



# **WATER HEATERS FOR THERMOSIPHON SYSTEMS**

**150L | 200L | 300L**



## **TECHNICAL DESCRIPTION INSTALLATION AND OPERATION MANUAL**

**WARNING! Before use read carefully the instructions!**



## KEY REQUIREMENTS FOR SAFETY

Before beginning installation and operation of your water heater it is compulsory to read the complete text of this instruction. It is designed to familiarize you with the unit, with the rules for its proper and safe use and the minimum activities necessary to maintain and service it. Furthermore, you will need to provide this guide for use by qualified persons who will install and repair the unit in case of failure. Installation and commissioning of the unit is not a warranty obligation of the seller and/or manufacturer. Keep this guide in a suitable place for future reference. Compliance with the rules helps for safety use of the appliance and is one of the warranty terms and conditions.

**ATTENTION!** Installation of the water heater and connection to the water main system should be performed only by qualified persons in accordance with the instructions in present manual and local regulations in force. Installation of safety and other components provided by the manufacturer is **COMPULSORY!**

**ATTENTION!** Connection of the water heater to the water main system should be performed only by qualified persons in accordance with the instructions in present manual and local regulations in force. The appliance should be properly connected to the current-carrying wires and the protection grid! Do not connect the appliance to the electrical installation before filling its water tank up with water! Failure to comply shall make the appliance dangerous and in such state its use is strictly forbidden!

**ATTENTION!** Connecting the tank with integrated heat exchangers to a local heating system (solar and/or other water heating systems using water or water solution as coolant) must be carried out by qualified and competent persons in accordance with their design. The way of use of such water heater when heating the water in its tank from an alternative electric coolant, as well as compliance with safety measures must be carried out as described in the supplementary instructions, regulations and requirements for use, servicing and maintenance. Such additional instruction booklet is provided by the company responsible for the design and installation works for connecting the tank to alternative heating sources.


**WARNING!** When using the appliance there is a risk of hot water scalding!

**WARNING!** Do not touch the appliance and its control panel with wet hands or if you are barefoot or standing on a wet spot!

**WARNING!** This appliance may be used by children of age over eight years old and persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, where they are under supervision or instructed about the safe use of the appliance and understand the dangers. Children must not be allowed to play with the unit! It is absolutely forbidden that children undertake cleaning or servicing of this appliance!

## ENVIRONMENTAL PROTECTION

This appliance is marked according the REGULATION concerning waste electric and electronic equipment (WEEE). By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

The symbol  on the product, or on the accompanying documents indicates that this appliance may not be treated as household waste. Instead it should be handed over to the applicable collection point for the recycling of electrical and electronic equipment. Disposal must be carried out in accordance with local environmental regulations for waste disposal. For more detailed information about treatment, recovery and recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

## TECHNICAL DESCRIPTION AND DATA

The water heaters are intended for installation on thermo siphon systems which are devices for heating water using solar energy. Its key elements are a solar collector, a stand, and a water heater with heat exchanger. The water heaters tanks are properly protected against corrosion by using high quality enameled coating, or are made of high-range chrome-nickel alloy (corrosion resistant) steel. Water tanks with enameled coating are equipped with built-in anodes made of special alloy providing additional protection.

