



Operating instructions



PHOTOVOLTAIC BOILER

(PVB-30-AC, PVB-8 0-AC)

**TECHNICAL DESCRIPTION ASSEMBLY, OPERATION AND MAINTENANCE
INSTRUCTIONS**

Table of contents

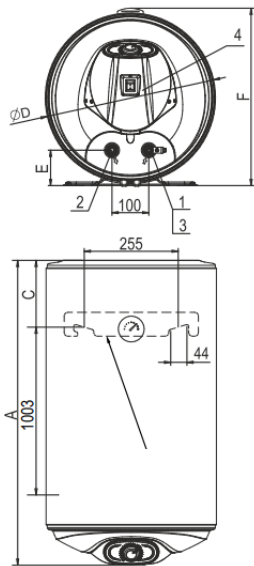
Manufacturer's drawings	3
Specifications	4
System Modes	5
Assembly	6
Connection	7
Further information	8
Safety	8
Other things to note	8
Specifications	9
Assembly	9
Connection to the water pipe	10
Electrical connection - PV	11
Operation	12
Maintenance and repair	13
Disturbances	14
Environmental protection	14
Warranties	14

Contact:
fothermo System AG
Im Starkfeld 45b
89231 Neu-Ulm
Germany

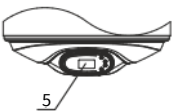
Phone: + 49 (0) 7346 9649960
Email: contact@fothermo.com
Registration Court Ulm: HRB 739609
VAT: DE329022123

IMPORTANT!
Please read these operating instructions carefully before installing and commissioning the hot water tank!

Manufacturer's drawings



Description	
1	Water supply
2	Water drain
3	Combined valve
4	Rotary control with thermostat
5	Electronic control unit

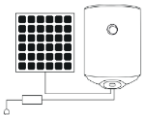
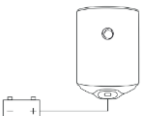
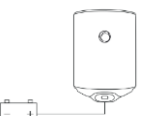


Photovoltaic Boilers			
Model		PVB-30	PVB-80
Volume		30	80
Illustration		1 2 3	
Dimensions [mm]	A	560	835
	C	155	185
	D	387	462
	E	80	96
	F	410	484

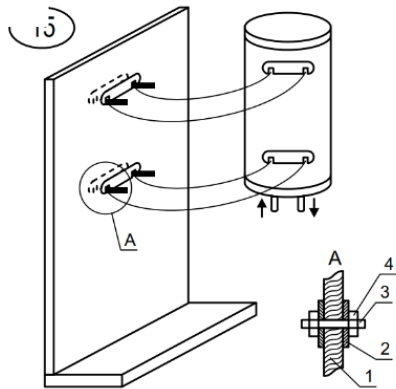
Specifications

	UNIT	30 LITRES	80 LITRES
Photovoltaic boiler			
Product Model	-	PVB-30	PVB-80
Volume	l	30	80
Max. photovoltaic heating capacity	W	550	550
Max. current consumed	A	15.5	15.5
230V heating power	W	1.500	1.500
Adjustable water temperature range for 230V reheating function	°C	0-75	0-75
Nominal pressure	Mpa	0.7	0.7
IP class	-	24	24
Weight (± 3%)	medical history	15	25
Max. water temperature	°C	65	65
Integrated MPP Tracker	-	✓	✓
Integrated reverse polarity protection	-	✓	✓
Digital display	-	✓	✓
CE certified	-	✓	✓
Dimensions (length, width, height)	Cm	40 x 40x 60	47 x 48 x 90
Water supply	-	G1/2 (M)	G1/2 (M)
Combined check and pressure relief valve	-	✓	✓
Corrosion protection	-	✓	✓
Enamel coating	-	✓	✓
Isolation	-	✓	✓
Energy efficiency class	-	C	C
Photovoltaic connection			
Recommended photovoltaic power	Wp	300-600	600-1200
Max. connectable photovoltaic power	Wp	1500	1500
Max. open-circuit voltage	VDC	42.4	42.4
Photovoltaic connector	-	MC4	MC4
Reheating via 230 V mains			
Type of reheating		Directly at the socket	
Heat output	W	1500	1500
Adjustable water temperature range	°C	10 - 75	10 - 75
Heating capacity depending on the currently available photovoltaic capacity			
200 W	°C / h	6	2
400 W	°C / h	12	4.5
550 W	°C / h	16	6

