

OPERATING AND INSTALLATION MANUAL

STATIONARY STORAGE TANKS



OKCE 100 NTR/2,2 kW
OKCE 125 NTR/2,2 kW

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READ CAREFULLY THE BELOW INSTRUCTIONS PRIOR TO THE INSTALLATION OF THE STORAGE TANK!

Dear customer,

The Works Cooperative of Dražice - Machine Plant, Ltd., would like to thank you for your decision to use a product of our brand. With this guide, we will introduce you to the use, construction, maintenance and other information on electrical storage tanks.



The manufacturer reserves the right for engineering modification of the product. The product is designed for permanent contact with drinkable water.

It is recommended to use the product in indoor environment with air temperatures from +2°C to 45°C and a relative humidity up to 80%.

Product's reliability and safety is proven by tests implemented by the Engineering Test Institute in Brno.

Meaning of pictograms used in Manual



Important information for storage tank users.



Recommendations of manufacturer, observance of which will ensure trouble-free operation and long service life of the product.



CAUTION!

Important note to be observed.

1 TECHNICAL SPECIFICATION OF PRODUCT

1.1 FUNCTION DESCRIPTION

Thanks to their construction and number of variants, the OKCE 100, 125 NTR series storage tanks enable economic preparation of hot service water (HSW) by means of various power sources. Their nominal performance provides sufficient amount of hot water for flat units, premises, restaurants, and similar establishments. For HSW reheat, electricity, various types of central heating boilers, recoverable energy sources (heat pumps, solar collectors) and combination of those can be chosen.

Service water heating via thermal energy through heat exchanger

Closing valves of the heat exchanger must be opened which ensures heating water flow from the hot water heating system. Together with a closing valve, it is recommended to install an air outlet valve at the inlet to the heat exchanger in order to bleed the heat exchanger as needed, in particular before the beginning of the heating season. The time of heating using the heat exchanger depends on the temperature and flow of water in the hot water heating system.

1.2 PRODUCT DESCRIPTION

The storage tank vessel is welded from a steel sheet; the exchangers from a steel tube and, as a unit, it is entirely coated with hot water resistant enamel. A flange is welded onto the upper bottom of the receptacle with a flange lid screwed to it. A sealing ring is inserted between the flange lid and the flange.

Thermowells for placing a heating element and sensors of regulation thermostat and safety fuse are located in the flange lid. Electric wiring is placed underneath the plastic removable cover. The temperature of water can be set using the thermostat.

For additional corrosion protection a magnesium anode is mounted in the upper part of the storage tank to adjust the electric potential inside the tank, reducing the risk of corrosion. The storage tanks have outlets of hot and cold water and a circulation opening welded to them. The tank is insulated with polyurethane foam of 40 - 65 mm thickness. The storage tank shell consists of a steel, powder-paint coated, sheet; the connecting parts are metal coated. The entire storage tank stands on three rectification screws with a possibility of levelling floor unevenness within the range of 10 mm. The storage tank is to be placed on the ground. The tank is tested with pressure of 0.9 MPa, heat exchangers with 1.5 MPa.

The NTR version has a heat exchanger located in the bottom part of the storage tank and one heating water source is used for heating.

