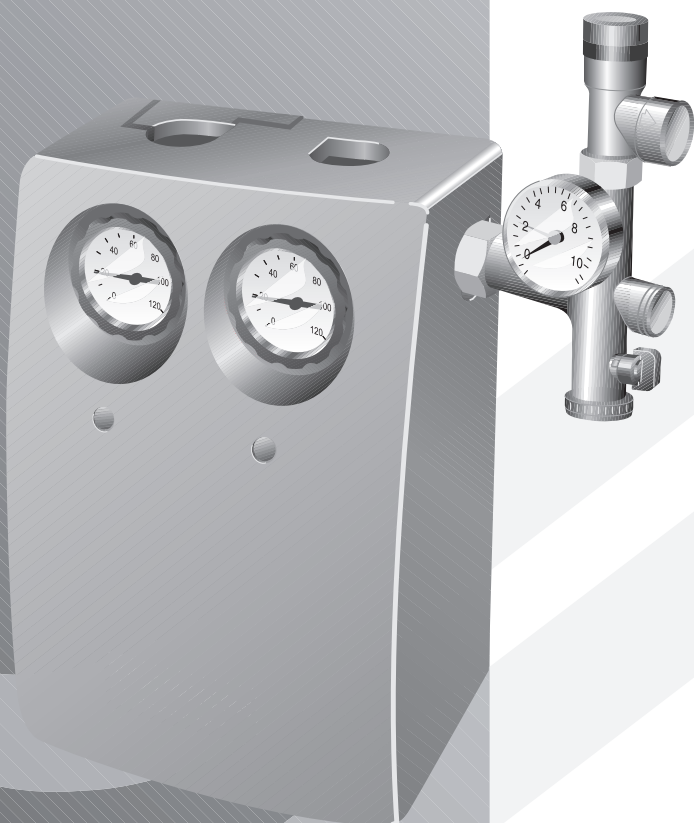


INSTRUCTION MANUAL
INSTALLATION AND SERVICING

AGS 2 SOLAR PUMP STATION

FOR SOLAR DOMESTIC HOT WATER SYSTEMS



UK/IE



This equipment complies with all the fundamental requirements of the relevant standards and guidelines.

Its conformity has been verified. All associated documents and the original Declaration of Conformity are available from the manufacturer.

About this manual

These installation and maintenance instructions contain important information for the safe and competent installation and maintenance of the AGS 2 solar pump station.

These installation and maintenance instructions are designed for specialists, who, due to their technical training and experience, are accustomed to working with solar heating systems and hot water installations. Only carry out these installation steps, if you possess these skills.

- ▶ Hand these installation and maintenance instructions to your customer.
- ▶ Explain to the customer the function and operation of the related devices.

One DHW cylinder and up to nine collectors can be connected to the AGS 2 solar pump station.

Product designation

The AGS 2 solar pump station is always referred to in this document as "solar pump station".

The umbrella term for DHW cylinders, combination cylinders and calorifiers is "solar cylinder".

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1 General information

In this chapter you will learn which technical rules and regulations apply to this installation.



USER NOTE

Observe all standards and guidelines applicable to the installation and operation of this system in your country.

UK		
Electrical connection	Connection of thermal solar heating systems	Installation and equipment of DHW cylinders
Current IEE wiring regulations	<p>EN 12976: Thermal solar heating system and their components (pre-fabricated systems).</p> <p>ENV 12977: Thermal solar heating system and their components (bespoke systems).</p> <p>BS5918: Latest version: Solar heating systems for domestic hot water.</p>	<p>BS5546: 2000 Specification for installation of hot water supplies for domestic purposes, using gas-fired appliances of rated input not exceeding 70 kW.</p> <p>BS6700: 1997 Specification for design, installation, testing and maintenance, of servicing supplying water for domestic use within buildings and their curtilages.</p>

Tab. 1 Technical rules for the installation of thermal solar heating systems (selection) in UK

- 1 VOB – Contract procedures for construction work – part C: General technical conditions of contract for construction services (ATV).
- 2 Terms of invitations to tender for construction services giving special consideration to the construction of living accommodation.

2 Safety

This chapter details the safety instructions in general and the meaning of user notes.

You will find the safety and user notes which specifically refer to the installation immediately following the individual installation steps.

Carefully read the safety instructions before commencing the installation of the solar pump station.

Severe injuries as well as material losses and environmental damage may follow, if you ignore safety instructions.

2.1 Correct use

The purpose of the solar pump station is to operate a solar heating system with type FKC-1S, FKC-1W, FKT-1S and FKT-1W flat collectors.

The solar pump station is exclusively designed for operating solar heating systems filled with propylene glycol:water mixtures (heat transfer fluid). Never use any other heat transfer medium.

The solar pump station must only be operated with approved Worcester controller's such as the TDS10 or FX Controls.

2.2 Notes structure

Two levels are identified by signal terms:



WARNING!

RISK TO LIFE

Identifies possible dangers which might lead to serious injury or death if appropriate care is not taken.



CAUTION!

RISK OF INJURY/ SYSTEM DAMAGE

Identifies potentially dangerous situations, which might lead to mild or slight injuries or to material losses.

Further symbols identifying dangers and user notes:



WARNING!

RISK TO LIFE

from electric shock.



USER NOTE

Tip for the optimum utilisation and setting of the product plus other useful information.

2.3 Safety instructions

- ▶ Please read these instructions carefully before commencing the installation.
- ▶ Solar pump stations should be installed and commissioned by specialist contractors.
- ▶ Before commencing work, familiarise yourself with all component and their handling.



WARNING!

RISK TO LIFE

from electric shock when the solar pump station is open.

- ▶ Before you open the solar pump station:
Isolate the solar pump station by switching the power supply off or by extracting the mains fuse.
- ▶ Safeguard the solar pump station against unintentional re-connection.



WARNING!

RISK OF SCALDING

at the draw-off points and pipework, when water temperatures rise above 60 °C.

- ▶ It is recommended that a DHW mixing valve is installed to guard against scalding.



CAUTION!

RISK OF INJURY

Injury and operating faults can result from making changes to the system construction.

- ▶ Never change the system construction.



CAUTION!

SYSTEM DAMAGE

through plastic pipes, (e.g. polyethylene pipes). These materials are not able to withstand the temperatures, which can occur in solar heating systems, i.e. up to 150 °C.

- ▶ In solar heating systems, use only pipes and fittings made from copper, brass, bronze brass or stainless steel.



CAUTION!

SYSTEM DAMAGE

through freezing water or evaporation inside the solar heating circuit during commissioning of the system.

- ▶ Only commission the solar heating system, when the sun does not directly radiate onto the collectors, i.e. only when it is very cloudy, early in the morning, in the evening or when the collectors are covered up. The solar heating system should also not be commissioned when there is a risk of frost.

3 Product description

The main components of the solar pump station are:

- Two ball valves (Fig. 1, **Item 2** and **4**) with integral thermometers and display for checking actual values at the solar pump station.
- A safety assembly (Fig. 1, **Item 5**, separate delivery unit), which protects the solar heating circuit. The safety valve and pressure gauge (Fig. 1, **Item 6**) are integrated in the safety assembly.
- One non-flow valve in both feed and return prevents the possibility of gravity circulation in the solar heating circuit.
- A circulation pump (Fig. 1, **Item 9**).
- A flow limiter with fill & drain valve and shut-off valve (Fig. 1, **Item 10**).

