

# OPERATING AND INSTALLATION MANUAL

## HOT WATER TANKS FOR SOLAR SYSTEMS

OKC 200 NTRR/SOL  
OKC 250 NTRR/SOL  
OKC 300 NTRR/SOL



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## CAREFULLY READ THIS MANUAL BEFORE INSTALLING THE WATER HEATER!

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 water heaters.



The product is not intended to be controlled by

- a) people (including children) with reduced physical, sensual or mental capacities, or
- b) people with insufficient knowledge and experiences unless supervised by responsible person, or unless properly instructed by such responsible person.

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.

Made in the Czech Republic.

### Meaning of pictograms used in the Manual



**Important information for heater users.**



**Abiding by the recommendations of the manufacturer serves to ensure trouble-free operation and the long service life of the product.**



**Caution!**  
**Important notice to be observed.**

# 1 PRODUCT TECHNICAL SPECIFICATION

## 1.1 FUNCTION DESCRIPTION

The OKC 200, 250, 300 NTRR/SOL hot water tanks are designed and manufactured as a part of a solar system containing additional integral elements of the system, such as sun collectors and their roof holders (flat roof stands), expansion tank, collector filling distribution and other items necessary for proper and trouble-free function of a solar system.

Their nominal performance provides sufficient amount of hot water for flat units, premises, restaurants, and similar establishments.

For final heating (reheat) of HSW, electricity, various types of central heating boilers and combination of those can be chosen.

## 1.2 PRODUCT DESCRIPTION

OKC NTRR/SOL - stationary tank with two spiral heat exchangers for heating of HSW with heating water from two sources. Reheat can be carried out by boiler in the top exchanger and also by electric heater TJ 6/4".

The tank receptacle is welded from a steel plate; the exchangers from a steel tube and, as a unit, it is entirely coated with hot water resistant enamel. For additional corrosion protection a magnesium anode is mounted in the upper part of the tank and in the side flange to adjust the electric potential inside the receptacle, thus reducing the risk of corrosion. This anode can be **exchanged with titanium anode** which is fed with electricity and is stable (it need not be exchanged after two years of the tank's operation as the magnesium anode). All types have the outlets of hot and cold water and a circulation opening welded to them. The receptacle is insulated with polyurethane foam of 50 mm thickness. The tank shell consists of plastic container, the connecting parts are metal coated. The entire tank stands on three rectification screws with a possibility of levelling floor unevenness within the range of 10mm. Under the plastic cover on the side of the 300 litre tank, there is a cleaning and revision opening ended with a flange. Both NTR and NTRR series heaters are equipped with a 6/4" aperture for in-screwing an additional heating element of TJ 6/4" series.



The tank is placed on the ground, next to the heating water source, or in its vicinity. All connecting distributions must be properly insulated from heat.

The OKC 200 - 300 NTRR/SOL tanks are indirect tanks designed for preparation of hot sanitary water by means of solar system.

The NTRR version is equipped with two exchangers for an optional combination of a solar system and an additional indirect circuit (e.g. gas boiler). A heating element can be mounted, as well.

## 1.3 TECHNICAL DATA

### 1.3.1 TECHNICAL DATA FOR TANKS

MODEL		OKC 200 NTRR/SOL	OKC 250 NTRR/SOL	OKC 300 NTRR/SOL
CAPACITY	l	200	242	275
HEIGHT	mm	1377	1557	1791
DIAMETER	mm	584	584	600
WEIGHT WITHOUT WATER	kg	104	109	111
HOT WATER OPERATING PRESSURE	MPa		1	
HEATING WATER OPERATING PRESSURE	MPa		1	
MAX TEMPERATURE OF HEATING WATER	°C		110	
MAX TEMPERATURE OF HOT WATER	°C		80	
LOWER EXCHANGER HEAT DELIVERY SURFACE	m <sup>2</sup>	0.8	1	1.2
UPPER EXCHANGER HEAT DELIVERY SURFACE	m <sup>2</sup>	0.8	0.8	0.8
LOWER EXCHANGER CAPACITY	l	5.5	7	8.5
UPPER EXCHANGER CAPACITY	l	5.5	5.5	5.5
BOTTOM/TOP EXCHANGER OUTPUT AT TEMPERATURE DROP 80/60 °C	kW	19/19	24/19	29/19
HSW* HEATING TIME BY EXCHANGER (LOWER/UPPER) AT HEAT DROP 80/60 °C [MIN]	min	34/23	33/26	33/25
STATIC LOSS	W	82	87	85