System Modes

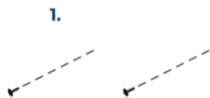
Mode	Illustration	Description	Energy source
1: PV mode		The boiler is primarily powered by PV electricity. If no solar energy is available, the 230V auxiliary heating can be switched on as an option.	PV Modules + 230V reheating
2: 12V battery		A battery can also be connected via the MC4 contact plugs. As soon as the connected battery reaches a voltage of 13.5 V, the excess energy is used to boiler. This happens during the battery is charged.	12 V battery Admitted: LiFePO4, lead-acid battery
2: 24V battery		A battery can also be connected via the MC4 contact plugs. As soon as the connected battery reaches a voltage of 27 V, the excess energy is used to boiler. This happens during the battery is charged.	24 V battery Admitted: LiFePO4, lead-acid battery

Assembly

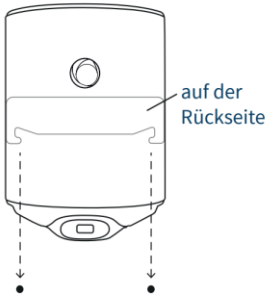


1	Wall
2	Plate
3	Stud
4	Mother

The installation of the 30, 80 liter boiler must be done **vertically** on a wall with a **90° angle** to the ground.



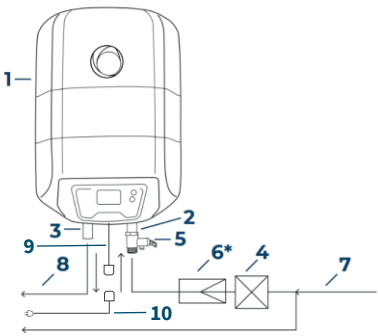
2.



3.



Connection



- 1 hot water tank
- 2 Water inflow
- 3 Water drainage
- 4 Barrier valve*
- 5 Combined check and pressure relief valve
- 6 Pressure reducing valve*
- 7 Cold water
- 8 Hot water
- 9 device plugs for external power supply
- 10 Power Cables*

*nötig falls Wasserdruck
> 0,5 MPa (5 bar)

*not included in delivery

Heating time of the water as a function of the PV heating power

Achievement	PVB-30	PVB-80
200 W	6 °C/h	2 °C/h
400 W	12 °C/h	4.5 °C/h
550 W	16 °C/h	6 °C/h

Hint

The values given in the table are to be understood as guideline values. The heat-up times depend on many factors (power, ambient air temperature, water withdrawal) and can differ from reality. The larger the connected photovoltaic power, the more the water can be heated on days with low solar radiation. The water is heated with a maximum power of 550 W, even if more photovoltaic power is available

Heating time of the water with the 230V heating power

Boiler size	PVB-30	PVB-80
1500 W	45 °C/h	15 °C/h

Further information



Dear customers, thank you for choosing a device from fothermo System AG!

The device will serve in your household for many years, as we combined high-quality materials and innovative technologies in its production. To be sure of its reliability, please read the installation and operating instructions carefully.

WARNING! Please read these operating instructions carefully before installing and commissioning the hot water tank! General warnings

Be sure to read the instructions and warnings in this manual carefully before installing and commissioning the hot water tank. The information provided here is intended to familiarize you with the hot water tank, with the rules for its proper and safe use, with the minimum requirements for its maintenance and servicing. In addition, you are obliged to make this manual available to the competent persons who will install and possibly repair the device. The installation of the hot water tank and the testing of its functionality are not part of the warranty obligation of the dealer and/or the manufacturer. These instructions should always be kept near the device for future reference. Compliance with the rules described here is one of the measures for the safe use of the product and is considered part of the warranty conditions.

Safety

WARNING! When using the device, there is a risk of burns or scalding!

WARNING! This device may not be used by persons (including children 3 years of age or older) with reduced physical or mental abilities unless such person is under the supervision of or has been instructed by such person in the use of the device. Children must be supervised so that they do not play with the device under any circumstances. It is forbidden for children to clean the device or operate it independently. Children aged 3 to 8 years are only

allowed to operate the tap connected to the water heater.