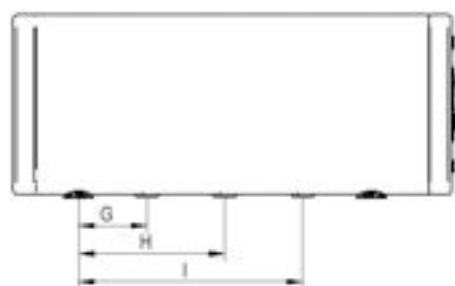
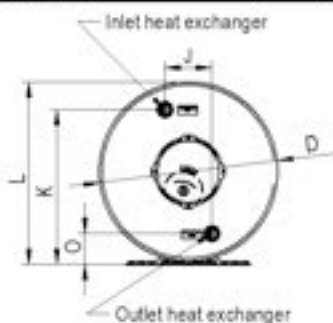
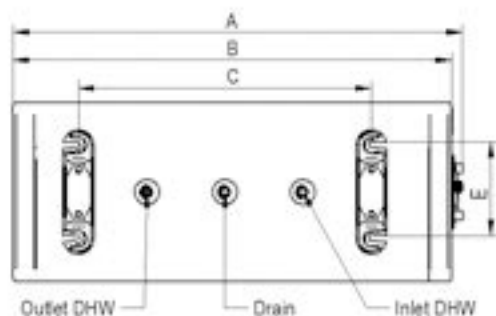
To protect your thermosiphon system it is necessary that the refrigerant entering the water tank heat exchanger to be selected for the specific climatic conditions. It should not freeze when temperatures fall. The water heater is equipped with a heating element with a power of 1,5kW for the 120 and 150 liter models, and 2kW for the 200 and 300 liter models, serving to prevent water from freezing in the water tank, and for additional heating, if necessary. In Table.1 and Fig. 1 you shall find the water heaters specifications.

The letters appearing in the models numbers have the following meaning: H - enameled water tank with housing of high-range chrome-nickel steel; HH - the water tank and its housing are made of high-range chrome-nickel steel.

MODEL	unit	CLASSIC 150	CLASSIC 200	CLASSIC 300
Volume	L	150	200	300
Tension	V	230V~	230V~	230V~
Power	kW	1.5	2	2
Nominal pressure	MPa	0.8	0.8	0.8
Heat exchanger surface	m <sup>2</sup>	0.68	0.6	0.85
Weight (empty)	kg	105	140	190
Input / Output H H W - socket		G1/2"	G3/4"	G3/4"
Input / Output heat exchanger - nipple		G1/2"	G3/4"	G3/4"
Drainage output - socket		G1/2"	G3/4"	G3/4"
Output for the T&P valve - socket	mm	-	G3/4"	G3/4"
Water heater insulation		Polyurethane foam	Polyurethane foam	Polyurethane foam

Table 1 - Data in the tables are only approximate.

			150(H)(HH)
A	mm		1315
B	mm		1290
C	mm		920
D	mm		460
E	mm		240
G	mm		176
H	mm		460
I	mm		744
J	mm		120
K	mm		397
L	mm		468
O	mm		79



		200	300
A	mm	1230	1583
B	mm	1197	1550
C	mm	787	1140
D	mm	587	587
E	mm	240	240
G	mm	176	176
H	mm	393	570
I	mm	610	963
J	mm	168	168
K	mm	475	475
L	mm	594	594
O	mm	93	93

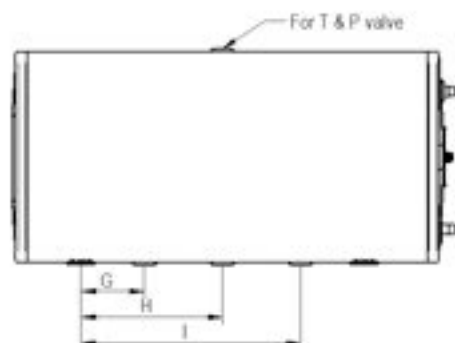
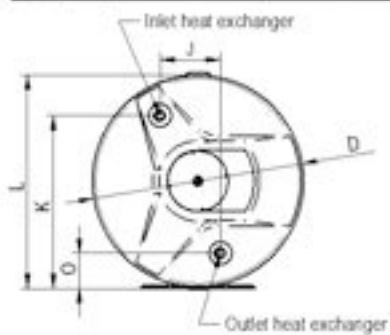
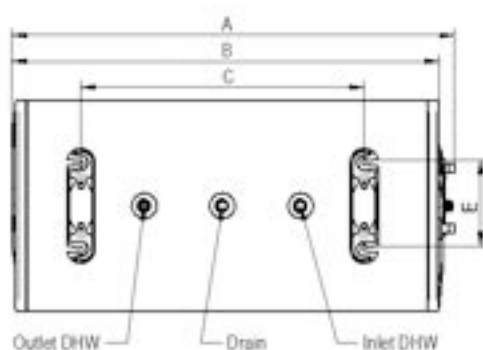


Fig. 1-(DHW – Domestic Hot Water)

## INSTALLATION - GENERAL CONDITIONS

**ATTENTION!** Each installation is individual and depends on installation site specific characteristics, the typical conditions, the system in which the water heater will be installed, and more. Only authorized and qualified persons can carry out the installation. The persons who carry out the installation shall accordingly be responsible.