\*HSW - Hot sanitary water 45 °C

Table 1

### 1.3.2 PRESSURE LOSSES

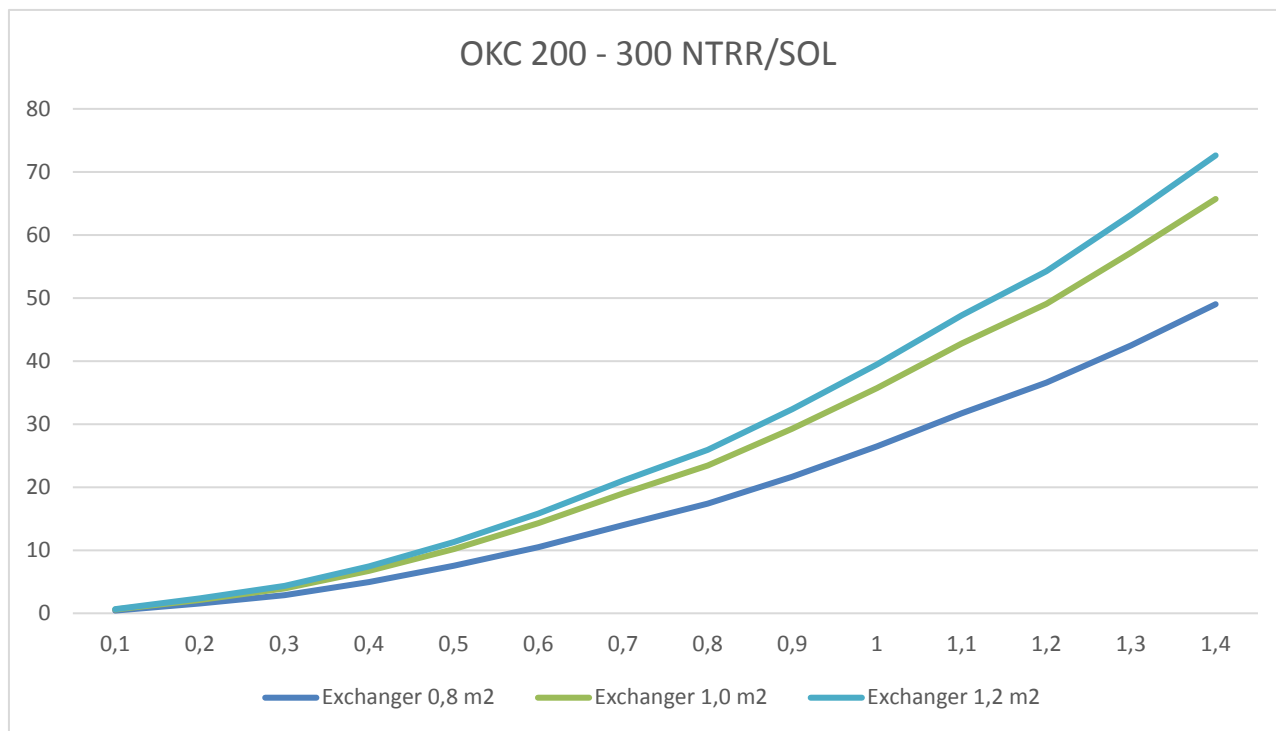


Figure 1

Pressure loss - mbar	Amount of heating water - m3/hr													
	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1	1,1	1,2	1,3	1,4
Heat exchanger 0,8 m <sup>2</sup>	0,43	1,56	2,9	4,96	7,54	10,5	14,01	17,4	21,65	26,46	31,72	36,6	42,5	49,02
Heat exchanger 1,0 m <sup>2</sup>	0,6	2,13	3,94	6,75	10,21	14,3	19,04	23,44	29,29	35,73	42,76	49,08	57,18	65,71
Heat exchanger 1,2 m <sup>2</sup>	0,66	2,36	4,36	7,45	11,28	15,81	21,03	25,91	32,37	39,49	47,26	54,24	63,2	72,62