IMPORTANT! Only competent persons may install and connect the hot water tank to the water pipe in accordance with the specifications in this manual and the relevant local regulations. The protective devices provided or recommended by the manufacturer as well as all other assemblies must be installed **ABSOLUTELY!**

IMPORTANT! Before connecting to the electrical powersupply, the hot water tank must be filled with water! Failure to comply with the requirements for the electrical connection affects the safety of the appliance, so that the hot water tank must not be used.

IMPORTANT! Note the maximum permissible pressure (see chapter: Technical data)

Other things to note

- The device is under pressure. During heating, the expansion water drips from the pressure relief valve.
- Operate the pressure relief valve regularly to prevent stuckness, e.g. due to limescale deposits.
- Install a combined type-approved check and pressure relief valve in the cold water inlet line. Please note that depending on the supply pressure, you may also need a pressure reducing valve.
- Install the pressure relief valve with the opening facing downwards.
- Install the pressure relief valve and drain line with a steady downward slope in a frost-free room.
- Size the drain line so that when the pressure relief valve is fully open, the water can drain off unhindered.
- The opening of the pressure relief valve must remain open to the atmosphere.
- This device contains a support battery, which is not replaceable. This is necessary for the display to function at night. A defect does not limit the basic functionality.
- The device may be operated up to an altitude of 4000 m above sea level.
- Post-heating is optional. Either only the PV energy or the PV energy combined with the post-heating power can be used.

Specifications

This hot water tank can provide hot water from the general water supply network to several consumers at the same time. The water used for heating must comply with the requirements set out in the normative documents for domestic water, in particular: chloride content up to 250 mg/l; electrical conductivity more than 100 $\mu\text{S}/\text{cm}$, pH value 6.5 - 8 for hot water tanks with glass-lined water tank. The thermal insulation is made of CFC-free polyurethane foam.

The maximum electrical power of the hot water tanks in PV mode is 550 W. The actual output of the heating elements depends on both the connected photovoltaic power and the irradiance of the sun. The water is heated to a maximum of 65 °C to ensure protection against scalding. Detailed information can be found in the data sheet or the nameplate. In addition to the photovoltaic power, an external reheating system with 1.5kW can be connected via the power grid. The minimum temperature can be set via a rotary control.

The hot water tanks are equipped with a combined check and pressure relief valve, which prevents overpressure of the water during unit operation. The water tanks are made of steel with a high-strength enamel coating and with additional cathode protection by a magnesium anode.

Assembly

The hot water tank may only be installed in a room with fire protection and room temperature permanently above 0 °C. During normal operation of the hot water tank, small amounts of water leak out of the safety valve. For this reason, the drain must be connected to a drain pipe. This also facilitates the maintenance, servicing and servicing of the hot water tank, especially in the event that the water is to be drained from the water tank.

When choosing a suitable location for the hot water tank, the following must be taken into account:

- Type and material of the wall,
- dimensions of the device,
- Mounting
- Arrangement of fasteners for wall mounting,
- arrangement of the pipes and the
- Degree of protection against water splashes.

The device is to be installed in a place where it does not come into contact with water. The hot water tank should be installed as close as possible to the tapping point in order to limit heat loss through the pipe. If the purchased hot water tank is equipped with a supply cable with a power plug, the product must not be installed in a damp room! The installation site must comply with the requirements for the power supply network and for the socket. See the section on the electrical connection. The following minimum distances between the appliance and the adjacent walls as well as to the ceiling must be observed:

- In the case of vertical hot water tanks – at least 70 mm between the unit and the ceiling; at least 50 mm between the device and the side wall; at least 350 mm below the device, to facilitate maintenance and repairs.

The hot water tank is to be permanently attached to a wall. To do this, use steel bolts (stud screws) with a diameter of 10-12 mm, which are attached to the wall. The fasteners must be secured against being pulled out of the wall – use anchor bolts or through bolts (depending on how the wall is procured). The fasteners on which the hot water tank is suspended must be designed for three times the weight of the hot water tank filled with water. It is forbidden to install the hot water tank on decorative walls (made of individual bricks or light building materials). The distances between the bolts (stud screws) for hanging

the devices are shown in Figs. 1, 2, 3, 7 and in the tables. Group 150 vertical hot water tanks are equipped with a different type of plate for suspension, so the distance between the bolts (stud screws) differs from other models and designs, Fig. 1.

