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SIME FORCED 200 - 300

SYSTÈMES SOLAIRES À CIRCULATION FORCÉE

SOLAR KIT FORCED DRAFT

SISTEMI SOLARI A CIRCOLAZIONE FORZATA

SISTEMAS SOLARES DE CIRCULACIÓN FORZADA

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Fonderie Sime SpA reserves the right to amend all of the product and relative accessories specifications without prior warning.

PREFACE

The **SIME FORCED** circulation manifolds must be installed by authorised professional installers, who must fully comply with the hydraulic and electric layouts.

To guarantee correct installation, they must follow the indications provided with each component (eg: solar collectors, mounting frame, control panel, boiler, solar unit, etc.).

The **SIME FORCED** circulation collectors can be installed according to three different solutions for groups of 1 to 6 people, and they come with the following components:

– Sime FORCED 200 code 8501812

- 1 Sime Plano 182 Collector code 8500011
- 1 BS 2S 200 Domestic Hot Water Boiler code 8106812
- 1 Single-column solar hydraulic unit (with Termosolis control unit) code 8501223
- 1 Expansion vessel bracket code 6317055A
- 1 Expansion vessel flexible tube code 6317056
- 1 Protection module for the overvoltage control unit code 8106123
- 1 Ø 1/2" L. 95 probe-holder code 6317047
- 1 Collector connection kit code 8500300
- 1 18-litre expansion vessel code 8106070
- 1 10 kg Antifreeze tank code 8106094
- 1 Chassis code 8501700
- 1 Thermostatic mixing valve code 8106097
- 1 Documentation kit code 5800343

– Sime FORCED 300 code 8501813

- 2 Sime Plano 182 Collector code 8500011
- 1 BS 2S 300 Domestic Hot Water Boiler code 8106813
- 1 Single-column solar hydraulic unit (with Termosolis control unit) code 8501223
- 1 Expansion vessel bracket code 6317055A
- 1 Expansion vessel flexible tube code 6317056
- 1 Protection module for the overvoltage control unit code 8106123
- 1 Ø 1/2" L. 95 probe-holder code 6317047
- 1 Collector connection n. 2 kit code 8500301
- 1 18-litre expansion vessel code 8106070
- 1 10 kg Antifreeze tank code 8106094
- 1 Chassis code 8501701
- 1 Thermostatic mixing valve code 8106097
- 1 Documentation kit code 5800343

– Sime FORCED 400

- 2 Sime Plano 182 Collector code 8500012
- 1 BS 2S 400 Domestic Hot Water Boiler code 8106814
- 1 Single-column solar hydraulic unit (with Termosolis control unit) code 8501223
- 1 Expansion vessel bracket code 6317055A
- 1 Expansion vessel flexible tube code 6317056
- 1 Protection module for the overvoltage control unit code 8106123
- 1 Ø 1/2" L. 95 probe-holder code 6317047
- 1 Collector connection n. 2 kit code 8500301
- 1 25-litre expansion vessel code 8106071
- 1 10 kg Antifreeze tank code 8106094
- 1 Chassis code 8501701
- 1 Thermostatic mixing valve code 8106097
- 1 Documentation kit code 5800343

FORCED CIRCULATION SYSTEMS

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Nowadays, production and energy savings without contaminating the environment is extremely important. The conventional energy sources of the planet are declining to a threatening level, as our society requires an increasing amount of energy; as a result, pollution is affecting the climate balance.

On the other hand, the Renewable Energy Sources can be a solution for both the energy and environmental problem. The international legislation is gradually modifying and encouraging, even imposing, the use of alternative energy products with the aim of meeting the energy requirement without placing the environment at risk.

DOMESTIC HOT WATER DEMAND

It was statistically calculated that the average daily consumption of a family varies from 35-50 litres per person. Should we add the consumption of the washing machine and dishwasher in case they were connected to the solar system, around 20 litres are required daily for each appliance (for one wash).

A family made up of four people with an average DHW consumption of 40 litres per person, requires a 160-litre solar system. The requirement increases by at least 40 litres per day if we add the domestic appliances connected to the solar system. To obtain the maximum benefit from the solar water heater, use the highest amount of hot water possible during the day so that the plant can continuously produce during the sunny period, maintaining yield to a maximum.

GENERAL INSTALLATION RULES

Installation must be conform to the local standards in force for hydraulic and electric plants: Remove the solar system packaging in the place of installation to protect the equipment against impacts during transport, avoiding resting the collectors' weight on the pipes connection fittings. The collectors' crystals must remain covered until installation is completed, until the boiler is filled with domestic water to avoid the filling liquid from boiling or the crystals from breaking. Do not remove the plastic protective caps of the connection fittings of the storage tank and those of the collectors.

Installation site: Before installing the solar system, carefully choose the place of installation and check if the surface where the appliance must be positioned can withstand the system's weight.

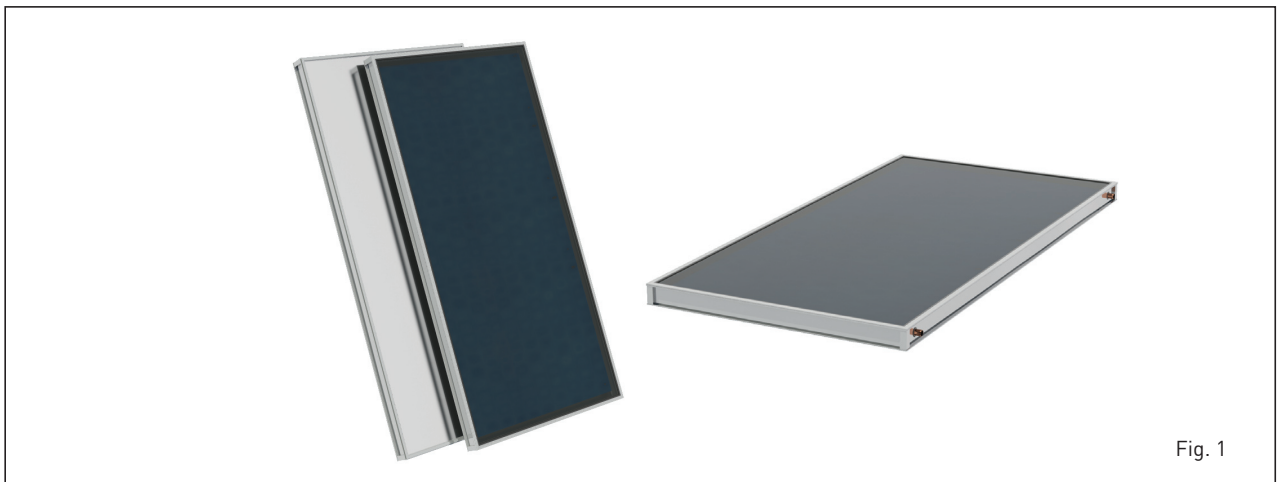
Piping: The client must agree the path of the pipes and cables with the installer in order to ensure correct installation according to the standards in force concerning electrical and hydraulic systems.

Direction - Perfect inclination - Shading: It is essential, in order to obtain maximum solar system yield, to properly choose the inclination and direction with regard to the installation place and the maximum production period requested. **The solar panels must be directed so that their surface faces the geographic South in the northern hemisphere (geographic North in the southern hemisphere), meaning they always face the equator. Deviations from the ideal orientation may reduce the system performance.**

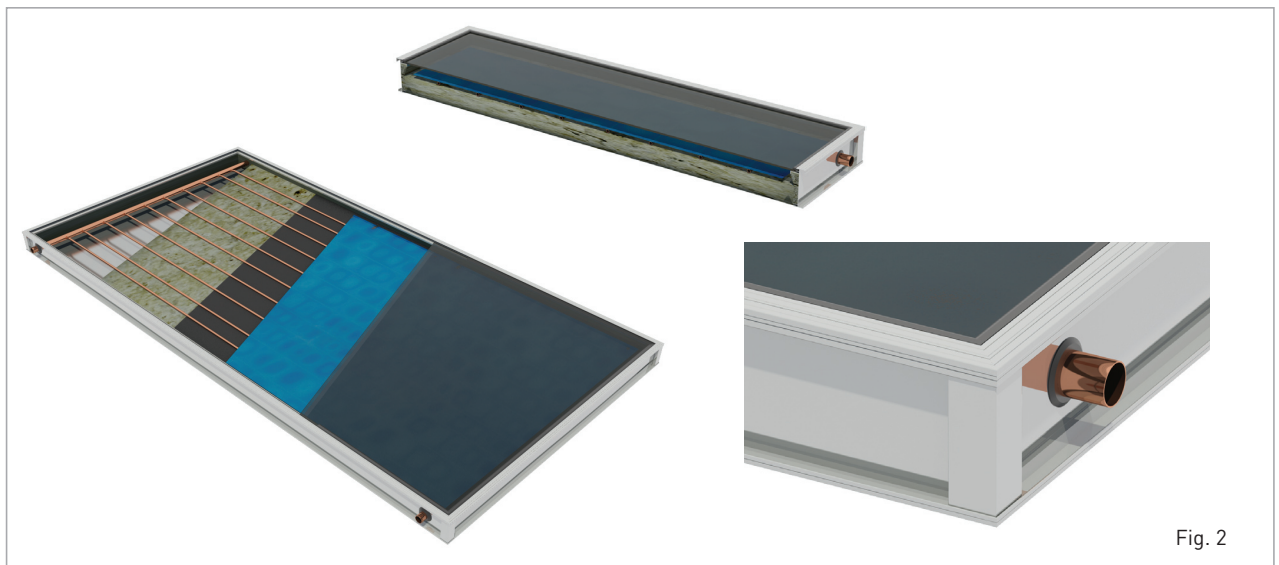
Correct the system yield if the change of the correct direction is inevitable, by increasing the collectors' surface based on an assessment of the specific conditions. As the angle of incidence of the solar radiation changes with the season and with the system's place of installation, the collectors' angle of inclination must be almost equal to the place of installation latitude. This inclination ensures maximum energy production on an annual basis. To ensure full exposure of the collector surface to the solar radiation during midday (at least 4 hours), it is important to prevent the system from being shaded by trees, buildings or other obstacles.

TECHNICAL FEATURES OF THE "SIME PLANO" COLLECTOR

1. **Outer body** made of aluminium profile [Al Mg Si 05].



2. **Rear cover** made of galvanized steel, 0.5 mm thick, tightly fitted with an elastic EPDM seal.
3. **Pipe grid**, whose number and thickness can be adjusted: Headers (horizontal) are punched with upper expansion, to ensure perfect fitting of the collectors (vertical) and to avoid pressure dropping in the collectors. Distance between pipes = 93 mm (EN 1652).
4. **Copper pipe grid: header: Ø 22**: supply and reaction of the solar collector. Ø 8 collectors: thermal-absorption of the 182 - 230 SIME FLAT solar collector.
5. **The 0.3 mm thick black sheet aluminium absorber** or the 0.4 mm thick selective aluminium absorber fully covers the surface of the opening cover and the headers, thereby increasing the collector's absorption capacity. The collector is welded to the pipe grid with LASER technology (**Laser Welded**).
6. **High density, environmentally-friendly thermal insulation** obtained with a 50 mm (rear) and 20 mm (sides) thickness layer in glass wool for maximum reduction of heat losses. Insulation thermal conductivity in glass wool: $\lambda = 0.035$ W/m grd (DIN 56612, measured at 0 °C)
7. **Tempered solar glass** with a constant expansion coefficient and a high luminous transmittance, can support adverse atmospheric conditions (e.g. hail, extreme change of temperatures, etc.). ANSI Z 97-1 (U.S.A.) BS 6206 (G.BRITAIN) DIN 52337 (GERMANY).