Table 2

# 1.4 DESIGN AND BASIC DIMENSIONS OF TANKS

OKC 200 NTRR/SOL  
OKC 250 NTRR/SOL

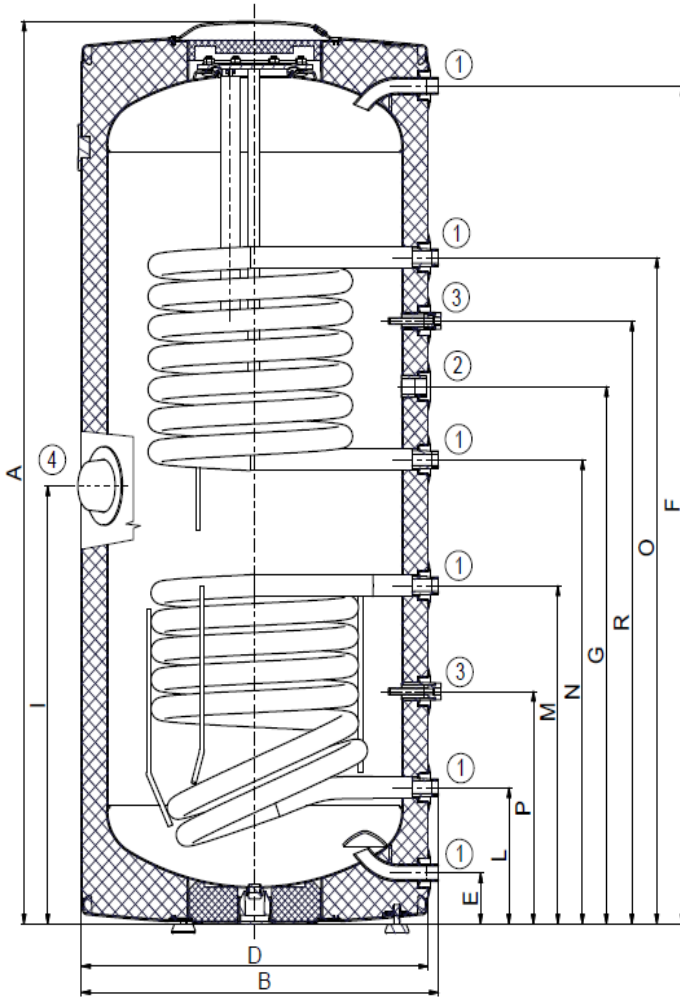


Figure 2

①	3/4" outer
②	3/4" inner
③	1/2" inner
④	6/4" inner

	OKC 200 NTRR	OKC 250 NTRR
A	1377	1557
B	607	607
D	584	584
E	80	80
F	1280	1460
G	820	1000
I	668	840
L	209	209
M	516	648
N	708	888
O	1016	1196
P	355	355
R	920	1100

