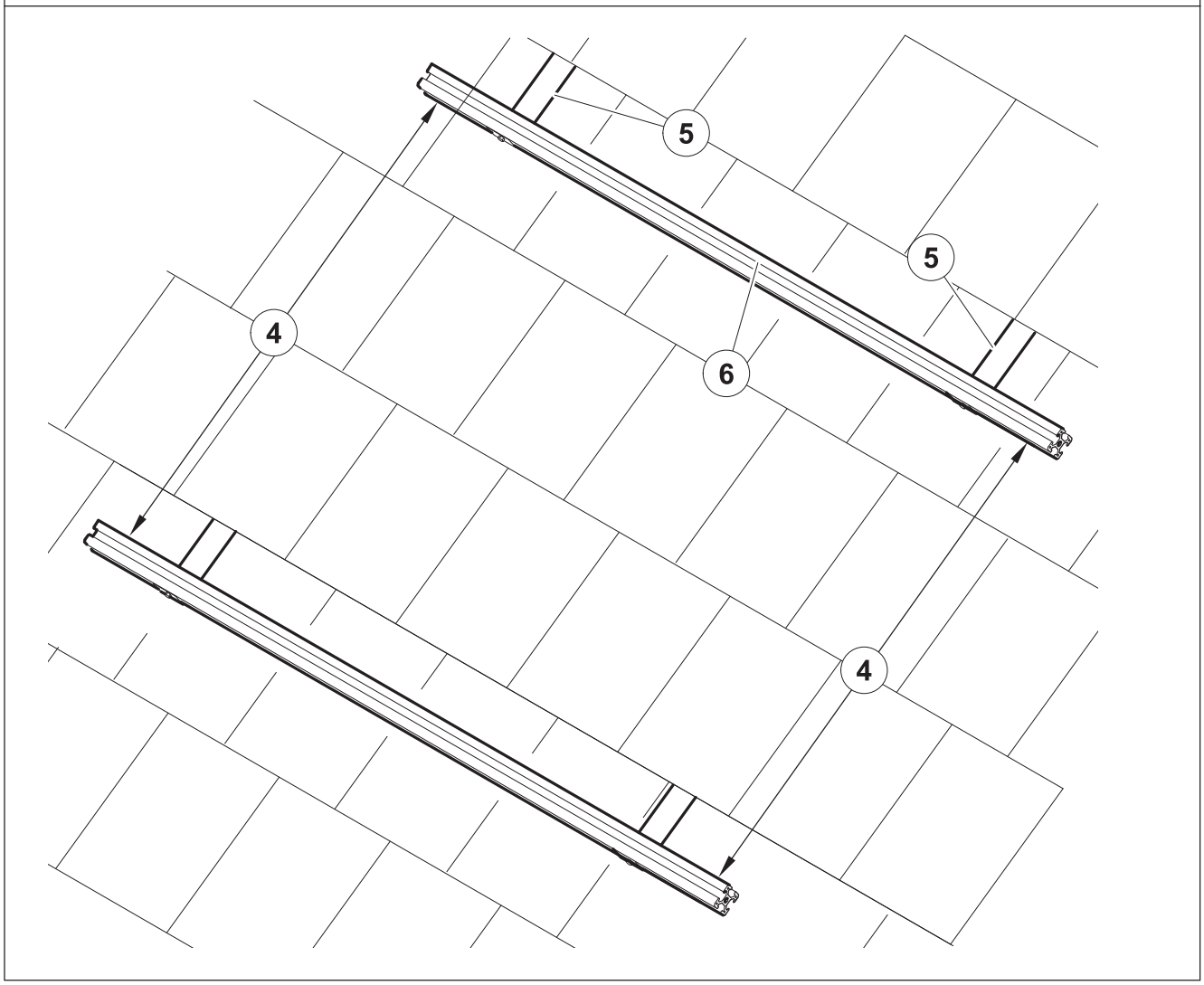
EXTREME care must be taken NOT to puncture the under side of the collectors.