ASSEMBLY OF THE SOLAR COLLECTOR CHASSIS

SUPPLY

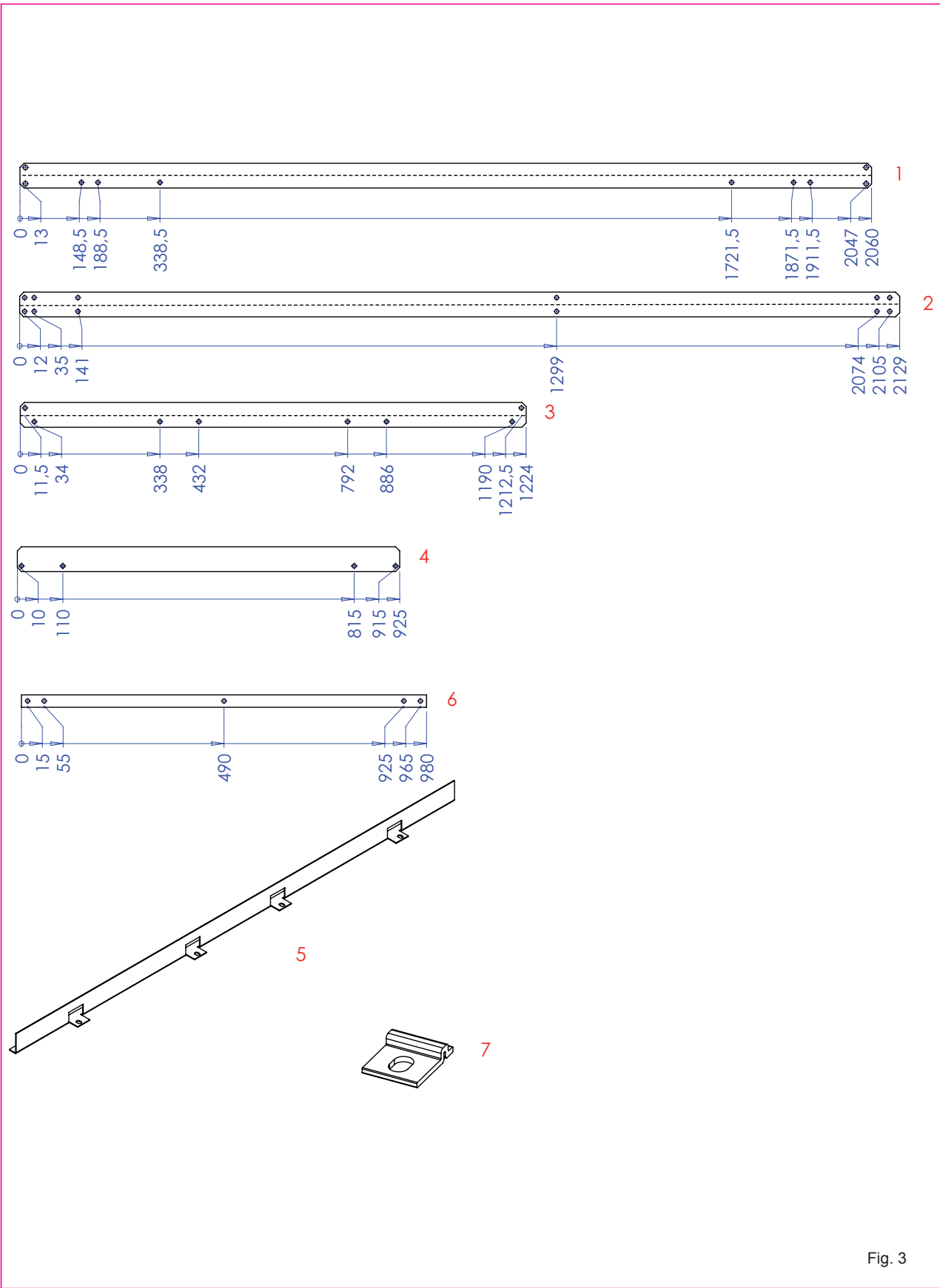
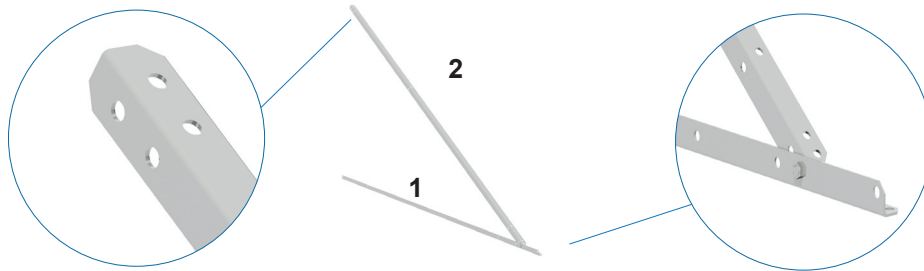


Fig. 3

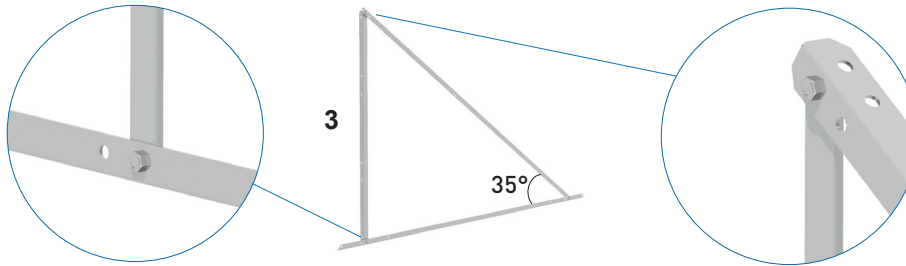
ASSEMBLY OF THE CHASSIS ON FLAT ROOF

CHASSIS WITH 1 OR 2 COLLECTORS

1. Tighten part 1 to part 2 using the M8 screws and nuts provided.
Repeat the operation for the other coupling.



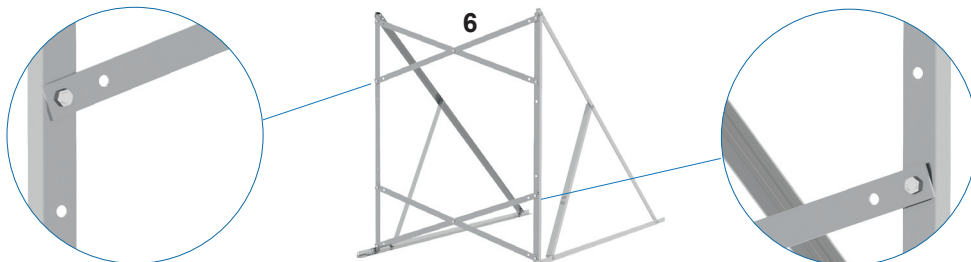
2. Tighten part 3 to part 2 vertically.



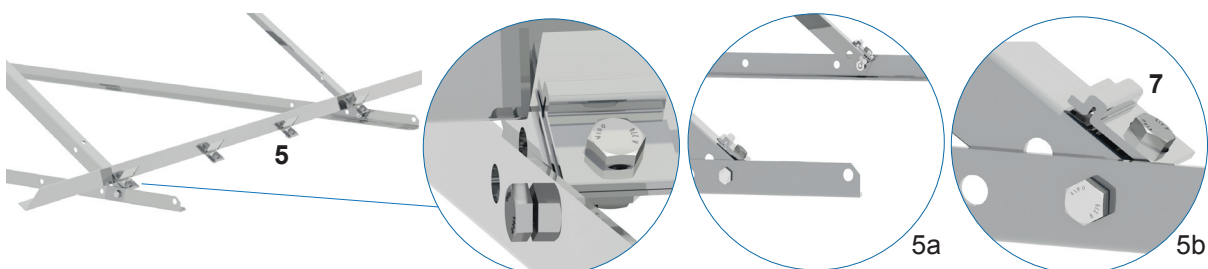
3. Tighten diagonal 4 to part 2 and tighten the bolts.
Repeat steps 1, 2, and 3 for the other coupling.



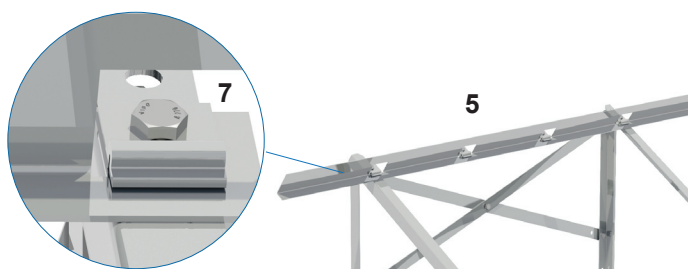
4. Place part 6 as indicated in the figure and tighten the pins.



5. **To assemble the solar collectors**, place the supporting section 5 of the collector to the lower part. Place the four washers (7) between the two parts, without tightening the M8 pins.
Do not use part 5 to mount a solar collector. The solar collector is fixed using the two washers (7), as described in figures 5a and 5b



6. Repeat the operation for the top part.



7. For the two-collector model, firstly place the left one lifting the upper and lower support part of the collector and the washers (7). Slightly tighten the M8 screws and nuts with the collector support parts when the same collector is placed underneath, in order to easily temporary assemble and centre it with the system.



8. Join the second collector and fasten the fittings. *
9. Direct the solar collector and firmly tighten the base using the 4 inserts and screws (M10x60).



* Tighten the fittings ONLY. ANY BREAKAGE DUE TO THE TORSION OF THE PIPE BUNDLE IS NOT COVERED BY THE WARRANTY.

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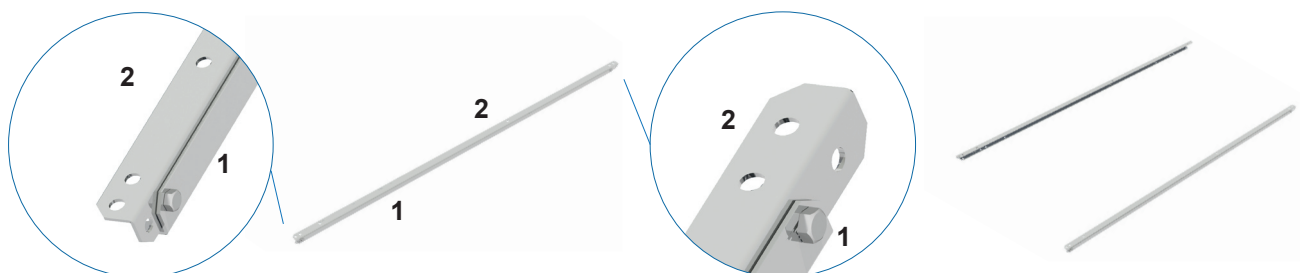
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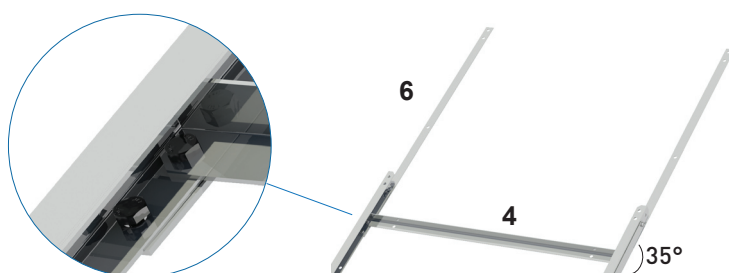
ASSEMBLY OF THE CHASSIS ON INCLINED ROOF

CHASSIS WITH 1 OR 2 COLLECTORS

1. Tighten part 1 to part 2 using the M8 screws and nuts provided.
Repeat the operation for the other coupling.



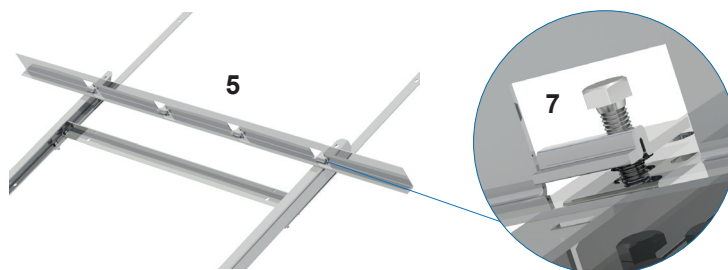
2. Place horizontal parts 4 to the upper parts to build the structure.
Tighten the right-hand side (6) (used to support the base to the tile) to the lower part.