1.3 DESIGN AND GENERAL DIMENSIONS

OKCE 100 NTR/2,2 kW, OKCE 125 NTR/2,2 kW

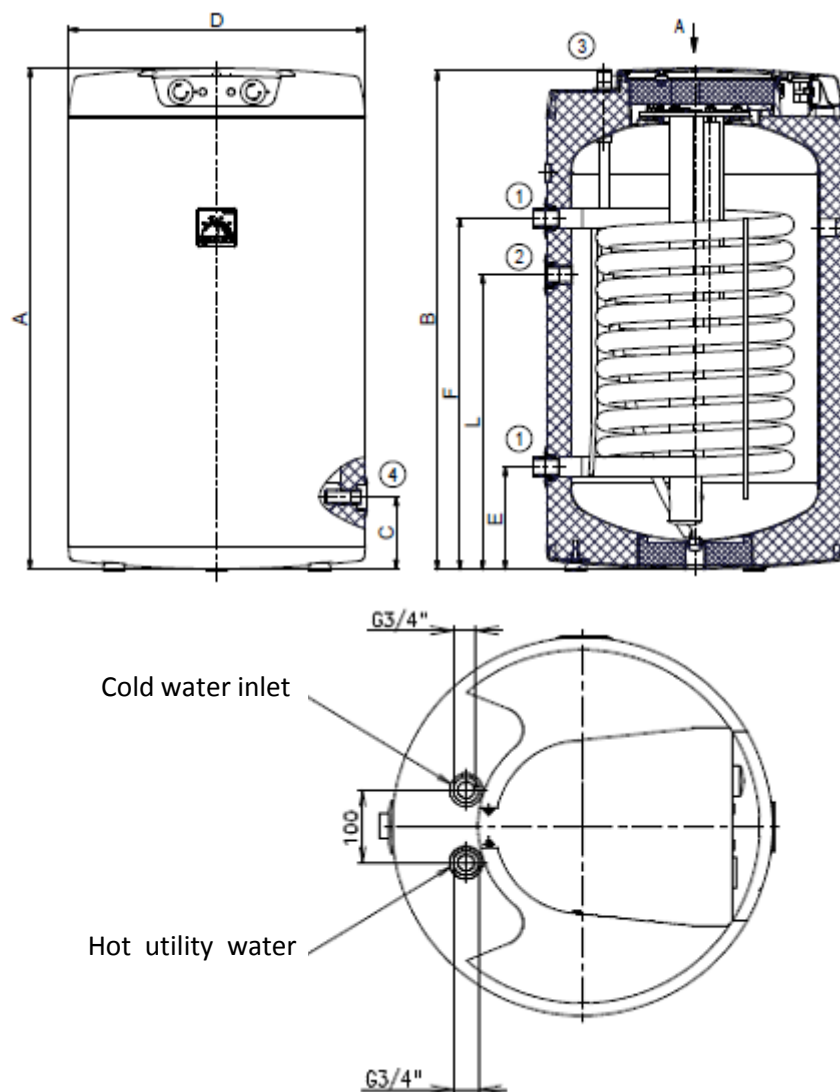


Figure 1

Type	OKCE 100 NTR/2,2 kW	OKCE 125 NTR/2,2 kW
A	885	1050
B	881	1049
C	127	128
D	524	524
E	182	182
F	622	752
L	522	622

①	1" vnější
②	3/4" vnitřní
③	3/4" vnější
④	1/2" vnitřní

1.4 TECHNICAL PARAMETRES

TYPE	OKCE 100 NTR/2,2kW	OKCE 125 NTR/2,2 kW
CAPACITY [l]	96	115
WEIGHT[kg]	59	71
OPERATING PRESSURE IN THE TANK [MPa]	0,6	
OPERATING OVERPRESSURE IN THE EXCHANGER [MPa]	1	
MAX RATING WATER TEMPERATURE [°C]	110	
MAX TEMPERATURE OF HSW [°C]	80	
LOWER EXCHANGER HEAT DELIVERY SURFACE [m ²]	1	1,45
BOTTOM EXCHANGER OUTPUT AT RATING WATER TEMPERATURE OF 80 °C AND FLOW 720 l/h [kW]	24	32
PERMANENT OUTPUT HSW [l/h]	610	990
TIME OF HEATING BY EXCHANGER FROM 10°C TO 60 °C [min]	14	14
TIME OF RATING WITH ELECTRICITY FROM 10°C TO 60 °C [h]	3	3,5
POWER INPUT [kW]	2,2	
ELECTRIC CONNECTION OF CONTROL ELEMENTS	1 PE-N 230 V/50 Hz	
IP PROTECTION	IP 44	
STANDING LOSS [W]	42	54

Table 1

2.3 PLUMBING FIXTURE



Power water connects to pipes with 3/4" thread in the bottom part of the storage tank. Blue - cold water supply, red - hot water outlet. For potential disconnection of the storage tank, the service water inlets and outlets must be provided with screw coupling Js 3/4". The safety valve is mounted on the cold water inlet identified with a blue ring.