The heat transfer fluid is circulated by the circulation pump integrated in the solar pump station (Fig. 1, **Item 9**).

The solar pump station is prepared for the connection of an external control device.

The control device handles the control of the solar heating circuit. The circulation pump is switched on if the set temperature difference between the solar storage unit and the collectors is exceeded. The circulation pump is switched off if the temperature difference is too small or if the maximum temperature in the storage cylinder or the collector is exceeded.

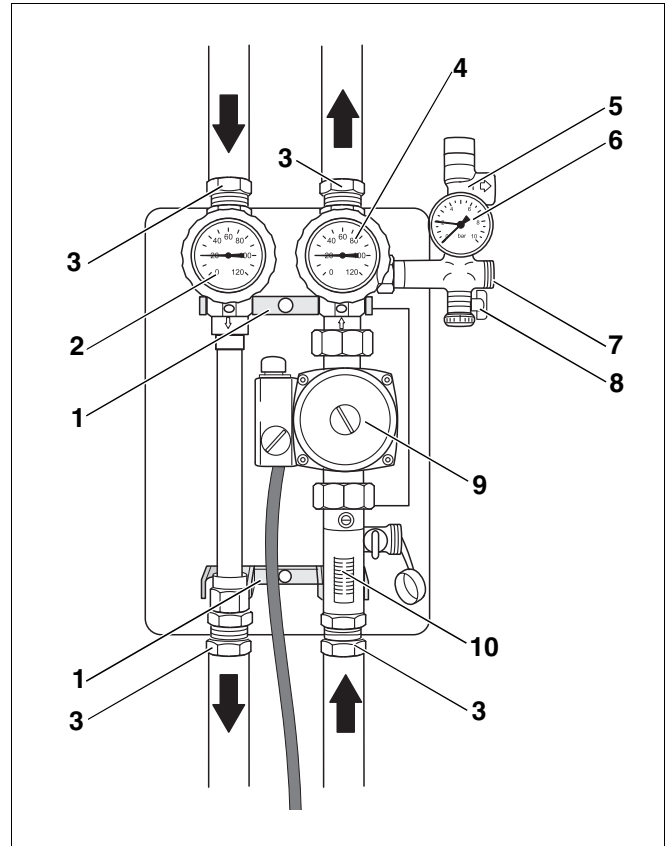


Fig. 1 Solar pump station for one consumer)

Item 1: Wall mounting

Item 2: L.h. ball valve with integral thermometer and non-flow valve

Item 3: Compression fitting (to be fitted on site)

Item 4: R.h. ball valve with integral thermometer (return)

Item 5: Safety assembly (separate delivery unit)

Item 6: Pressure gauge

Item 7: Expansion vessel connection

Item 8: Fill & drain valve

Item 9: Circulation pump (adjustable)

Item 10: Flow limiter with fill & drain valve and shut-off valve

4 Specifications

	Unit	AGS 2
Permissible flow temperature	°C	120
Permissible operating pressure	bar	3
Test pressure	bar	9
Mains voltage		230V AC, 50 – 60 Hz
Maximum current consumption by each circulation pump	A	0,39
Dimensions (Height/Width/Depth)	mm	375/250/190
Flow and return connections (compression fittings)	mm	22

Tab. 2 Solar pump station specifications

5 Scope of supply

- ▶ Check before commencing the installation whether all listed components have been delivered.

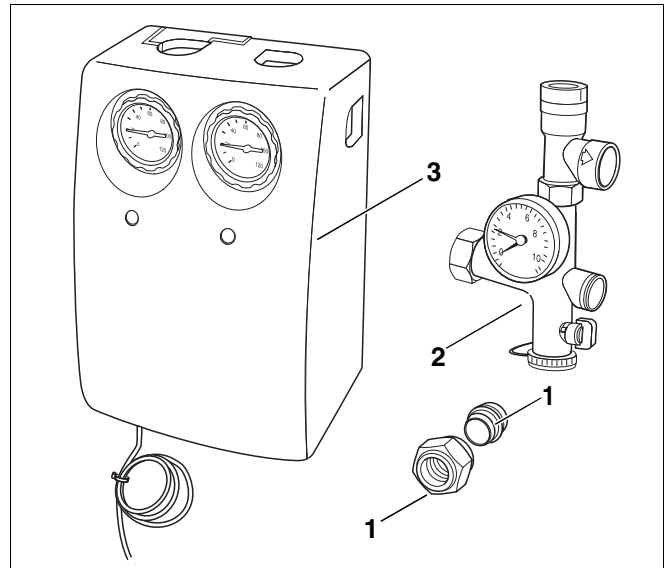


Fig. 2 Solar pump station scope of supply

Item 1: Compression fitting (4x)

Item 2: Safety assembly, comprising: Safety valve, pressure gauge and fill & drain valve (1x)

Item 3: Solar pump station (1x)

6 Installing pipework

This chapter details how to install the pipework and how to integrate the solar pump station into an existing system.

6.1 General information regarding pipework

The collectors (Fig. 3, **Item 3**), the solar pump station (Fig. 3, **Item 4**) and the solar cylinder (Fig. 3, **Item 1**) are interconnected using suitable pipework.



CAUTION!

SYSTEM DAMAGE

through plastic pipes, (e.g. polyethylene pipes). These materials are not able to withstand the temperatures which can occur in solar heating systems, i.e. up to 150 °C.

► **CAUTION!**

In solar heating systems, use only pipes and fittings made from copper, brass, bronze brass or stainless steel.

- While the pipework is being installed you should extend the collector sensor lead (Fig. 3, **Item 2**) as far as the solar pump station (control). Make sure that the cross-section of the lead conforms to the specifications in the controller instructions.

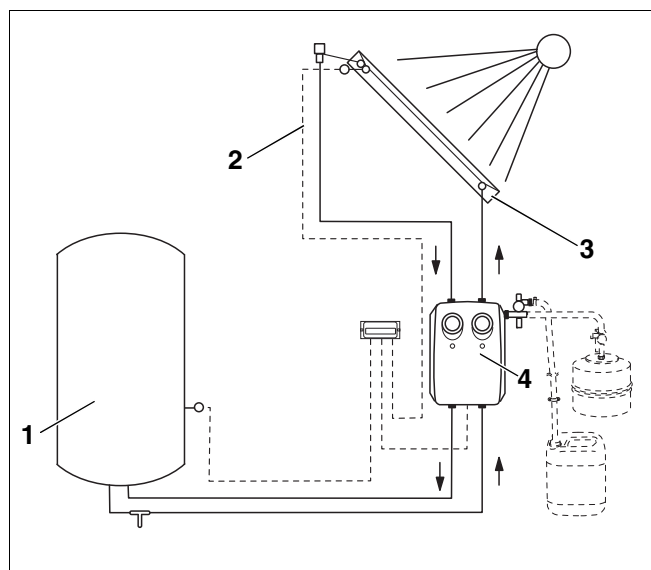


Fig. 3 Solar heating system pipework

- Item 1:** Solar cylinder (consumer)
Item 2: Collector sensor lead
Item 3: Collectors
Item 4: Solar pump station

6.1.1 Static system head



USER NOTE

The height difference between the highest point in the pipework (collector) and the solar pump station may, for the components supplied, be a maximum of 15 m (the so-called "static height").

If the static height is greater than 15 m:

- Exchange the standard 3 bar safety valve in the solar pump station for a 6 bar safety valve.
- Ensure that all components, and in particular the expansion vessel, are suitable for a system pressure of 6 bar.