You will find an example of water heater installation on the system stand on Fig. 2

You will find on the package the elements necessary for the installation of the water heater (1) on the stand (6).

1. Place the water heater (1) to lie on the stand (6) (Fig. 2).of the system.
2. Affix the water heater with the supplied 4 pcs. of standard fixture kit.

### LEGEND:

1. Water heater
2. Bolt M10x25(30) – 4 pcs.
3. Washer A M10 wide brim – 4 pcs.
4. Washer A M10 – 4 pcs.
5. Nut A M10 – 4 pcs.
6. Stand

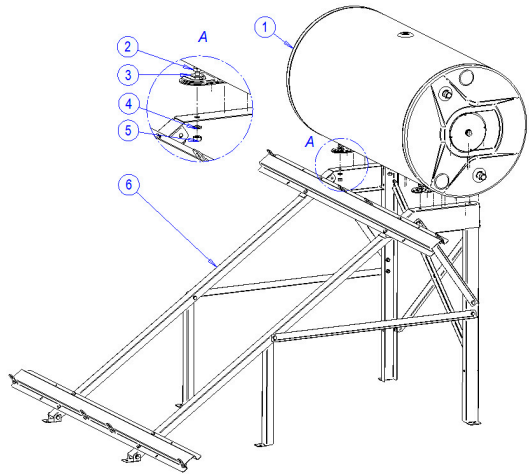


Fig. 2

**ATTENTION!** In order to allow thermosiphon system to operate properly it is necessary to level in two directions horizontally the water heater. The stand used should allow possibility for leveling.

### Installation sites and conditions for a thermosiphon system

**ATTENTION!** The weight of thermosiphon system in full condition depending of modification may reach up to 500 kg. Selected installation site must support the additional weight of thermosiphon system!

Installation is permitted only on roof or other fixed rigid surfaces or trestles with sufficient support capacity. Before beginning installation process the static support capacity of roof or support structure must be carefully checked. Special attention must be paid to the quality of the foundation to sustain the screw connections for holding installation related tools and accessories. It is further necessary to check the entire

thermosiphon structure for specific requirements concerning certain areas, especially those with heavy snowfall (Note: 1 m<sup>3</sup> fluffy snow ~ 60 kg; 1 m<sup>3</sup> wet snow ~ 200 kg), or regions with strong winds – systems may withstand winds with speed up to 100 km/h. Pay attention to all features of the installation site (winds, whirling and jet effects, turbulence and other), which may cause increased stress on the system. When selecting installation site carefully note that maximum loads are not exceeded neither because of snow nor because of winds. Thermosiphon systems must be installed in such a way as to prevent formation of drifts or snow piles to reach them or build upon them. It is mandatory to provide at least 1 m distance to the ridge/edge of the roof.

### **Instructions**

Thermosiphon installation is in fact interference with (existing) roof. All roof coverings (shingles, shakes and slates); extended and inhabitable roof spaces or roof slope less than required spans need additional work before installation, such as reinforcing spaces for protection against penetrating water under wind pressure or melting or falling snow.

When installing on flat roof (ground) without penetrating roof outer shell for fixing shall be used blasted concrete blocks and tightening with ropes. The system must be installed on the concrete blocks. Rubber bands must be used to improve adhesion between the roof and the concrete blocks and to prevent damage of the roof cover.

Additional safety with steel ropes thick in average 5 mm (minimum tensile strength of 1450 N/mm<sup>2</sup>) is necessary in order to absorb strong winds.