WARNING! The support brackets of the hot water tanks must be firmly attached to the wall of the room. Washers must be attached under the screw heads (nuts of the stud screws)! A drill hole template is printed on the product packaging.

The installation site must comply with the requirements of the electrical installation. During installation, sufficient distance to neighboring walls and sufficient distance under the device for water and photovoltaic connections must be provided.

Connection to the water pipe

When connecting the device to the water pipe, please pay attention to the arrows and the information rings around the cold and hot water pipes (inlet and return pipes). The cold water pipe has a blue ring and is marked with an arrow to the pipe. An arrow away from the pipe and a red ring marks the hot water pipe.

The hot water tank is equipped with a combined check and pressure relief valve. This is in the product-packaging and **MUST** be mounted on the cold water pipe. During this installation, the arrow on the hull of the valve, which indicates the direction of the flow of water through the valve, must be followed.

WARNING! Failure or improper installation of the combi valve supplied with the product will void the product warranty.

WARNING! The installation of any shut-off or check valves between the combined valve and the hot water tank **IS PROHIBITED!** Blocking the side opening of the combined valve and/or locking its lever is strictly prohibited!

The pipe connections have G1/2 male threads. Mechanical illustrations regarding the connection of the hot water tank are shown in Figures 1 and 2.

The hot water tank works with the pressure of the water pipe. The water pressure in the waterpipe system should be higher than 0.1 MPa (1 bar) and lower than 0.5 MPa (5 bar). If the pressure of the water pipe is higher than 0.5 MPa, a pressure reducing valve must be installed.

If other accessories that are not included in the scope of delivery have to be used in accordance with local regulations, they must be installed according to the specifications. In the event that the water pipes are made of copper or other metal, which is different from the metal of the water tank, as well as if brass fasteners are used, non-metal fittings must be installed on the inlet and return sides of the hot water tank (dielectric fittings).

A drainage system is recommended to drain any water that may drip from the side opening of the combined valve. The drain pipe must be carried out with a constant gradient and in a frost-free environment. It must always remain open.

After the hot water tank has been connected to the water pipe, the water tank must be filled with water. The order of the steps to be performed is:

- Open the hot water tap of the furthest mixer tap completely.
- Open the stopcock (Table 1, No. 4)
- Wait until the air comes out of the system and a strong stream of water flows out of the mixer tap. Let the water run for about 30 seconds.
- Close the hot water tap of the mixer tap.
- Lift the small lever of the pressure relief valve (Table 1, No. 5) and wait 30 - 60 seconds until a strong jet of water flows from the side opening of the valve.
- Release valve lift.

WARNING! If no water flows out of the valve opening or only a thin stream flows, then this indicates a malfunction, which can clog the safety valve of the combined valve.

It is FORBIDDEN to carry out the electrical connection of the device as long as the fault has not been resolved!

WARNING! If the requirements for connection to the water pipe are not met, the water tank will not be filled with water, which will lead to the malfunction of the heating element. If the combined valve is not installed or is installed incorrectly, this can cause destruction of the water tank, the room and/or other property damage and personal injury. The resulting damages are not within the scope of the manufacturer's and the seller's warranty and are at the expense of the person who had not followed the instructions in this manual. **WARNING!** The combined pressure and check valve is one of the protective

devices that ensure the safety of the hot water tank. It is strictly **FORBIDDEN** to use the hot water tank with a damaged or removed/unmounted combined valve!

WARNING! The combined check and pressure relief valve is one of the protective devices that ensure the safety of the hot water tank. It is strictly **FORBIDDEN** to use the hot water tank with a damaged or removed/unmounted combined check and pressure relief valve (safety valve)!

If necessary, the pressure relief valve can also be used to drain the water from the water tank. In this case, do the following:

- Disconnect the hot water tank from any live electrical lines.
- Interrupt access to cold water.
- Open the hot water tap of the mixertap or disconnect the hot water pipe (return pipe) of the hot water tank.
- Lift the small lever of the combined valve (Table 1, No. 5) and wait until no more water comes out of the valve.
- **Warning!** The flowing water can be hot – danger of touching. These steps do not ensure complete emptying of the water reservoir.