6.1.2 Connecting the pipework

▶ CAUTION!

Only use hard solder when soldering copper pipes in solar heating systems.

All connections and joints must be resistant to temperatures of up to 150 °C and resistant to glycol.



USER NOTE

We recommend you select the pipework in accordance with table (Tab. 3). If the system provides additional pressure loss (bends, valves, etc.), you should, perhaps, consider selecting pipe with larger diameter.



USER NOTE

If threaded pipe connections are to be sealed with hemp, you should use a thread sealing paste which can withstand temperatures up to 150 °C (e. g. NeoFermil universal).

Number of collectors	Single pipe length			
	up to 6m	up to 15m	up to 20m	up to 25m
to 5	Ø 15 mm (DN12)		Ø 22 mm (DN15)	Ø 22 mm (DN20)
to 9	Ø 22mm (DN15)	Ø 22 mm (DN20)	Ø 28 mm (DN25)	Ø 28 mm (DN25)

Tab. 3 Sizing the pipework

6.2 Routing pipework

6.2.1 Earthing pipework

Pipework between the collector array and the solar cylinder must be bonded to avoid electrical potential differences. This work must be carried out by an authorised specialist.

- ▶ Fit one earth clamp each on the flow and one on the return pipe (any position).
- ▶ Connect the earth clamps to the earthing system of the property using an earth bonding cable of min. 6 mm² diameter.

6.2.2 Venting the pipework

- ▶ If you intend venting a solar heating system with an automatic air vent valve (Fig. 4, **Item 1**) at the highest point of the system, run your pipework rising to the air vent valve. Any change of direction downwards requires an additional air-vent valve (use all metal vents; temperature resistance up to 150 °C).

6.2.3 Insulating pipework

- ▶ On the outside, insulate pipework with UV and high temperature resistant (150 °C) material.
- ▶ On the inside of buildings, insulate pipework with high temperature resistant (150 °C) material.



USER NOTE

Mark the flow and return pipes on both ends to avoid interchanging them.

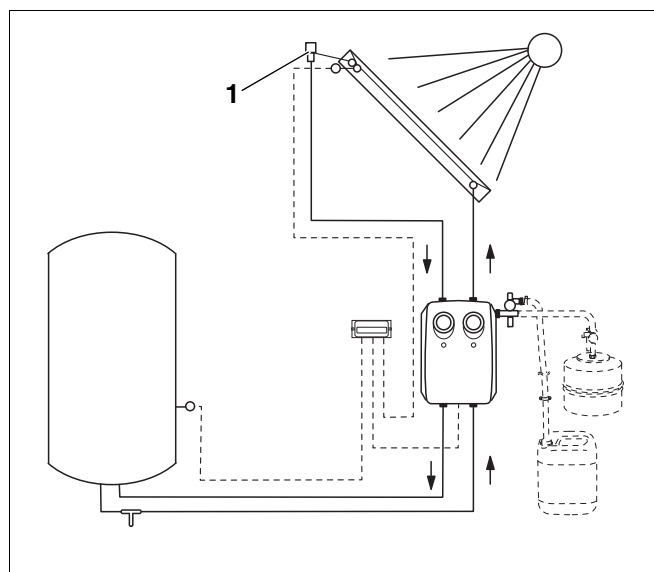


Fig. 4 Position of the automatic air vent valve

Item 1: Automatic air vent valve (available as option)

7 Installing the solar pump station

This chapter describes how to install the solar pump station.

- Make yourself familiar with the on-site conditions and local regulations before commencing the installation.

7.1 Tips on layout of the installation space

Install the solar pump station and the controller as close as possible to the solar storage cylinder to make the temperature sensors easier to connect.

We recommend you install the top wall mounting bracket (Fig. 5, **Item 2**) at a height of approx. 1.6 – 1.7 m.

When the solar pump station is installed alongside the solar storage cylinder the space required for the expansion vessel should be taken into account.

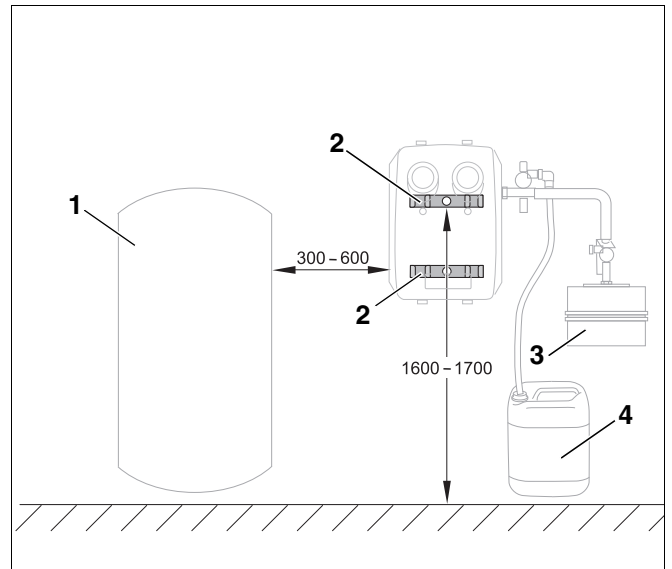


Fig. 5 Recommended positioning (measurements in mm)

Item 1: Solar cylinder (consumer)

Item 2: Wall mounting

Item 3: Expansion vessel

Item 4: Canister

7.2 Notes regarding electrical connections

The electrical connection must be made by a qualified electrician. Local regulations must be observed.



SYSTEM DAMAGE

through the circulation pump running dry.

CAUTION!

- ▶ Ensure that you operate the circulation pump only after the pipework has been filled, otherwise the circulation pump can be damaged.

7.3 Installing the wall bracket and solar pump station

You need to open the solar pump station before you can install the wall bracket (Fig. 6, **Item 4**).

- ▶ Remove the thermal insulation from the front (Fig. 6, **Item 1**).
- ▶ Remove both the thermal insulation shells (Fig. 6, **Item 2**) from the left and right at the rear.
- ▶ Unclip the top and bottom of the two pump legs on the flow and return (Fig. 6, **Item 3**) from the wall bracket (Fig. 6, **Item 4**).
- ▶ Drill an 8 mm hole for each wall bracket (Fig. 6, **Item 4**) at a distance of 262 mm from each other and screw the wall bracket on.
- ▶ Click the two pump legs on the flow and return (Fig. 6, **Item 3**) back into place in the wall bracket.
- ▶ Push the two thermal insulation shells (Fig. 6, **Item 2**) on the left and right back in.

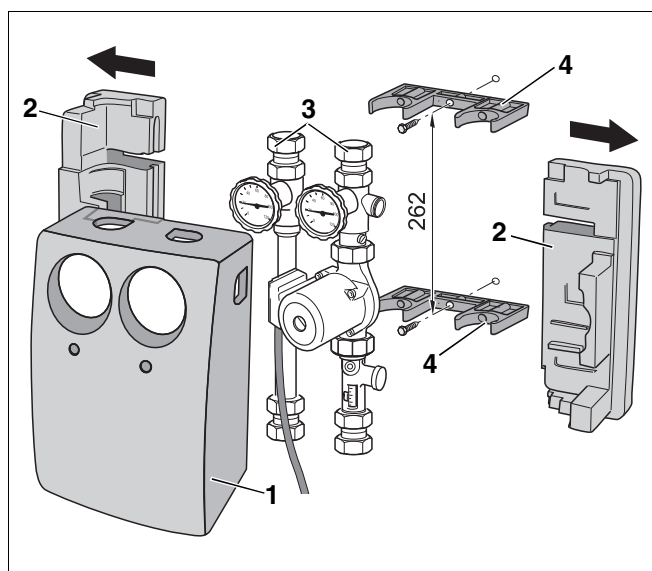


Fig. 6 Remove thermal insulation from the front

Item 1: Front thermal insulation

Item 2: Rear thermal insulation

Item 3: Pump legs (flow and return)

Item 4: Wall bracket

7.4 Installing the safety assembly

- ▶ Install the safety assembly with the gasket enclosed (21 x 30 x 2) (Fig. 7, **Item 1**) on the solar pump station return.