### **Lightning protection**

It is prohibited to connect the thermosiphon system directly to the building lightning conductor. It is mandatory to observe a minimum safety distance of 1 m to any adjacent conductive objects.

When installing on standing metal construction made on site always seek advice from qualified electricians. In order to secure equalization of building's potential the metal pipes of the solar circuit, as well as all boxes and connects of the thermosiphon system must be connected to the main bus. **The procedure must be performed by a qualified electrician.**

## **WATER HEATER CONNECTION TO THE SYSTEM**

Connect the water heater to the system in accordance with all requirement of the special additional instructions provided by the company responsible for the design of the installation and connection to the system. It is mandatory to install all supplied and/or recommended by this company safety, control and coolant movement management devices.

**WARNING!** It is prohibited to fit stop valves on heat exchanger both ends (inlet and outlet) simultaneously. In cases where the water heater shall not be used in the thermosiphon system and is not connected to a heat source circuit, its heat exchanger

must be filled with propylene glycol solution suitable for heating systems. The coolant pressure in the heat exchanger should not exceed 0.6 MPa.

The connection of the water heater to the system circuit must be completed only by qualified technicians in the field from a company specializing in such services and in accordance with its design.

## **WATER HEATER CONNECTION TO THE WATER SUPPLY NETWORK**

The plumbing to which the water heater will be connected, as well as any other elements included in it shall have to withstand sustained water temperatures above 80°C and for short periods - above 100°C, as well as to pressure at least twice high the appliance working pressure.

On Fig. 1 you will find the outlets for connecting the water heater to water supply network. All water heater outlets are marked with labels.

When an optional T&P valve is installed (additional protection device) for protection against high temperatures (90-95°C) and pressures (1 Mpa), the latter must be mounted on the water heater cylinder upper outlet. It is compulsory to mount an exhaust pipe to the outlet of the T&P valve in order to allow draining of water to appropriate plumbing pipes in case of valve activation.

The drain outlet located in the lower central part of the water heater is used for remote tank drainage

When connecting the tank to the pipes for hot and cold water plumbing must comply with the indicative labels around the pipes for cold and hot water (inlet and outlet pipes) of the water heater.

Where local regulations require use of additional devices that are not included with the unit supply set and are not placed in the packaging, these must be purchased and installed according to regulations.

A schematic diagram for water heater connection to the water supply is shown on Fig 3.

### **LEGEND:**

1. Water heater
2. Outlet pipe (hot water)
3. Inlet pipe (cold water).
4. Combined return safety valve.
5. Pressure reducing valve (if necessary - at pressure in the water mains over 0,6 MPa)

6. Shut-off valve.

Fig. 3



It is compulsory to install the combined return safety valve supplied in the set in such manner as to observe the arrow on its body indicating the cold water direction flow. It is as well advisable in order to comply with pt. 8 of section **IMPORTANT RULES** to install the combined valve on an easy access place.

**WARNING!** It is forbidden to install shut-off fittings between the combined valve and the water heater! It is absolutely forbidden to block the side hole of the combined valve!

If necessary you may make a system for draining dripping water from the combined valve side hole. The drain pipe must have constant downward slope and located in anti-freezing environment with extremities in the atmosphere.

Where the plumbing pipes are copper or of another metal, other than that of the water tank, or where brass fasteners are used, it is recommended to install on the water tank inlet and outlet non-metallic couplings (dielectric fittings).

**ATTENTION!** All additional pipe outlets (except those on the heat exchanger) which shall not be connected to water supply installation, must be closed with the fittings supplied in the packages, or other suitable for this purpose. The connections must be sealed for a water pressure of at least 1.6 Mpa.

## **FILLING THE WATER HEATER WITH WATER**

Once the water heater is connected to the water supply main, its water tank should be filled up with water. It is carried out in the following order:

1. Open completely the turn-cock for hot water of the most distant mixing tap;
2. Open the shut-off valve on pos. 6 of Fig. 3.
3. Wait until a flow of dense and strong jet of water comes from the mixing tap outlet;
4. Close the turn-cock for hot water of the mixing tap.
5. Lift the combined valve lever and wait for about 30-60 seconds until a thick and powerful stream of water runs out from the valve side opening.
6. Release the combined valve lever.