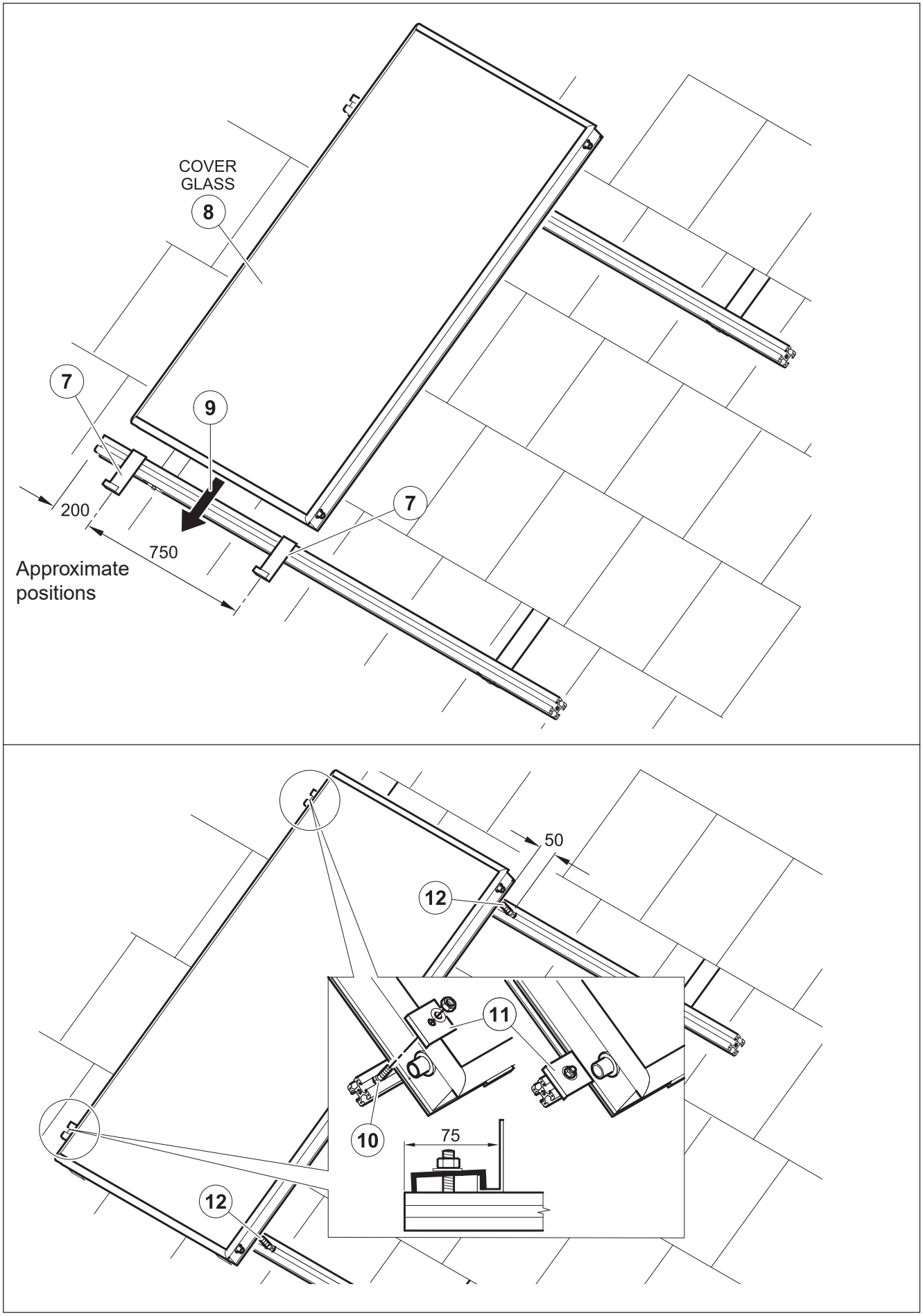
IMPORTANT

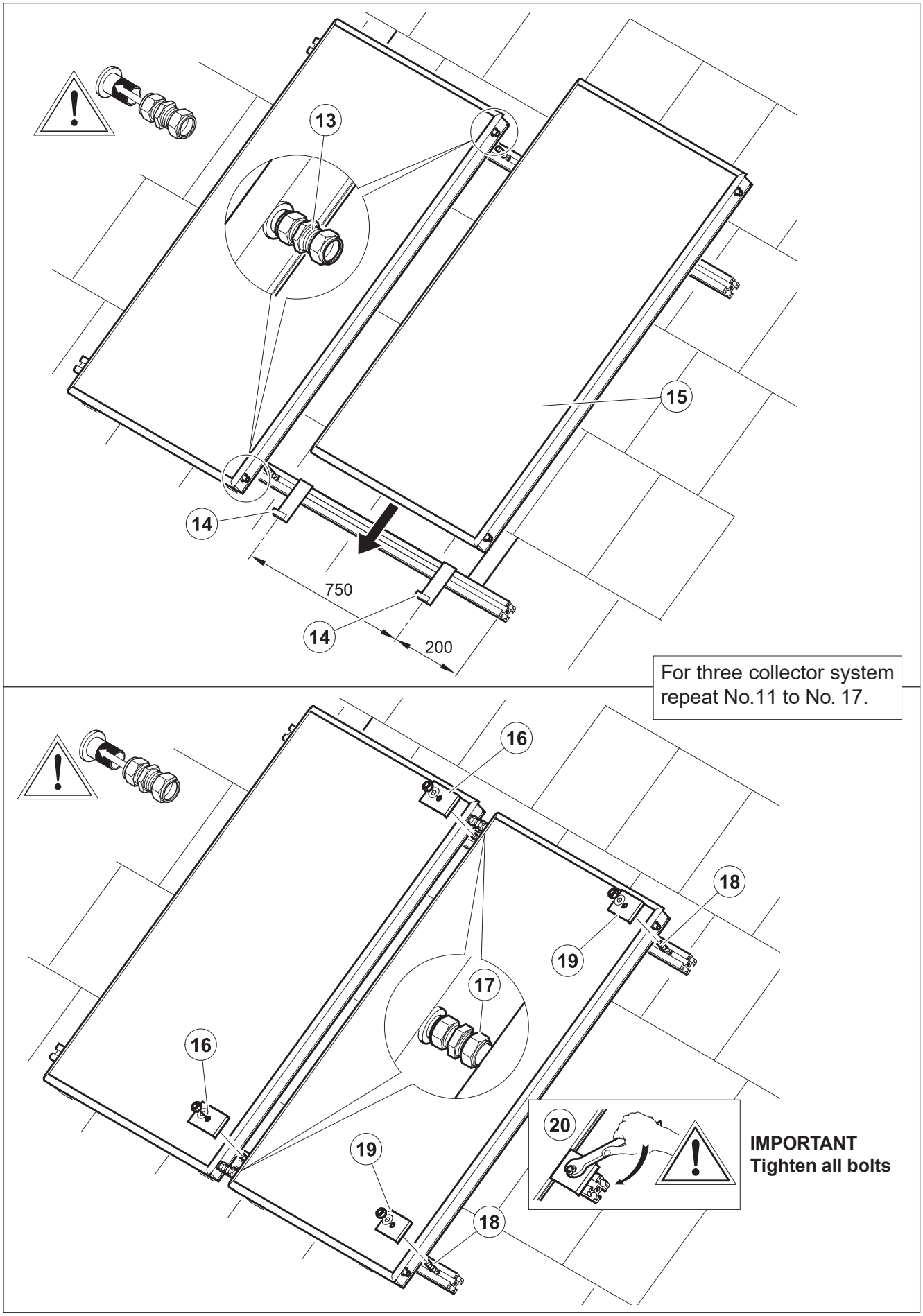
After installation check all clamp nuts are tight.

Note:-
Sensor S1 and ½" pocket are packed in with the AST 100 Controller.


