

OPERATING AND INSTALLATION MANUAL



STATIONARY WATER HEATERS



OKCE 160 NTR / 2,2 kW
OKCE 200 NTR / 2,2 kW
OKCE 250 NTR / 2,2 kW
OKCE 300 NTR / 2,2 kW
OKCE 300 NTR / 3-6 kW
OKCE 200 NTRR / 2,2 kW
OKCE 250 NTRR / 2,2 kW
OKCE 300 NTRR / 2,2 kW
OKCE 300 NTRR / 3-6 kW

OKC 160 NTR / BP
OKC 200 NTR / BP
OKC 250 NTR / BP
OKC 300 NTR / BP
OKC 200 NTRR / BP
OKC 250 NTRR / BP
OKC 300 NTRR / BP

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Read carefully the below instructions prior to the installation of the heater!

Data sheet pursuant to Directive No 442/2004 Coll. and Annex No 7

Heater types	Energy efficiency class	Heat losses ((Wh/24hr)/l)	Nominal capacity (l)	Time of content heating (hours)	Electricity consumption for heating of volume from 15°C to 65°C (in kWh)	Heat losses ((kWh/24hr)
OKCE 160 NTR/2,2 kW	C	8,8	160	4,5	9,5	1,4
OKCE 200 NTR (NTRR)/2,2 kW	B	7	200	5,5	12	1,4
OKCE 250 NTR (NTRR)/2,2 kW	B	6,9	250	6,8	15	1,73
OKCE 300 NTR (NTRR)/2,2 kW	B	6,2	300	8,5	17,6	1,86
OKCE 300 NTR (NTRR)/3-6 kW	B	6,2	300	3-4,5-6	17,6	1,86

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

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



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1. USE

Thanks to their construction and number of variants, the OKC 160 - 300 series water heaters 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.

2. PRODUCT DESCRIPTION

The heater tank 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. For additional corrosion protection a magnesium anode is mounted in the upper part of the heater to adjust the electric potential inside the tank, reducing the risk of corrosion. All types have the 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 heater shell consists of a steel, powder-paint coated, sheet; the connecting parts are metal coated. The entire heater stands on three rectification screws with a possibility of levelling floor unevenness within the range of 10 mm. Under a plastic cover on the side of the heater, there is a cleaning and revision opening ended with a flange; various performance heating units may be mounted into the opening. The NTR and NTRR series heaters from 200 litre volume are equipped with a 6/4" aperture for in-screwing an additional TJ heating element. Such version is used when the heater is connected to either a solar system or a system with a heat pump, to reheat water in the upper part of the heater to the temperature required. The heater is to be placed on the ground. The tank is tested with pressure of 0.9 Mpa, heat exchanger with 1.5 Mpa.

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

The NTRR version is equipped with two exchangers for an optional combination of two heating water sources; both exchangers can be combined in a series. **The NTR/BP and NTRR/BP series do not have a heating element. Heater cannot be used for flow heating of hot water in an exchanger.**

Placement and environment type

The heater is placed on the ground, next to the heating water source, or in its vicinity. All connecting distributions must be properly insulated from heat. It is recommended to use the product in an indoor environment with air temperatures from +2 to 45°C and a maximum relative humidity of 80%.

3. IMPORTANT NOTICES

- **Without a proof issued by a professional company about performed electrical and plumbing fixture the warranty shall be void.**
- The Mg anode has to be checked regularly and exchanged, if needed.
- **No stop valves can be put between the heater and the safety valve.**
- All outlets of hot water must be equipped with a combination faucet.
- Before the first filling of water heater it is recommended to tighten the nuts of the flange joint of the tank.
- It is not allowed to handle the thermostat, aside from temperature resetting with a control button.
- All electric installation handling, setting, and regulation feature exchange, may only be implemented by a service company.
- **The thermal fuse must not be turned off!** In case of a thermostat defect, the thermal fuse interrupts electric power supply to the heating element if the water temperature in the heater 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 (in case of a combined heater).
- **We recommend you operate the heater with one type of energy.** In case a solar system is connected to the bottom exchanger, it is necessary to connect a TJ 6/4" line element in the coupling above the heater for potential additional heating.