Table 3

OKC 300 NTRR/SOL

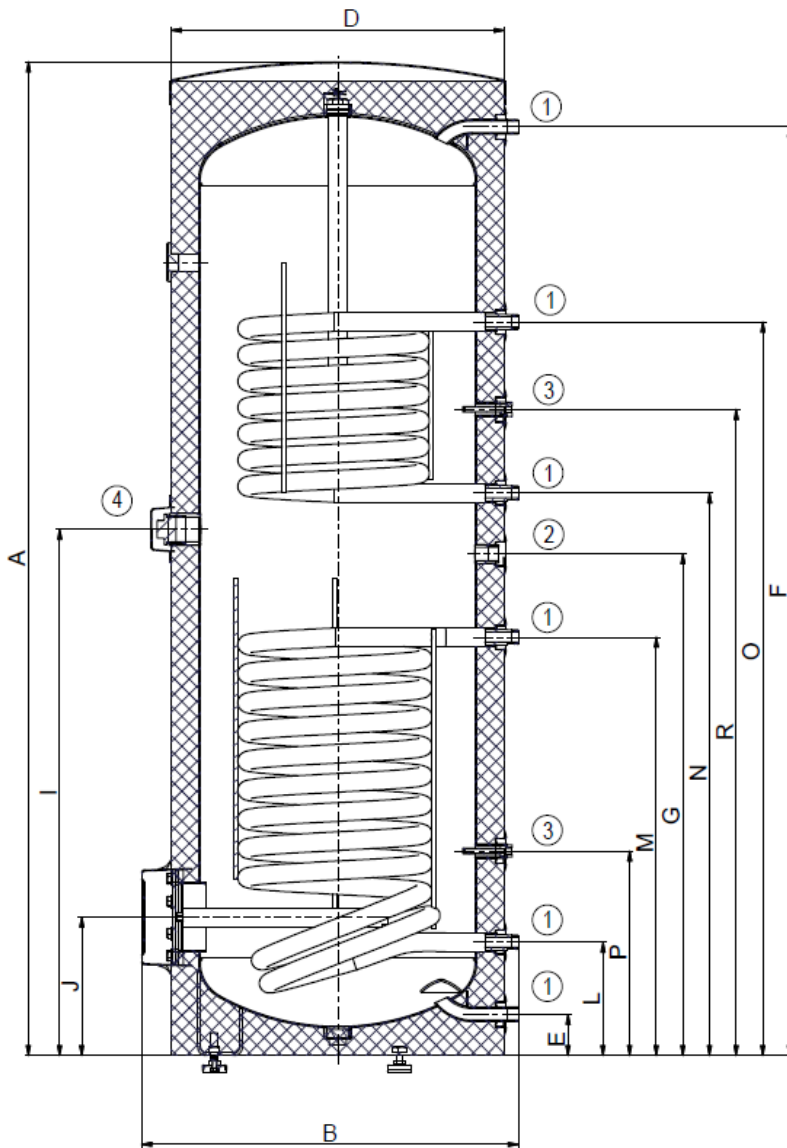


Figure 3

①	3/4" outer
②	3/4" inner
③	1/2" inner
④	6/4" inner

OKC 300 NTRR/SOL	
A	1791
B	678
D	600
E	74
F	1674
G	904
I	948
J	249
L	204
M	754
N	1014
O	1322
P	369
R	1164

Table 4





300 litre volume tanks are screwed onto the bottom wooden palette with M12 screws. When the tank is released from the pallet and prior to its putting into operation, 3 screw legs supplied have to be installed as the product accessories. With three adjustable legs, the tank may be positioned vertically to the base within 10 mm range.

## 2 AND FITTING INSTRUCTIONS

### 2.1 OPERATION OPERATING CONDITIONS



The tank shall only be used in accordance with the conditions specified on the power plate and in instructions for electric wiring. Besides the legally acknowledged national regulations and standards, also conditions for connection defined in the local electric and water works have to be adhered to, as well as the installation and operation manual.

The temperature at the place of the tank installation must be higher than +2°C; and the room must not freeze. The appliance has to be mounted at a convenient place; it means that the appliance must be easily available for potential necessary maintenance, repair or replacement, as the case may be.



**We emphasize that the tank shall not be connected to power supply if flammable liquids (benzine, stain cleaner) or gases, etc., are handled in its proximity.**

## 2.2 EXAMPLES OF TANKS CONNECTION

### 2.2.1 CONNECTING A TANK TO A SOLAR SYSTEM



Tank shall be connected to a solar system by a person familiarised with these heating systems. Temperatures in a solar circuit may achieve far over 100°C, and there are higher pressures than in typical heating systems, therefore correct selection of interconnecting materials and its coupling is of great importance, as well as correct dimensioning of the expansion tank connected to this system.