Each hot service water pressure storage tank must have a safety valve with a membrane spring. Nominal clearance of safety valves is defined by standard. Storage tanks are not equipped with a safety valve. The safety valve must be easily accessible, as close to the storage tank as possible. The inlet pipes must have at least the same clearance as the safety valve. The safety valve is placed high enough to secure dripping water drain by gravity. We recommend mounting the safety valve onto a branch pipe. This allows easier exchange without having to drain the water from the storage tank. Safety valves with fixed pressure settings from the manufacturer are used for the assembly. Starting pressure of a safety valve must be identical to the maximum allowed storage tank pressure and at least 20 % higher than the maximum pressure in the water main (Table 2). If the water main pressure exceeds such value, a reduction valve must be added to the system. **No stop valves can be put between the storage tank and the safety valve.** During the assembly, follow the guide provided by the safety equipment manufacturer.



It is necessary to check the safety valve each time before putting it into operation. It is checked by manual moving of the membrane from the seat, turning the make-and-break device button always in the direction of the arrow. After being turned, the button must click back into a notch. Proper function of the make-and-break device results in water draining through the safety valve outlet pipe. In common operation, such a check needs to be implemented at least once a month, and after each storage tank shutdown for more than 5 days. Water may be dripping off the drain pipe of the safety valve; the pipe must be open into the air, pointed down; environment temperatures must not drop below zero. When draining the storage tank, use the recommended drain valve. First, close the water supply into the storage tank.

Please find necessary pressure values in the below Table 2. For proper safety valve operation, a backflow valve must be mounted on the inlets pipes, preventing spontaneous storage tank draining and hot water penetrating back into the water main. We recommend that the hot water distribution from the storage tank was as short as possible to minimise heat losses. At least one demountable joint must be mounted between the tank and every supply pipe.

Adequate piping and fittings with sufficiently dimensioned maximum temperature and pressure values must be used.

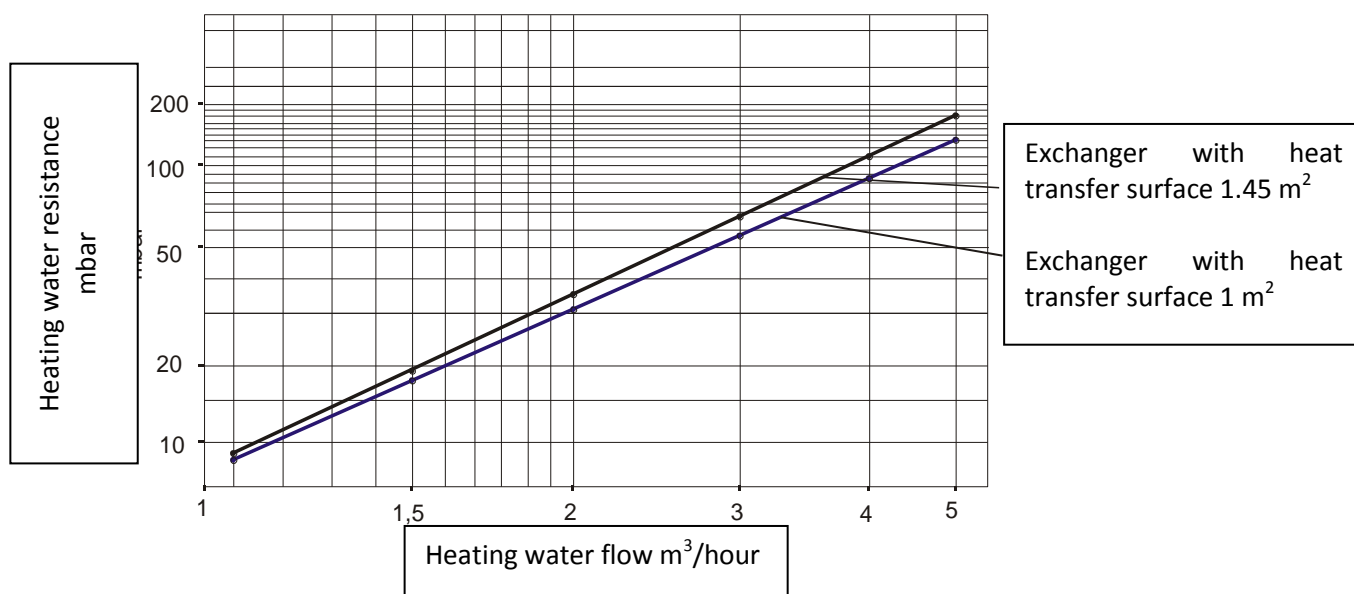
Storage tanks must be provided with a discharge valve mounted on the cold service water inlet to the storage tank for potential disassembly or repair.