1
3
2
1

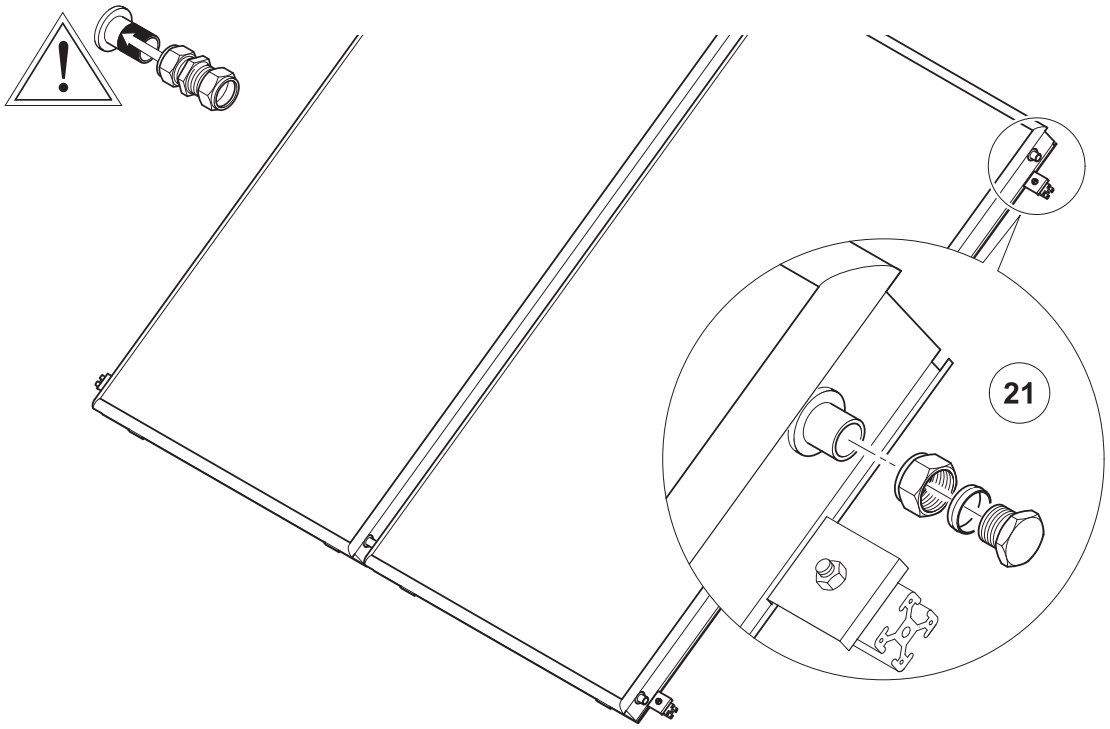

5
5
4
6
4

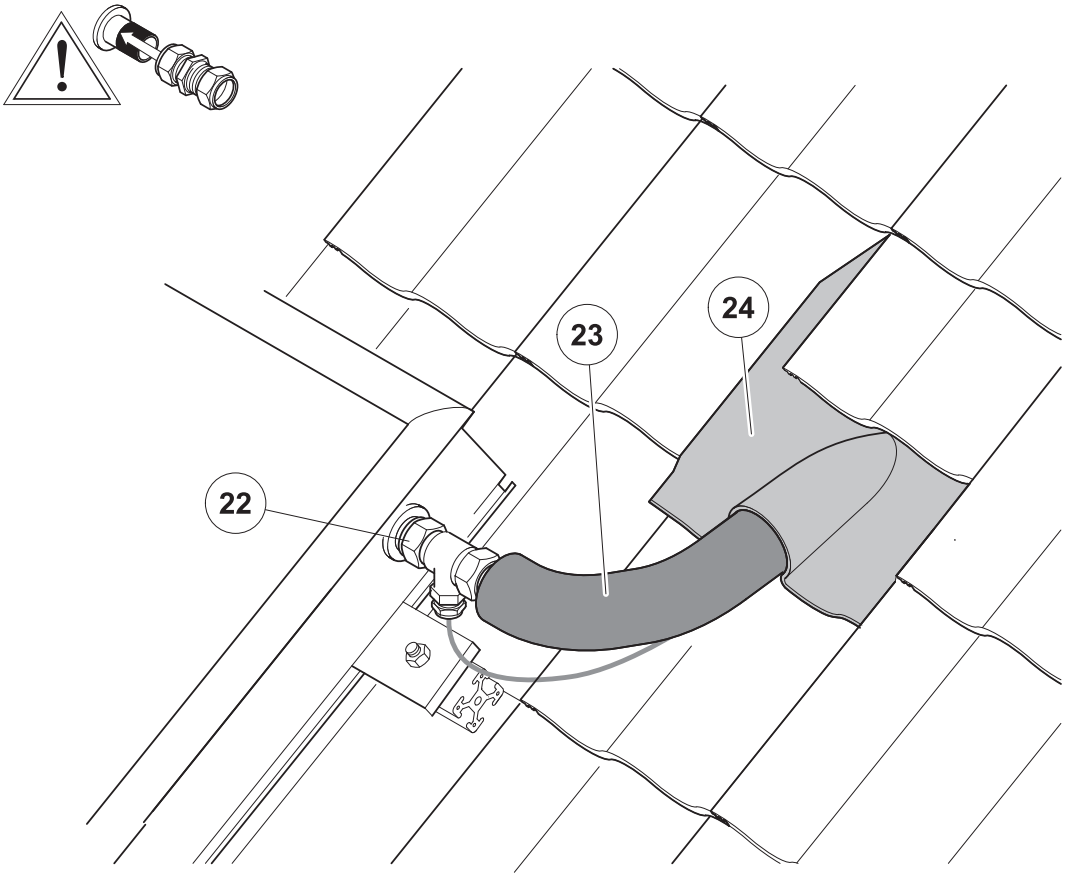

COVER
GLASS
8
7
9
7
200
750
Approximate
positions
50
12
11
10
75
12



For three collector system repeat No.11 to No. 17.