4. PUTTING THE HEATER INTO OPERATION

After connecting a heater 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 heater may be put into operation.

Procedure:

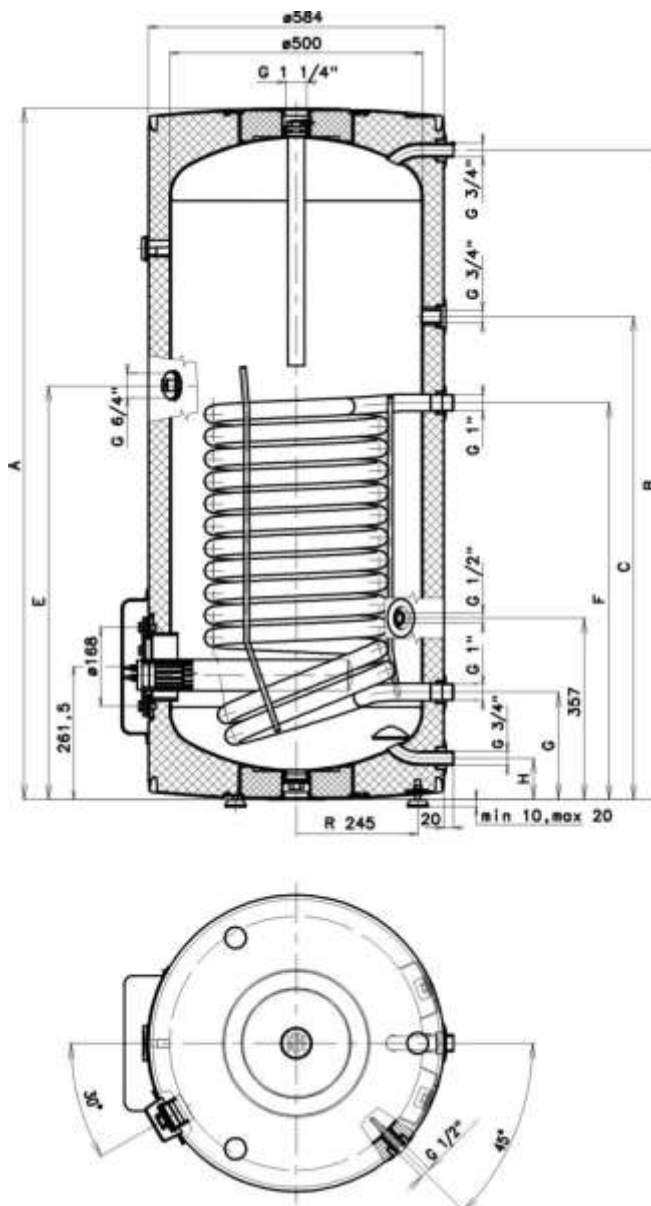
- a) Check both water and electric installation; for combined heaters, check the installation to a hot water heating system. Check proper placement of operating and safety thermostat sensors. The sensors must be inserted all the way in; first the thermostat and then the safety fuse.
- b) Open the hot water valve on the combination faucet;
- c) open the cold water inlet valve to the heater;
- d) when the water starts flowing through the hot water valve, the filling of the heater 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 (for combined heaters, 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. When commencing operation, flush the heater until the cloudiness in the water is gone.
- i) Make sure to fill in properly the warranty certificate.