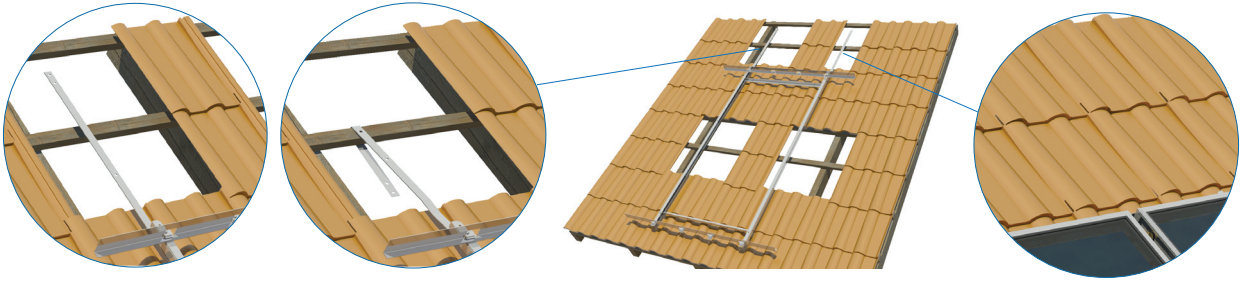
3. Place the collector 5 support part on the lower part, for the two collector model; place the four collector fixing washers (7) between the parts and tighten the M8 screws with the nuts. Part 5 is not required for mounting the single-collector model. As indicated in figure 3a, the collector is fixed using the collector fixing washers (7).



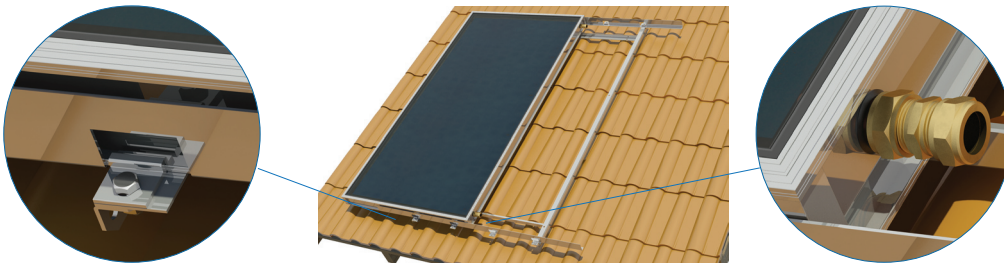
4. Repeat the operation for the top part.



5. Use a spirit level to fix the right-hand side of point 2 to the tile sides in order to place them horizontally compared to the subsequent ones.
Manually bend the right-hand side of step 2 enclosing the sides of the tiles.
Drill and fasten using lag bolts. Use a spirit level to place the base horizontally



6. For the two collector model, firstly place the left one lifting the upper and lower support part of the collector. Slightly tighten the M8 screws and nuts with the collector support parts when the same collector (7) is placed underneath, in order to easily temporary assemble and centre it with the system Position the Ø22 fittings mechanically fastened to the collector edges.



7. Join the second collector and tighten the fittings. *
9. Position and mechanically fasten the Ø22 socket on the top-right part and on the bottom-left part of the collector[s].

* Tighten the fittings ONLY. BREAKAGE DUE TO THE TORSION OF THE PIPE BUNDLE IS NOT COVERED BY THE WARRANTY.

TECHNICAL FEATURES OF THE BOILER

Install the boiler [refer to the boiler dimensions and connections].

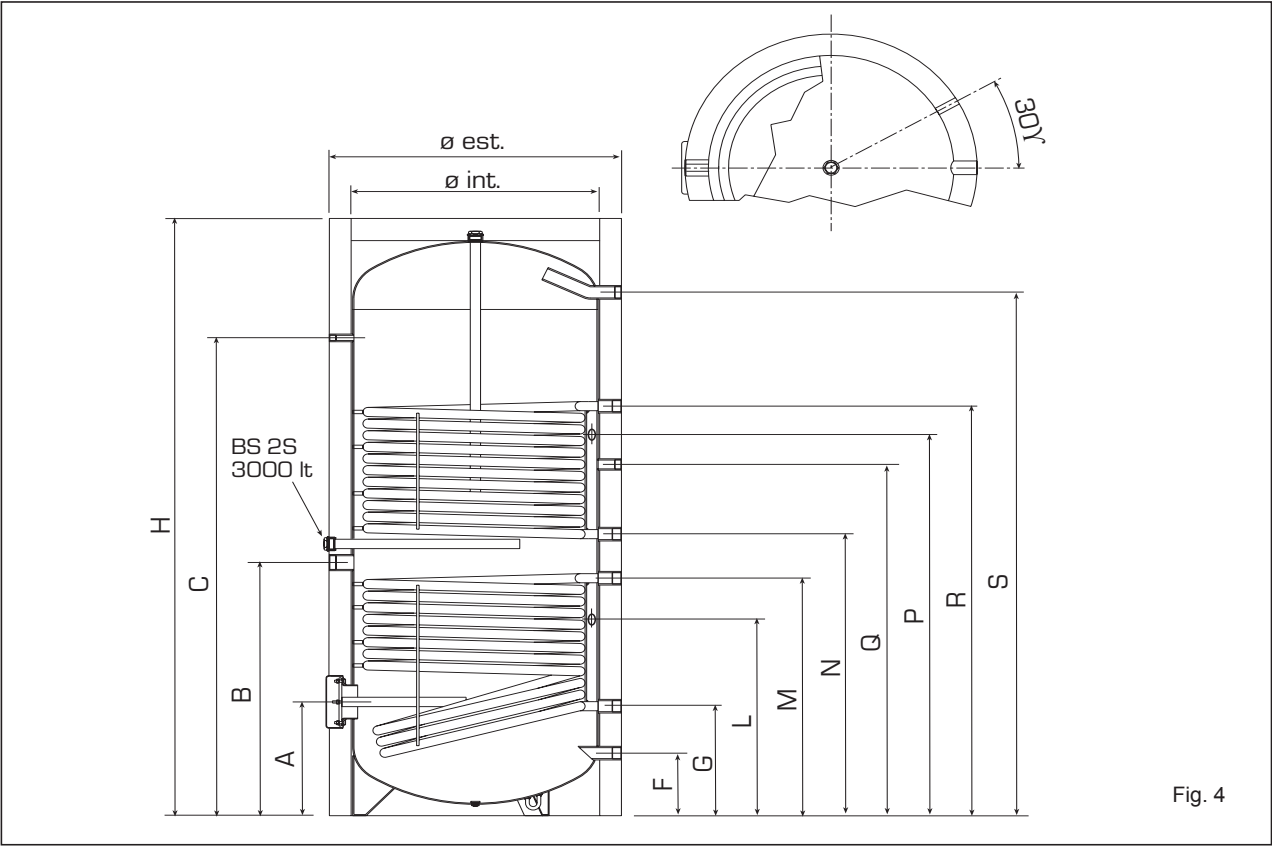


Fig. 4

Dimensional values and hydraulic connections			BS 2S 200	BS 2S 300	BS 2S 400
INSPECTION FLANGE	A	mm	257	257	268
Connection			outer Φ 168 mm/ inner Φ 114 mm		
ELECTRIC HEATER	B	mm	629	914	891
Connection			1" 1/2		
THERMOMETER	C	mm	929	1384	1411
Connection			1/2"		
COLD WATER	F	mm	67	67	79
Connection			1"		
SOLAR CIRC. RETURN	G	mm	264	264	286
Connection			1" 1/4		
SOLAR CIRC. SENSOR	L	mm	474	654	660
Connection			1/2"		
SOLAR CIRC. FLOW	M	mm	579	849	846
Connection			1" 1/4		
HEATING RETURN	N	mm	679	979	1011
Connection			1" 1/4		
HEATING FLOW	R	mm	994	1294	1361
Connection			1" 1/4		
RECIRCULATION	P	mm	914	1214	1245
Connection			1/2"		
HEATING SENSOR	Q	mm	884	1141	1163
Connection			3/4"		
HOT WATER	S	mm	1164	1609	1581
Connection			1"		
TOTAL HEIGHT	H	mm	1270	1710	1655
OUTER DIAM. (WITH INSUL.)	Out. D.	mm	600	600	710
INNER DIAM. (WITHOUT INSUL.)	Inn. D.	mm	500	500	600

Install a pressure reducer, where required, for the inlet domestic hot water. Install a calibrated safety valve according to that indicated on the data plate applied to the storage tank and, in standard cases, install a 6 BAR safety valve.

Install an 8 bar safety valve on the cold water inlet of the boiler in order to protect the product from excessively high pressure.

Place a water pressure regulator at the mains water inlet, which must be calibrated at a maximum level of 4.5 bar, in the event the boiler is installed in an area where the mains water pressure is too high (on average more than 6.5 bar).

If the mains water is too hard (20 °F), install a purifying device, correctly calibrated, in front of the boiler.

Before commissioning, we recommend making sure that the flanges and the connections of the removable coils are fastened correctly.

The storage tank temperature must not exceed 95 °C to prevent damage to the inner coating.

We recommend cleaning inside the boiler every 12 months. Check the magnesium sacrificial anodes every 12 months to prevent corrosion. Inspect where water is particularly aggressive.

OPERATION FORCED CIRCULATION SYSTEMS

Forced circulation solar systems are used to produce domestic hot water. They constitute an ecological proposal and efficient energy solution that combines high results, autonomy, design, easy installation and money savings; moreover, they reduce the consumption cost of the traditional energy sources considerably.

The system automations control the temperature difference between the solar collectors and the boiler; in addition, they provide the relative commands to ensure the continuous supply of hot water according to the circuit regulations.

The differential thermostat is programmed electrically to control the thermal differential and is supplied with interface keys and a screen to display the parameters and messages. Moreover, it comes with:

- Closed circuit antifreeze protection system.
- Overheating closed circuit protection system.

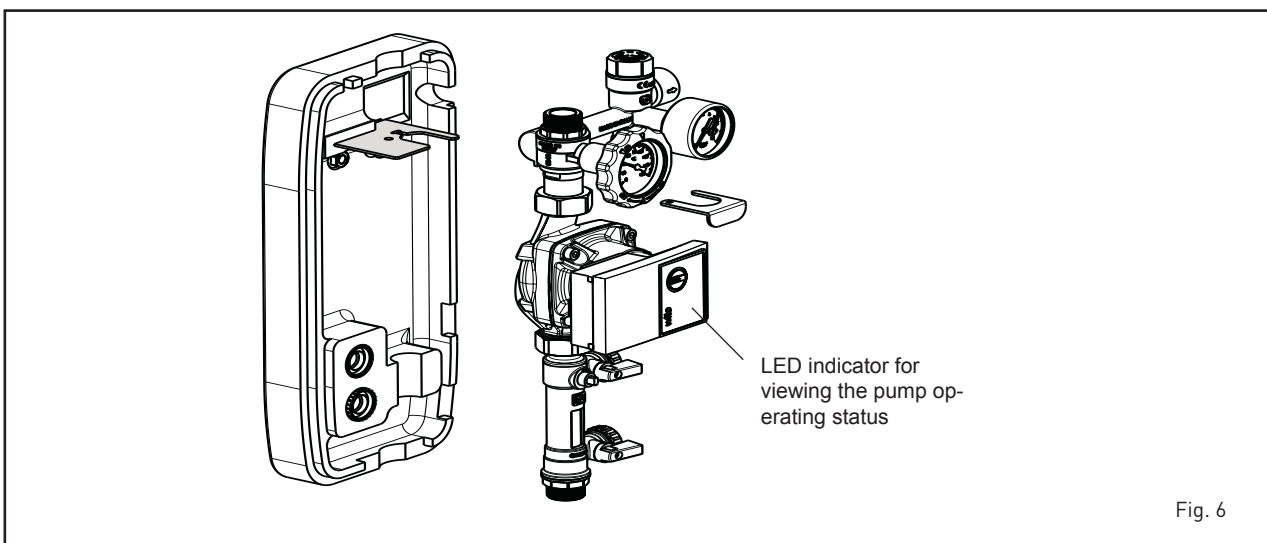
When the temperature of the solar collector exceeds that of the boiler by 6-10 °C, the solar system circulator activates (thermal differential implementation). The circulator stops the operation when the temperature drops to 20 °C (hysteresis). In the event of system inertia, a command can be sent to an auxiliary energy source (electric or central heating).

All the components required for the connection are included in the packaging.

All the components are suitable for the mixture of water and glycol.

SOLAR HYDRAULIC UNIT

SINGLE-COLUMN UNIT (Fig. 6)



DESCRIPTION OF THE OPERATIONS

Installation load (part I - Fig. 7):

Intercept the flow by closing the valve (screwdriver fitted horizontally) Introduce the fluid of tap A. Wait for the liquid discharge from tap B. Slowly close taps A and B.