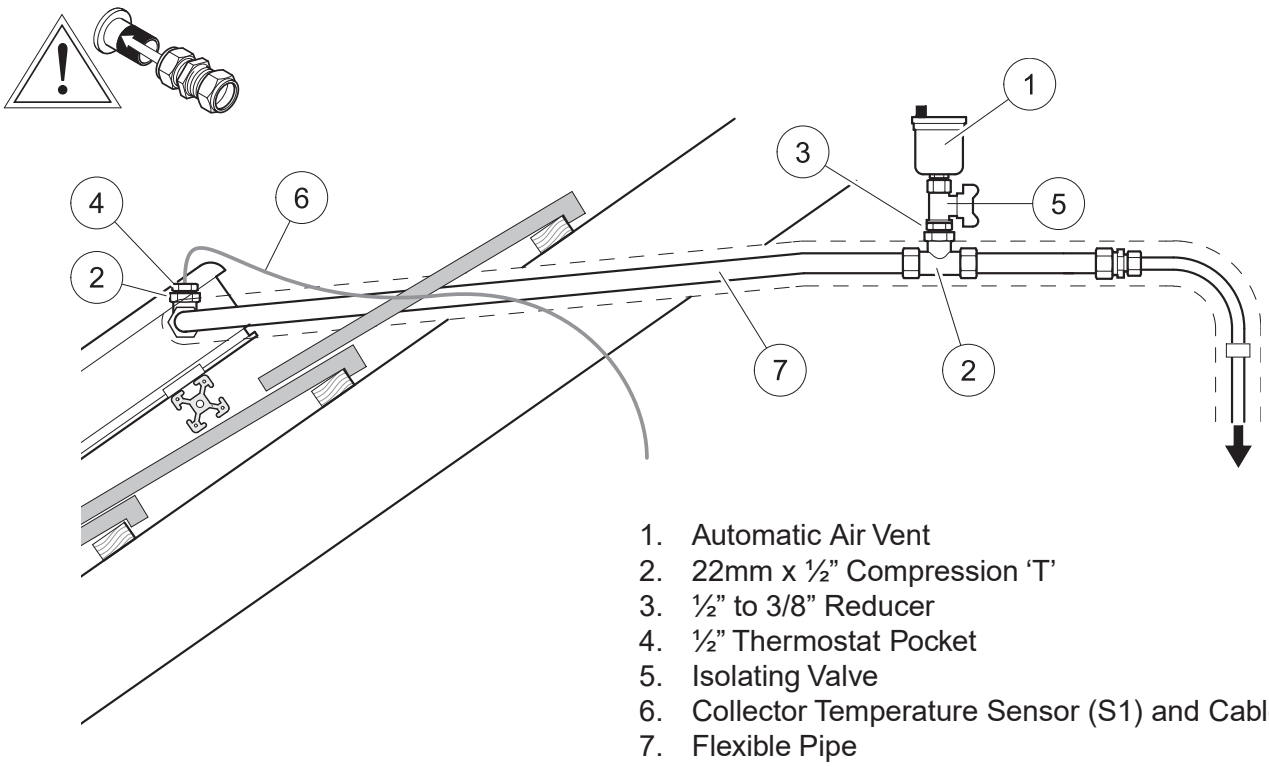
IMPORTANT
Tighten all bolts





Flow shown

5.20 Plumbing Connections



1. Automatic Air Vent
2. 22mm x ½" Compression 'T'
3. ½" to 3/8" Reducer
4. ½" Thermostat Pocket
5. Isolating Valve
6. Collector Temperature Sensor (S1) and Cable
7. Flexible Pipe

Fig. 5.20a Collector Flow Connection - Typical

6. COMMISSIONING AND SERVICING

Commissioning and servicing instructions are detailed in the associated SOLARcomfort Pump Group Instructions.