When assembling the security equipment, follow the standards.

SAFETY VALVE STARTING PRESSURE [MPa]	ADMISSIBLE OPERATING STORAGE TANK PRESSURE [MPa]	MAX PRESSURE IN THE COLD WATER PIPE [MPa]
0,6	0,6	up to 0,48
0,7	0,7	up to 0,56
1	1	up to 0,8

Table 2

2.4 PRESSURE LOSSES



Type	Pressure loss mbar				
	tHV = 60 °C				
	Amount of heating water in m3/h				
	1	2	3	4	5
Exchanger 1 m2	7	24	51	86	130
Exchanger 1.45 m2	9	32	68	115	174

2.5 CONNECTION OF STORAGE TANK TO HOT WATER HEATING SYSTEM

a) *Water heating by electric energy*

After the storage tank is connected to electric network, the heating element starts heating water. The element is turned on and off by a thermostat. After reaching the temperature set, the thermostat switches off the electric circuit and thus discontinues water heating. The control light signals if the element is in operation (light is on) or if it is off (the light goes out). In case of longer operation without using the heated volume, the thermostat has to be set to position 5°C to 8°C (set the “snowflake” symbol on the thermostat selector) to avoid its freezing, or electricity supply to the storage tank has to be switched off.

In combined versions, the stop valve on the inlet to the exchanger has to be closed, which prevents heating water in the hot water heating system.

b) *Service water heating via thermal energy through heat exchanger*

Closing valves of the heat exchanger must be opened which ensures heating water flow from the hot water heating system. Together with a closing valve, it is recommended to install an air outlet valve at the inlet to the heat exchanger in order to bleed the heat exchanger as needed, in particular before the beginning of the heating season (

Figure 4). . The time of heating using the heat exchanger depends on the temperature and flow of water in the hot water heating system. A storage tank is made in universal design - depending on the need of connecting the closing valves to the heating element either from the right, or from the left.



It is recommended to install stop valves on the heating water inlet and outlet (for possible dismantling of the storage tank). The valves have to be as close to the storage tank as possible to avoid higher thermal losses.

2.6 EXAMPLES OF STORAGE TANKS CONNECTION

Connecting a storage tank to a heating circuit

The storage tank is placed on the ground, next to the heating source, or in its vicinity. The heating circuit is connected to marked inputs and outputs of the storage tank exchanger; the deaeration valve is mounted in the highest place. It is necessary to install a filter into the circuit in order to protect the pumps, the three-way valve, and backflow flaps, and the exchanger from sedimentation. It is recommended to flush the heating circuit before the assembly. All wiring connections must be properly insulated from heat.