Cleaning the system with water (part I - Fig. 7):

Intercept the flow by closing valve V (screwdriver fitted horizontally). Introduce the washing liquid of tap A. Wait for the liquid discharge from tap B.

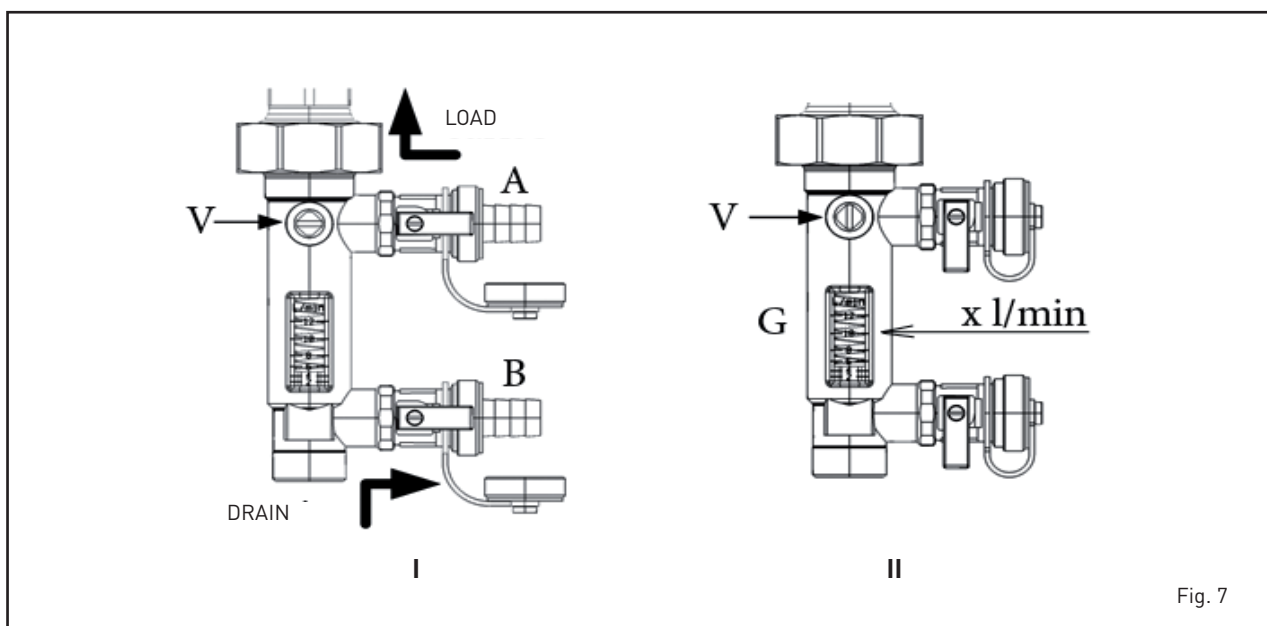
Let it flow for the time required. Close tap A. Close tap B. Open valve V

Interception of the pump (part I - Fig. 7):

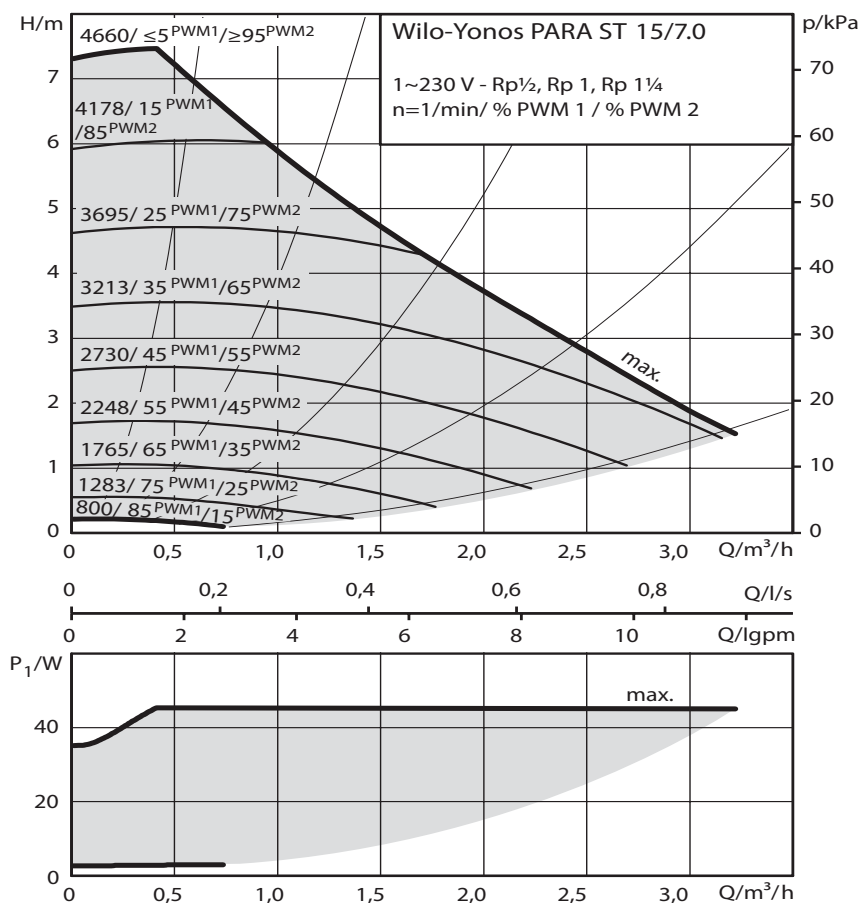
Close valve V (screwdriver fitted horizontally).

Calibration configuration using the flow regulator (Part II - Fig. 7):

Slowly turn valve V and make sure that the upper side of float G coincides with reference mark of the graduated scale.



External control via PWM



SOLAR UNIT HIGH EFFICIENCY PUMP

The solar unit circulator is the WILO type, model Yonos PARA ST 15/7 PWM (code 6272328). Find hereafter any anomaly reported by the pump's LED and the possible solutions:

LED colour	Pump status	Fault	Possible solution
Red-Green flashing	"Transient safety shutdown"; Anomaly in progress After eliminating the anomaly, the pump restarts automatically	Network voltage too high or too low; (160V > Vn > 280V)	- Check network voltage
		Motor overload; rotor friction or blockage due to the presence of debris	- Check the characteristics of the system water; clean the system of any debris
		Excessive speed; the pump rotor is actuated by an external factor and is rotating at a speed exceeding the maximum permitted speed	- Check that there is no external flow in the system (no other pump in operation)
		Overcurrent; stator winding is in short circuit due to water	- Check for leaks in the system
		The temperature inside the motor is too high	- Check the water temperature in relation to ambient temperature
		The pump is obstructed by an external flow (> 1200l/h) in the opposite direction	- Eliminate or reduce the external flow (< 1200l/h)
Flashing red	"Permanent safety shutdown"	Pump blocked due to debris in the system	- Remove and reconnect the electrical power supply (OFF - ON)
		Fault in the electronic board and/or the motor	- If the "red LED" continues to flash: - REPLACE THE PUMP
LED off	Stationary	No electrical power	- Check the electrical power connection
		LED faulty	- Check if the pump can operate
		Electronic board faulty	- REPLACE THE PUMP

SOLAR CONTROL PANEL

The solar control panels adjust the circulation of the primary circuit with the signal provided by the pump, according to the Δt detected between the solar collectors and the lower part of the solar storage tank. Depending on the type of installation, the control panels also control the integration of the secondary circuit.

The TERMOSOLIS control panel is provided as per standard with the **GI hydraulic unit**.

TERMOSOLIS CONTROL PANEL

TERMOSOLIS is a digital electronic device which can be programmed to manage thermal solar plants.

The solution manages wholly the solar system by checking the pumps, the eventual diverter valve, the probes (PT1000 e NTC), a puffer/boiler and, also, another secondary heating source.

The integrated user interface is composed by a backlight display and 4 buttons. The display shows the scheme of the selected plant and the probes in place with their values and the eventual anomalies, while the buttons can switch on or off the device and program the board functions.

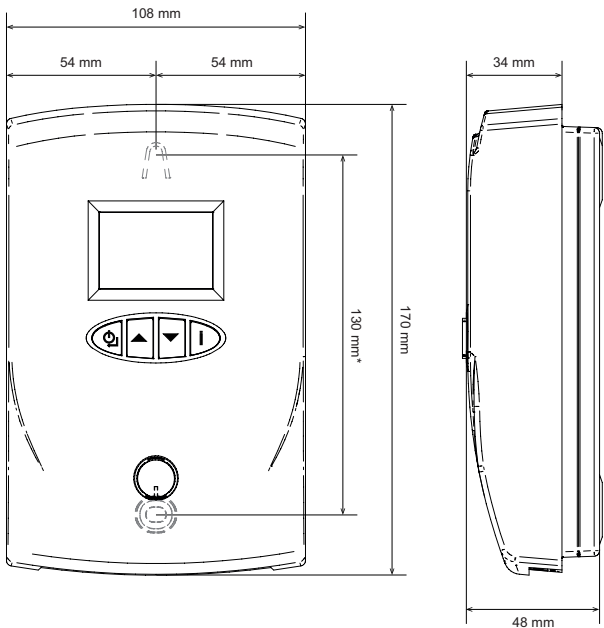
To assure the system endurance, when switched off, some functions are kept on, as the anti-freezing protection, the anti-lock of the pump and of the diverter valve.

There are 3 possible profile of the device, such as Stand Alone, in which only TermoSolis is present itself; communicating with a Sime Home/Sime Home Plus remote control, so a remote control and Full System manage the system; and then the complete solution, which sees the connections with other Sime devices to get the whole control of the heating and DHW plant.

TECHNICAL DATA

GENERAL	
Power supply	230 Vac +10% - -15%
Frequency	50Hz +5% - -5%
Range of working temperatures	-20°C + +60°C
Fuse	3,15AF (fast) 5x20
Varistor	300 Vac D7
SOLAR PUMP - P1 TRIAC (230 Vac)	0,5A - Cosφ 1
AUX 3 out - P1 PWM (230 Vac)	230Vac - 0,5A
AUX 2 out - P2 (230 Vac)	0,5A - Cosφ 1
AUX 1 out - Enabled thermostat /P2	0,5A - Cosφ 1
FREE CONTACT out - D1 (230 Vac)	230Vac - 0,5A
TEMPERATURE PROBE NTC	
Range of correct work of the probes	-40°C + +105°C
Temperature in which the probe will indicate a fault	-5°C>T>120°C
General tolerance on temperatures (referred only to electronic board)	±1,5°C
TEMPERATURE PROBE PT1000	
Range of correct work of the probes	-40°C + +250°C
Temperature in which the probe will indicate a fault	-50°C>T>170°C
General tolerance on temperatures (referred only to electronic board)	±1,5°C
ENVIRONMENTAL CONDITIONS OF USE	
Ambient working temperature	-20°C + +60°C
Storage and transport temperature	-30°C + +60°C
Max. environment humidity (without any condensing)	95% a 40°C

DIMENSIONS



Function of the **buttons**:

SERIGRAPH	DESCRIPTION	FUNCTION
	ON/OFF	Turn on or turn off the device
	BACK	Back to previous menu
	INCREASE	Go to next parameters or go to next value
	DECREASE	Go to previous parameter or go to previous value
	INFO	Keep pressed for 1 sec.: Temperature information (S2, S3 - S1,S4)
		Keep pressed for 10 sec.: Access to programming menu

The plastic box has protection rating IP20

*130 mm is the wheelbase between the holding hanger, which is set up in the front side of the device (back cover), and the fixing hole, which is placed down in the back cover.

POWER SURGE PROTECTION MODULE

The surge protection box protects the solar control panel from power surges that may be transmitted through the collector probe cable (eg caused by heavy storms) thereby damaging it.

ANTIFREEZE

The heat transfer fluid introduced in the primary circuit consists of a mixture of water and non-toxic food grade inhibited propylene in order to prevent the collectors and external piping from freezing. The minimum percentage of glycol to be introduced is 40%, in order to allow the antifreeze corrosion inhibitor to prevent the substance from disappearing in a short time (and therefore to become aggressive towards the system components). The antifreeze liquid is supplied with a 10 kg tank. (code 8106094).