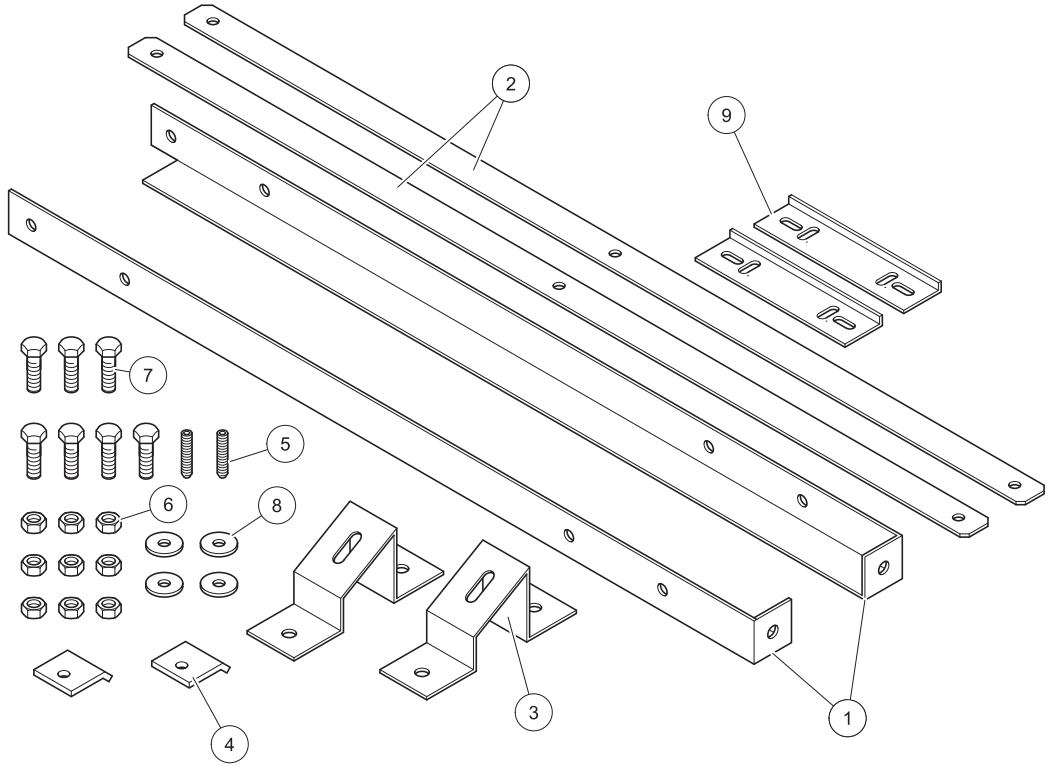
7. FLAT ROOF/GROUND MOUNTING KIT

Collectors can be mounted on a flat roof or on any prepared flat surface using the Flat Roof/Ground mounting kit.

Product Code 3820011 - 2 Collector Kit

Product Code 3820012 - 3 Collector Kit

7.1 Component List



Ref	Description	Qty 2 COLLECTOR KIT	Qty 3 COLLECTOR KIT
1	Upright	4	6
2	Cross Bracing	4	6
3	Collector Bottom Bracket	4	6
4	Bottom clamp	4	6
5	M8 x 25 Grub Screw	4	6
6	M8 Nut	18	27
7	M8 x 25 Hexagon Bolt	14	21
8	M8 Washer	8	12
9	Connecting Plate	2	4

Fig. 7.1a Flat Roof / Ground Mounting Kit Component List

7.2 Angle of Inclination

Note:-
Section 7.2 only applies to flat roof and level ground applications, for pitched roofs the collectors are always at the same angle as the roof pitch.

The inclination of the collectors in relation to the horizontal surface will depend on the season in which the collectors will be used, the type of use intended and the latitude of installation..

It is generally believed that to obtain optimum performance from solar panels the angle of inclination should be equal to the latitude of the location. When this is so the solar panels will directly face the sun at noon on 21st March and 21st September.

This is correct for lower latitudes, however given that the UK has large variations in radiation levels between summer and winter this is not strictly correct. In practice it has been found that optimum performance in Southern England has been achieved by an angle of 35° to the horizontal.

In the unlikely event that peak winter operation (October – March) is required, the inclination should be equal to the latitude of the location, increased by up to 10°, this will encourage absorption when the sun is low over the horizon. In the UK this could result in an angle of 50° - 75°, however it is not practical to install the collector at an angle greater than 60°.

Latitudes for the UK

City	Latitude	City	Latitude
Plymouth	50°	Southamton	51°
London	51.5°	Birmingham	52.5°
Liverpool	53.5	Leeds	54°
Edinburgh	56	Inverness	57.5°
Dublin	53	Faroe	62°

7.3 Collector Orientation

The solar collectors offer maximum energy performance when the glass surface faces directly south. It is recommended not to vary more than 30° from the optimum due south position.

A collector facing east side of south will give better performance in the morning than in the afternoon.

A collector facing west side of south will give better performance in the afternoon than in the morning.