**WARNING!** If no water is coming out of the opening of the combined valve or the flow is weak (during normal water pressure), this should be considered as a malfunction indicating that impurities from the plumbing or caused by sewage connections have blocked the safety valve of the combined valve. **IT IS FORBIDDEN** to proceed with appliance electric connection before eliminating the reason for malfunction.

**WARNING!** Failure to comply with the requirements for connection to the water supply system may cause partial filling up of the water tank and malfunction of the heating element, or when the combined valve is not installed at all or has been improperly installed this may even cause destruction of the water tank, the room and/or other damages to tangible and intangible property. Such consequences are not within the scope of manufacturer or seller warranty liabilities and shall be at the expense of the party, which has not observed the present manual instructions.

The water heater connection to the water supply system must be performed only by qualified persons.

## **WATER HEATER CONNECTION TO THE POWER SUPPLY NETWORK**

Within the water heater is installed an electric heating element which may be used in case of eventual fall in environmental temperature below or around 0°C and in case of necessity for additional water heating if solar light is insufficient. The electric thermoregulator of the water heater is factory adjusted to switch on the heating element when the water temperature within the tank falls below 11°C. If you wish to use additional water heating the thermoregulator adjustment must be changed. For that purpose it is necessary first to dismantle the water heater by turning the thermoregulator lever clockwise and reach the temperature you wish to reach (max 75°C). You should note that in such situation the heating element may heat the water in the tank even when not necessary.

**WARNING!** Do not proceed to connect the water heater to the power supply network unless you have made sure that its water tank is full with water! Check!

The water heater is equipped with a protection degree for electrocution - Class I.

The water heater is designed for connection to single-phase power supply networks. Power supply is provided through separate circuit consisting of three wires insulated water proof and UV proof cable with cross section of each wire from 1,5 mm<sup>2</sup> to 2,5 mm<sup>2</sup> (phase, zero and protection). It is compulsory to have installed in the phase circuit an electric fuse of 16A.

Fig. 4

The connection of the cables from the mains switchboard to the unit terminals shall be carried out after carefully removing the plastic cover so that the electrical wiring in the unit does not disengage. According the electric schema on fig. 4 the phase wire of the power cable shall be connected to the terminal marked A1 (L). The neutral wire shall be connected to terminal B1 (N), while the protective one – to the security terminal (screw or stud) marked with the protective earthing sign. It is necessary to secure the power

cable against displacement by using cable clamp fastener installed on the protective cover. Once the power cable is connected and fixed, the protection cover is placed back on its location and fixed with its screws while taking care not to cut any cable, the thermostat capillary pipe or the thermal cut-out.

**ATTENTION!** It is recommended to place on a visible and accessible place a panel with switch and LED indicator for the water heater in order to monitor and control the electric heater operation.

**WARNING!** IT IS COMPULSORY that in the electric circuit feeding the heater is installed such a device which in the conditions of over voltage category III provides full disconnection of all poles. The conductors between the circuit and the device incoming electrical terminals must not be interrupted by any circuit breaker or fuse.

Once the appliance is connected to the power supply grid check its functionality.

**WARNING!** Failure to comply with the requirements concerning connection to the mains shall impede the appliance safety, in which it is prohibited to use. Such consequences are not within the scope of manufacturer or seller warranty liabilities and shall be at the expense of the party, which has not observed the present manual instructions.

Only qualified persons are entitled to connect the water heater to the mains and to check its functionality.

## **SERVICE, PREVENTION, MAINTENANCE**

**ATTENTION!** Always drain the water from the water heater, the water supply pipes and the discharge pipes before the winter season when temperatures fall below 0°C, while complying with pt. 9 of section **IMPORTANT RULES**. Fill the system again only when you are sure that the winter period is past and there is no risk of water freezing.

