

6720803996-00.1V

Thermo siphon for Flat roofs

FCB 120-1V / FCB 120-1V-B

125 / 250 L System



BOSCH

Installation instructions

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1 Key to symbols and safety instructions

1.1 Key to symbols

Warnings



Warnings in this document are framed and identified by a warning triangle which is printed on a grey background.



Electrical hazards are identified by a lightning symbol surrounded by a warning triangle.

Keywords indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **NOTICE** indicates that material damage may occur.
- **CAUTION** indicates that minor to medium injury may occur.
- **WARNING** indicates that serious injury may occur.
- **DANGER** indicates possible risk to life.

Important information



Important information in cases where there is no risk of personal injury or material losses is identified by the symbol shown on the left. It is bordered by horizontal lines above and below the text.

Additional symbols

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document or to other related documents
•	a list entry
–	a list entry (second level)

Table 1

1.2 Safety instructions

This chapter explains how the information in these installation instructions is laid out, and gives general safety instructions for safe and trouble-free operation. Safety instructions and user notes relating specifically to installation are found in the installation instructions alongside the specific installation steps. Please read the safety instructions carefully before starting the installation. If safety instructions are ignored, severe or even fatal injuries may result, as well as material losses and environmental damage.

Danger when working on roofs

- ▶ Take appropriate action to prevent accidents during all work on roofs.
- ▶ Take precautions against a possible fall while working on roofs.
- ▶ Always wear personal protective clothing and safety equipment.
- ▶ After completing the installation, check the installation set, the collectors and the tank are securely positioned.

Installation and maintenance

- ▶ Only have the appliance installed or modified by an approved heating contractor.
- ▶ Only use the tank for heating domestic hot water.

Risk of scalding

Always monitor operation if temperatures are above 60 °C.

- ▶ We recommend installing a DHW mixing valve downstream of the "DHW outlet" connection.

Risk of scalding

If the collector and installation material have been exposed to the sun's rays for a prolonged period, touching certain components may cause burns.

- ▶ Always wear personal protective clothing and safety equipment.
- ▶ Before and during installation, cover the collector and installation material (for example with a towel) to protect against high temperatures caused by solar radiation. It is worth leaving the equipment covered until the system is commissioned.

Maintenance

- ▶ **Customer recommendation:** Arrange an inspection/maintenance contract with an approved heating contractor, and have the appliance serviced every year.
- ▶ The user is responsible for the safety and environmental compatibility of the appliance.
- ▶ Only use genuine spare parts.

Instructing the customer

- ▶ Instruct the customer in the functions and operation of the appliance.
- ▶ Inform customers that they must not carry out any modifications or repairs.

2 Information about the installation set

2.1 Intended use

The rooftop installation set is designed to hold solar thermal collectors and their associated tank, which are installed on flat roofs at an angle of 23° or 40°. Never damage the structure of the building while installing the solar thermal system.

Conditions of use

Only fit the installation set on roofs with sufficient load bearing capacity; if necessary, consult a structural engineer or professional roofer.

The installation set is suitable for a installation height of not more than 20 m.

Fit additional profile rails, which are not part of the standard delivery, in the case of greater installation heights (up to 50 m or with wind speeds in excess of 129 km/h).

Never use the rooftop or flat roof installation sets to fix any other objects to the roof. They are designed only to enable the solar collectors and tank to be securely fixed.



Observe country-specific standards and directives when installing and operating the heating system.



The installation of a solar circuit pump can be considered in place of the thermosiphon if, due to static considerations, the roof is unable to bear the weight of the tank.



IMPORTANT: We recommend our customers not use the water from solar system directly for drinking purpose.

2.2 LIGHTNING PROTECTION

- Check regional regulations as to whether a lightning protection system is required.
- Lightning protection is normally required for buildings higher than 20 m, for example.
- Have a qualified electrician install the lightning protection.
- If a lightning protection system is installed, check whether the solar thermal system is included in this system.

Conditions of use

Consult standard IE-62305 for detailed information on "Recommendations on Lightning Protection"

3 Specification


Thermosiphon system			
Certificates		 Flat plate collector Certified by Bureau of Indian Standards as per IS 12933 Part I	
Further details		TSS 125	TSS250
Approximate operating weight	kg	195	380
Dimensions of Installed System (L x W x H)	mm	1005 x2500x1350	2010 x 2625 x 1425

Table 2 System specification

Collector		
Type		FCB 120-1V
Width	mm	1.032 x 2.026 x 92
Weight (empty)	kg	~36
Gross area ¹	m ²	2.09
Aperture area ¹	m ²	1.94
Absorber area ¹	m ²	1.878
Absorber type		Aluminium Full sheet
Absorber volume ¹	l	0.8
Absorber coating		Black selective coating
Glass Transmission	%	86 ± 2
Glass ¹	mm	3,2
Insulation /Thermal cond.	W/mK	Rockwool 0.043/ PUF 0.02
Back/Side thickness	mm	45/10
Stagnation Temperature ¹	(Max)	170
Max. operating pressure	bar	6 (only for collector)
Zero loss efficiency		> 70%
Overall heat loss		< 3.5 W/m ² K

Table 3 Collector specification

System	1 Circuit		2 circuits	
	125L	250L	125L	250L
Storage tank	made of Stainless steel 304L steel for horizontal installation		made of Stainless steel 304 L steel with heat exchangers inside the tank	
Type				
Domestic water volume	l	125	150	250
Solar fluid make up tank	l		3	3
Diameter	mm	480	640	640
Length	mm	1.180		
Weight (empty)	kg	22	38	48
Max. operating pressures		0.5 bar (Non Pressurized System) (Open vented)		
Corrosion protection		Aluminium Anode		
Storage cover		GI Pre-coated		
Insulation		50 mm Polyurethane insulation, CFC free		
Connection for electrical resistance		1 1/4" BSP INT. thread		
Cold Water Inlet		¾" BSP EXT. thread		
Hot water outlet		¾" BSP EXT. thread		

Table 4 Tank specification

System Output Temperature: Min. 60 °C¹) at ambient temperature of 32 °C

1) With minimum solar radiation of 5 kW/m² / day



It is mandatory to test the water sample before choosing the right system.

Parameters	TTS – 1 C System	TTS – 2 C System
Chlorides (ppm)	< 50 PPM	< 50 PPM
Total Hardness (CaCO ₃) ppm	< 150 PPM	< 300 PPM
Fluorine content (ppm)	< 50	< 50
PH	6.5 – 8.0	6.5 – 8.0

Table 5

4 Before installation

4.1 General notes



We recommend that you engage the services of a roofing contractor, who will be experienced in working on roofs and aware of the risk of falling.



DANGER: Risk to life through falls and falling parts!

- ▶ Take precautions against a possible fall while working on roofs.
- ▶ Always wear personal protective clothing and safety equipment.
- ▶ After completing the installation, check the installation set, the collectors and the tank are securely positioned.

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

Check the following:

- Whether the delivered material is complete and undamaged.
- The structure of the roof for sufficient load bearing capacity and damage (e.g. leaks).
- The optimum arrangement of the solar collectors. Take solar radiation into account (southerly orientation¹⁾). Avoid shade from high trees or similar.
- The stability of the installation surface. Remove gravel or similar material.



Only use original spare parts from the manufacturer and replace faulty parts immediately.



Have a professional roofer carry out all difficult roof repairs, particularly sealing bitumen layers.



Deviations from the optimal orientation do not result in noticeable differences in output. For further information on the output curve of the system in cases where the orientation/slope deviates, see the technical documentation.

1) Align systems in the southern hemisphere to the north.

4.2 Standard delivery

4.2.1 Installation set for flat roofs



The installation sets are designed to hold and secure the tank and collectors.