7.4 Dimensions

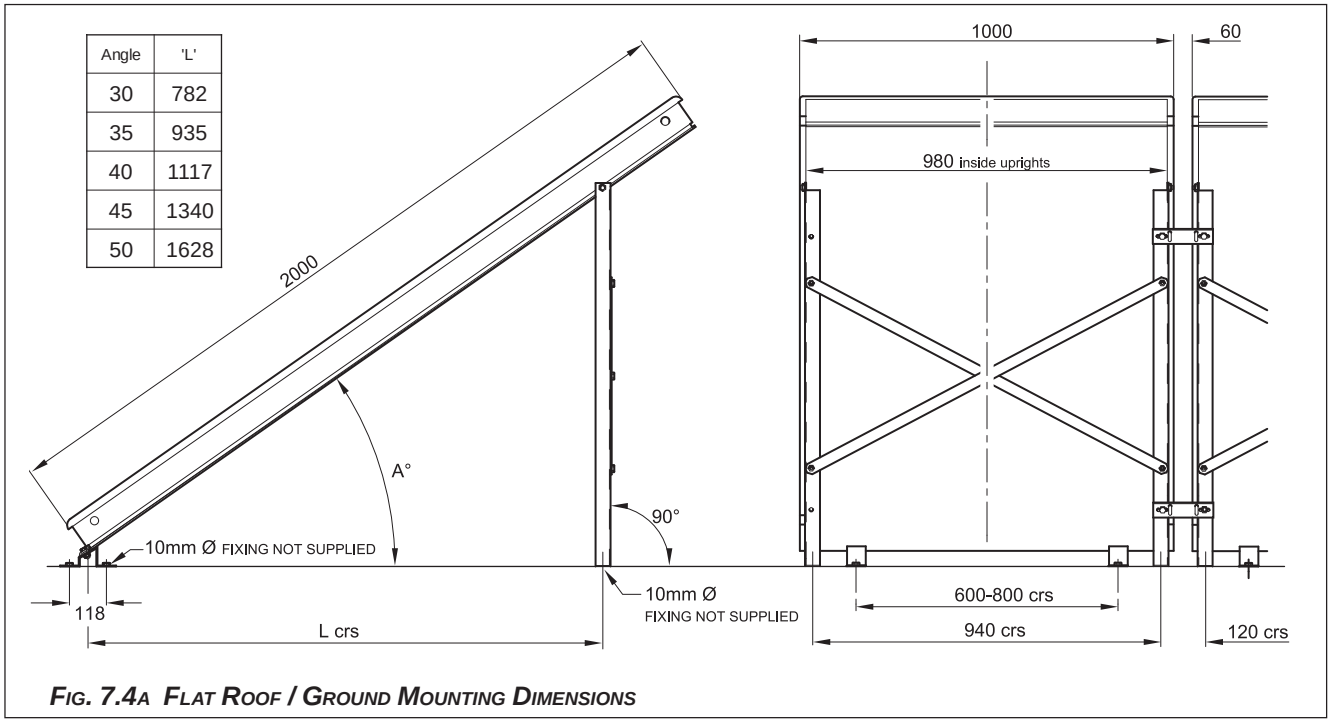


Fig. 7.4a Flat Roof / Ground Mounting Dimensions

7.5 Flat Roof Condition

Prior to installation, the current condition of the roof must be assessed to ensure that it is capable of withstanding the additional weight of the solar collectors and roof mounting system. Where necessary, specialist personnel should be contacted to verify the suitability of the roof structure.

The frame should be fixed to the floor with M10 Bolts (not supplied).

It is essential that the fixing points are 100% waterproof.

7.6 Ground Preparation

When the collectors are to be mounted on the ground a suitable base should be provided. A suggested construction is shown in Fig. 7.5a.

The frame should be fixed to the base with M10 Bolts (not supplied).

On very exposed sites further bracing is recommended.