Description:

Specific weight at 15 °C: 1.053

Colour: Colourless

Appearance: Liquid

Boiling point: 160 °C at 760 mmHg

Water % weight: 3.2

Freezing point at 50% in water: -34 °C

pH (50% volume): 9.0

Foam: ml/s 40/02

Corrosion resistance test with various types of metals: excellent according to the ASTM D method for resistance to hard water: Not precipitated

Reserve Alkalinity: ml HCL 0.1 N .

THERMOSTATIC MIXING VALVE

The thermostatic mixing valve (supplied with the forced circulation system) is used in systems for the production of domestic hot water.

Its function is to maintain the set temperature value of the mixed water, which is sent to the application when the temperature and the supply pressure of the hot and cold inlet water, or of the extracted flow rate, vary.

The substance of the domestic hot water contained in the solar boiler may be at a higher temperature (eg: 60°C); therefore, in order to prevent physical burns, a thermostatic mixing valve that mixes hot water with cold water must be installed in order to reach an optimal service temperature (eg 40 °C - 45 °C).

SOLAR EXPANSION VESSEL

The solar expansion vessels must have a nitrile membrane as the heat-transfer fluid that circulates inside the primary circuit is made with water and non-toxic propylene antifreeze liquid.

The expansion vessels cannot have a butyl membrane nor can the heating tanks have

SBR membranes, as the antifreeze liquid may damage them (as it is a very aggressive substance).

The **SIME FORCED** circulation solar equipment is supplied with an 18 L expansion vessel with nitrile membrane.

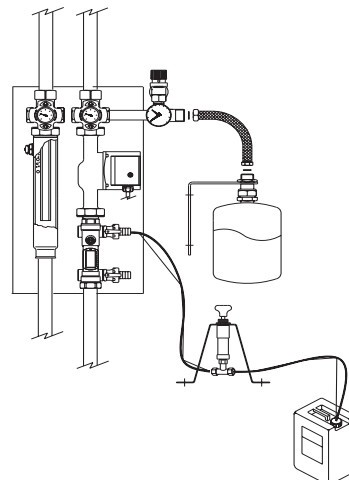
Description:

18 L expansion vessel with a fixed nitrile rubber membrane.

Flange: pressed galvanised carbon steel.

Max. pressure: 6 bar

Fitting: 3/4"



REQUIREMENTS AND PRE-INSTALLATION OF THE SOLAR COLLECTORS

DIRECTION OF THE SOLAR COLLECTORS

To ensure optimal yield, the solar collector must face SOUTHWARDS. A 15-20 °C deviation can be accepted; deviations that exceed 20° must be compensated by using a larger collector.

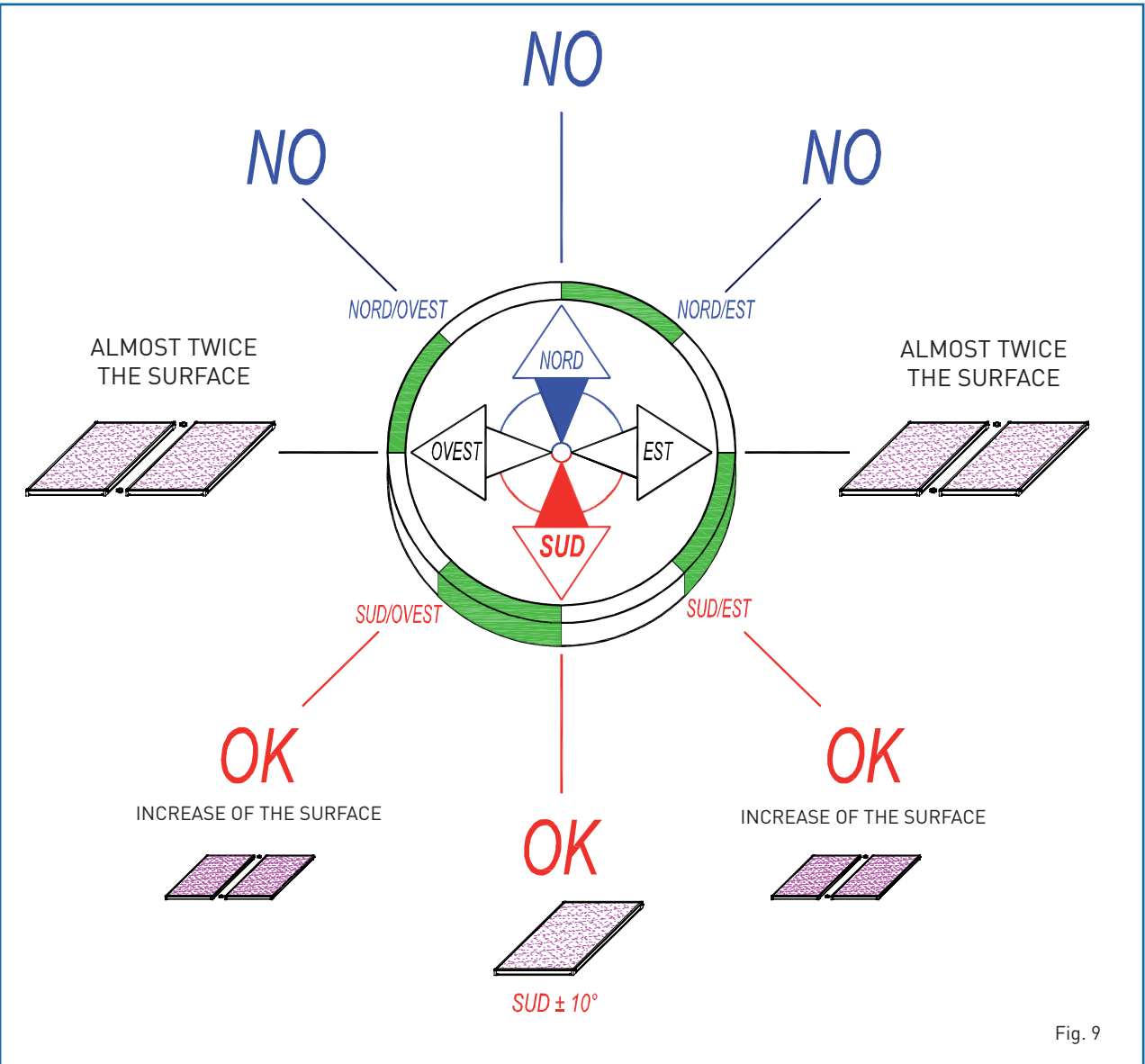


Fig. 9

INCLINATION OF THE SOLAR COLLECTORS

In order to optimise the performance, the inclination angle of the collector must be equal to the latitude of the installed equipment.

Use the support inclination closest to this angle.

In Italy, for example, for annual use, a support inclined by 45° is used (eg, houses for civil use).

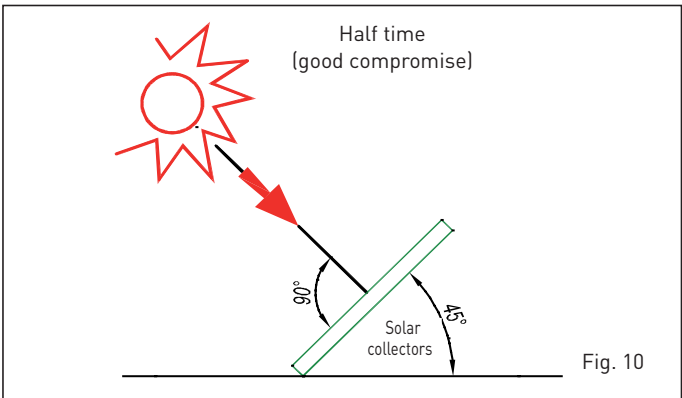
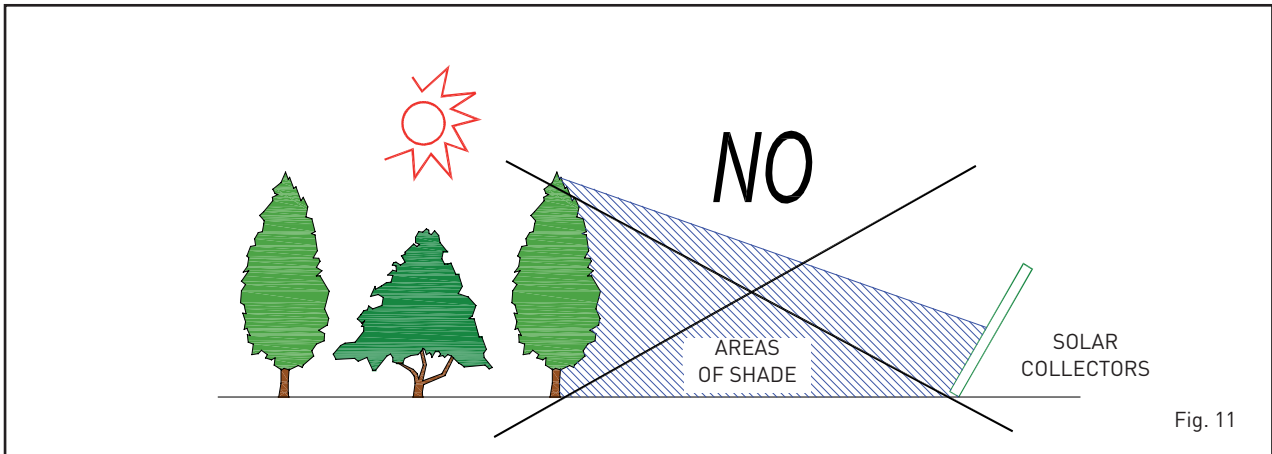


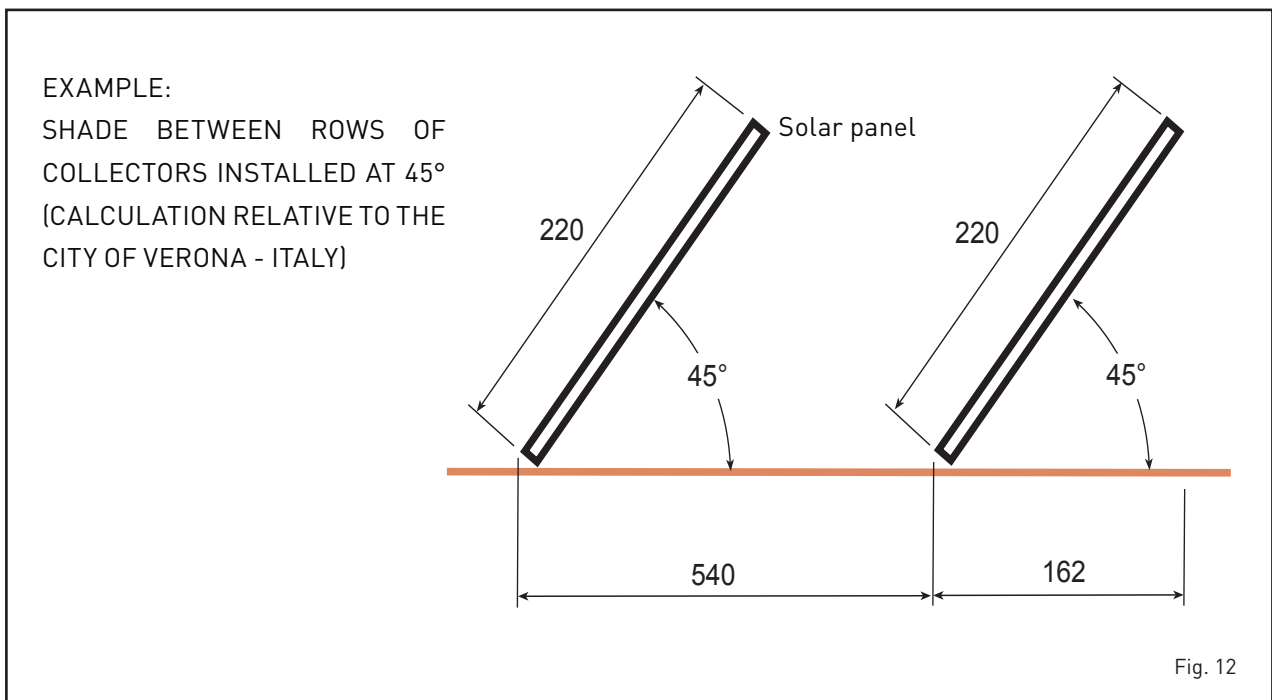
Fig. 10

POSITIONING THE SOLAR COLLECTORS

The solar collectors can be installed in various positions, on the outside of the house or around it, and can have various configurations. Make sure that the collector receives the sun rays without any interference from trees or close buildings, even during the worst conditions (winter); otherwise, compensate the lack of radiation by increasing the collector surface.