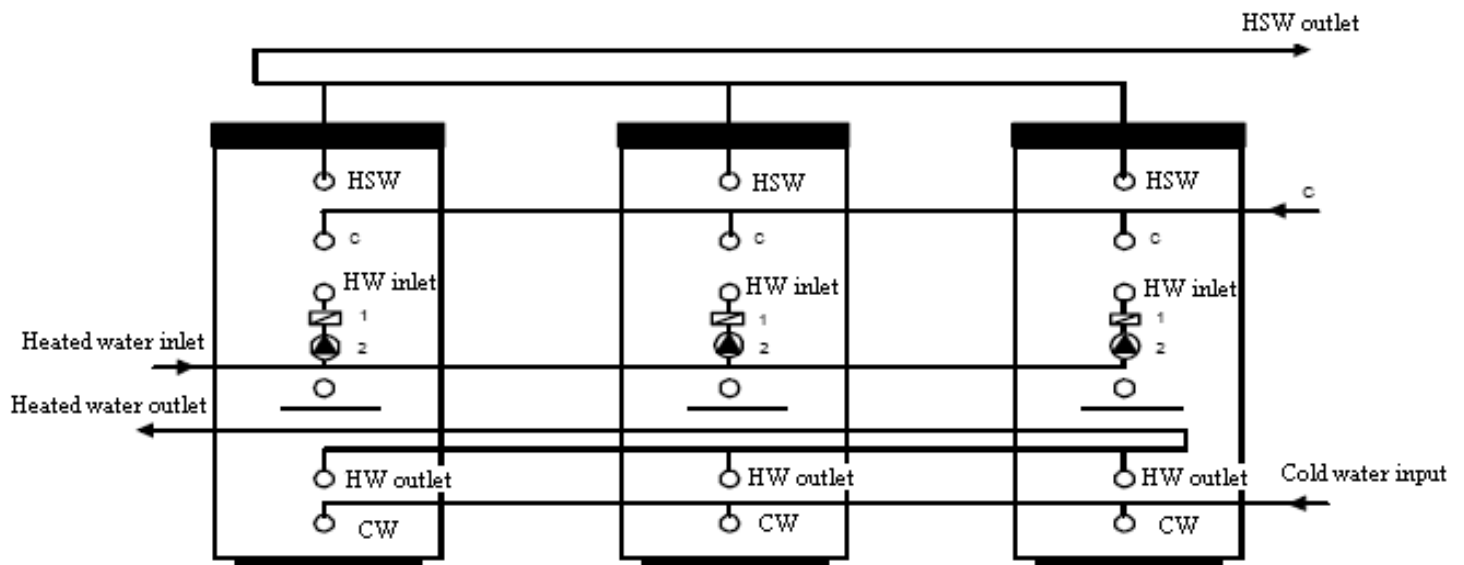
If the system works with priority heating of HSW using a three-way valve, always follow the installation instructions of the three-way valve's manufacturer.

Connecting a storage tank to a hot water distribution

Cold water shall be connected to an inlet marked with a blue ring and writing “HSW INLET”. Hot water shall be connected to an outlet marked with a red ring or writing “HSW OUTLET”. If the hot service water (HSW)

distribution is equipped with circulation circuit, it shall be connected to the outlet marked with "CIRCULATION". For potential drain of storage tank, the HSW inlet has to be provided with a "T" fixture with a drain valve. Each individually lockable storage tank must be at the cold water inlet provided with a stop gate, test cock, safety valve with a reverse flap and a pressure gauge.

An example of a group storage tank connection for steady hot water consumption from all tanks using



Tichelmann's method

HW – hot water
CW – cold water
C – Circulation

HSW – hot service water
1 – return valve
2 – pump

Figure 3

2.7 PUTTING INTO OPERATION

After connecting a storage tank to the water main, the hot water heating system, the electric network, and after testing its safety valve (based on the valve manual attached), the storage tank may be put into operation.

PROCEDURE:

- a) Check water and electric installation as well as the installation to a hot water heating system. Check proper placement of operating and safety thermostat sensors. The sensors must be inserted all the way in; first the thermostat and then the safety fuse.
- b) Open the hot water valve on the combination faucet.
- c) Open the cold water inlet valve to the storage tank.
- d) When the water starts flowing through the hot water valve, the filling of the storage tank is finished and the valve needs to be closed.
- e) Should a leak (of the flange lid) occur, we recommend tightening the screws of the flange lid.
- f) Fasten the electric installation cover.
- g) When heating service water heating by **electric energy**, turn on the electricity (the heating water inlet to the heating insert must be closed).
- h) When heating the water with **thermal energy** from a hot water heating system, turn off the electricity and open the valves at the inlet and outlet of heating water or bleed the exchanger.
- i) When commencing operation, flush the storage tank until the cloudiness in the water is gone.
- j) Make sure to fill in properly the warranty certificate.