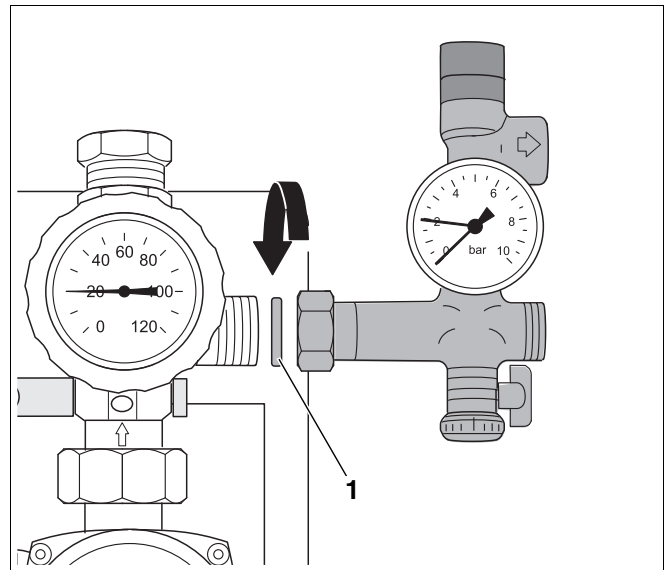


Fig. 7 Install the safety assembly

Item 1: Gasket

7.5 Connecting the expansion vessel



USER NOTE

A 25 litre expansion vessel (7739 300 119) (Fig. 8, **Item 2**) is available as an accessory.

- ▶ Connect the expansion vessel (Fig. 8, **Item 2**) into the return of the safety assembly (Fig. 8, **Item 1**) of the solar heating station.
- ▶ Install the expansion vessel (Fig. 8, **Item 2**) with suitable fixing material.
- ▶ A mounting unit for the expansion vessel (7739 300 331) is also available.

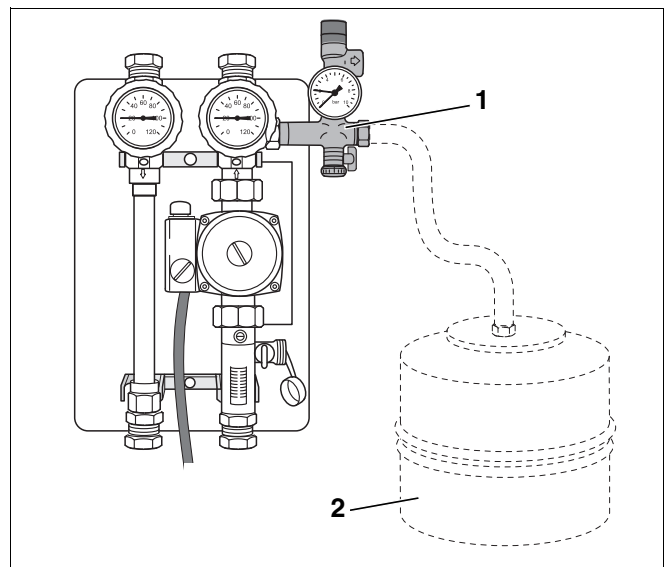


Fig. 8 Connecting the expansion vessel

Item 1: Safety assembly

Item 2: Expansion vessel

7.6 Connecting pipework

- ▶ Connect the pipes to the collectors and to the cylinder via compression fittings (Fig. 9, **Item 1**). Prevent components from twisting.
- ▶ Run a pipe (Fig. 9, **Item 2**) from the exit opening in the safety valve to the empty glycol container or other suitable high temperature resistant container (Fig. 9, **Item 4**) and secure it.

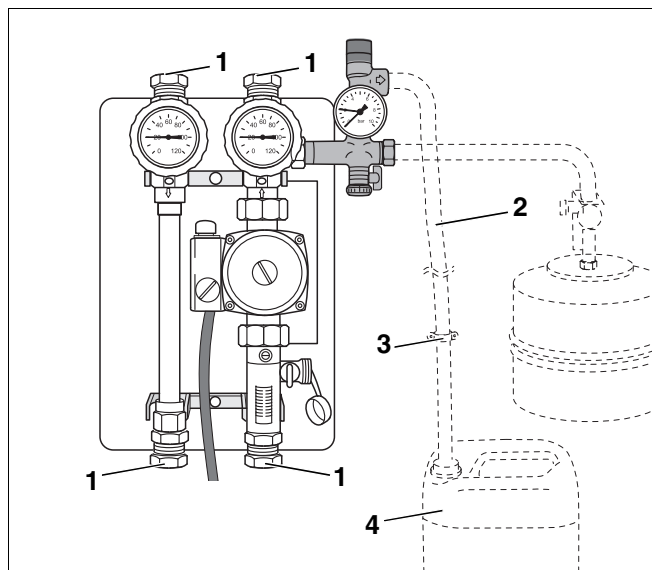


Fig. 9 Solar pump station connections

Item 1: Compression fittings

Item 2: Safety valve/ container pipe (to be fitted on site)

Item 3: Safety valve pipe clamp

Item 4: Container (empty glycol container)

7.6.1 Installing the fill & drain valve

- ▶ Install a device for draining the solar heating system (tee piece with fill & drain valve, Fig. 10, **Item 1**) into the return at the lowest point in the solar heating system.

7.6.2 Connecting the solar cylinder

- ▶ For detailed installation instructions and further details, see the installation instructions of the solar cylinder.

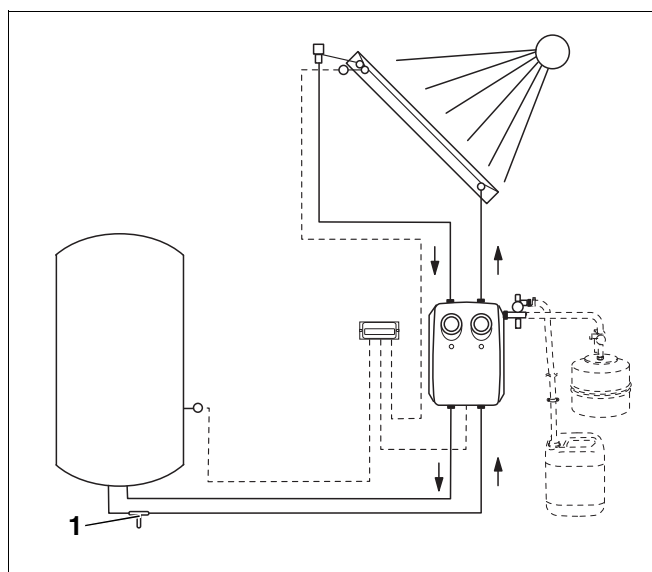


Fig. 10 Position of the fill & drain valve

Item 1: Fill & drain valve

8 Commissioning the solar pump station



CAUTION!