In the presence of various aligned solar collectors, make sure they do not shade each other and comply with the project indications (see Fig. 12). Before positioning the system, you must be aware of the local regulations. In Italy, for example, except for landscape or monumental areas, it is sufficient to communicate the installation to the authorised technical departments.



DIMENSIONS OF THE SOLAR SYSTEM

The system dimensions depend on the consumption of hot water and m^2 heated by the system at low temperature (only for combined systems).

The choice depends on the type of climate and on the number of family members, which will affect the measurement of the deposit and that of the collectors.

Solar system for the production of domestic hot water

It is the ideal solution for new individual housing units with integrated boiler in heating mode only.

How it works (Fig. 13)

The general operating principle of the solar systems is the following: the sun heats the heat-transfer fluid and transfers the energy to the boiler by means of the collector and the support of a pump.

In the boiler, the coil transfers the heat to the domestic hot water, which warms up.

With reference to the table below, the **TERMOSOLIS** control panel with three probes is used both to activate the pump to transfer the energy from the solar collectors to the boiler through the fixed coil, and, optionally, to activate the automatic motorised valve that deviates the flow of the heating system boiler to the coil, for the integration inside the boiler.

The control panel compares the temperature detected by probe "S1" in the solar collector with that detected by probe "S2" located at the bottom of the boiler.

When the temperature of the collector exceeds that of the boiler considerably, ΔT inside the control panel provides the signal to the solar circuit pump to transfer energy.

When this does not happen, the pump does not receive the signal and the energy accumulated in the boiler is transferred to the panel and will be dispersed.

In this event, the boiler activates by means of probe "SB" and ensures the temperature of the domestic hot water.

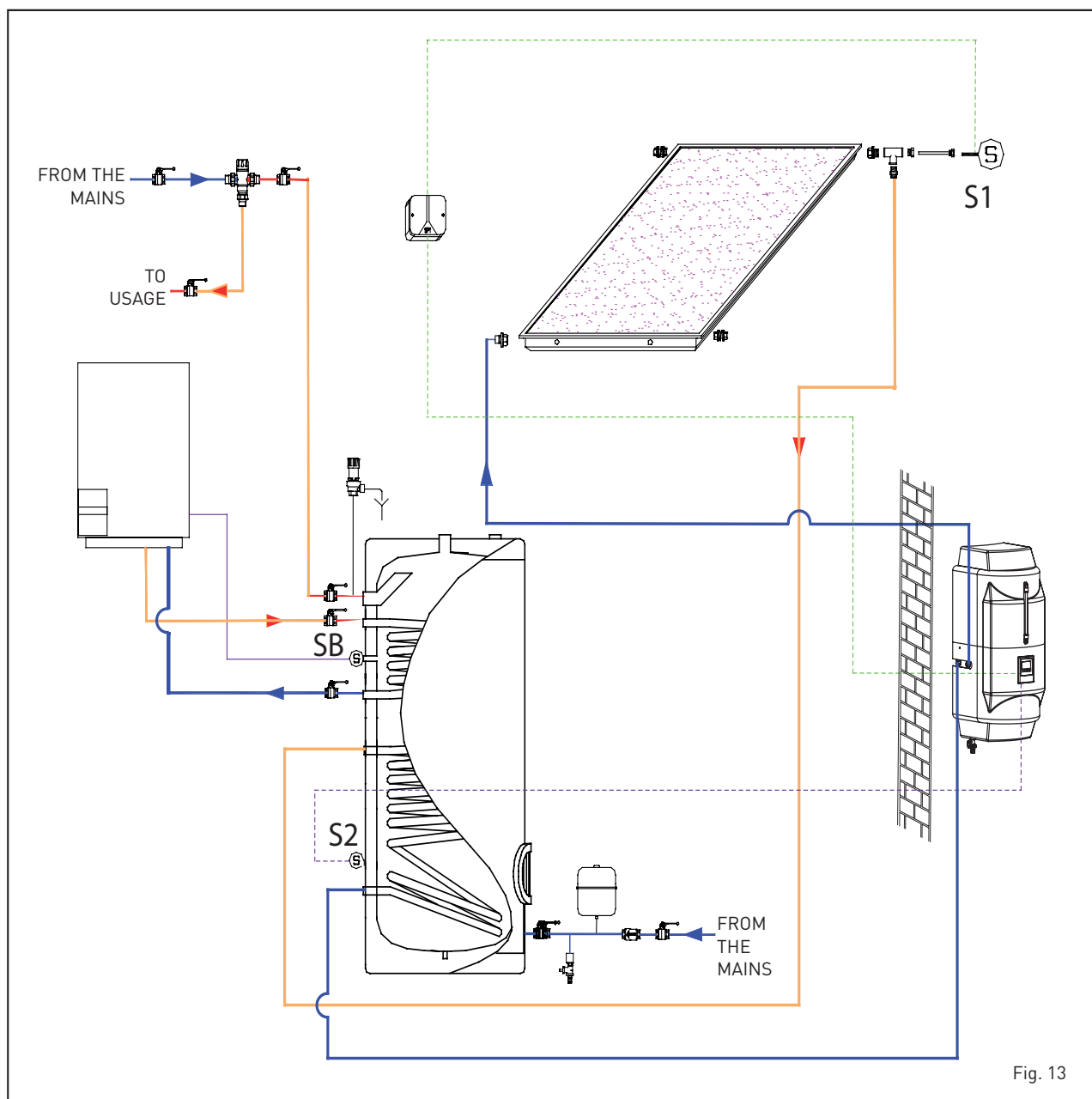


Fig. 13

INSTALLATION OF THE SOLAR COLLECTORS

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SOLAR COLLECTORS

To ensure optimal yield, the solar collector must face southwards.

We recommend installing a minimum of 2 collectors for every DB solar hydraulic unit.

A 15-20 °C deviation can be accepted; deviations that exceed 20° must be compensated by using a larger collector. In Italy, for example, for annual use, a support inclined by 45° is used (eg for civil use).

We recommend covering the collectors until the system is commissioned, in order to prevent damage to the insulation, due to the high temperature that can be reached (up to 200 °C), and during prolonged downtime.

Use the packaging of the collectors to cover the solar panels or, alternatively, use shading sheets.

When you fasten the fittings to the solar collector, block the terminal box using a wrench (or clamp) to oppose a counter force and prevent torsions in the head of the panel pipe bundle.

BREAKAGE DUE TO THE TORSION OF THE PIPE BUNDLE IS NOT COVERED BY THE WARRANTY.

We also recommend moving the water (from top to bottom) inside the collectors and boiler heat exchangers before installation in order to remove any processing waste.

CONNECTION JOINTS AND FITTINGS

To join the threads of the primary circuit, especially those located externally, we recommend using anaerobic sealant that resists temperatures higher than 150°C or, alternatively, use hemp (for a mechanical seal) combined with high density Teflon for vapour (for hydraulic seal).

The copper pipe junctions of the primary circuit must be made with brazing or mechanical brass fittings with metal warhead seal. Avoid fittings with O-ring seal, as, at high temperatures, this material may cause damage (unless O-rings are used for special solar systems).

The junctions of stainless steel piping must be flared with fittings and have a gasket suitable for high temperatures and be supplied with a specific kit.

Use bronze or brass fittings in contact with the panel to prevent corrosion due to galvanic currents.

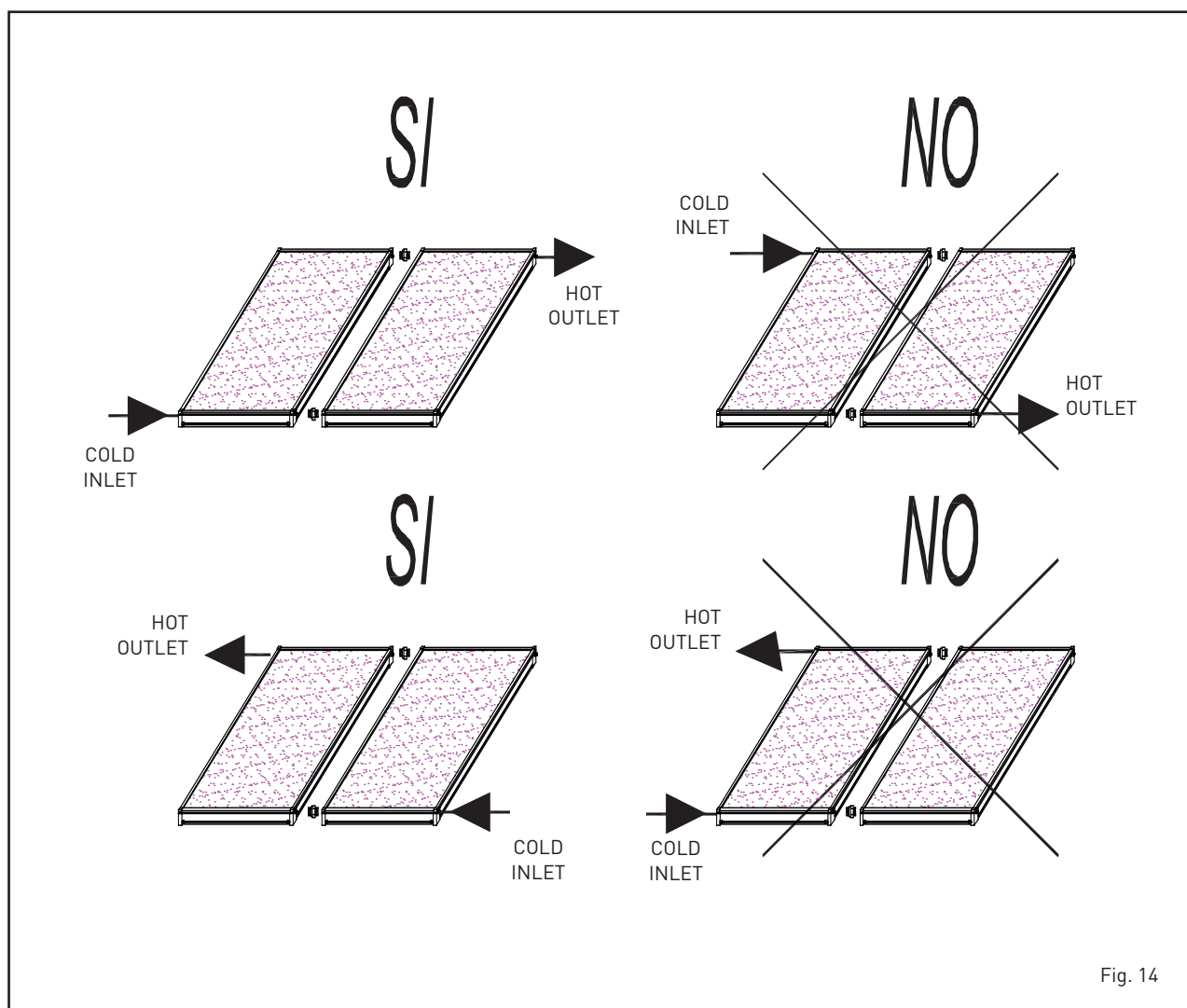
Example of installation of solar collector fittings.

Refer to the instructions provided in the installation diagram attached to the material required to see how to mount the solar panel fittings.

ATTENTION:

The cold inlet of the “Sime Plano” collectors must be located at the bottom right or at the bottom left of the collector coil.

The hot outlet must be at the top of the opposite side, ie, if we enter in the bottom left, we must exit from the top right and vice-versa (see Fig. 14).



PIPING AND INSULATION

The pipes that connect the solar collector to the boiler hydraulic unit must be made of copper or stainless steel (fitted hose reel made of AISI 316L stainless steel 2x2 insulated) and must have an outer diameter of 10 mm (no greater, no smaller).