2.8 STORAGE TANK CLEANING AND ANODE ROD EXCHANGE

Repetitive water heating causes limestone sediment on both the enamelled tank walls and chiefly the flange lid. The sedimentation depends on the hardness of water heated, its temperature, and amount of hot water consumed.



We recommend checking and cleaning the tank from scale and eventual replacement of the anode rod after two years of operation.

The anode life is theoretically calculated for two years of operation; however, it changes with water hardness and chemical composition in the place of use. Based on such an inspection, the next term of anode rod exchange may be determined. Have the company in charge of service affairs clean and exchange the anode. When discharging water from the storage tank, the mixing valve of the hot water tap must be open in order to avoid creating underpressure that would prevent water discharge.



To prevent formation of bacteria (e.g. *Legionella pneumophila*) within stack heating it is recommended, if absolutely necessary, to increase the temperature of HSW periodically for a transitional period of time to at least 70°C. It is also possible to make use of another way of HSW disinfecting.

2.9 SPARE PARTS

- | | | |
|-------------------------------|-------------------------|-------------------------------------|
| - Flange lid | - flange lid seal | - insulation flange lid |
| - Thermostat and thermal fuse | - Magnesium anode | - control button for the thermostat |
| - Control lights with wires | - capillary thermometer | - set of M12 (or M10) bolts |
| - Heating element | | |

When ordering spare parts, give part name, type, and type number from the storage tank label.

3 OPERATION OF THERMOSTAT

3.1 SERVICING

3.1.1 OPERATING DEVICES OF THE STORAGE TANK

Service devices of storage tanks of 100 and 125 l capacity are located under the transparent guard of the control panel (Figure 5Figure 5).

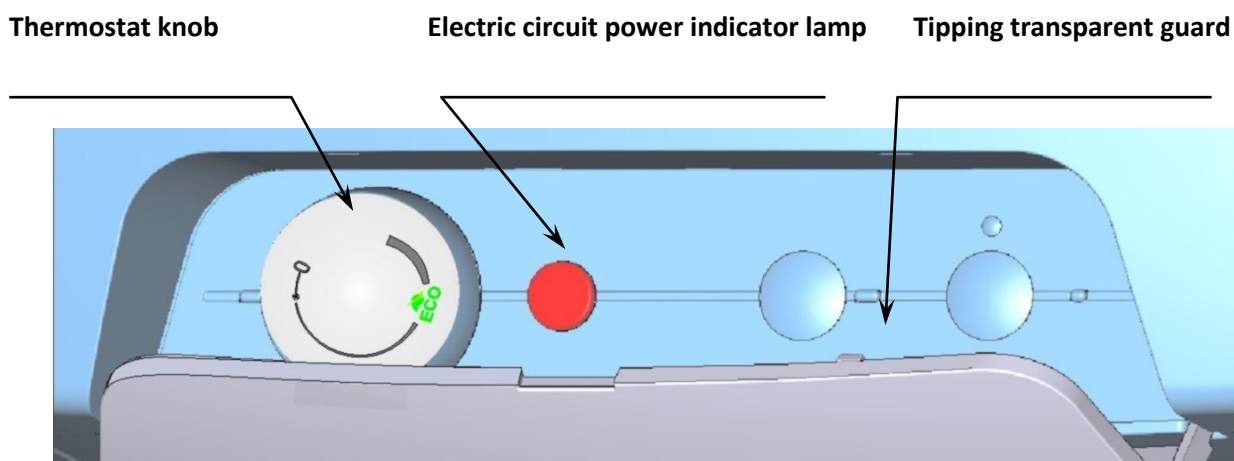


Figure 5

3.1.2 TEMPERATURE SETTING

Water temperature is set by turning the thermostat knob. The desired symbol is adjusted against the fixed point on the control panel (Figure 6).