SYSTEM DAMAGE

caused by evaporation inside the solar heating circuit during commissioning of the system.

- ▶ Only commission the solar heating system when the sun is not radiating directly onto the collectors, i.e. only when it is very cloudy, early in the morning, in the evening or when the collectors are covered up. The solar heating system should also not be commissioned when there is a risk of frost.

The collectors must only be operated with Tyfocor L (heat transfer fluid).

The heat transfer fluid is pre-mixed and ready to use. It safeguards reliable operation within the stated temperature range, protects against freezing and ensures high vapour reliability.



CAUTION!

RISK OF INJURY

through contact with heat transfer fluid.

- ▶ Always wear protective gloves and goggles when handling heat transfer fluid.
- ▶ Wash with soap and water following any skin contact with heat transfer fluid.
- ▶ If the heat transfer fluid comes into contact with eyes, rinse immediately with copious quantities of running water.

The liquid is non-corrosive and biodegradable. Further details regarding the heat transfer fluid can be requested from the manufacturer.

Frost protection



CAUTION!

SYSTEM DAMAGE

through freezing, when the heat transfer fluid is not adequately protected from frost.

- ▶ Check at least annually whether frost protection down to at least -25 °C is ensured.

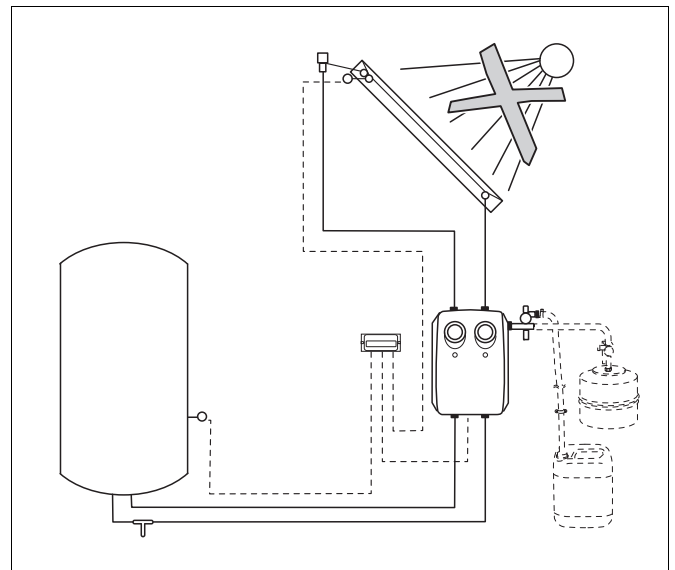


Fig. 11 Commissioning the solar heating system

	FK240
Heat transfer fluid	Tyfocor L
Temperature range	-32 to +170 °C

Tab. 4 Heat transfer fluid temperature range

8.1 Flushing and filling the solar heating system with heat transfer fluid

8.1.1 Opening the air vent valve (accessory)

Function of the shut-off screw and the weather protection cap

The solar heating system is vented through the opened shut-off screw (Fig. 12, **Item 3**). The weather protection cap must always be positioned over the shut-off screw to prevent moisture entering through the opened shut-off screw into the air vent valve (Fig. 12, **Item 4**).

- ▶ Open the air vent valve by opening the ball valve (Fig. 12, **Item 2**).
- ▶ Open the air vent valve by unscrewing the shut-off screw (Fig. 12, **Item 3**) by one full turn.

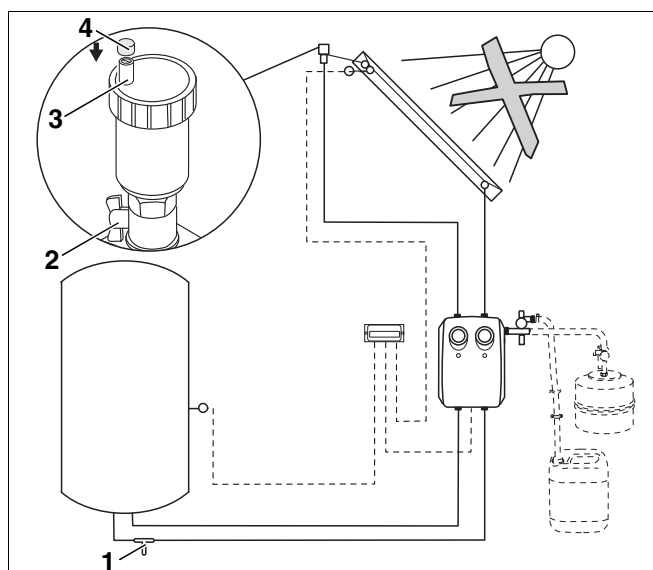


Fig. 12 Open air vent valve

Item 1: Fill & drain valve

Item 2: Ball valve

Item 3: Shut-off valve

Item 4: Weather protection cap

8.1.2 Flushing and filling the pipework

Before the system is commissioned the pipework must be flushed with heat transfer fluid to remove any contaminants.

- ▶ Connect the flushing pipes to the fill & drain valve for the safety assembly (Fig. 13, **Item 5**) and to the fill & drain valve on the flow limiter (Fig. 13, **Item 6**).
- ▶ Open the fill & drain valves
- ▶ Turn the slot of the adjusting screw (Fig. 13, **Item 4**) in the return vertically to open the non-flow valve.
- ▶ Turn the left ball valve with integral thermometer in the flow (Fig. 13, **Item 3**) in the direction indicated by the arrow (to a 45° position) to open the non-flow valve.
- ▶ Make sure that the right ball valve with integral thermometer in the return (Fig. 13, **Item 7**) is open. The dot on the thermometer must be at the top.
- ▶ Turn the slot of the adjusting screw (Fig. 13, **Item 2**) in the return vertically to open the flow limiter (Fig. 13, **Item 1**).

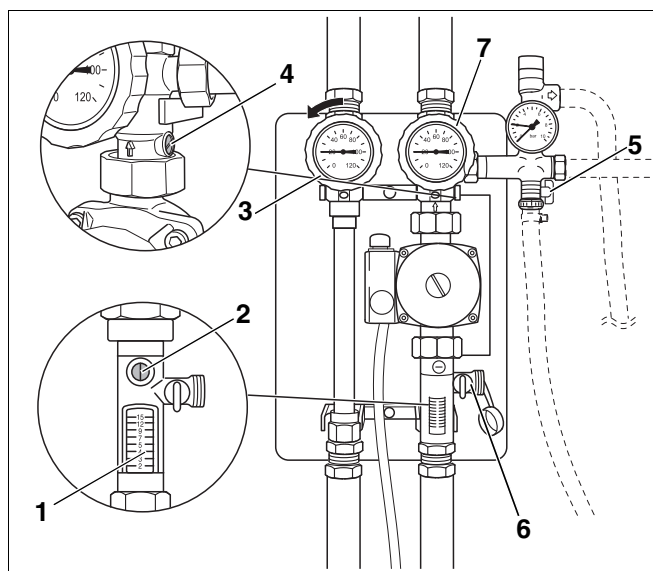


Fig. 13 Preparing for flushing and filling

Item 1: Flow limiter

Item 2: Flow limiter adjusting screw

Item 3: Left ball valve with integral thermometer and non-flow valve (flow)

Item 4: Non-flow valve adjusting screw (return)

Item 5: Fill & drain valve for safety assembly

Item 6: Fill & drain valve on flow limiter

Item 7: R.h. ball valve with integral thermometer (return)



PLEASE NOTE:

- ▶ The non-flow valves must never be opened except during the flushing and filling process.