5. TECHNICAL PARAMETERS

OKCE 160 NTR/2,2 kW, OKCE 200 NTR/2,2 kW, OKCE 250 NTR/2,2 kW

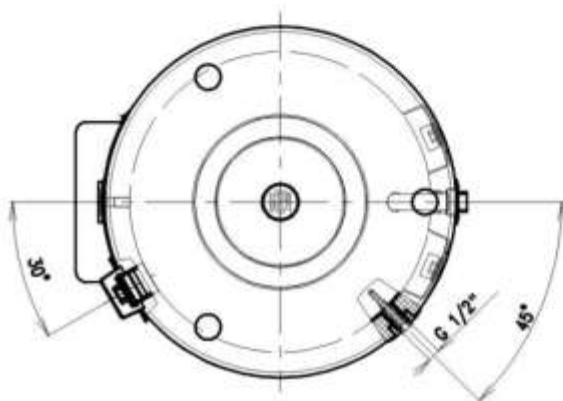
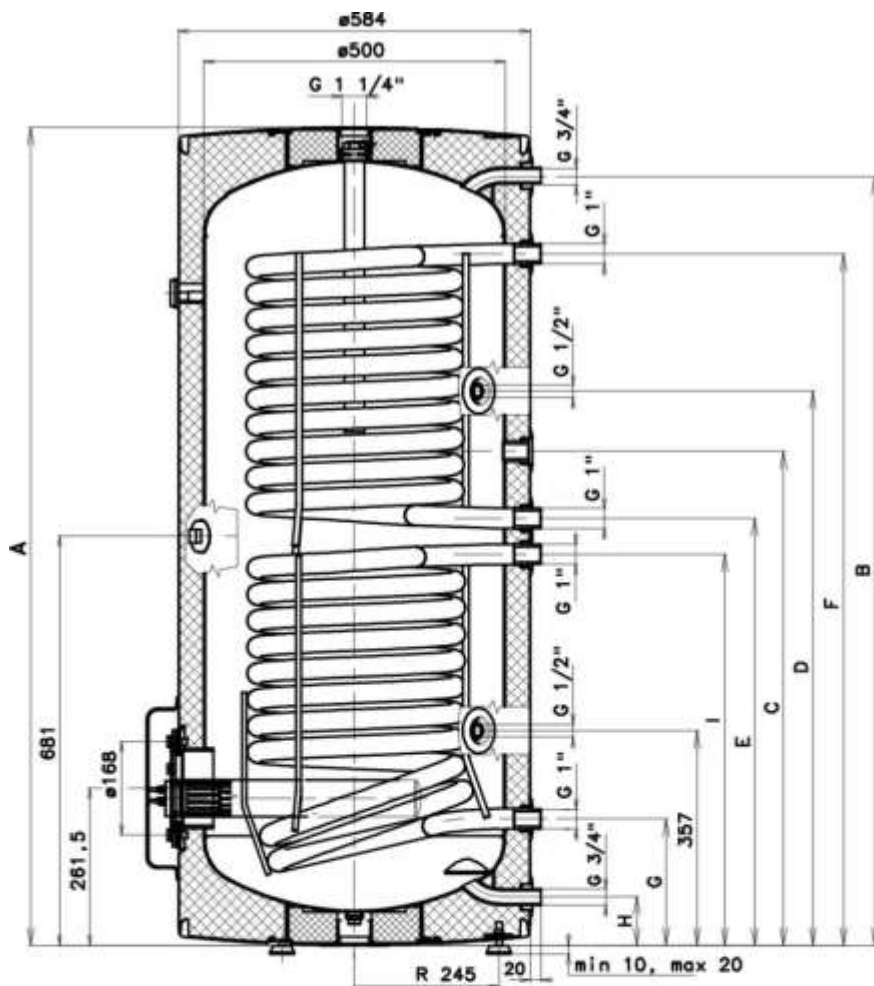
OKC 160 NTR/BP, OKC 200 NTR/BP, OKC 250 NTR/BP



Type	OKCE 160 NTR/2,2 kW	OKCE 200 NTR/2,2 kW	OKCE 250 NTR/2,2 kW
	OKC 160 NTR/BP	OKC 200 NTR/BP	OKC 250 NTR/BP
A	1052	1362	1542
B	969	1282	1462
C	652	952	1062
E	-	813	813
F	782	782	782
G	212	212	212
H	82	82	82

A 160 l capacity heater does not feature a G6/4" opening.