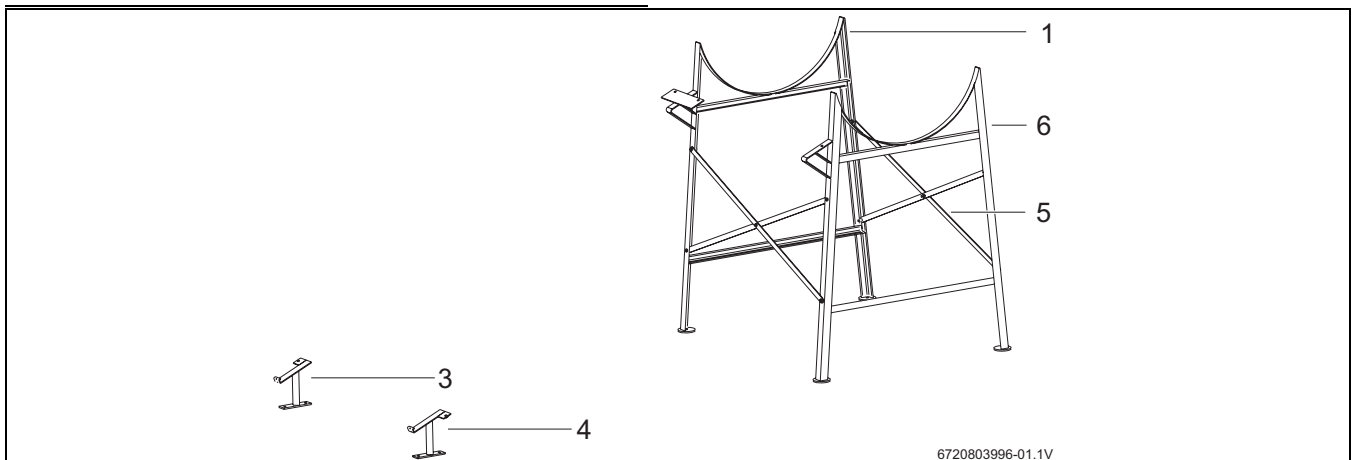


Fig. 1

Standard Flat roof Installation Set for TSS 125		
Pos.	Qty	Designation
1	1x	Tank Support – Left End
3	1x	Collector front end – Left support
4	1x	Collector front end – Right Support
5	4x	Tank Support – connecting bars
6	1x	Tank Support – Right End
	1x	Hose pipe support
	15 x	M8 x 25 bolt, Nut and washer
	5x	Down holder clamp

Table 6

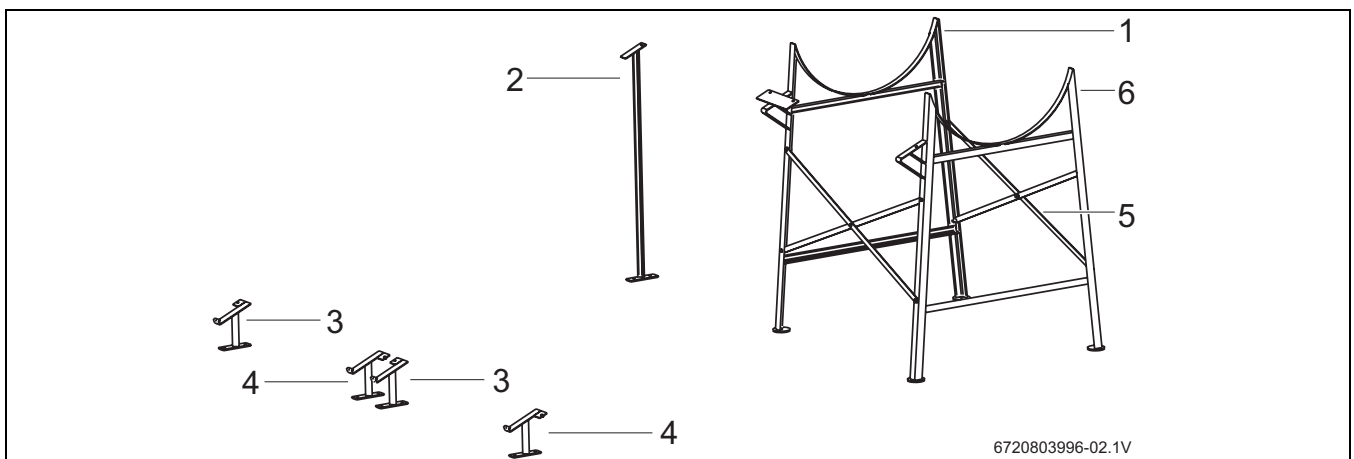


Fig. 2

Standard Flat roof Installation Set for TSS 250		
Pos.	Qty	Designation
1	1x	Tank Support – Left End
2	1x	Second Collector Rear Support
3	2x	Collector front end – Left support
4	2x	Collector front end – Right Support
5	4x	Tank Support – connecting bars

Table 7

6	1x	Tank Support – Right End
	1x	Hose pipe support
	19x	M8 x 25 bolt, Nut and washer
	9x	Down holder clamp

Table 7

4.2.2 Hydraulic connection set for flat roof Installation

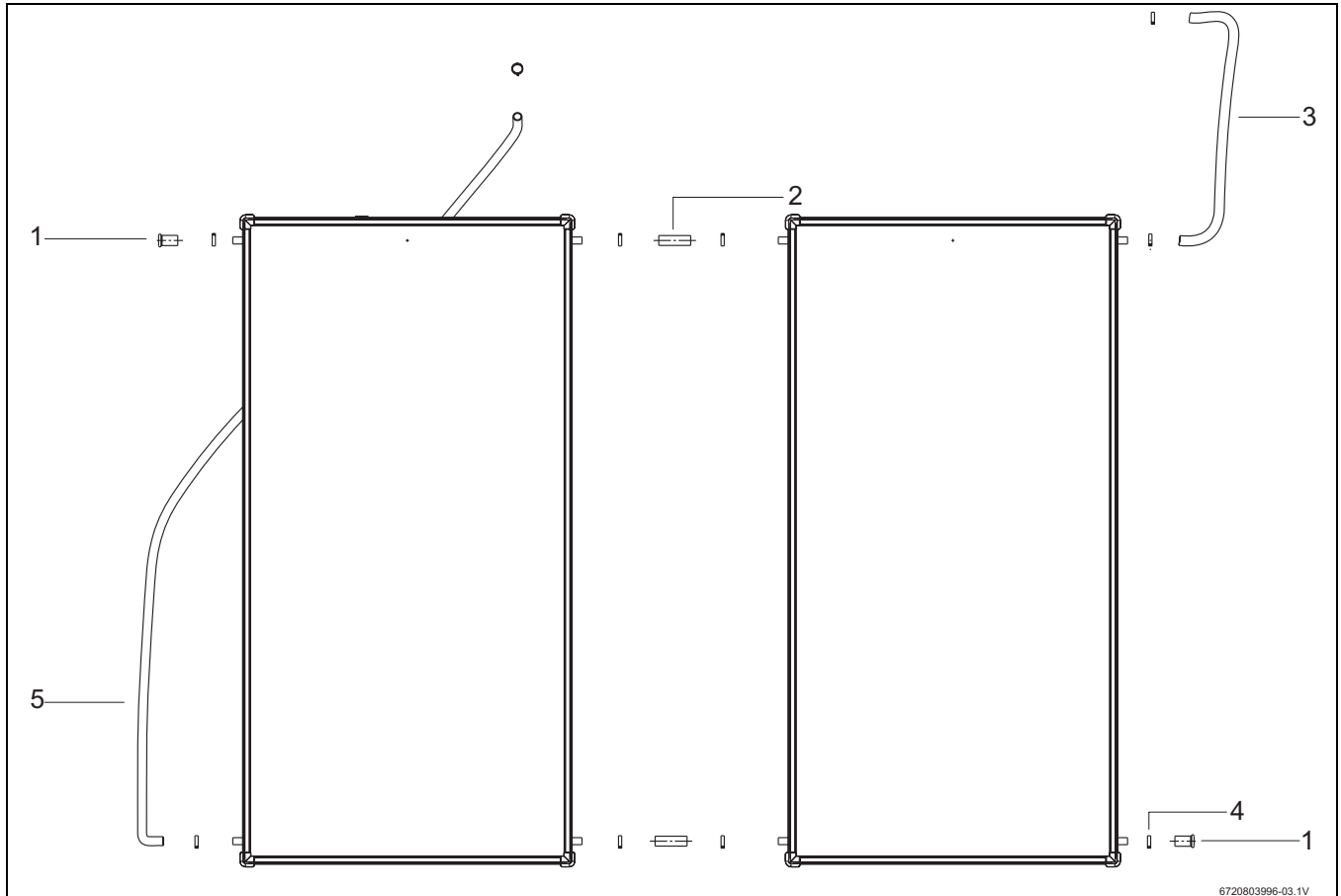


Fig. 3 Installation sets for 2 collectors: 1 standard installation set, 1 extension installation set

Standard Hydraulic Set for TSS 125			Standard Hydraulic Set for TSS 250		
Pos.	Qty	Designation	Pos.	Qty	Designation
1	2x	EPDM Dummy hose pipe	1	2x	EPDM Dummy hose pipe
3	1x	EPDM hose, 1000mm	2	2x	EPDM hose, 100mm
4	6x	Hose clamp (worm clip)	3	1x	EPDM hose, 1000mm
5	1x	EPDM Hose, 2400mm	4	10x	Hose clamp (worm clip)
			5	1x	EPDM Hose, 3200mm

Table 8

4.3 Required Tools / Equipments


- Spanner – M8, M4 – 2 Nos
- Screw Driver
- Measuring tape – 5m
- Magnetic Compass
- Spirit level
- Roofing ladder
- Rope
- Crane or mobile hoist
- Pipe cutter, Pipe threading device

4.4 Transport and storage

All components are protected by transport packaging.

Transport protection for collector and tank connections

The collector connections are protected against damage with plastic caps.

 **NOTICE:** System damage through damaged sealing faces!

► Remove the plastic caps [1] immediately prior to installation.