Each year it is necessary to inspect the thermosiphon system in order to detect any damages, leaks or contaminations.

In an empty water tank within its heat exchanger should not circulate coolant! Cover its collector/s.

### **Cleaning the water tank from accumulated limestone**

In order to secure reliable operation of the water tank in areas with highly calcareous water it is recommended to clean the limestone accumulated within. This operation should take place at least once every two years, while in areas with higher limestone content even more frequently. The depositions on the enamel coating should not be removed otherwise than wiped with dry cotton cloth and without using hard tools. Regular limestone removal and cleaning is particularly important for appliance reliable operation. It is recommended that during this maintenance operation you carry out a review of the enameled tank anode condition. These services are not subject to warranty coverage and must be performed only by qualified person.

## IMPORTANT RULES

1. The water heater is intended for installation in thermosiphon systems and supply household hot water (H H W) for big family houses. The heated water should be correspond to the normative documents for domestic water and, in particular: its chlorides composition should be less than 250 mg/l and its electric conductivity should be more than 100  $\mu\text{S}/\text{cm}$ , while its pH within the limits of 6.5-8 for the water heaters with enameled water tanks, and electric conductivity less than 200  $\mu\text{S}/\text{cm}$  for the water heaters with chrome-nickel steel water tanks. The water pressure in the water supply system should be higher than 0.1 MPa and lower than 0.5 MPa. If the water pressure is higher than 0.5 MPa - please refer to the instructions in the section for connection to the water supply network.
2. Compliance with requirements included in the section **SAFETY MEASURES** is absolutely **COMPULSORY**.
3. The water heater is intended for installation and operation in regular fire safe premises and in conditions providing watertight environment according its protection class. Otherwise, it shall damage the appliance and because it is a violation of these instructions for installation and use it shall not be covered by the manufacturer or retailer warranty obligations.
4. When connecting the water heater to the electric power installation it is **MANDATORY** to connect in correct way the neutral and protective cable wires to the premise network! Failure to comply shall make the appliance dangerous and in such state its use is strictly forbidden!
5. The water heater connection to the water supply and power supply networks and their functionality tests must be performed only by qualified person. It shall certainly allow You to be sure to implement all requirements for installation.
6. The water heater connection and functionality check are not manufacturer or dealer warranty obligations and are not covered by warranty service.
7. **WARNING!** In case of any risk of temperatures dropping below 0°C in the area where the thermosiphon system is installed and it shall not be connected to regular power supply, it is compulsory to drain the water from the system – please refer to pt. 10.
8. **WARNING!** To ensure safe and trouble-free operation of the heater, its combined valve should be vented periodically. This is done by lifting the lever until from the valve lateral opening starts to flow a thick and strong stream of water for a certain time (30-60 seconds). This operation must be carried out obligatory after connecting the heater to the plumbing and when filling of the tank with water in the process of using the heater not less than once every two weeks, as well as eventually after stop and start of water supply. This is the reason why it is recommended that the combined valve be installed in an easily accessible place. If when the tank is full there is not leak of water or the water flow is very weak, the combined valve is faulty or the valve is clogged by impurities in the water supply network. Using water heater with a defective combined valve is strictly prohibited. Switch off immediately the appliance from the power supply and contact the

nearest authorized by manufacturer service company. Otherwise, it shall cause a default on the tank and possibly cause other damages.

9. The steps for draining the water are as follow:

- ◆ Disconnect the heater from the mains with the optional device and for greater security disconnect the fuse in the heater phase circuit.
- ◆ The cold water access to the appliance is cut - the stop cock is turned on as on pos. 6 from Fig. 3.
- ◆ Open the hot water knob on the mixing tap or disconnect the hot water connection to the pipe outlet from the water heater (outlet DHW - Fig. 1).
- ◆ Open the tap connected to drain valve - Fig. 1

**WARNING!** IT IS ABSOLUTELY PROHIBITED TO SWITCH ON POWER SUPPLY TO THE SYSTEM WHEN THE WATER TANK IS PARTIALLY FILLED OR EMPTY OF ITS WATER CONTENT!