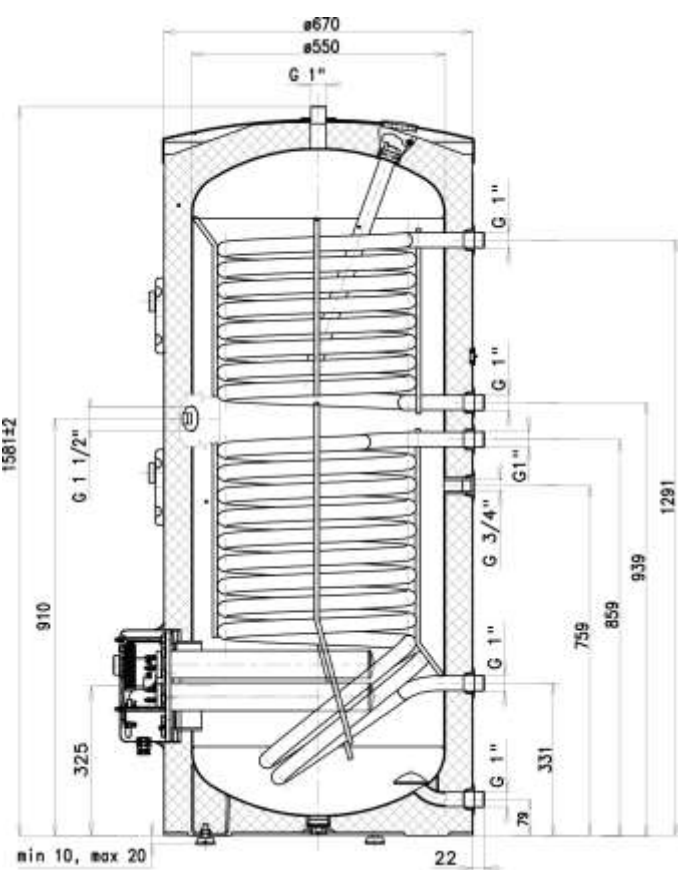
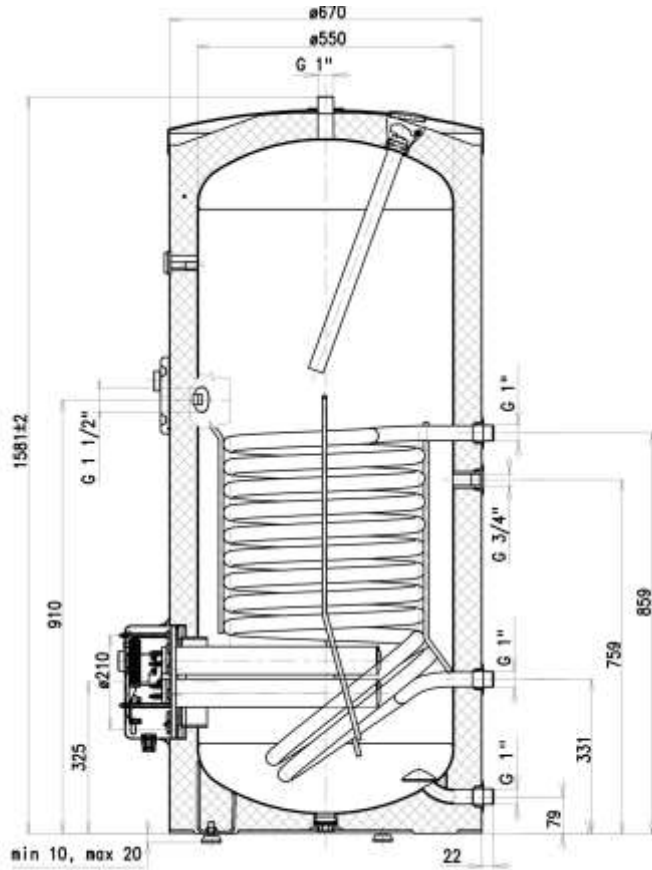
OKCE 200 NTRR/2,2 kW, OKCE 250 NTRR/2,2 kW, OKC 200 NTRR/BP, OKC 250 NTRR/BP



Type	OKCE 200 NTRR/2,2 kW	OKCE 250 NTRR/2,2 kW
	OKC 200 NTRR/BP	OKC 250 NTRR/BP
A	1362	1542
B	1282	1465
C	862	1065
D	922	1002
E	712	895
F	1152	1335
G	212	215
H	82	85
I	652	655

**OKCE 300 NTR/2,2 kW, OKCE 300 NTR/3-6 kW
OKC 300 NTR/BP**

**OKCE 300 NTRR/2,2 kW, OKCE 300 NTRR/3-6 kW
OKC 300 NTRR/BP**



6. HSW (Hot Service Water) TEMPERATURE CONTROL

a) HSW TEMPERATURE CONTROL for 300 litre heaters – the panel is a part of the heater

Each heater has a separate HSW temperature control for every exchanger. The temperature of water can be set between 5-74°C.