The 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 tank's heat exchanger; the deaeration valve designed for solar system is mounted in the highest place. It is recommended to flush the heating circuit before the assembly. All wiring connections must be properly insulated from heat.

Connecting a tank:



The manufacturer recommends that mixing valve is mounted on the hot water outlet, on sunny days the temperature in the tank may reach up to 90°C which is a temperature that, in case of scalding, may cause health complications. Output temperature suitable for general use shall be set on the mixing valve.

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 INLET". If the hot sanitary water (HSW) distribution is equipped with circulation circuit, it shall be connected to the outlet marked with "CIRCULATION". For potential drain of the tank, the HSW inlet has to be provided with a "T" plumbing with a drain valve. Each individually lockable tank must be on the cold water inlet provided with a stop gate, test tap, safety valve with a reverse flap and a pressure gauge.

### 2.2.2 EXAMPLE OF CONNECTING A TANK WITH SOLAR COLLECTORS AND A GAS BOILER

#### **Connecting a tank to a boiler heating circuit:**

The tank is placed on the ground, next to the heating source, or in its vicinity. The heating circuit is connected to marked inlets and outlets of the tank's heater exchanger; deaeration valve is mounted in the highest place. It is necessary to install a filter into the circuit in order to protect pumps, three-way valve, 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 HUW using a three-way valve, always follow the installation instructions of the three-way valve's manufacturer.