These steps do not ensure complete emptying of the water reservoir. Only competent persons may carry out these measures because they involve disconnecting the electrical circuit of the device and removing the flange from the water tank.

WARNING! It is **STRICTLY FORBIDDEN** to carry out the electrical connection of the hot water tank as long as the water tank is completely or partially emptied! Before using the appliance again, first fill the water container with water.

WARNING! It is **FORBIDDEN** for the heat transfer medium to circulate through the heat exchanger of the hot water tank when the water tank is completely or partially emptied.

WARNING! When draining the water from the water tank, it is essential to take all necessary measures to prevent damage caused by the drained water.

IMPORTANT! When draining the water from the water tank, it is essential to take all necessary measures to prevent damage caused by the drained water.

IMPORTANT! In Denmark, Sweden, Norway and Finland, the connection of the hot water tank to the public water network may only be used with the use of a suitable pressure reducing valve. Local regulations must be observed.

Electrical connection - PV

WARNING! Any electrical connection may only be made if the hot water tank is filled with water.

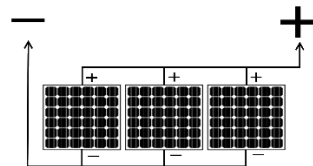
IMPORTANT! The hot water tank is operated with direct current. The hot water tank has a class of protection against electric shock "Class III" and may only be supplied in the protective extra-low voltage (SELV). Only voltage sources recommended by the manufacturer may be connected. A faulty and/or unsuitable power system poses a high risk and can cause an accident. If the connection cables of the device are damaged, they must be replaced.

IMPORTANT! Photovoltaic modules may **only be connected IN PARALLEL**. When connecting more than one photovoltaic module, always use a suitable plug connection for parallel connection. See figure "PV Parallel Connector". A series connection of the photovoltaic modules leads to a defect in the device.



PV Parallel Connectors

Pay attention to correct polarity when connecting!



Only one parallel PV module connection is allowed! A serial port will damage the device!

The electrical connection of the hot water tanks is made to the factory-fitted MC4 supply plugs. Once the electrical connection has been made, check the functionality of the appliance. The hot water tank is completely disconnected from the power supply system when all supply plugs are disconnected.

Connection of photovoltaic modules:

IMPORTANT! The assembly and electrical parallel connection of PV modules may only be carried out by a competent person and must exclude any danger to third parties. When installing the photovoltaic modules, the rules and laws applicable on site must be observed.

IMPORTANT! Always lay cables in such a way that no one can trip over them or get caught on them. There is a risk of injury. The cables must be fastened in such a way that no tensile load is applied to the connectors. Furthermore, it must be ruled out that the cables and connectors rub over surfaces and edges (e.g. in windy conditions) or are permanently in water.

IMPORTANT! A maximum of photovoltaic modules with an open-circuit voltage of 42.4 V may be connected.

- Photovoltaic modules must be properly connected using the factory-connected MC4 connectors.
- Up to five modules may be connected in parallel. Depending on the module, this corresponds to an MPP power of about 1500 W_p.

Design of the required photovoltaic power:

- The higher the number of hours of sunshine per day, the smaller the PV power required.
- The warmer the water supplied from the tap, the smaller the PV output required.
- Design of the photovoltaic power for the months with the lowest irradiation during the use of the photovoltaic boiler.
- The higher the amount of hot water required per day, the greater the PV output required.

The following table serves as a guideline for the design of the photovoltaic power depending on the climatic conditions:

Climatic conditions	PVB-30	PVB-80
Sun-poor countries, e.g. Northern and Central Europe	600 W _p	1200 W _p
Sun-rich countries, e.g.	300 W _p	600 W _p

southern Europe and Africa		
----------------------------	--	--

The values shown are indicative values. Depending on the conditions prevailing on site and the respective usage conditions, the sensible design of the photovoltaic output may deviate from the values described.

Extension of the photovoltaic cables:

When extending the photovoltaic cables, the MC4 contact plugs must be properly fastened to ensure function and safety. Basically, the PV cable should be kept as short as possible. Use solar cables with a cross-section of at least 4mm² for the extension.