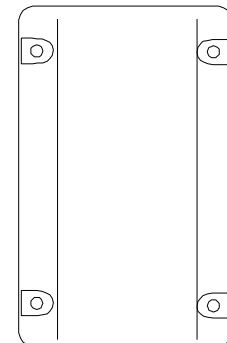
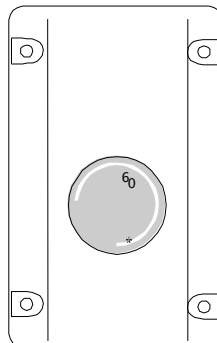
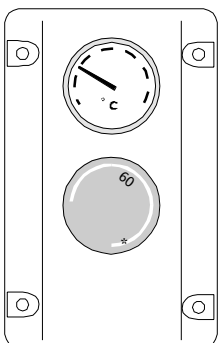
A vertical double thermowell is welded onto the tank shell for the controller sensors, for each exchanger. If an external temperature control is used, the thermowell is adapted for 7 and 10 mm diameter probes. The probes can be shifted vertically for proper adjustment of the entire system.

Exchanger control panels:

NTRR top exchanger control panel:
Capillary thermostat and thermometer

NTR & NTR lower exchanger control panel:
kapilárový termostat

Cover panel if external HSW temperature control is used



b) HSW (Hot Service Water) TEMPERATURE CONTROL for heaters:

**OKCE 160 NTR/2,2 kW, OKCE 200 NTR/2,2 kW, OKCE 250 NTR/2,2 kW, OKC 160 NTR/BP, OKC 200 NTR/BP, OKC 250 NTR/BP
OKCE 200 NTRR/2,2 kW, OKCE 250 NTRR/2,2 kW, OKC 200 NTRR/BP, OKC 250 NTRR/BP**

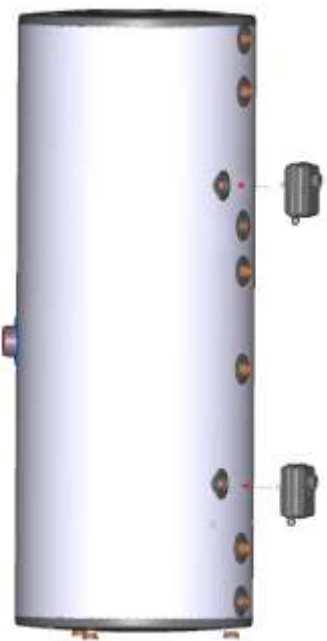
Each heater has a separate HSW temperature control for every exchanger.
The temperature of water can be set between 5 - 75 °C.
Thermowells for controller sensors with an inner thread are fitted in the heater tank.

Thermoregulation boxes KR230V, KR24V are not included in the heater package, you can buy them as accessories.

Thermoregulation exchanger boxes:

Box KR230V(24V) for control of NTR & NTRR top and bottom exchanger: capillary thermostat

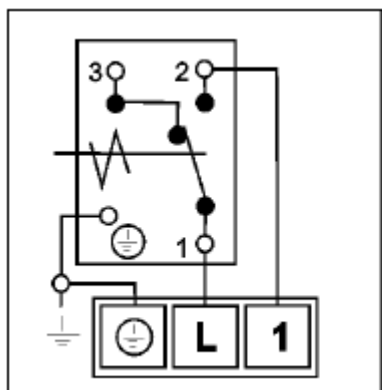
Fitting a thermoregulation box onto a heater:
- fitting on the back side of heater wells
- by the number of exchangers - 1 or 2 thermoregulation boxes