- ▶ Flush the pipework with heat transfer fluid. To do this, you may use electric pumps, manual pumps or attachments to power drills, which can produce a pressure of at least 2 bar.
- ▶ After flushing the circulation pump briefly, close the right hand ball valve with integral thermometer in the return (Fig. 13, **Item 7**, page 18) in order to flush the pipework in the circulation pump's direction of flow.
- ▶ Close the fill & drain valve on the flow limiter (Fig. 13, **Item 6**, page 18) and open the ball valve with integral thermometer in the return (Fig. 13, **Item 7**, page 18). The dot on the thermometer must be at the top.
- ▶ Fill the solar heating system until the pressure comes up to 1.5 - 2.2 bar.



PLEASE NOTE:

For information on venting the solar heating system, please see Chapter 8.5 "Ensuring the solar heating system is free from air bubbles", page 20.

- ▶ Close the fill & drain valve for the safety assembly.

8.2 Check pressure in the pipework

After flushing and filling the solar heating system with heat transfer fluid you must check the pressure.

Checking water connections



USER NOTE

When checking the pressure, ensure that the non-flow valves, the flow limiter, the ball valves with integral thermometer and any other shut-off devices are open.

- ▶ Pressure test the system. Observe the maximum pressure ratings of all components concerned.
- ▶ Check the solar heating system for leaks.
- ▶ Close the fill & drain valve on the safety assembly.

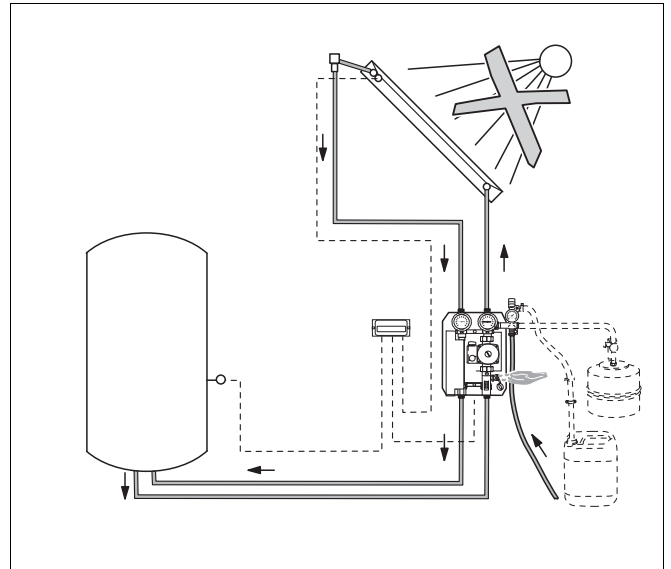


Fig. 14 Only flush the solar heating system when the sun is not shining directly onto the collectors.



USER NOTE

To avoid heat losses, close the non-flow valves again after the pressure test (see Chapter 8.7 "Checking and adjusting the flow rate", page 22).

8.3 Cleaning the air vent valve (accessory)

- ▶ Close the ball valve (Fig. 15, **Item 4**).
- ▶ Unscrew and clean the automatic air vent valve (Fig. 15, **Item 3**).
- ▶ Refit the cleaned components.
- ▶ Refit the automatic air vent valve.
- ▶ Open the ball valve (Fig. 15, **Item 4**).

8.4 Matching the inlet pressure of the expansion vessel

The expansion vessel is pre charged to a set pressure, however, the expansion vessel charge pressure is calculated from the static system head (a difference of 1 m represents 0.1 bar) plus 0.4 bar. However, set the pressure at least to 1.2 bar.

- ▶ Set the inlet pressure when the system is not under load (without liquid pressure), to make the maximum useable volume available.
- ▶ Increase the pressure correspondingly, if the calculated inlet pressure is higher than the factory-set inlet pressure (1.5 bar).

The static height may be a maximum of 15 m (see Chapter 6.1 "General information regarding pipework", page 10).

8.5 Ensuring the solar heating system is free from air bubbles

- ▶ When using an automatic air vent valve (accessory), vent the solar heating system by opening the ball valve (Fig. 15, **Item 4**).
- ▶ Switch on the power supply to the solar pump station and, if relevant, to the external control device.
- ▶ Manually switch the circulation pump ON and OFF via the control unit.

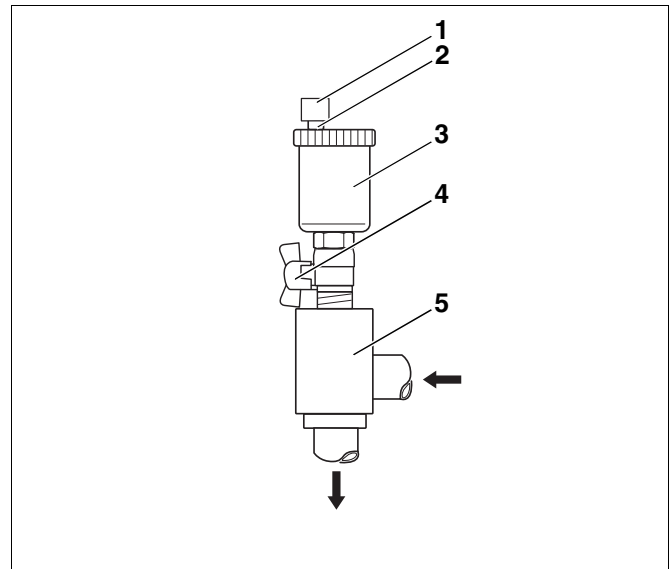


Fig. 15 Automatic air vent valve

Item 1: Weather cap for shut-off screw

Item 2: Shut-off valve

Item 3: Automatic air vent

Item 4: Ball valve

Item 5: Air trap

- ▶ During the changeovers, check the pressure gauge indication (black needle, Fig. 16, **Item 1**) at the safety assembly.



USER NOTE

The solar heating system contains air and must be vented more thoroughly, if the black needle of the pressure gauge (Fig. 16, **Item 1**) indicates pressure fluctuations when the circulation pump is switched ON and off.

The viscosity of the heat transfer fluid makes air bubbles substantially more resilient than those in pure water. Therefore, close the air vent valve only when the venting process has been completed (circulation pump operation for several hours).

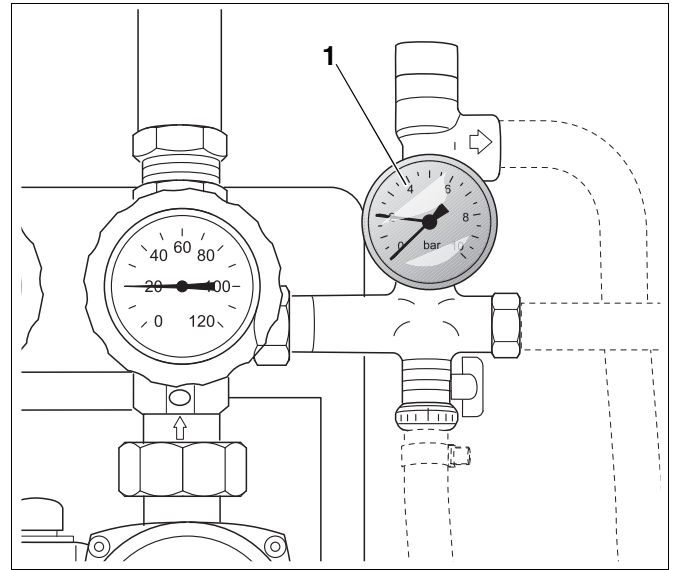


Fig. 16 Safety assembly with pressure gauge

Item 1: Pressure gauge

8.6 Setting the system pressure

During commissioning, the system pressure should be 0.7 bar above the static pressure (1 metre height differential equals 0.1 bar).