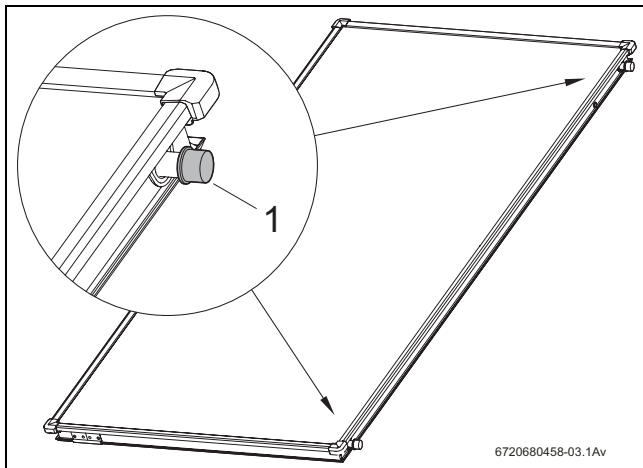



Fig. 4 Plastic caps on collector connections

Storage

Store the collectors in a dry location.

4.5 Estimating your space requirements

 **NOTICE:** System damage through wind eddies and wind pressure peaks at the flat roof perimeter!

► Before commencing installation, ensure that a clearance of at least one metre is allowed between the flat roof frame and the roof perimeter (→ Fig. 5).

It is mandatory to install the system with collector facing south direction in a shadow free area.

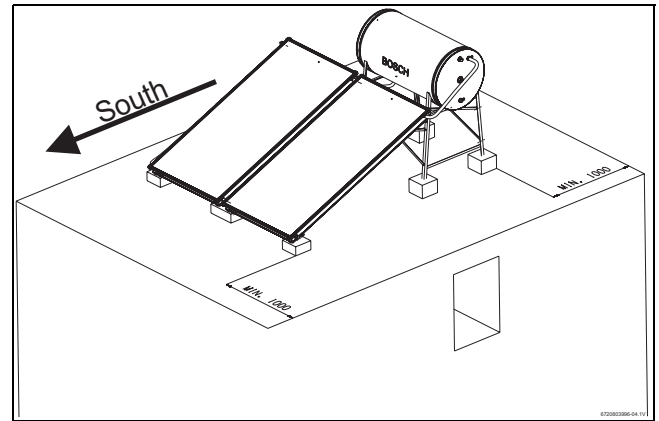


Fig. 5

Space requirement, collector array

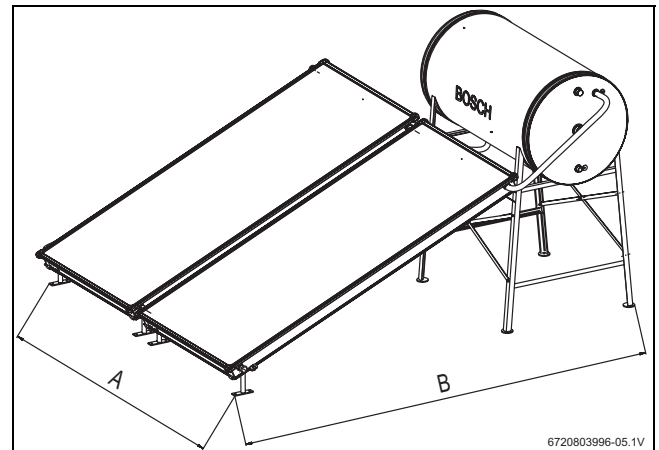



Fig. 6 Space requirement, collector array

The dimensions given for the space requirement do not take account of the pipes. For the pipes, on the right and left of the collector array, allow at least an extra 0.5m on each side.

Number of collectors	Dim. A	Dim. B
1 (125 liters)	1100 mm	2500 mm
2 (250 liters)	2050 mm	2625 mm

Table 9 Space requirement for rooftop installation


5 Installing the flat roof mounting structure

 **DANGER:** Risk to life through falls and falling parts!

► Take appropriate action to prevent accidents during all work on roofs.

5.1 Flat roof

5.1.1 Installing flat roof frame 125/250 l system - building not taller than 20 m

 To facilitate installation, first tighten all screws by hand.

- ▶ Hold the tank vertical support in position and connect them by using cross bars and fasteners at both front and back.

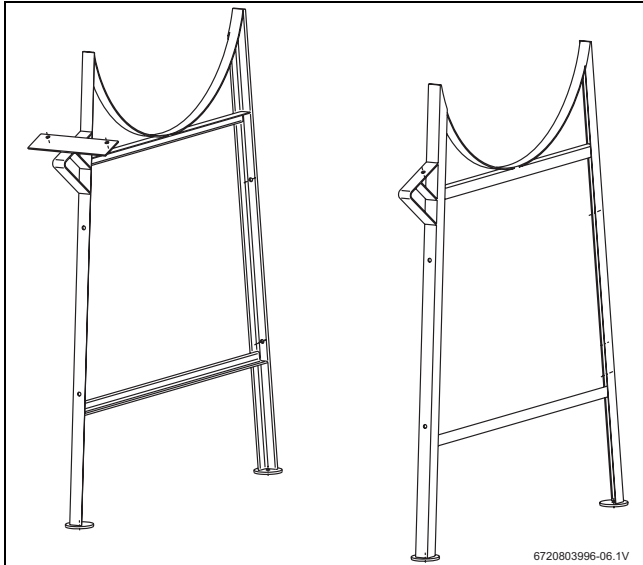


Fig. 7

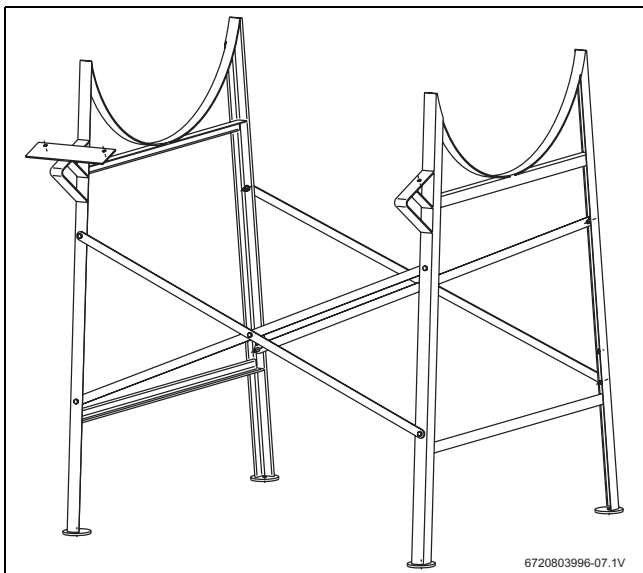


Fig. 8

6 Tank Installation

6.1 Installation of tank on flat roof

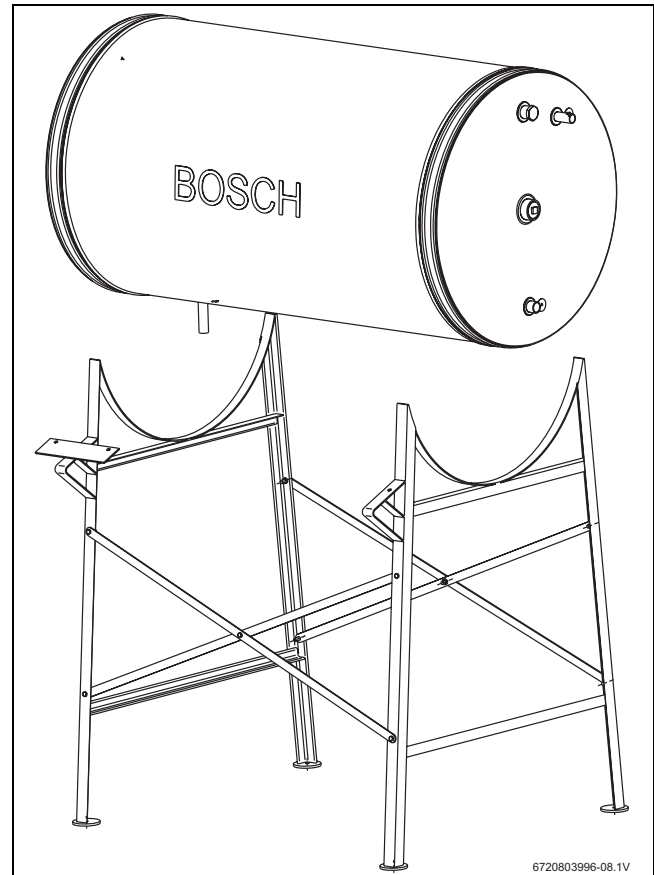


Fig. 9

- ▶ Place the tank on the mounting structure, and align it to the center of the two supports.
- ▶ Ensure that the BOSCH sticker on the tank is facing the collector side and cold water pipe should be positioned down.
- ▶ The tank will be held in its position by the virtue of its own weight.
- ▶ Ensure that the EPE pads are pasted on the U bracket before placing the tank.