**WARNING!** Following water drain cover the solar collectors with tarpaulin or other similar thick cloth in order to prevent system overheating.

Before putting the system back in operation do not forget to fill the water tank with water – please refer to section **WATER HEATER CONNECTION TO THE WATER SUPPLY NETWORK**.

**WARNING!** When draining the water out of the water tank all necessary precautions must be taken to prevent damages from flowing out water.

10. The rules for checking the anode protection and anode replacement, as well as removal of the accumulated limestone, must be strictly observed both during and after the appliance warranty period.

11. During the appliance usage and maintenance do not damage the metal plate with its technical data and serial number. Should you take it off, keep it with the warranty form because it is the document serving to identify the water heater.

# ISSUES - CAUSES AND SOLUTIONS

Issue	Cause	Solution
The water in the water heaters is not heated enough from the collectors	<ol style="list-style-type: none"> <li>1. System incorrect size.</li> <li>2. Water heater not leveled horizontally.</li> <li>3. Flexible connections are not oriented in the same vertical direction (air pockets are formed).</li> <li>4. Insufficient heat conductor fluid in the system due to leak or drip.</li> <li>5. Expansion vessel bended aside (more than 10° aside).</li> </ol>	<ol style="list-style-type: none"> <li>1. Water heater must be leveled horizontally.</li> <li>2. Change the orientation and form of flexible connections so that these are in the same vertical direction.</li> <li>3. Drain the refrigerant off the system. Remove the malfunctioning by dismantling the defective part or seal, then re-fill the system (please refer for how to do it in the additional instructions of the company that has completed the design and installation works for connecting the water heater with the alternative heat sources).</li> <li>4. Lift the expansion vessel in as much as possible vertical position.</li> </ol>
The electric heating element does not operate correctly.	<ol style="list-style-type: none"> <li>1. There is a switching fault (electric connection and cables) between the electric network and the heating element.</li> <li>2. Faulty heating element, thermostat or thermoregulator</li> </ol>	<ol style="list-style-type: none"> <li>1. Checked, discovered and removed by qualified person.</li> <li>2. Changed by qualified person.</li> </ol>

## **WARRANTY, WARRANTY PERIOD AND WARRANTY CONDITIONS**

The warranty, warranty conditions, warranty period, warranty validity for purchased appliance and service related manufacturer or vendor liabilities during the appliance warranty period are listed in the thermosiphon system warranty form. When buying the appliance/system this warranty form must be filled and signed both by seller and buyer. Keep the warranty form in a secure place.

In all instances shall be in force the applicable laws, regulations and other legislation dealing with the rights and obligations of consumer, seller and manufacturer, and their relationships related to purchased water heater, its installation, use, servicing and maintenance.

COMPLIANCE WITH THE REQUIREMENTS OF THIS INSTRUCTION MANUAL IS A PREREQUISITE FOR SAFE OPERATION OF YOUR PURCHASED PRODUCT AND IS ONE OF THE WARRANTY TERMS AND CONDITIONS.

IT IS ABSOLUTELY PROHIBITED TO THE USER OR ANY AUTHORIZED BY HIM PERSON TO UNDERTAKE ANY CHANGES IN THE PRODUCT DESIGN AND STRUCTURE. ANY FINDING OF SUCH ACTIONS OR ATTEMPTS SHALL AUTOMATICALLY RENDER VOID ALL WARRANTY LIABILITIES OF SELLER OR PRODUCER.

IN CASE OF NECESSITY FOR SERVICE SEEK ONLY MANUFACTURER AUTHORIZED SERVICE COMPANIES LISTED IN THE ANNEXED FORM.

THE MANUFACTURER PRESERVES HIS RIGHT TO STRUCTURAL CHANGES WITHOUT NOTICE WHERE SUCH SHALL NOT AFFECT PRODUCT SAFETY.

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