However, it must be at least 1.5 bar and no higher than 2.2 bar.

- ▶ Determine the system pressure when the system is cold (20 °C).
- ▶ If the pressure is too low you should pump additional heat transfer fluid; the fill & drain valve for the safety assembly needs to be opened for this purpose.
- ▶ Close the ball valve (Fig. 17, **Item 1**) of the air vent valve after the venting process has been completed.

When heat transfer fluid evaporates in the collectors, pressure equilibrium will only be obtained via the expansion vessel if the air vent valve has been closed.



USER NOTE

Flush the filling pump with tap water after the solar heating system has been filled.

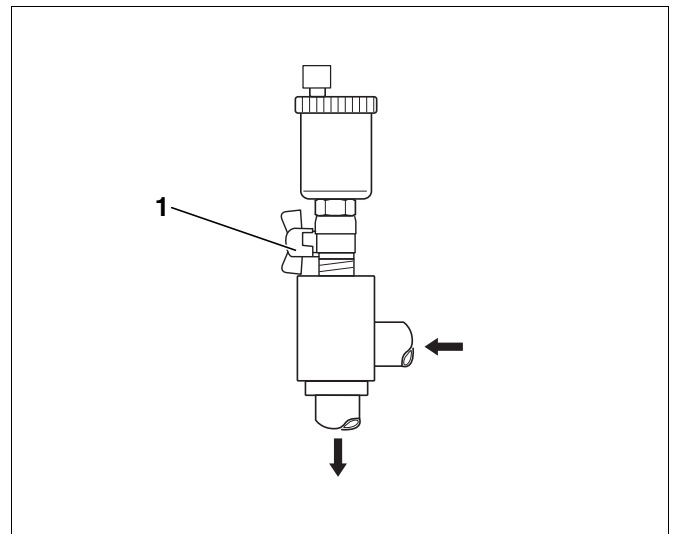


Fig. 17 Automatic air vent valve

Item 1: Ball valve

8.7 Checking and adjusting the flow rate

Adjust the flow rate when the system is cold (20 °C).

- The flow rate during commissioning needs to be adjusted if the control device is not equipped with speed regulation.
- ▶ Turn the slot of the adjusting screw (Fig. 18, **Item 5**) in the return horizontally to close the non-flow valve.
- ▶ Turn the l.h. ball valve with integral thermometer in the flow (Fig. 18, **Item 4**) as far as it will go in the direction indicated by the arrow to close the non-flow valve.
- ▶ Turn the slot of the adjusting screw (Fig. 18, **Item 2**) in the return vertically to open the flow limiter (Fig. 18, **Item 6**).
- ▶ Select "Manual" operating mode on the control device (see service instructions for control device).

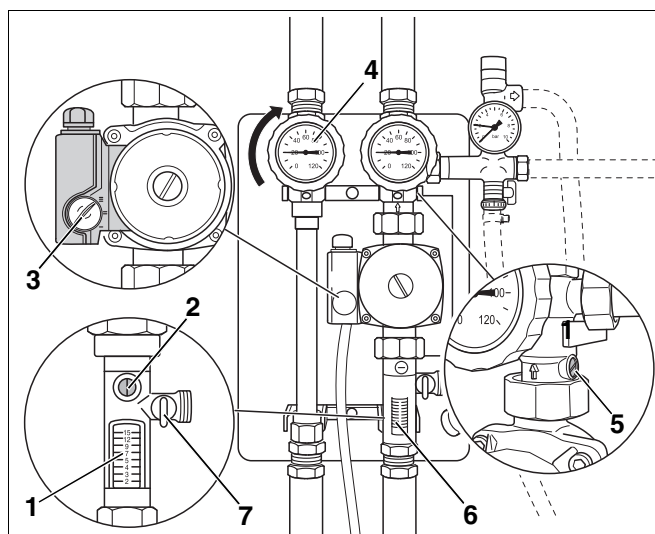


Fig. 18 Adjust the flow rate

Item 1: Flow limiter sight glass

Item 2: Flow limiter adjusting screw

Item 3: Circulation pump step switch

Item 4: L.h. ball valve with integral thermometer and gravity brake (flow)

Item 5: Non-flow valve adjusting screw (return)

Item 6: Flow limiter

Item 7: Flow limiter fill & drain valve

- ▶ Depending on the number of installed collectors, take the required flow rate from table (Tab. 5).
- ▶ Check the flow rate through the flow limiter sight glass (Fig. 18, **Item 1**).
- ▶ To set the flow rate in advance, adjust the circulation pump step switch (Fig. 18, **Item 3**) so that the required flow rate is achieved or exceeded with the lowest possible step.



USER NOTE

Check all the shut-off devices, the permissible pipe length and dimensions (see Chapter 6.2 "Routing pipework", page 12) if the stipulated flow rate cannot be achieved with the highest circulation pump speed. If necessary use a stronger pump.

The flow limiter adjusting screw (Fig. 18, **Item 2**, page 22) is used to fine-tune the flow rate.

- ▶ Close the adjusting screw of the flow limiter (Fig. 18, **Item 2**, page 22) with a screw driver, until the edge of the float in the sight glass indicates the recommended flow rate.

Flow rate (when system is cold)	
Collectors	l/min
2	approx. 2
3	approx. 3
4	approx. 4
5	approx. 5
6	approx. 6
7	approx. 7
8	approx. 8
9	approx. 9

Tab. 5 Overview of – flow rate

8.8 Installation of the thermal insulation

- ▶ Position the front thermal insulation (Fig. 19, **Item 1**) on the pump legs (Fig. 19, **Item 2**).
- ▶ Press the front thermal insulation (Fig. 19, **Item 1**) against the rear thermal insulation shell (Fig. 19, **Item 3**).

8.9 Notes regarding the operation of the solar pump station

The solar pump station is operated by means of a control device connected externally. Therefore, observe the documentation supplied regarding functions and the operation.

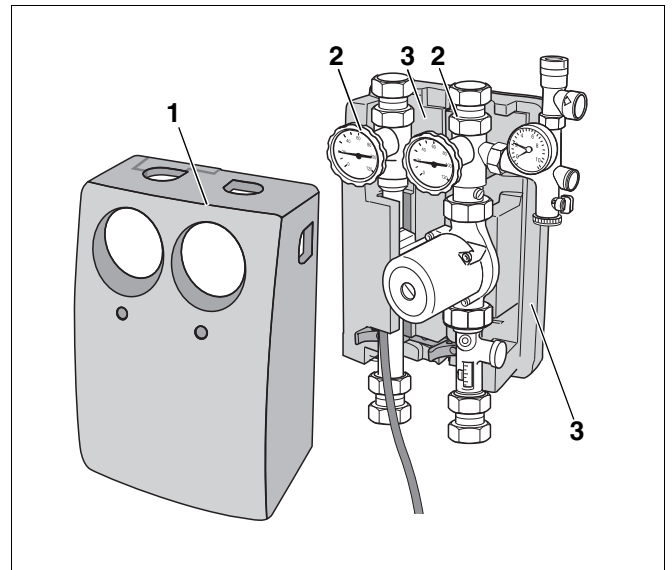


Fig. 19 Installing thermal insulation at the front

Item 1: Front thermal insulation

Item 2: Pump legs (flow and return)

Item 3: Rear thermal insulation shells

9 Commissioning, inspection and maintenance reports

The inspection and maintenance reports provide an overview of the required inspection and maintenance work for the AGS 2 solar heating system.