7 Collector installation

7.1 Installation of collector on flat roofs

- ▶ Observe the following safety instructions and user information



DANGER: Risk to life through falls and falling parts!

- ▶ Take precautions against a possible fall while working on roofs.
- ▶ Always wear personal protective clothing and safety equipment.
- ▶ After completing the installation, check the installation set, the collectors and the tank are securely positioned.



DANGER: Risk to injury through falling collector!

- ▶ During transport and installation, ensure that the collectors are adequately secured.



NOTICE: System damage through damaged sealing faces!

- ▶ Remove the plastic caps on the collector connections immediately prior to installation.



NOTICE: System damage through leaking solar hoses!

- ▶ It is very important to ensure the safety clip is positioned correctly. Subsequent loosening using pliers can impair resilience.



Use lifting equipment as used by professional roofers or 3-point suction handles with adequate load bearing capacity for the installation.

7.2 Preparing to install the collectors



NOTICE: System damage through leaking solar hoses!

- ▶ It is very important to ensure the safety clip is positioned correctly. Subsequent loosening using pliers can impair resilience.

7.3 Positioning the first collector

- ▶ Fix the front end collector supports using collector clamp and M8 screws.

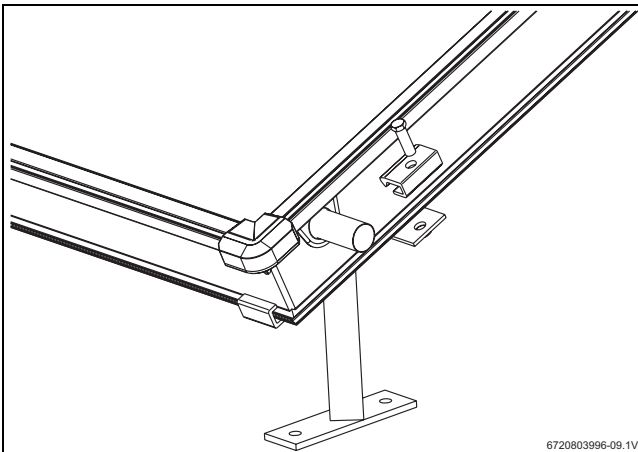


Fig. 10

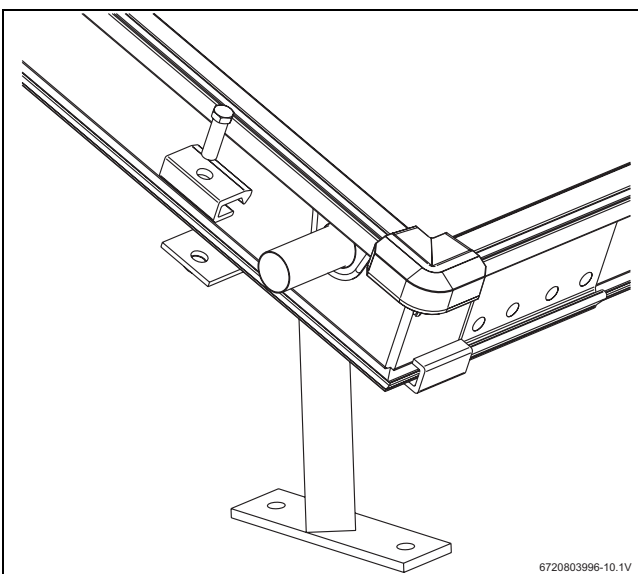


Fig. 11

- ▶ After fixing the front end supports, lift the rear end of the collector and place it on the tank mounting support as shown in fig. Position the collectors and clamp it to the mounting structure using the collector clamps.

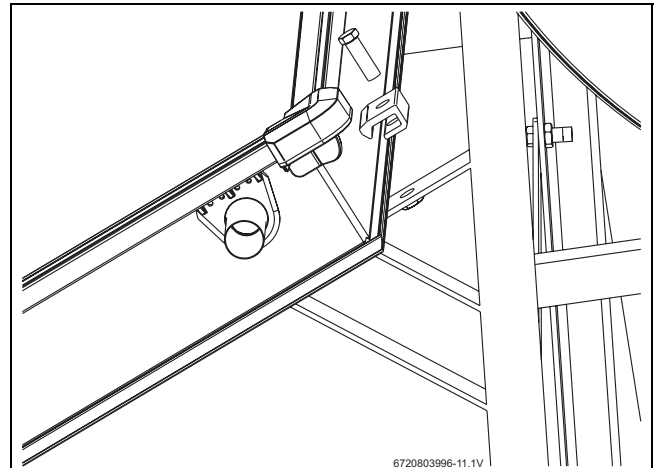


Fig. 12

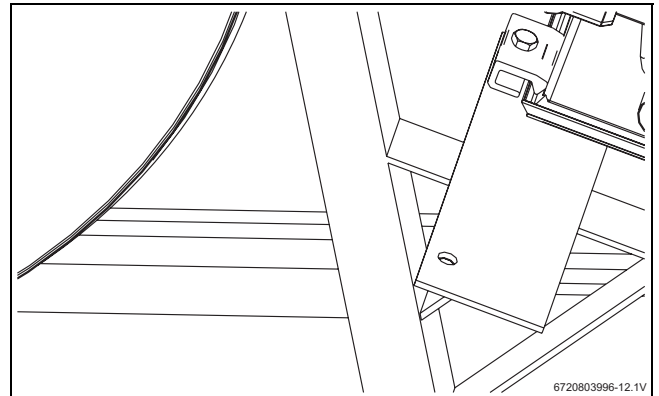


Fig. 13

7.4 Installing the second collector for 250 Liters system

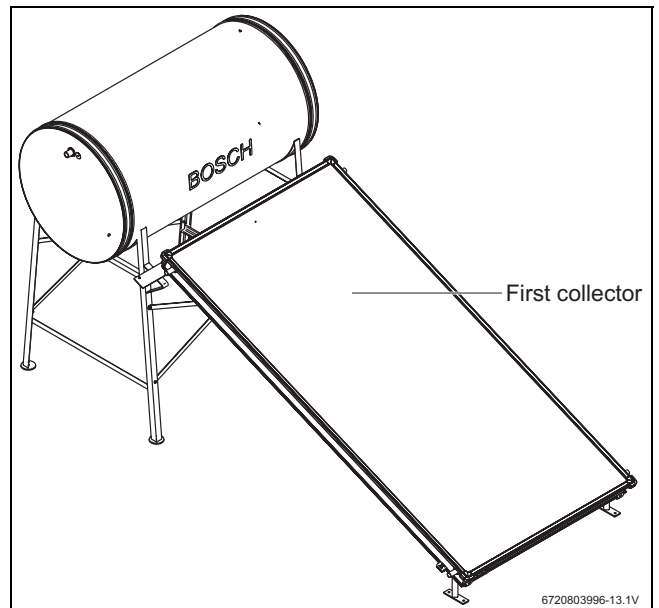


Fig. 14

7.4.1 Installing second collector

- ▶ Insert the EPDM hose and the clamps into header pipe of the first collector

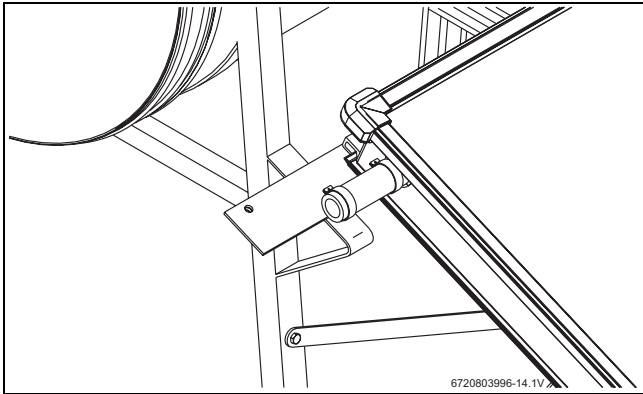


Fig. 15

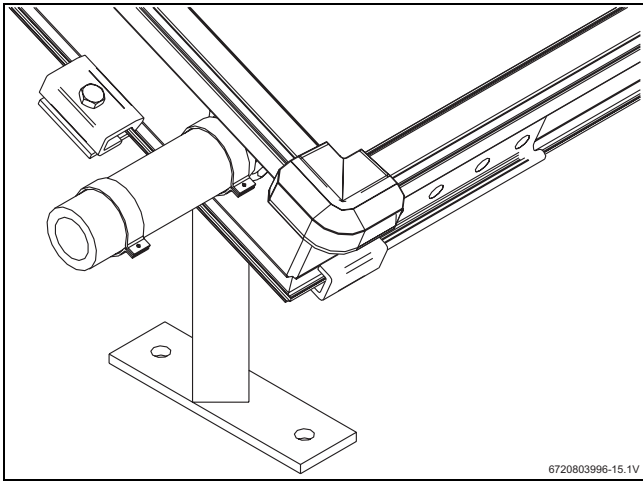


Fig. 16

- ▶ Move the second collector towards the first collector and Insert the header pipe into the hose and clamp it tightly