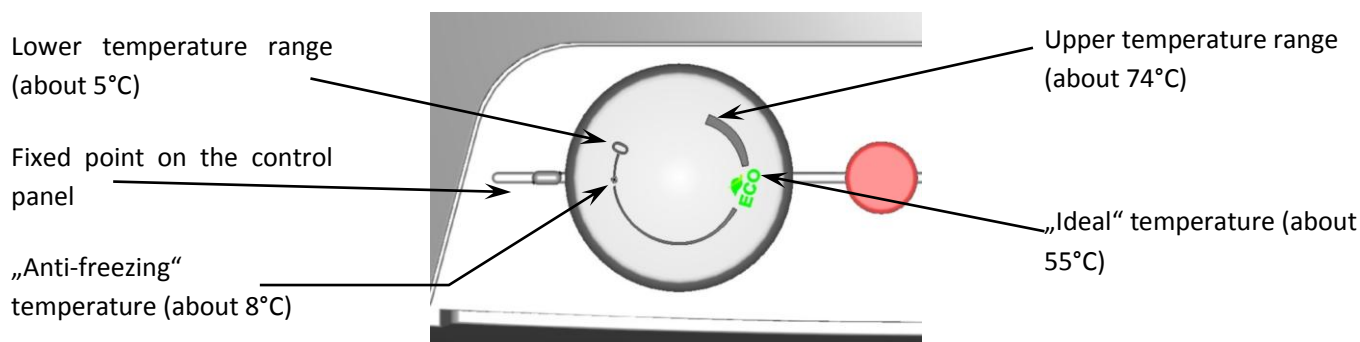


Figure 6



Adjusting the thermostat selector at the left backstop does not mean permanent shutoff of the heating element. When the storage tank is in use without blocking the daily rate, we do not recommend the temperature to be set above 65°C. The maximum value to select is „55“.

3.2 MOST FREQUENT FUNCTION FAILURES AND THEIR CAUSES

DEFECT	CONTROL LIGHT	FAILURE
Water in the tank is cold	<ul style="list-style-type: none"> Is on 	<ul style="list-style-type: none"> Heating element failure
Water in the tank is not warm enough	<ul style="list-style-type: none"> is on 	<ul style="list-style-type: none"> Failure of one of the heating coils in the element
Water in the tank is cold	<ul style="list-style-type: none"> is not on 	<ul style="list-style-type: none"> Thermostat failure The safety fuse turned off electricity supply Power supply outside the storage tank discontinued
Water in the tank does not correspond with temperature set	<ul style="list-style-type: none"> is on 	<ul style="list-style-type: none"> Thermostat failure

Table 3



Do not try to repair the failure yourselves. Seek either expert or service help. It does not take much for an expert to remove the defect. When making a repair appointment, report the type and serial number you find on the performance plate of your storage tank.

4 IMPORTANT NOTICES

4.1 INSTALLATION REGULATIONS



Without a confirmation of performed electrical installation issued by an authorised company, the warranty certificate shall be void.

The Mg anode has to be checked regularly and exchanged, if needed.

No stop valves can be put between the storage tank and the safety valve.

If the overpressure in the water main exceeds 0.48 MPa, a pressure control valve must be mounted before the safety valve.

All hot water outputs must have a combination faucet.

Before filling the storage tank with water for the first time, it is recommended to fasten the flange connection nuts of the tank.

It is not allowed to handle the thermostat, aside from temperature resetting with a control button.

All electric installation handling, adjustment and replacement of the regulation elements shall only be performed by an authorised service company.

The thermal fuse must not be turned off! In case of thermostat defect, the thermal fuse interrupts electric power input to the heating element if the water temperature in the storage tank exceeds 95°C.

As an exception, the thermal fuse may also switch off due to water overheating caused by overheating the hot water heating system boiler.

We recommend you operate the storage tank with one type of energy.



Both the electric and water installation must follow and meet the requirements and regulations relevant in the country of use!

4.2 DISPOSAL OF PACKAGING MATERIAL AND FUNCTIONLESS PRODUCT

A service fee for providing return and recovery of packaging material has been paid for the packaging in which the storage tank was delivered. The service fee was paid pursuant to Act No. 477/2001 Coll., as amended, at EKO-KOM a.s. The client number of the company is F06020274. Take the water boiler packages to a waste disposal place determined by the town. When the operation terminates, disassemble and transport the discarded and unserviceable storage tank to a waste recycling centre (collecting yard), or contact the manufacturer



09-2015