We recommend you carry out a first inspection or maintenance after approx. 500 hours.

Offer your client an inspection or maintenance contract with an interval of 2 – 3 years.

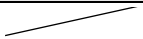
- ▶ Complete the report and tick all work carried out.
- ▶ Use the report also as copy template for further inspections and maintenance events.

Operator: _____

System location: _____

Commissioning, inspection and maintenance work	Page	Initial start-up	Inspection/maintenance		
			1.	2.	3.
Date					
General commissioning					
1. Flow and return pipes installed and earthed?	12	<input type="checkbox"/>			
2. Solar heating system filled with heat transfer fluid?	18	<input type="checkbox"/>			
3. Pressure testing carried out on pipework?	19	<input type="checkbox"/>			
4. Air vent valves closed?	20	<input type="checkbox"/>			
5. Expansion vessel charge pressure tested and entered?	20	_____ bar			
6. Solar heating system checked to be free from air bubbles?	20	<input type="checkbox"/>			
7. Frost protection to _____ °C tested and analysed? Frost protection safeguarded until _____ (month/year) (Check frost protection every two years)		_____ °C	_____ °C	_____ °C	_____ °C
Solar heating circuit					
1. Test the system pressure in a cold state and enter into the report. System temperature at the return thermometer?	21	_____ bar _____ °C	_____ bar _____ °C	_____ bar _____ °C	_____ bar _____ °C
2. Volumetric flow (flow rate) checked when the system is cold and recorded? Circulation pump adjustment (1/2/3)?	22	_____ l/min _____	_____ l/min _____	_____ l/min _____	_____ l/min _____
3. Non-flow valves ready to operate (closed)?	22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Thermostatic hot water mixing valve functioning (if installed)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collector array					
1. Visual inspection of the collector array carried out?	See installation instructions for the collector installation system	<input type="checkbox"/>	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹
2. Collector sensor correctly positioned and inserted into the sensor well up to the end stop and fully threaded in?		<input type="checkbox"/>	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹
3. Visual inspection of the installation system carried out?		<input type="checkbox"/>	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹
4. Visual inspection for leaks carried out on the joints between the installation system and the roof cover?		<input type="checkbox"/>	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹
5. Visual inspection of the pipework insulation carried out?		<input type="checkbox"/>	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹	<input type="checkbox"/> ¹

¹ Where required.

Commissioning, inspection and maintenance work	Page	Initial start-up	Inspection/maintenance		
			1.	2.	3.
Solar cylinder					
1. Solar cylinder maintenance carried out (see cylinder installation instructions)?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Control					
2. Pump function tested in positions (ON/OFF/Auto)?	See service instructions for the control device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Checked temperature display of all temperature sensors (resistance)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Temperature sensors correctly positioned, insulated and connected?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Maximum cylinder temperature for solar cylinder 1 checked and recorded?		_____ °C	_____ °C	_____ °C	_____ °C
7. Re-heating functions OK?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Is the required set temperature (reheating) achieved by the control unit?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments					
The solar heating system was installed and commissioned or inspected and maintained in accordance with these instructions.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Company stamp/date/signature					

SOLAR THERMAL COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the Solar Thermal System and associated equipment as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name	Telephone Number
Address	
Commissioned by (<i>print name</i>)	
Company Name	Telephone Number
Company Address	
Commissioning Date	

To be completed by the customer on receipt of a Building Regulations Compliance Certificate.

Building Regulations Notification Number (*if applicable*)

Confirmation that required areas of the installation have been notified to Local Authority Building Control (LABC)

a). Initials of commissioning engineer

b). Competent Persons Scheme (CPS) details or details of LABC direct notification

Confirmation that panels have been installed without lessening the structure, weathering and fire resistance of the roof in accordance with the relevant Building Regulations and standards. Initials of commissioning engineer

COLLECTOR DETAILS

Make of collector	Model of collector	
Serial number of each collector: (<i>if more than 6 collectors please append additional sheet</i>)		
i.	ii.	iii.
iv.	v.	vi.

INSTALLATION DETAILS

Solar System Operating Pressure bar (cold) Expansion vessel air/nitrogen charge bar (cold)

Expansion or drain back vessel size litres

Operating correctly: Yes Treated for leaks and flushed: Yes

Filled and purged for air: Yes

System heat transfer fluid details:

What type/make of heat transfer fluid used?

System volume litres

What is the fluid mix: Water %

Glycol %

Frost protection provided to °C

Is the installation in a hard water area (above 200ppm)?

Yes No

If yes, has a water scale reducer been fitted or has Tmax been limited to 60°C?

Yes No

What type of scale reducer has been fitted?

Air purged from solar primary circuit: Yes

Primary circuit valves and air vent(s) set to final operating positions:

Yes

Pump speed setting recorded: Speed setting

Max flow rate litres/min

Solar primary circuit pressure relief valves tested for correct operation:

Yes

Location

Device for limiting hot water temperature outlets has been fitted:

Yes No

Type

Location

All exposed pipework lagged in accordance with regulations using suitably temperature rated materials

Yes

For unvented hot water storage cylinder, will controls stop solar fluid circulation in the event of cylinder overheating?

Yes

SOLAR SYSTEM CONTROLS

Make and model of DTC

Temperature sensors checked and operating correctly

Yes

Differential Temperature Controller (DTC) settings:

T on °C T off °C

T max °C Other DTC Settings

Thermostat located in back-up heating zone of cylinder

Yes No

Have optimum settings for HW controls been explained to the customer?

Yes No

Does this include Legionella Bacteria protection settings with back up heating system to bring boiler volume to 60°C for an hour once a day?

Yes No

Electrical installation is in accordance with BS7671

Yes

Location of electrical isolation switch to solar control/pump unit

ALL INSTALLATIONS

The heating and hot water system complies with the appropriate Building Regulations

Yes

The system and associated products have been installed and commissioned in accordance with the manufacturer's instructions

Yes

The efficient operation of system and its controls have been demonstrated to and understood by the customer

Yes

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer

Yes

Commissioning Engineer's Signature

Customer's Signature

To confirm satisfactory demonstration and receipt of manufacturer's literature)

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.



Service Record

It is recommended that your heating system is serviced regularly and that the appropriate Service Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

Service 1 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 2 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 3 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 4 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 5 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 6 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 7 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 8 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 9 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

Service 10 Date

Energy Efficiency Checklist completed? YES NO

Engineer Name _____

Company Name _____

Telephone Number _____

Comments _____

Signature _____

EXCELLENCE COMES AS STANDARD

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www.worcester-bosch.co.uk

Part Number: 6 720 612 204 (2009.10) SD

The logo for Worcester Bosch Group features a stylized wave symbol to the left of the word "WORCESTER" in a bold, sans-serif font. Below "WORCESTER" is the text "Bosch Group" in a smaller, regular sans-serif font.

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