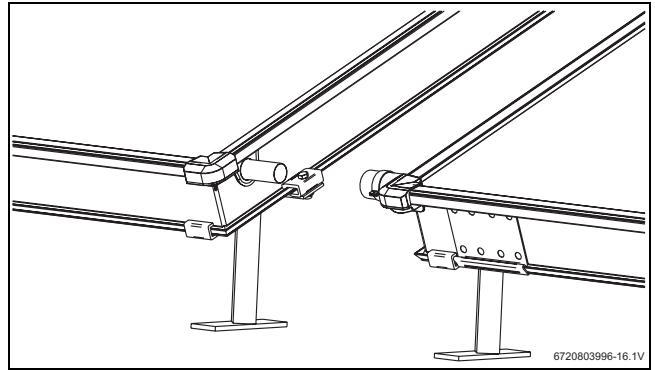


Fig. 17

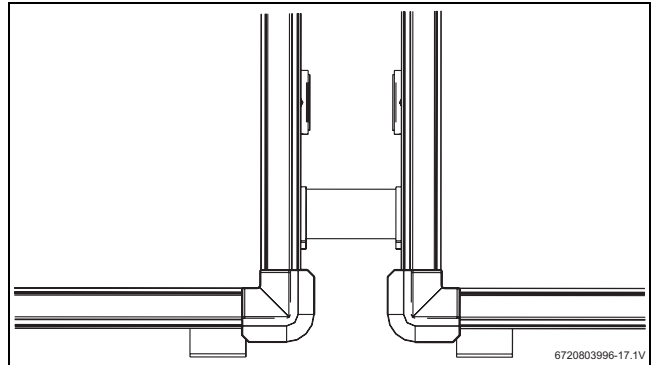


Fig. 18

- ▶ Clamp the second collector rigidly to the mounting structure as shown below.

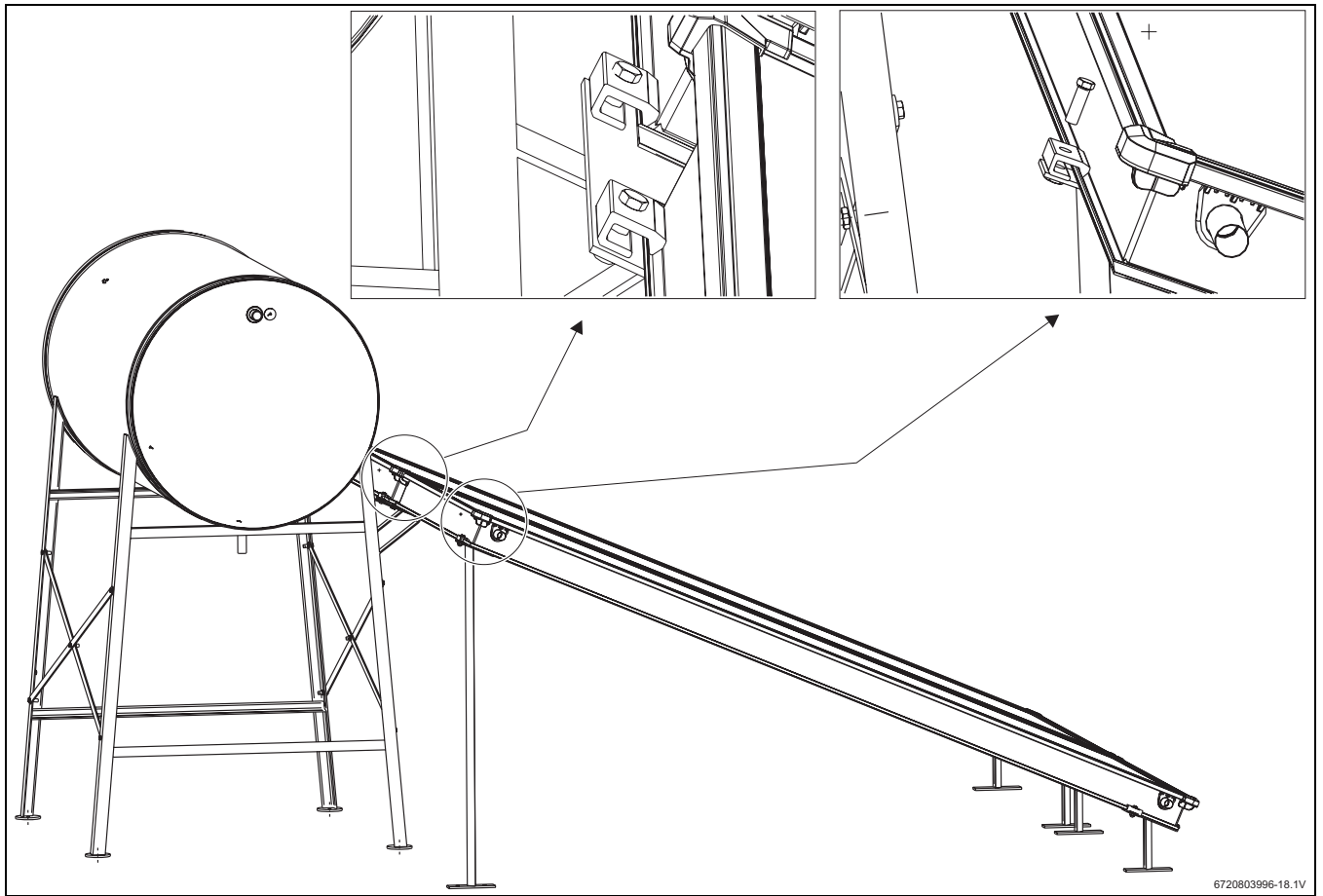


Fig. 19

8 Installation of connection lines

8.1 Installing the dummy hose pipes

- ▶ Remove the plastic protection cap from the header pipe.
- ▶ Insert the hose clamp into the hose
- ▶ Insert the dummy hose into the header tube.
- ▶ Tighten the hose clamp rigidly using screw driver.