Connection of an external AC reheater:

IMPORTANT! Use only certified appliance plugs (IEC-320 - C13 plugs) are recommended. Failure to comply will result in a loss of warranty and may result in a defect in the device.

The external AC reheating is used for extended use of the photovoltaic boilers.

For example, long periods of bad weather can be bridged by connected AC reheating

Operation

WARNING! This device may not be used by persons (including children 3 years of age or older) with reduced physical or mental abilities unless such person is under the supervision of or has been instructed by such person in the use of the device. Children must be supervised so that they do not play with the device under any circumstances. It is forbidden for children to clean the device or operate it independently. Children aged 3 to 8 years are only allowed to operate the tap connected to the water heater.

Operation:

To turn it on:

Press  and hold the - button for about three seconds.

Display:

Note: The display turns on when the photovoltaic modules are connected to the boiler.

The current water temperature is shown on the display.

- POWER IN: Input power of PV modules
- VOLTAGE: Input voltage of PV modules

- USED PV ENERGY: Sum of the PV energy used

Menu navigation:

Press the  - button briefly. By pressing the button again, you jump to the next page in the menu.

Settings:

Press the  - button repeatedly. This allows individual adjustments to be made to the device. Please note: The adjustments will only be active if an external power supply is connected to the photovoltaic boiler.

CHANGE SYSTEM MODE:

Select the desired mode by pressing the  - button. Mode 1 (PV HOME) is preset at the factory.

Quick Start Guide SYSTEM MODES

Mode 1 (PV HOME)

For the direct connection of photovoltaic modules. If required, an AC auxiliary heating system can also be connected via mains power.

Mode 2 and 3

For connecting external energy sources such as a battery. For this purpose, a fothermo battery cable is required to be able to connect the battery to the MC4 contact plugs. The battery cable can be purchased separately. You can find more information in the respective product description.

Power off:

Press  and hold the - button for about three seconds.

Setting the postheating temperature

If external mains power is connected, a temperature can be set that is maintained by the boiler (AC afterheating). This can be adjusted via the rotary control.

In summer, when the solar radiation is strongest and heating is ensured by PV energy, the recommendation is to set the rotary control to the lowest possible temperature.

If the sunlight is not sufficient, the rotary control can be set to the desired temperature (recommended 35°C to 40°C).

Other things to note:

Leakage of water:

The check valve and pressure relief valve can drip during normal operation of the hot water tank due to the expansion of water during heating. Make sure that escaping water is fed into a suitable collection-container or drain. The dripping of water is not a defect. The side valve opening must not be closed in any way. Laying a drain pipe facilitates future maintenance and servicing measures, as the water can be easily drained from the hot water tank.

Noise:

It is possible that noise may be generated inside the appliance during the heating of water. This is due to calcareous deposits on the heating element. Increased limescale formation can be observed from water temperatures of over 60°C. This can lead to impairment and damage to the heating elements and the hot water tank.

Legionella formation:

Due to the small volume of the hot water tanks, the risk of legionella formation in the system can be almost eliminated. In order to take precautions, the following measures are recommended:

- Fresh water supply or regular water-withdrawal.
- Heat the water at regular intervals to at least 60°C.
- After not using the device for more than one month, a water replacement is recommended.

Maintenance and repair

Corrosion protection:

In every hot water tank with an enamelled water tank there is an additional corrosion protection installed. This corrosion protection consists of a magnesium anode (sacrificial anode).

The anode is a consumable item (i.e. wear and tear during normal device operation). The average lifespan is 3 years. This service life depends in particular on the operating mode of the device and on the properties of the water to be heated. At regular intervals, a specialist from the after-sales service authorized by the manufacturer or seller should check the condition of the anode and, if necessary, replace it. Compliance with the deadline and timely renewal of the anode are important conditions for efficient corrosion protection of the water tank. The testing and renewal of the anode are not part of the warranty performance obligations of the manufacturer and the dealer. For the safe operation of the hot water tank in regions

with calcareous water, the moderate cleaning of the water tank from the melted limestone. This cleaning should be done at least once every two years. In regions with calcareous water more often. The deposits on the enamel coating do not need to be scraped off, just wiped off with a dry cotton cloth. Regular cleaning and removal of the limestone is particularly important for the safe operation of the device. It is recommended to check the anode of the enameled water tank at the same time. These services are not part of the warranty and must be carried out by competent persons. The regulations for the control of the anode protection and the renewal of the anode, and the removal of the collected limestone, are to be applied both during and after the expiry of the warranty, performance deadline of the device.