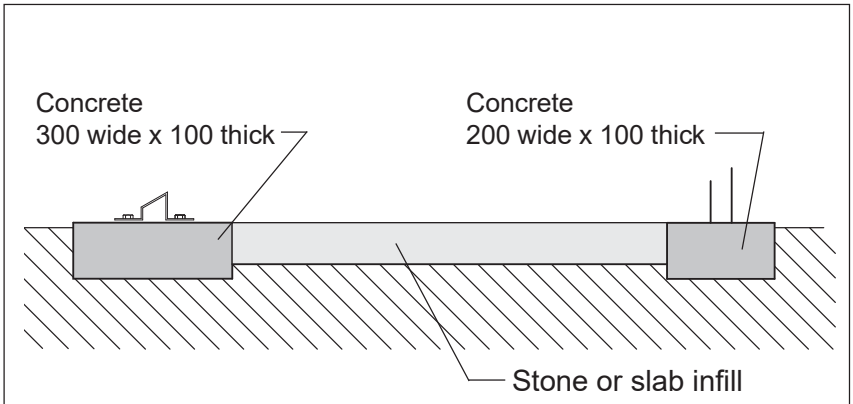


Fig. 7.6a Ground Mounting Base

7.7 Assembly

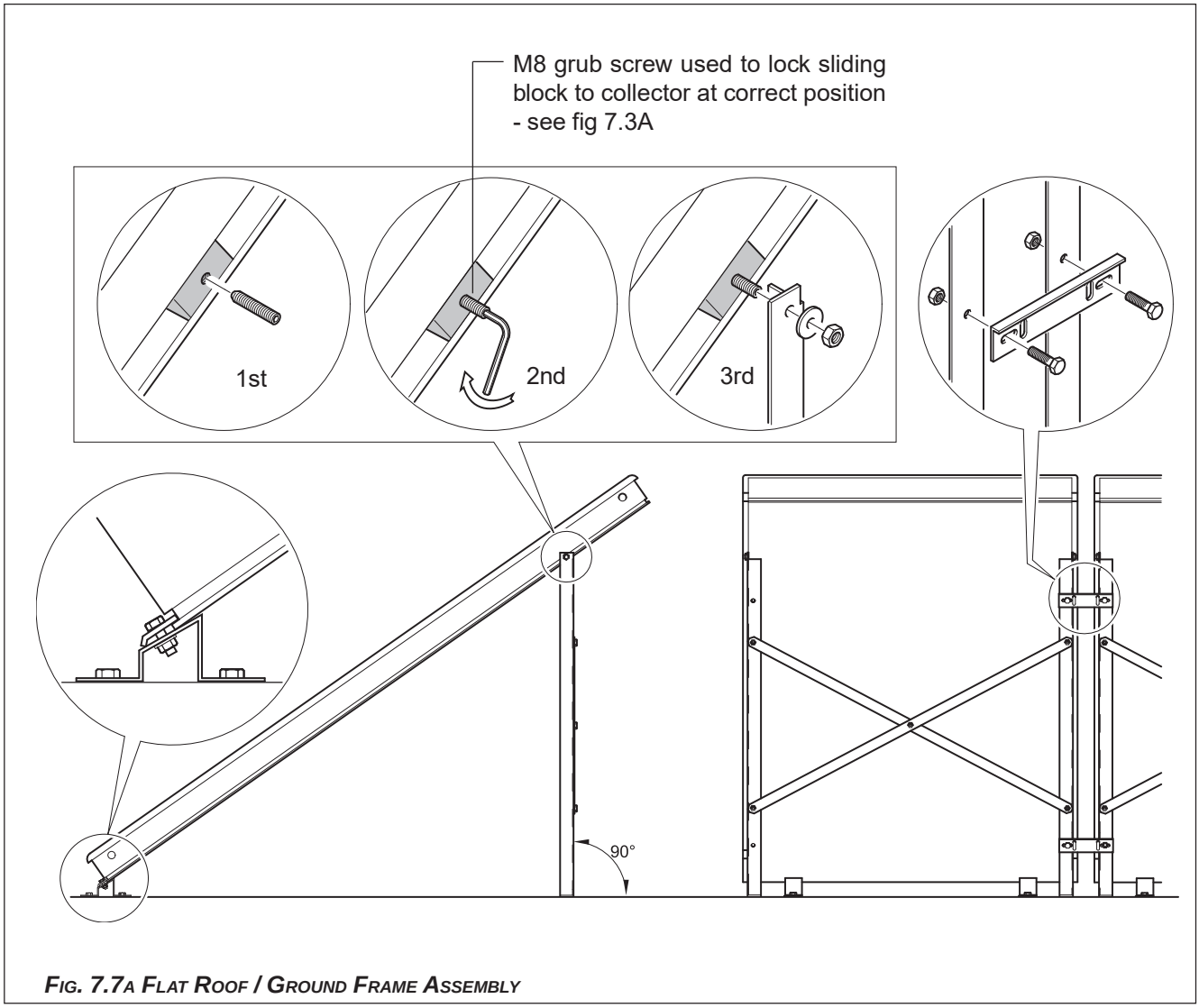


Fig. 7.7a Flat Roof / Ground Frame Assembly

NOTES

TERMS AND CONDITIONS OF GUARANTEE

The SOLARcomfort Collectors are guaranteed for 5 years against manufacturing defect.

Please read these terms and conditions which are in addition to any terms and conditions detailed in this book or any registration card supplied with your appliance.

SOLARcomfort solar thermal systems must only be installed and commissioned by Ariston trained and approved installers. Failure to comply with this requirement will invalidate the warranty.

A charge will be made to the owner of the appliance if:-

1. The reason for any service visit is as a direct result of a failure to install the appliance in accordance with the manufacturer's instructions.

2. Your installer does not complete the necessary commissioning process and procedure as detailed in the Installation and Operating Instruction manuals.

3. Your appliance is not serviced on or before the 12 month anniversary of installation.

4. Our service engineer calls as requested and the failure is a non-manufacturing defect.

Failure to pay an invoice for any such occurrence **will** be assumed by MTS that you accept that your appliance has not been installed correctly and understand that any manufacturer's guarantee has been withdrawn.

On the 12 month anniversary of the appliance installation, you must have it serviced to continue any guarantee offered into the following year. Failure to do so **will** invalidate your guarantee and should an MTS engineer be required to attend and no proof of service documentation is made available, then MTS **will** charge.

If you have a problem with commissioning on installation, please contact our Technical Department on 0870 241 8180.

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