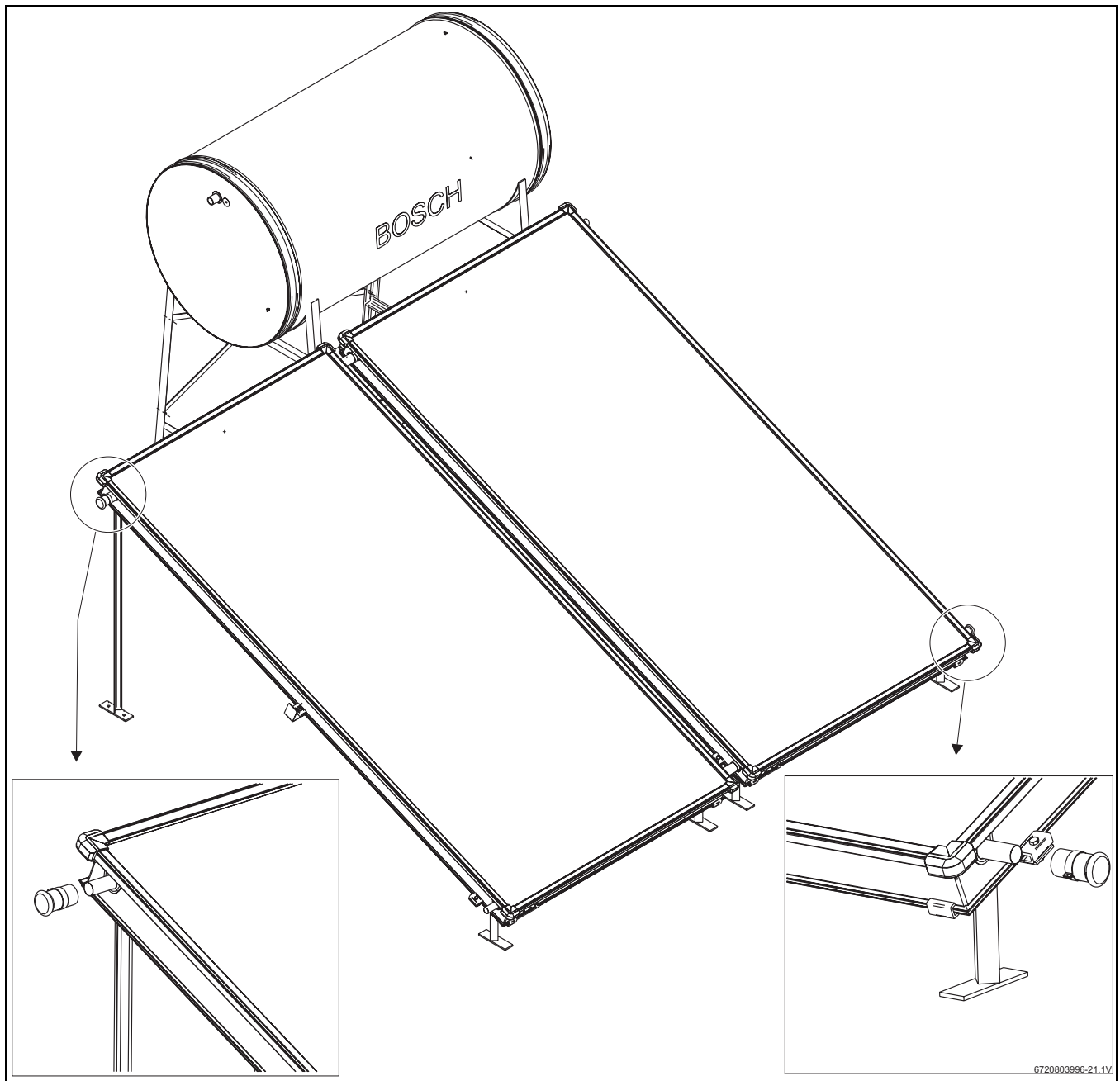
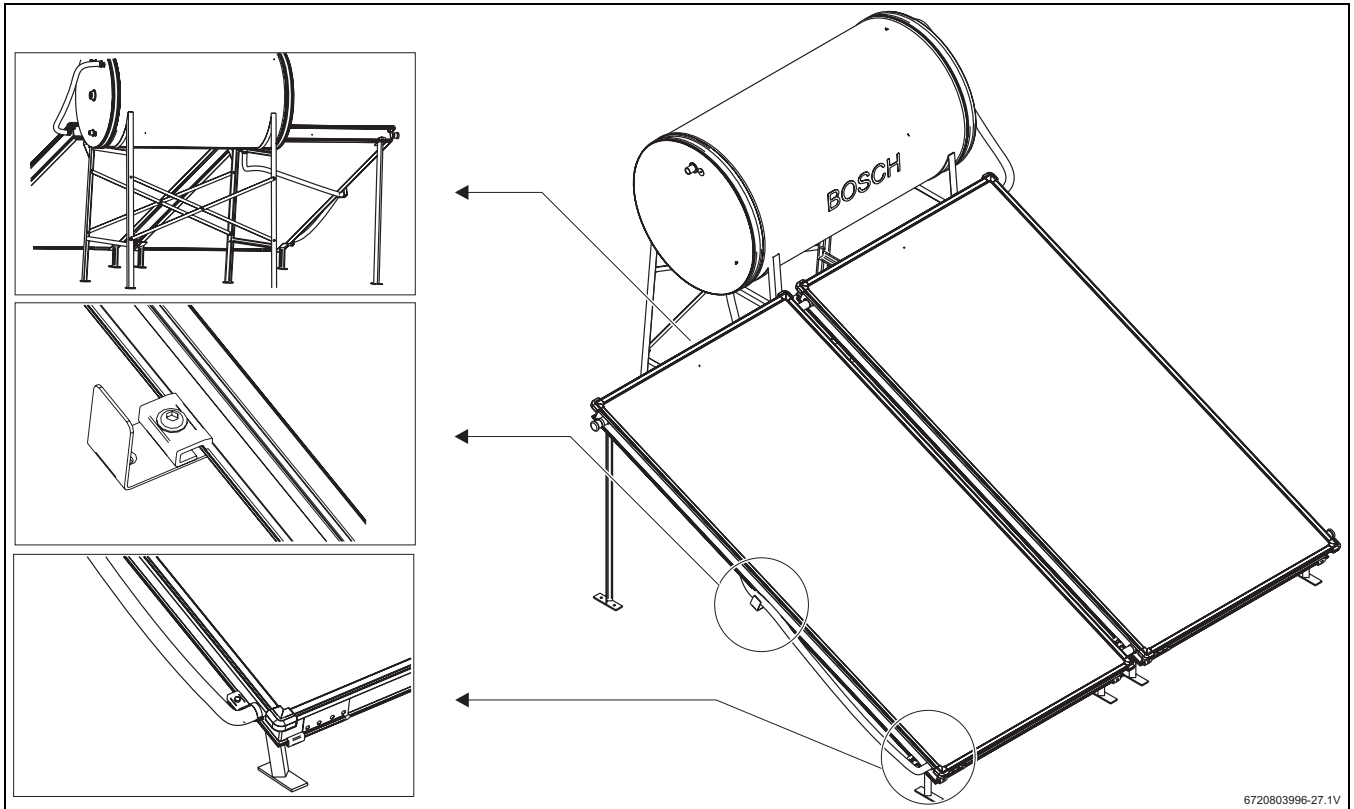


Fig. 20

8.2 Connecting the cold water hose pipe

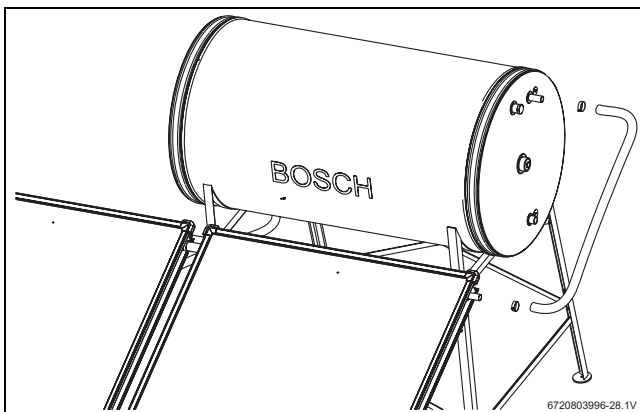


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Fig. 21

- ▶ Connect one end of EPDM hose to the bottom header pipe of the second collector.
- ▶ Fix the hose pipe support bracket with collector clamp to the second collector.
- ▶ Connect other end of EPDM hose to the cold water outlet pipe at the bottom of the tank using clamp.
- ▶ Route the hose pipe through support bracket.

8.3 Connecting hot water inlet pipe.



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Fig. 22

- ▶ Remove the plastic cap from the header pipe.
- ▶ Insert one end of the EPDM hose into the collector header and clamp is rigidly with hose clamp.
- ▶ Connect the other end of the hose pipe to hot water inlet pipe of the tank.