Relief valve:

To ensure objection-free and safe operation of the hot water tank, the combined valve must be checked regularly for any reduced permeability. To do this, lift the small lever and wait about 30 - 60 seconds until a strong jet of water emerges from the side valve opening. This test must be carried out after filling the water tank with water, at 2-week intervals and after failure and restoration of the water supply. If no water flows from the valve opening or only a thin stream flows, then this indicates a malfunction.

There may be contamination of the water pipe. The fault must be rectified before commissioning.

Cleaning:

The outer shell and the plastic parts of the hot water tank can only be cleaned with a slightly damp cotton cloth, without aggressive and/or abrasive agents. It is forbidden to clean the device with a steamer. The hot water tank can only be put back into operation after the moisture has been completely removed.

Disturbances

If a fault occurs during the use of the hot water tank, please disconnect all live pipes from the appliance and contact the manufacturer or your dealer.

Environmental protection

This equipment is labelled in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive. By ensuring that the appliance is returned to a suitable disposal centre at the end of its life, you are helping to protect the environment and avoid negative impacts on the environment and human

health. That  - Symbol on the hot water speicher points out that the device must not be disposed of in normal household waste at the end of its service life. In the event of a disposal centre with special equipment for electrical or electronic equipment. The end user must comply with local disposal regulations when disposing of the goods.

For more information on treatment, recovery and recycling processes, please contact your local council, your local waste disposal centre or the specialist retailer from whom you purchased the product.

Warranties

The warranty for the device is only valid under the following conditions:

- The device is installed according to the assembly and use instructions.
- The device is only used for its intended purpose and in accordance with the assembly and use instructions.

The warranty includes the correction of all manufacturing defects that may occur during the warranty period. Only the professionals authorised by the seller are allowed to carry out the repairs. The warranty does not cover damages:

- improper transport,
- improper storage,
- improper use,
- unsuitable water parameters,
- improper electrical voltage that deviates from the rated voltage,
- the freezing of the water,
- extraordinary risks, accidents or other force majeure,
- Failure to follow the assembly and use instructions, and
- in all cases when an unauthorized person tries to repair the device.

In the aforementioned cases, the damage will be repaired against payment. The warranty of the device does not apply to parts and components of the device that are worn out during its normal use, nor to parts that are degraded during normal use, to lights and signal lamps, etc., to discoloration of external surfaces, to changes in the shape, dimensions and arrangement of parts and components that have been subjected to an effect that does not correspond to the normal conditions of use of the device. Missed benefits, material and non-material damage resulting

from the temporary impossibility of using the equipment during the period of its repair and maintenance are not covered by the warranty of the device.

COMPLIANCE WITH THE REQUIREMENTS SPECIFIED IN THE MANUAL IS A PREREQUISITE FOR THE SAFE OPERATION OF THE PURCHASED PRODUCT AND IS ONE OF THE WARRANTY CONDITIONS. ANY MODIFICATIONS OR MODIFICATIONS MADE TO THE STRUCTURE OF THE PRODUCT BY THE USER OR BY PERSONS AUTHORIZED BY HIM ARE STRICTLY PROHIBITED. IF SUCH ACTS OR ATTEMPTS ARE DETECTED, THEN THE WARRANTY OBLIGATIONS OF THE MANUFACTURER OR THE DEALER ARE INVALID. THE MANUFACTURER RESERVES THE RIGHT TO MAKE STRUCTURAL CHANGES WITHOUT NOTICE, PROVIDED THAT THE SAFETY OF THE PRODUCT IS NOT COMPROMISED. IF NECESSARY, OR IF THERE IS ANY MISUNDERSTANDING IN CONNECTION WITH THE TRANSLATION AND THE TERMS USED IN THIS LANGUAGE VERSION OF THE ASSEMBLY AND USE INSTRUCTIONS, PLEASE USE THE GERMAN VERSION AS THE ORIGINAL AND AS THE PRIMARY VERSION.