The pipes must never be made of galvanised steel due to galvanic currents and incompatibility problems with the antifreeze liquid; moreover, they must never be multi-layers for problems related to the high temperature that can be reached.

The pipes of the primary circuit must be well insulated to minimise thermal loss.

The section of the pipe close to the solar collector must be insulated with material resistant to temperatures close to 150°C. Connection pipes can be made of stainless steel or copper.

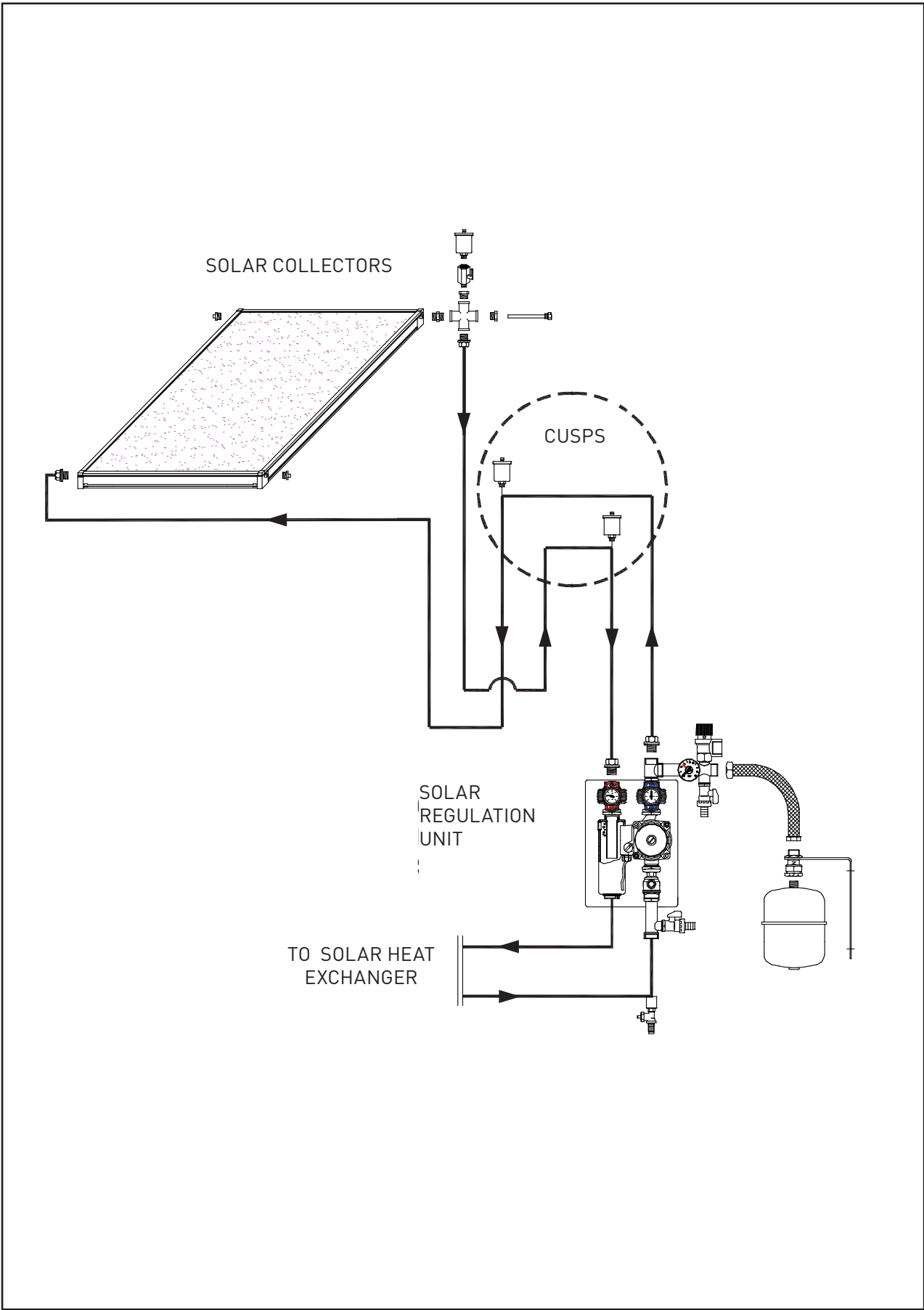
If they are made with copper, we recommend a strong brazing (castolin, silver alloy, etc) to ensure seal at high temperature. For copper pipes in domestic systems, we recommend expanded elastomer insulation, specific for solar systems, having a minimum thickness of 19 mm (and in any case compliant with the standards in force), resistant to weather agents and coated on-site with adhesive aluminium tape for the section exposed to bad weather.

For medium-large systems, we recommend using rock-wool insulation, 40 mm thick, (and in any case compliant with the standards in force) coated with aluminium sheet for the section exposed to bad weather and with PVC for the section located indoors.

The pipes that connect the solar collector to the boiler hydraulic unit must be always downhill; therefore, there must not

be any points where the pipes go upwards to prevent the formation of air pockets and, as a result, malfunctions.

In the event "Cusps" are required for structural reasons, you must install bleed valves either on the flow or return.



SOLAR EXPANSION VESSELS

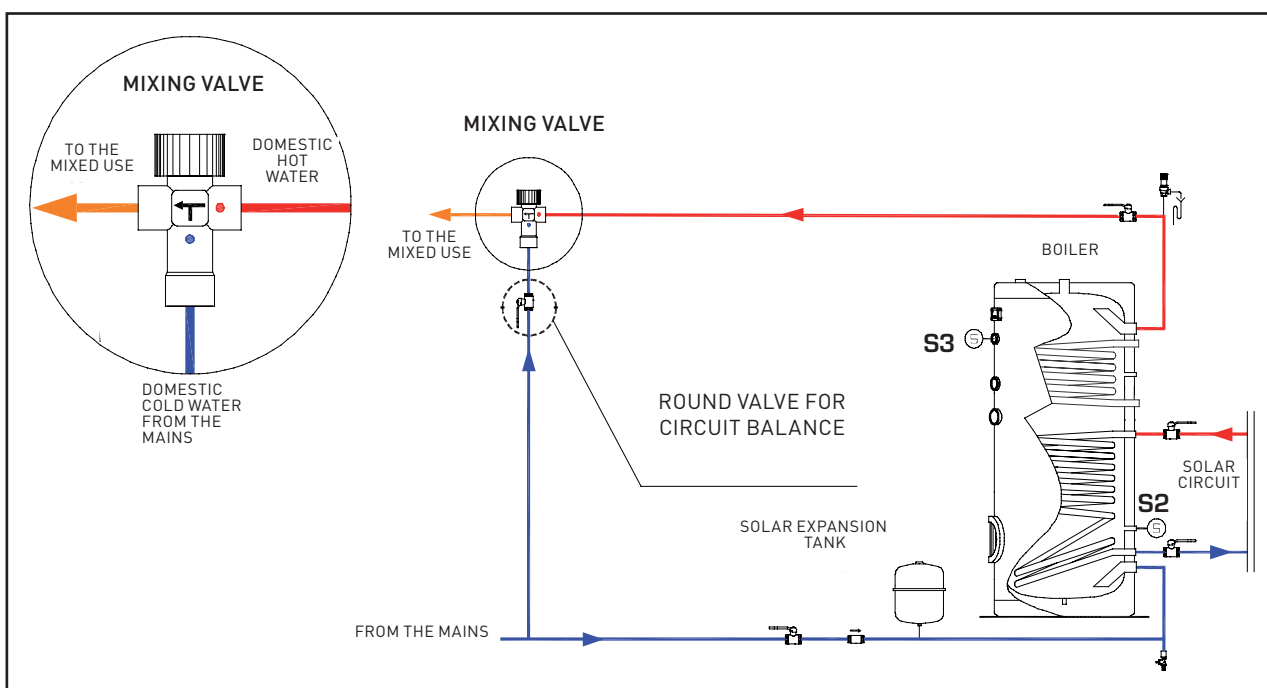
The expansion vessels must have suitable dimensions to contain additional volumes of the mixture of water - antifreeze liquid generated from thermal expansion and vapour, which can be checked in the collector. The membranes of the expansion vessels must be suitable for the maximum discharge pressure supplied by the safety valves (6 bar) and must be resistant to the mixture of water and antifreeze liquid (heat-transfer fluid).

Check that the pre-charge pressure of the expansion vessel is approximately 0.3 bar lower than the cold water filling pressure of the system.

THERMOSTATIC MIXING VALVE

The thermostatic mixing valve must be installed on the boiler outlet before the water reaches the application (in order to prevent scalding), according to that indicated in the attached power supply diagram.

To ensure correct mixing, the hot water circuit and the cold water circuit must have the same pressure.



CONNECTING THE ELECTRICAL DEVICES

The hydraulic installer must install the temperature probes of the control unit and place the relative cables; on the other hand, an authorised electrician must carry out the connection to the 22 V mains, the power supply of the solar circulator and that of the motorised valves, as set forth in the standard in force and in compliance with the specific instructions supplied with the system.

To prevent probe malfunctions, we recommend the following:

1. Do not place the temperature probe cables in a pipe containing a 220 volt line;
2. Use shielded cables;
3. To extend the probe cable of the collectors, use the temperature-resistant cable (eg, silicon cable).

We recommend connecting the supporting grille of the solar collectors and the pipes to the earthing system of the house.

CHARGING THE SYSTEM

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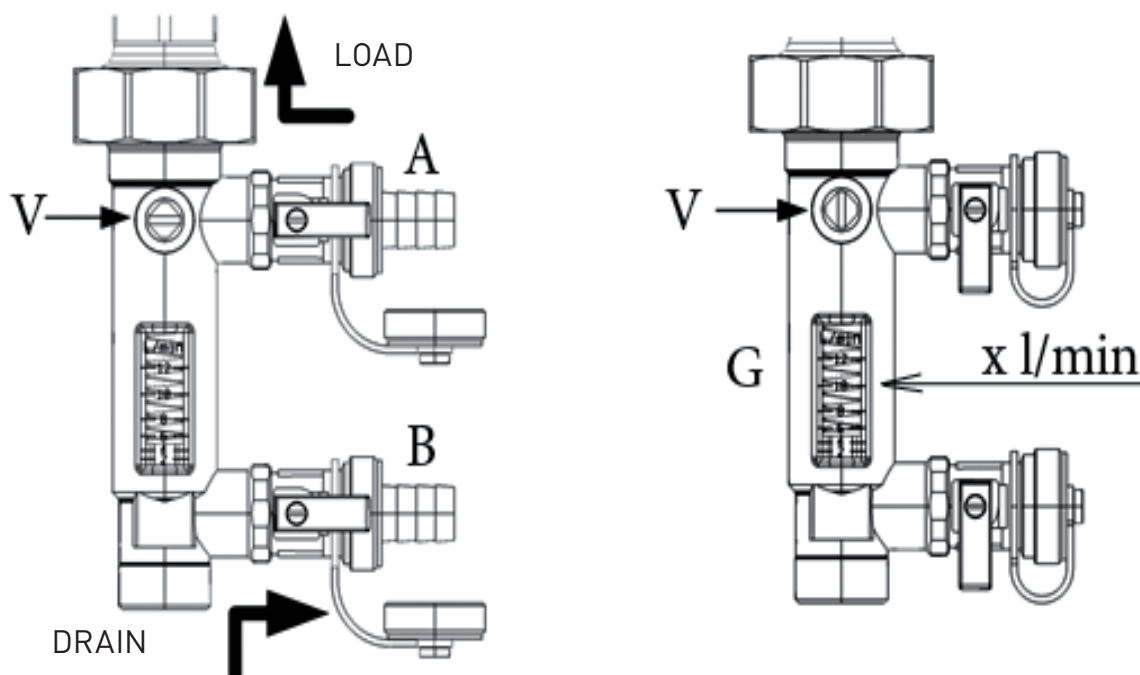
CLEANING THE SOLAR CIRCUIT

To clean and fill the solar circuit, use the two taps of the solar unit, one set for filling and the other one for discharge, separated by a shut-off valve. To improve operation, place the solar unit taps on the lowest point of the system. Optionally, install a 3rd tap in the lowest part of the system to fully discharge the system.