8.4 Schematic layout of the solar water heating system

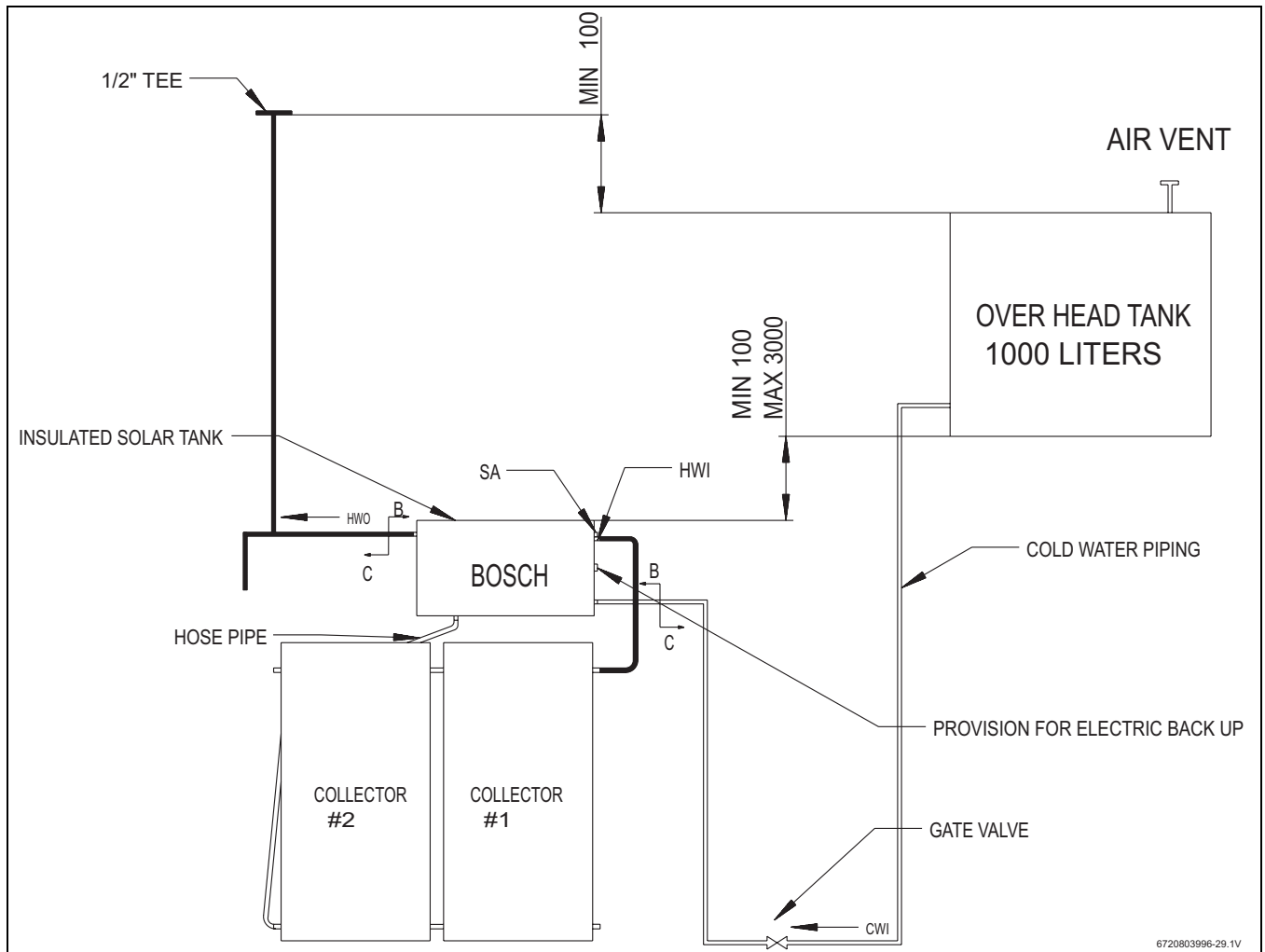


Fig. 23

- [SA] Sacrificial Anode
- [HWI] Hot water Inlet
- [CWI] Cold water Inlet
- [HWO] Hot water outlet
- [B] BOSCH scope
- [C] Customer scope

9 Commissioning



Prior to commissioning, ensure that all connections are tight.



It is mandatory to fix all the vertical support of the mounting structure on the roof top with cement concrete as per the size mentioned in fig 25 & fig 26.

9.1 Securing the mounting structure with cement concrete

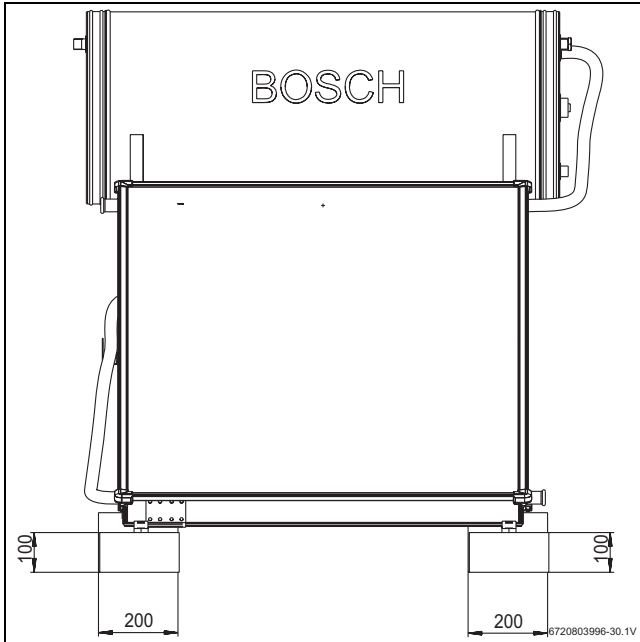


Fig. 24

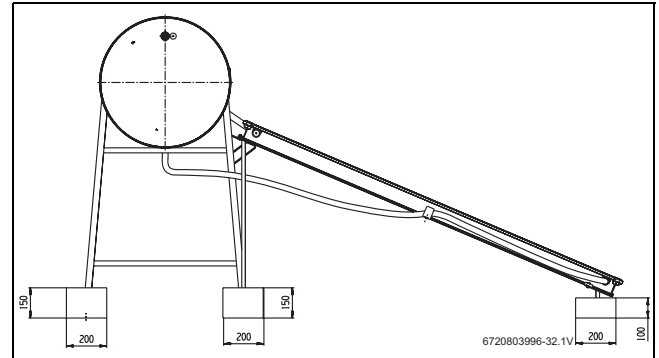


Fig. 25

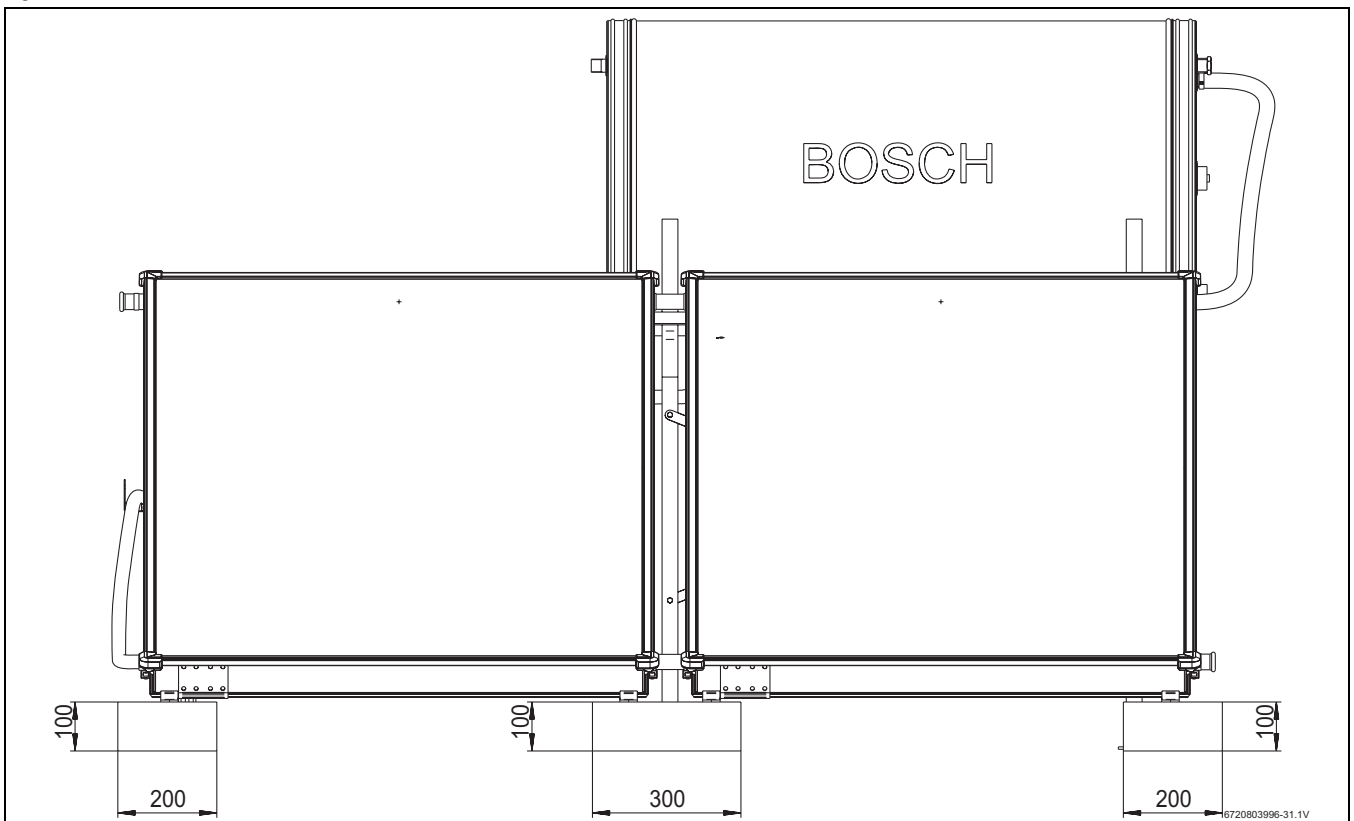


Fig. 26

- ▶ Air vent or air release valves as shown in schematic is a must for all installations. Absence of air vent will damage the system and same is not covered under warranty in such conditions.
- ▶ Hot water piping should be properly insulated. The hot water piping should be kept as min. as possible to avoid the heat losses.

- ▶ Immediately after installation, the tank system should be filled with water.
- ▶ Open the cold water inlet valve and allow the water get filled into the solar tank by gravity from the overhead tank. Open the hot water tap until the water gets completely filled.