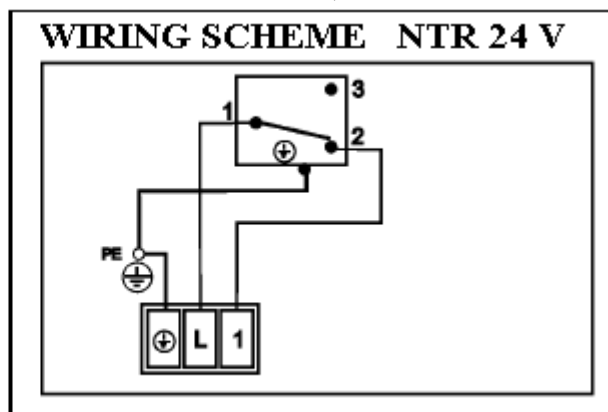
Name	Voltage	IP protection
KR 24V	24 V	IP 24
KR 230 V	230 V	IP 24

Wiring scheme:

230V



24 V



7. TECHNICAL DATA CHART

Type		OKCE 160 NTR/2,2 kW	OKC 160 NTR/BP	OKCE 200 NTR/2,2 kW	OKC 200 NTR/BP	OKCE 200 NTRR/2,2 kW	OKC 200 NTRR/BP	OKCE 250 NTR/2,2 kW	OKC 250 NTR/BP	OKCE 250 NTRR/2, 2kW	OKC 250 NTRR/BP	OKCE 300 NTR/2,2 kW	OKCE 300 NTR/3-6 kW	OKC 300 NTR/BP	OKCE 300 NTRR/2, 2kW	OKCE 300 NTRR/3-6 kW	OKC 300 NTRR/BP
Capacity	l	155		200		195		250		245		300				295	
Maximum weight of the heater	kg	80/77		95/92		106/103		106/103		116/112		116/122/111				150/155/148	
Maximum operating pressure in the tank	MPa	0,6		0,6		0,6		0,6		0,6		0,6				0,6	
Maximum operating overpressure in the exchanger	MPa	1		1		1		1		1		1				1	
Maximum heating water temperature	°C	110		110		110		110		110		110				110	
Maximum temperature of HSW (Hot Service Water)	°C	80		80		80		80		80		80				80	
Lower exchanger heat delivery surface	m ²	1,45		1,45		1,08		1,45		1,08		1,5				1,5	
Upper exchanger heat delivery surface	m ²	-		-		1,08		-		1,08		1,08				1,08	
Bottom /top exchanger output at heating water temperature of 80°C and flow 720 l/h	kW	32		32		2x24		32		2x24		35				35 / 27	
Permanent HSW ¹ output of Upper/Lower exchanger	l/h	990		990		670/650 *1080		990		670/650 *1080		1100				1100 / 760	
Time of heating by exchanger from 10°C to 60°C	min	17		22		28 / 16		28		36 / 20		24				24 / 16	
Time of heating with electricity from 10°C to 60°C ²	hod	4,5		5,5		5,5		6,5		6,5		8,5 / 6-3				8,5 / 6-3	
Power input ²	kW											2,2 3-6		-		2,2 3-6	-
Electric connection of control elements																	
IP Protection																	
Heat losses/Energy efficiency class	kWh/24 h	1,4/C		1,4/B		1,4/B		1,73/B		1,73/B		1,86/B				1,86/B	

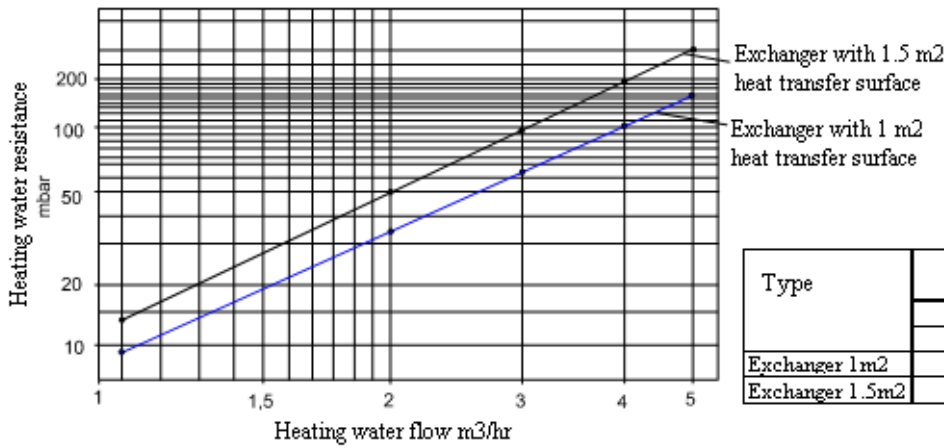
¹ HSW - Hot service water 45°C

² These data do not apply to those NTR/BP types that do not have a heating element.