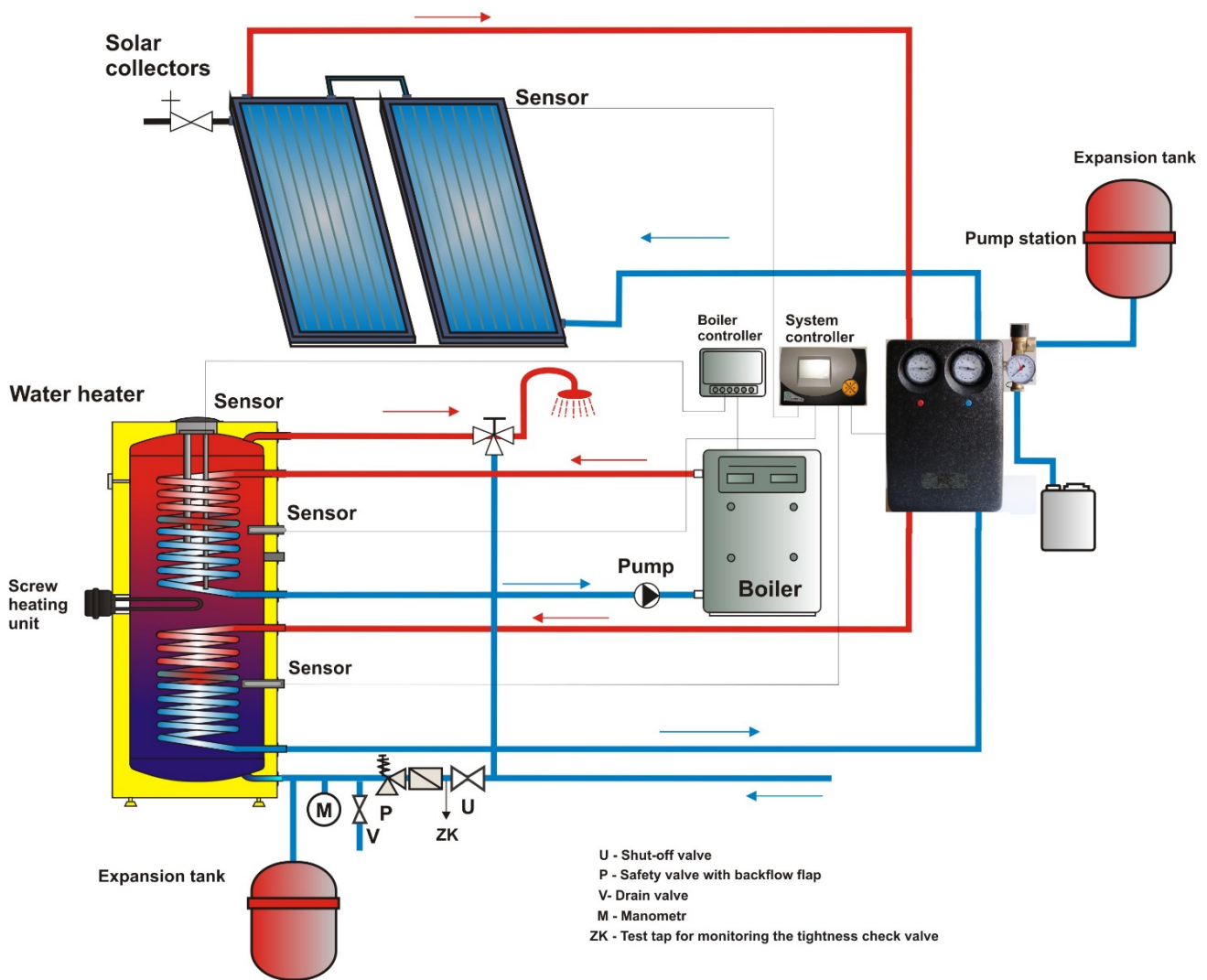


Figure 4

Heater with volume exceeding 200 liters at the outlet hot water piping provide combined temperature and pressure safety fittings according to ČSN EN 1490, or the temperature safety fittings fitted with water temperature sensor placed in the heater or other safety valves DN 20, and the opening overpressure compliant with the maximum operating overpressure of the heater vessel. The safety valve does not replace the safety valve on the cold water inlet. No closing, return armature, and filter may be mounted between the heater and the safety valve.

## 2.3 PLUMBING FIXTURE



Every hot utility water pressure tank shall be equipped with membrane spring loaded with safety valve. Tanks 300 l are not equipped with safety valve. If the tanks 200 and 250 l enclosed safety valve 0.6 MPa. Safety valve shall be easily accessible, fitted as close as possible to the tank. The inlet pipes must have at least the same clearance as the safety valve. Safety valve is placed high enough to secure dripping water drain by gravity. We recommend mounting the safety valve onto a branch pipe. Easier exchange without the necessity of draining water from the tank. Safety valves with fixed pressure settings from the manufacturer are used for the assembly. The starting pressure of the safety valve must be identical to the maximum allowed tank pressure, and at least 20 % higher than the maximum pressure in the water main. If the water main pressure exceeds such value, a reduction valve must be added to the system. During assembly, follow the guide provided by the safety equipment manufacturer. The cold water inlet of each individually closable heater must be fitted with a seal, test tap or plug to check the non-return valve, as well as a non-return valve and safety valve. Heaters with a volume of more than 200 litres must also be fitted with a pressure gauge.



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 regular operation, such a check needs to be carried out at least once a month, and after each shutdown of the tank longer 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 tank, use the recommended drain valve. First of all, close water inlet in the tank.

Find necessary pressure values in the below Table 5. For proper safety valve operation, a backflow valve shall be mounted on the inlet pipes that prevent spontaneous draining of the tank and hot water penetration back into the water main. We recommend that the hot water distribution from the 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.

SAFETY VALVE START-UP PRESSURE [MPa]	ACCEPTABLE OPERATING OVER-PRESSURE OF WATER TANK [MPa]	MAXIMUM PRESSURE IN COLD WATER PIPES [MPa]
0.6	0.6	<b>up to 0.48</b>
0.7	0.7	<b>up to 0.56</b>
1	1	<b>up to 0.8</b>

Table 5

## 2.4 FIRST COMMISSIONING

### PROCEDURE OF FILLING THE TANK WITH WATER

1. Open the stop valve on the tank inlet
2. Open the hot water valve on the combination faucet. Once water starts flowing out through the combination faucet the filling is completed and the faucet shuts off.
3. Check the joints for tightness.
4. When start using, keep flushing the tank until the cloud disappears.
5. Make sure to fill in properly the warranty certificate.