9.2 Installation of 2-C systems

9.2.1 Installation of make-up tank

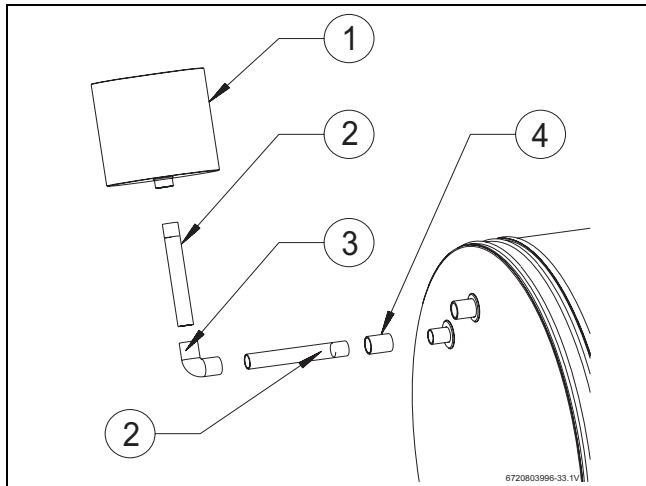


Fig. 27 Make up tank assembly

- [1] Tank
- [2] 1/2" BSP Pipe Nipple (6"L)
- [3] 1/2" BSP Elbow
- [4] 1/2" BSP Coupling

9.2.2 Installation of air vent assembly

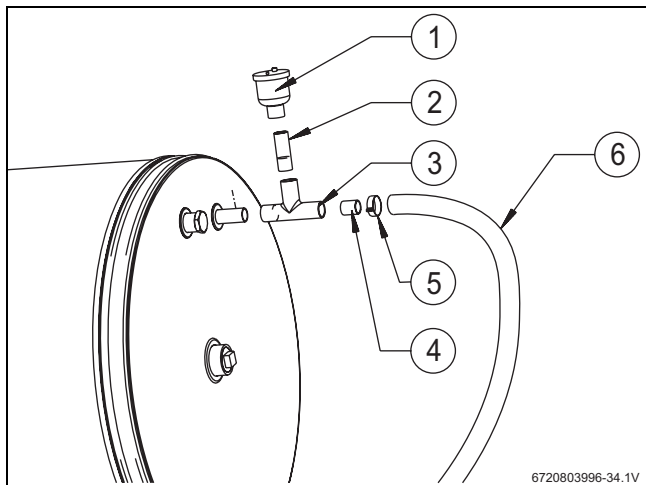


Fig. 28 Air vent assembly

- [1] Air release valve
- [2] 1/2" BSP Pipe nipple (2"L)
- [3] 1/2" BSP Tee
- [4] 1/2" BSP Pipe nipple (1"L)
- [5] Hose clamp
- [6] EPDM Hose

9.3 Commissioning of 2-Circuit Systems

Fill the hot water circuit through the make up tank with de-mineralized water or glycol water mixture. (in case of glycol + water, mixture should be in the ratio of 1:2)



WARNING: Risk of injury through contact with heat transfer medium

- ▶ When handling heat transfer medium always wear protective gloves and goggles.
- ▶ If heat transfer medium comes into contact with the skin, it can be washed off with water and soap.
- ▶ If, despite protective goggles, heat transfer medium comes into contact with the eyes, rinse eyes thoroughly under running water while holding eyelids wide open. The medium is non-corrosive and biodegradable. A safety datasheet with further information regarding the heat transfer medium is available from the manufacture on request.



Glycol or water should be sourced locally by the installer / dealer. It will not be supplied in the standard installation kit

10 Checks following commissioning and maintenance



Only carry out the final insulation work when the points in the checklist have been ticked off.

Checks

Solar hose secured with hose clamps	<input type="checkbox"/>
Mounting structure connection screws Rigidly fixed	<input type="checkbox"/>
No leakage of water through the connections	<input type="checkbox"/>
Air vent correctly installed	<input type="checkbox"/>
Mounting structure fixed on the roof with concrete	<input type="checkbox"/>
DM water / Glycol water mixture completely Filled in secondary circuit (Only for 2-C susyems)	<input type="checkbox"/>
System installed in correct direction	<input type="checkbox"/>
Air vent/air release in the solar circuit installed correctly	<input type="checkbox"/>

Table 10

11 Environment / disposal

Environmental protection is a fundamental corporate strategy of the Bosch Group. The quality of our products, their economy and environmental safety are all of equal importance to us and all environmental protection legislation and regulations are strictly observed.

We use the best possible technology and materials for protecting the environment taking account of economic considerations.

In order to continue with our commitment to the environment, we expect our customers to work with us to ensure safe and responsible disposal of the product at the end of its lifecycle.

In case the safe and effective disposal of the product proves difficult, BOSCH will accept the materials returned to its premises. BOSCH will then undertake to recycle or dispose the products in accordance with the best environmental practices.

Packaging

We participate in the recycling programmes of the countries in which our products are sold to ensure optimum recycling. All of our packaging materials are environmentally compatible and can be recycled.

Used appliances

Used appliances contain valuable materials that should be recycled. The various assemblies can be easily dismantled and synthetic materials are marked accordingly. Assemblies can therefore be sorted by composition and passed on for recycling or disposal.

12 Maintenance

Installation

- ▶ Once in a year drain the system by removing the cold water outlet pipe from the tank. Before draining ensure that cold water inlet valve is closed. Draining intervals should be regular if water is hard.
- ▶ Check the condition of the sacrificial anode periodically. Replace it if found corroded.
- ▶ For 2-C systems makeup tank should be topped up with anti-freeze solutions or de-mineralized water at regular intervals, if not system performance will come down.
- ▶ Ensure that hot water is used once in day, either in the morning or in the evening to get better performance.

Heat transfer medium (For 2-C Systems)

- ▶ Test the heat transfer medium with a suitable instrument (corrosion and frost protection).
- ▶ Test the pH value of the heat transfer medium with a suitable instrument.



We recommend checking the frost protection level every two years.

Collector

Contaminated surfaces restrict the collector performance.

- ▶ Clean the glass surface of the collector regularly with cold water.

Tank

Unless agreed otherwise in writing, the tank may only be filled with potable water. Generally, we recommend having the tank checked and cleaned by authorized installer at least every two years. If water quality is hard, checking and cleaning should be at regular intervals.



DANGER: Risk of scalding on the safety assembly!
Water may escape from the safety assembly when the tank is drained.

- ▶ Drain escaping water so that scalding is prevented.



Tighten all hexagon screws first by hand, then with a spanner by a three quarter turn (equal to the recommended torque of 40 Nm with a torque wrench).

13 Warranty Terms

1. Name and Address of Manufacturer

Bosch Limited
PB No 3000, Hosur Road, Adugodi
Bangalore 560 030

2. Identification of the Product covered by these Warranty Terms

For correct identification of the Product, the correct name must be specified in the invoice.

3. Warranty Terms for Solar Thermal Products

3.1 The Manufacturer is responsible before the Product Buyer, for the lack of conformity of the Product, counting from the delivery date / commissioning date (whichever is earlier) to:

- **12 months** for solar thermal collectors, Insulated solar tank, mounting structures, and hydraulic connections.

3.2 To execute his rights, the consumer must report to the supplier the lack of conformity of a Product within a 2-month period counting from the date of its detection.

3.3 All Products must be installed according to the local legislation and according to the installation and user's manuals, and with original (or recommended) accessories from the brand. An incorrect installation from the consumer, or an installation that does not fulfil the requirements of law will not be considered for Warranty. In such cases, the installation must be corrected.

3.4 It is up to the consumer and installer to ensure that frequent maintenance operations take place, as indicated in the Installation and User's manuals, included in the Product.

3.5 This warranty shall apply only to the manufacturing defects arising in the system under standard usage conditions. BOSCH reserves the right to repair the system free of charge or replace the system within the warranty period.

3.6 This Warranty is valid for Products and Equipment of the Bosch brand that have been purchased and installed in the Republic of India.

4. Circumstances that exclude the application of these Warranty Terms

Services under Warranty are not valid (being the consumer responsible for the cost of intervention) in the following cases:

4.1 If the hardness of the water fed into 1-C system is more than 150 PPM (parts per million) and 2-C systems is more than 300 PPM. If the chloride content in the water is more than 50 PPM

4.2 If the inlet water pressure is more than the prescribed limits.

4.3 The Bosch Product is part of a heating system, but its warranty does not include faults from external components that may affect its function.

4.4 Products whose function has been affected by faults from external components or by faulty dimensioning.

4.5 Damages caused by use of accessories or spare parts that are not the ones determined by the Manufacturer.

4.6 Damages caused by un-fulfilment of the installation and user instructions, as well as caused by incorrect application of the Product or abnormal climate conditions, abnormal working conditions, overcharge, or inadequate maintenance.

4.7 The Products were modified or manipulated by unqualified staff.

4.8 Damages caused by external agents (animals), atmospheric or geological phenomena (strong rain, hail, thunderstorms), as well as from excessive water pressure, lack of anti-freezing fluid, tension, pressure or filling of inadequate circuits, vandalism, urban confrontation or any type of armed conflicts.

4.9 Damages caused by transport not performed by Bosch.

4.10 Aesthetic faults that don't include changes to the description made, will not be considered under the Warranty. except if they represent a limitation in the Product function, according to the calculation described in the law.

4.11 Items such as rubber / plastic products, glass, sacrificial anode, fasteners and other consumables are not covered under warranty.

5. The Manufacturer will correct, without any cost for the Consumer

The faults covered by Warranty, whether by repairing or by replacing the Product. The Products, equipments and replaced parts will therefore become property of the Manufacturer.

6. Any disputes shall be subjected to Bangalore jurisdiction only.

Notes

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