Before filling the system with the mixture of water and antifreeze liquid, rinse it making water circulate. This way, the processing waste of the solar circuit is removed.

- Open the tap (A) and connect it to the cold water tap using a rubber pipe.
- Open the tap (B) and connect it to a water discharge tap using a rubber pipe.
- Close the shut-off valve (V).
- Close all the shut-off taps before closing the automatic bleed valves or all the manual bleed valves.
- Open the water tap and leave the water to run hard in the solar circuit for a few minutes.
- If this operation is performed when there is a risk of frost, pay special attention to the back drain of the collector in order to prevent the formation of frost and breaking the panel.

In the event that the collectors do not run for long periods, we recommend disconnecting them from the system to make air flow inside and covering them using a shading sheet to prevent them from overheating.



CHECKING THE SEAL

Complete the rinsing phase by closing the tap (B) and let the pressure increase inside the solar system until a pressure 0.2 bar below that of the safety valve is reached (eg, if the safety valve is 6 bar, try with 5.8 bar). Close the tap (A) and then the water tap.

Open the shut-off tap (V). Configure the solar circuit pump operation in the control unit, open the shut-off taps of the bleed valves and release the air from the solar circuit manually:

- on the roof, remove the cover of the bleed valve and press using the tip of a screwdriver;
- on the thermal system, through the exhaust gas of the solar unit.

Check the pressure and, if required, reset by opening the tap (A) and the water tap.

Visually check all the pipes and fittings and make sure there are no leaks. Leave the system under pressure for a time to verify whether the pressure decreases.

During a trial period, the system can run only with water to verify the presence of possible leaks, if there is not risk of frost.

New systems may freeze because the owner bought the antifreeze liquid but did not add it the system. To avoid these problems, make sure that the antifreeze liquid has been poured into the system.

BLEEDING THE SOLAR CIRCUIT

Connect both taps to a cube using a rubber pipe to discharge and drain the system. The amount of water can be measured and used to prepare the mixture of water and glycol. To ensure drainage, the bleeding valves must be open to make the air enter and, if required, press using the screwdriver to facilitate the operation.

Make sure that the water filled in the circuit is discharged from the system to prevent it from freezing or from damaging the panel.

FILLING THE SOLAR CIRCUIT

Before filling the circuit, check the pre-charge pressure of the expansion vessel using a pressure gauge or bike pump having a pressure approximately 0.3 bar below the cold water filling pressure of the system.

If you plan to use the antifreeze liquid, mix water and glycol inside a container before pouring it into the system. The percentage of glycol depends on the minimum temperature that can be reached in the area where the system is installed (it is obtained from the stored data related to the minimum temperature of the area). This temperature must be reduced by at least 10°C so as to allow the panel to cool down to about 6-7°C above ambient temperature.

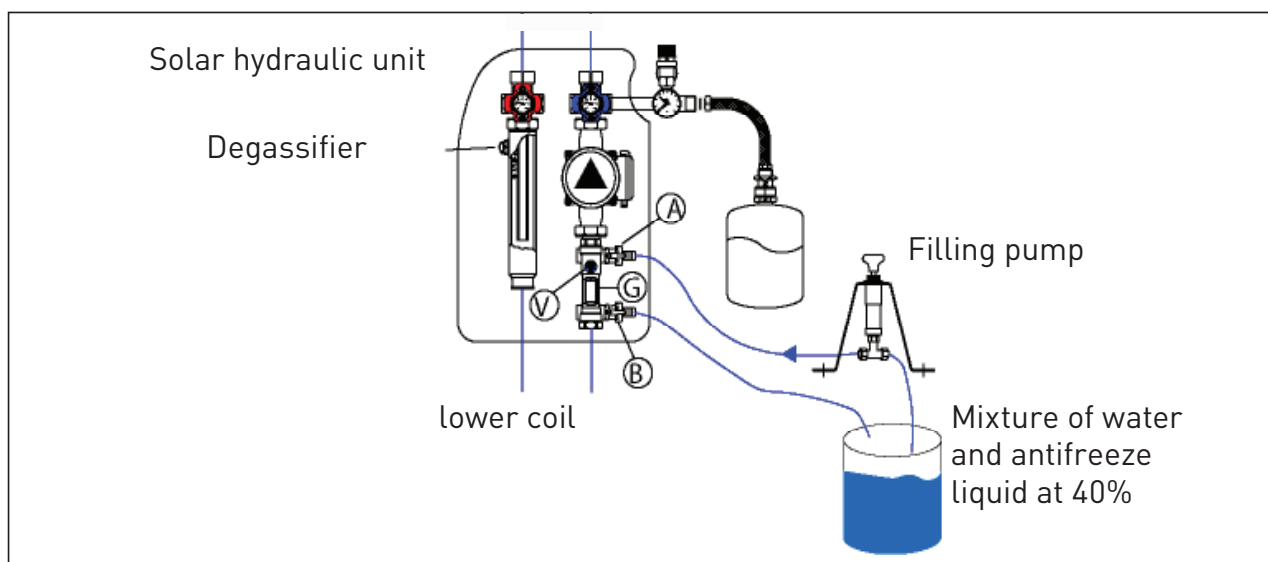
To be sure, integrate the antifreeze liquid until you reach 40% of the volume of the total mixture (not lower, regardless of the protection rating, to achieve an effective inhibitory function against pipe corrosion).

THE WARRANTY DOES NOT COVER ANY ICE BREAKAGE

The cold water filling pressure in the solar collector must be of 1.2 - 1.5 bar. If the system filling point meets the thermal system, it is necessary to reach the pressure resulting from the difference in hydrostatic level between the thermal system and the solar collector. For example, in the event that the set of collectors is open at a height close to 6 m compared to the thermal system, which is 6 m = 0.6 bar, the system should be charged by 2.1 bar (1.5 bar + 0.6 bar).

The filling occurs as described below:

- Connect a filling pump using the rubber pipes (for example, the manual filling pump code 8106095 optional, or a system test pump) to the container and tap (A).
- Take the rubber pipe of tap (B) back to the container.
- The taps must remain open and the shut-off valve (V) must remain closed.
- Open all the shut-off taps in front of the automatic and manual bleed valves.
- The manifold circuit must be filled using the pump with the mixture of water and glycol, until the fluid starts leaking from the tap (B).
- Close the tap (B). The pressure inside the solar circuit must be released until the desired initial pressure is reached. Now, close tap (A) and stop filling.
- Open the shut-off tap (V).
- Activate the solar circuit pump setting it in continuous operation to remove the air from the circuit. Manually open the bleed valve many times pressing with the tip of a screwdriver. Release the air from the pump by opening the large copper screw in front of the pump. Release the air from the gas extractor. Adjust the valve (V) so it has a flow rate of 45/50 l/h per m² of the inlet surface.
- After a few days and once you have fully released the air (no noise is heard inside the system), close the shut-off valves in front of the bleed valves in order to prevent the discharge of possible vapours inside the collector from the valve.
- Once again, check the initial pressure inside the solar circuit when it is still cold (early in the morning) and, if required, add new fluid.
- If there is still no fluid, apply the insulation on the pipes of the solar circuit, joining all points (or glueing them) without leaving leaks.



CONFIGURATION OF THE SOLAR CONTROL PANEL

Check that all the probes and electric devices required for system operation are connected properly.

Fasten the control panel according to the system configuration described in the instruction manual provided with the control panel.

Once the control panel is configured, the solar system is ready for use.

NOTE: The TERMOSOLIS control unit is included in the single-column solar unit provided with BS 2S DHW boilers. For every subsequent configuration of the solar control unit, refer to the attached manual.

MAINTENANCE

The forced circulation systems by **SIME FORCED** are extremely reliable and require minimum maintenance during the year. Comply with the following instructions:

WHEN	WHAT TO DO
EVERY YEAR (BEFORE WINTER)	Make sure that the percentage of antifreeze liquid in the mixture is below the freezing point; it can be added.
	Make sure that the pH of the water and antifreeze liquid mixture exceeds 8. In the event this value is lower, add a corrosion inhibitor (However, the antifreeze liquid must be replaced every 3-4 years).
	Check that the pressure of the collector circuit has dropped below the minimum pressure of the system (15 bar + hydrostatic gradient), and finally integrate the cold system with the mixture of water and antifreeze liquid.
	Check the operation of the automatic air bleed valve; remove the cap and press using a screwdriver. If air is released together with the liquids, the automatic valve is not working properly. Replace the valve if required.
	Empty the collector circuit and wash using running water. Pour the mixture of antifreeze liquid and water in the proportion suitable for the new antifreeze.
EVERY 3-4 YEARS	Check the magnesium anodes and replace if worn. Drain the hot water contained in the boiler and remove the anode to check the state of wear.

TROUBLESHOOTING

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[IT](#)
[ES](#)

1. The system does not heat or does not heat well
2. The pump makes a noise
3. Decrease of the system pressure
4. Leak in the safety valve
5. Display of incorrect values in the control unit
6. High temperature of the collectors during the night
7. Strong pressure changes
8. The water in the boiler cools down considerably during the night
9. High temperature in the solar collectors

PROBLEM/CAUSE	1	2	3	4	5	6	7	8	9	SOLUTION
Air in the system	X	X	X						X	When the system is in hot mode, drain the air bleed valve of the collectors and gas extractor in the solar unit. Repeat the operation for a few days.
Blocked pump	X	X							X	Open and close the pump to unblock it; replace it if required.
Dirt in the pump	X	X							X	Remove the motor and clean it.
Incorrect assembly of the pump	X	X							X	Install the pump correctly.
Pump speed range configured incorrectly	X	X							X	Always set the pump on speed 3 (speed is controlled from the control unit).
Defects of the pipe seal	X		X							Detect the leak and have it repaired by a qualified installer.
Excessive pressure in the system makes the safety valve open	X		X	X			X		X	Reset the system heat transfer fluid in cold mode, place it back under pressure, and drain it in hot mode.
Incorrect assembly of the temperature probe	X				X	X		X	X	Install the probe correctly or replace it if burnt.
Incorrect configuration of the control unit	X								X	Configure the control unit as indicated in the attached instructions.
No power supply available	X								X	Check the fuse of the control unit and fuse box.
Missing insulation	X							X		Isolate the system correctly using suitable insulation for solar systems.
Excessive consumption of water	X									Measure the water consumption.
The solar unit dampers are closed	X								X	Open all the dampers of the solar unit.
Pre-charge in the expansion vessel is too low or too high	X		X	X			X		X	Set the pre-charge pressure of the expansion vessel to a pressure approximately 0.3 bar below the cold water filling pressure of the system.
The expansion vessel is too small	X		X	X			X		X	Replace the expansion vessel and install a larger one (operation carried out by the installer).
The non-return valve of the solar unit is blocked.	X					X		X		Unblock the non-return valves of the solar unit.

DISPOSING OF THE SOLAR SYSTEM

The solar system consists of the following components:

SOLAR COLLECTOR

it can be disposed of by separating the main components:

- Metal parts (aluminium or stainless steel casing, copper capturing surface, brass fittings);
- Covering glass slab;
- Insulation (mineral wool sheet, CFC-free polyurethane foam);
- Rear polypropylene closing sheet (black) or made of PVC (white).

SOLAR BOILER

it can be disposed of by separating the main components:

- Metal parts (boiler body, magnesium anode, and protection device if made of stainless steel);
- Insulation (CFC-free rigid polyurethane foam);
- leatherette coating (only for vertical boilers).

SOLAR UNIT

It can be disposed of by separating its main components:

- The pump is made of cast iron metallic parts (pump body), copper (windings), steel (shaft) and reinforced resins (impeller);
- Metal parts (steel and brass fittings);
- Insulation (40g/l black, EPP thermoformed)

TERMOSOLIS REGULATION CONTROL UNIT

it can be disposed of by separating the main components:

- Plastic parts (the outer half and the transparent cover);
- Electrical parts.

PIPING

They can be disposed of by separating the main components:

- Copper or stainless steel piping;
- Expanded elastomer insulation.

COLLECTOR SUPPORTING FRAME

The supporting frame is made of aluminium.

GENERAL CONDITIONS:

1. General aspects:

This manual supersedes and replaces all previous editions.

2. Products:

We reserve the right to apply technical modifications to the products after updates without prior notice. Subject to composition and printing. The figures and diagrams used are symbolic.



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