## 2.5 INSPECTION, MAINTENANCE & CARE FOR THE APPLIANCE



If water contains too many minerals, an expert has to come to remove the scale that forms inside the tank, as well as free sediments. This has to be performed after one or two years of operation. The cleaning is carried out through the hole in the flange - dismantle the flange lid and clean the tank. A new sealing has to be used for re-fitting. Since the inside of the tank has special enamel, which must not get in contact with the scale removing agent - do not work with decalcification pump. Remove the lime layer with a timber and suck it off, or wipe it off with a clout. After that, the appliance must be rinsed thoroughly and the heating process is checked the same as during the initial putting in operation. Do not use any abrasive cleaning agents (such as liquid sand, chemicals - acid, alkaline) or dye thinners (such as cellulose thinner, trichlor, and the like) to clean the outer shell of the tank. For cleaning use a wet clout and add a few drops of liquid cleaning agent for household applications. Repetitive water heating causes lime scale sediment on both the tank walls and chiefly on the flange lid. The sedimentation depends on the hardness of heated water, its temperature, and the 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. If the anode is only blocked with sediments clean its surface and, if used up, mount a new one. Have a company in charge of service affairs deal with the cleaning and exchanging of the anode. When draining water from the tank, the mixing faucet valve for hot water must be open, preventing the occurrence of under-pressure in the tank receptacle that would stop water from draining.

### **PROCEDURE OF EXCHANGING ANODE ROD IN UPPER PART OF THE TANK**

1. Turn off control voltage to the tank

2. Drain water from 1/5 tank.

PROCEDURE: Close water inlet in the tank

Open the hot water valve on the combination faucet

Open the drain tap of the tank

3. Anode is screwed in under the plastic cover in the upper lid of the tank

4. Unscrew the anode using adequate wrench

5. Pull the anode out and follow reversed steps to install a new one

6. During the fitting, make sure the grounding cable (300-500l) is connected properly; this is the condition of the anode's proper functioning

7. Fill the tank with water

### **PROCEDURE OF EXCHANGING ANODE ROD IN SIDE FLANGE**

1. Turn off control voltage to the tank

2. Drain water from the tank.

PROCEDURE: Close water inlet in the tank

Open the hot water valve on the combination faucet.

Open the drain tap of the tank

3. One anode is screwed in under the plastic cover in the upper lid of the tank, and the other one is screwed in on the side flange

4. Unscrew the anode using adequate wrench

5. Pull the anode out and follow reversed steps to install a new one

6. Fill the tank with water

## **2.6 SPARE PARTS**

- flange lid      - magnesium anode                      - set of M12 bolts              - 3 pieces of legs with M12 thread
- flange lid seal - magnesium anode 33x200      - insulation flange lid      - thermowells ½"

When ordering spare parts always state the name of the part, the type and type number from the tank's plate.

## 3 IMPORTANT NOTICES

### 3.1 IMPORTANT NOTICES

- **Without a confirmation of both electric installation and assembly by expert company, the warranty certificate is invalid.**
- Check and exchange the Mg anode regularly.
- **No closing armature may be mounted between the tank and the safety valve.**
- All hot water outputs must have a combination faucet.
- Prior to the first filling the tank with water we recommend that the receptacle's flange connection nuts are tightened.
- 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 supply to the heating element if the water temperature in the tank exceeds 90 °C.
- As an exception, the thermal fuse may also switch off due to water overheating caused by overheating the hot water heating system boiler.
- **It is necessary to activate the heating circuit and remove potential impurities that are captured in the filter; after that the system is fully functional.**
- If you don't use the heater (hot water tank) for longer than 24 hours, or if the facility with heater is unattended, close the cold water inlet to the heater.
- The heater (hot water tank) shall be used exclusively in accordance with the conditions specified on the performance plate and in the instructions for electric wiring.
- Due to the transport and thermal dilating, excessive enamel may fall of the heaters with exchangers on the tank bottom. This occurrence is common and has no effects on the heater's service life and quality. The decisive enamel layer which remains in the vessel. DZD has many years of experience with this occurrence and it is not a reason for complaints.