LE – lower (bottom) exchanger UE – upper (top) exchanger *Exchangers combined in a series

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

8. PRESSURE LOSSES



Type	Pressure loss mbar t _{HW} = 60 °C				
	Amount of heating water in m ³ /hr				
	1	2	3	4	5
Exchanger 1m ²	7	27	61	109	170
Exchanger 1.5m ²	12	50	108	192	300

9. EXAMPLES OF HEATERS CONNECTION

Connecting a heater to a heating circuit

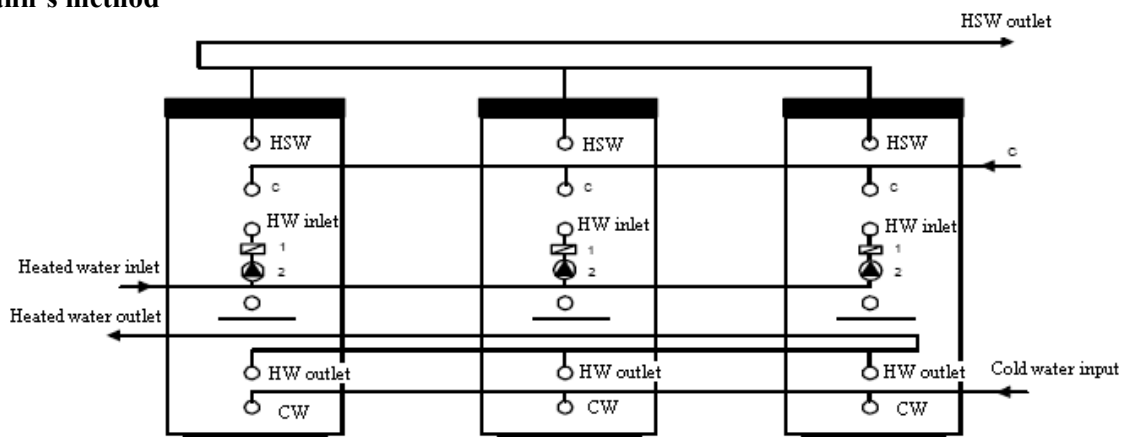
The heater is placed on the ground, next to the heating source, or in its vicinity. The heating circuit is connected to marked inputs and outputs of the heater exchanger; the deaerating valve is mounted in the highest place. It is necessary to install a filter into the circuit in order to protect the 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 Heater 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 heater, the HSW inlet has to be provided with a "T" fixture with a drain valve. Each individually lockable heater must be at the cold water inlet provided with a stop gate, test cock, safety valve with a reverse flap and a pressure gauge.

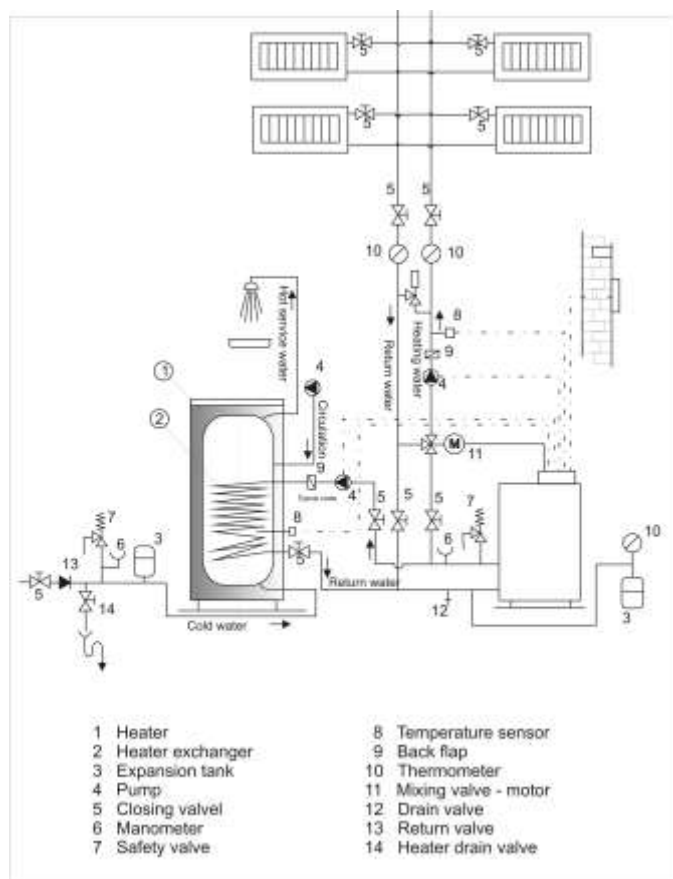
An example of a group heater connection for steady hot water consumption from all tanks using Tichelmann's method