Do not attempt to remove potential defect by yourselves. Seek either expert or service help. It does not take much for an expert to remove the defect. When organizing repair state the model designation and serial number that is to be found on the power plate of your water tank.



Do not attempt to remove potential defect by yourselves. Seek either expert or service help. It does not take much for an expert to remove the defect. When organizing repair state the model designation and serial number that is to be found on the power plate of your water tank.

## 3.2 INSTALLATION REGULATIONS



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



To prevent the occurrence of bacteria (e.g. Legionella pneumophila) within stack heating it is recommended, if absolutely necessary, to increase the temperature of hot service water (HSW) periodically for a transitional period of time to at least 74°C. It is also possible to make use of another way of disinfecting HSW.

## 3.3 TRANSPORT & STORAGE INSTRUCTIONS

The device shall be transported and stored in dry place and protected from weather effects with temperature range from -15 to +50°C. During loading and unloading the instructions stated on the packaging shall be observed.

## 3.4 DISPOSAL OF PACKAGING MATERIAL AND NON-FUNCTIONING PRODUCT

A service fee for providing return and recovery of packaging material has been paid for the packaging in which the product 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 tank packages to a waste disposal place determined by the municipality. When the operation terminates, disassemble and transport the discarded and unserviceable heater to a waste recycling centre (collecting yard), or contact the manufacturer.



22-10-2018



## 4 ANODE WITH EXTERNAL VOLTAGE SOURCE

- MAINTENANCE FREE (ON DEMAND)

Anode rod is immune to wear and operates without the need of maintenance. Anode rod with an external voltage source consists of mini-potentiostat and titanium electrode that are interconnected via a connecting cable. Potentiostat for cathode protection of enamelled water tanks with integrated red/green LED signal system. Supply and referential electrode with a coating of noble metal oxides; supply with protective current without wear; referential anode to measure the actual potential in the accumulator.

Titanium anode can be integrated in a 300 litre tank in exchange for the original anode in G1 1/2" funnel. In 200 and 250 litre tanks, the flange lid shall (n. 2000262) be exchanged additionally, or have the modification made in the production.

Technical data of anode

<b>Minipotenciostat CORREX® MP</b>		
Function	Potentiostat for anti-corrosion cathode protection of electrical enamelled water tanks (intermittent potentiostat with controlled regulation of protective current potential) with integrated red/green LED signal system.	
Mains power supply	Voltage:	230 V ± 10 %
	Frequency	50..60 Hz
	Power input:	< 4 VA
Indicators	Required potential:	2,3 V ± 50 mV
	Impulse frequency:	100 Hz
	Intermittence:	200 µs
	Rated current (secondary)	100 mA
	Supply voltage (secondary):	max 10.6 V at 100 mA
Display	Two LEDs, 5 mm diameter	Green: followed by supply with protective current Red: failure none is on no power supply
Operation	Temperature range (Potentiostat):	0...40 °C
	IP protection:	II (operation in closed rooms)
Bushing	Dimensions (without Euro socket plug):	L x W x H = 80 x 50 x 45 mm
	Weight (without anode cable)	approx. 160 g
<b>Titanium electrode CORREX®</b>		
Function	Supply and referential electrode with a coating of noble metal oxides; supply with protective current without wear; referential electrode to measure the actual potential in the tank.	
Bolt with thread	M8 x 30	
Dimensions of electrode in the section filled with water (Basic MP version)	Diameter:	2 mm
	Length	200 mm
	Coating length	100 mm
Assembly options:	Fitting into a sleeve Fitting into an insulated hole	

Read more about titanium anode in a separate document about accessories:

<http://www.dzd.cz/images/download>