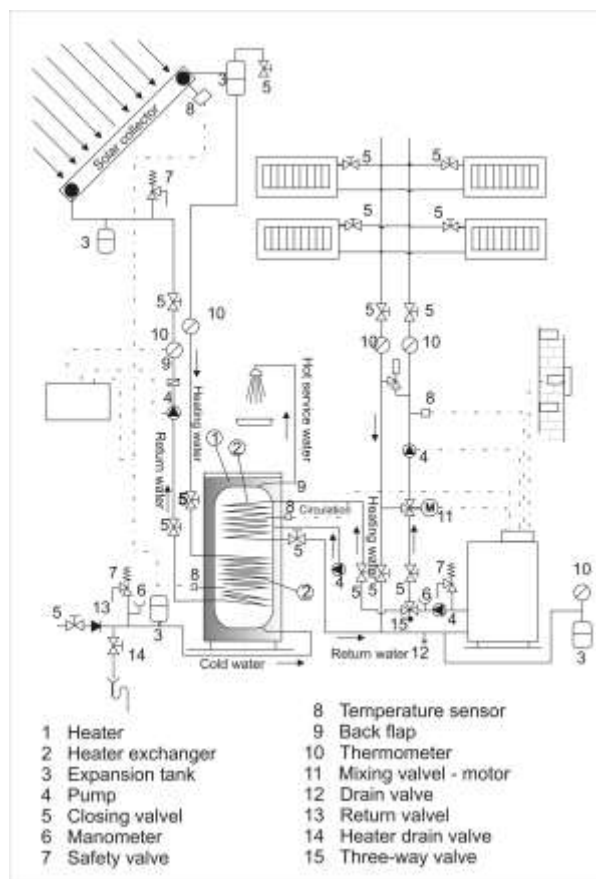
OV – Heating water
SV - Cold water
C - circulation

TUV - Hot service water
1 - Return valve
2 - pump

OKC 160-300 NTR
heated by a gas boiler with two pumps



OKC 200-300 NTRR
nahřívavý plynovým kotlem a slunečními kolektory
controlled by a three-way valve



10. ELECTRIC WIRING

OKCE 160 NTR/2,2 kW, OKCE 200 NTR/2,2 kW, OKCE 200 NTRR/2,2 kW, OKCE 250 NTR/2,2kW, OKCE 250 NTRR/2,2 kW, OKCE 300 NTR/2,2 kW, OKCE 300 NTRR/2,2 kW, OKCE 300 NTR/3-6 kW, OKCE 300 NTRR/3-6 kW

Water heaters are equipped with a universal electric heating unit with either set or adjustable heating element performance. A heating unit consists of a flange, to which one or three wells for ceramic heating elements and one thermowell are welded (see fig.). A unit is attached by either 8 M 10 screws with a 168 mm clearance, or 12 M 12 screws with a 210 mm clearance. In the wiring plastic cover, there is a thermostat and a safety fuse; heater operation control light; and a lead-in wire bushing.

The sensors must be inserted all the way in; first the thermostat and then the safety fuse.

The performance of heating unit may be adjusted based on either required heating time or connecting possibilities of electric energy distribution in the place of use.

Technical parameters of an electric heating unit

	Heating unit 2,2 kW	Universal heating unit 3-6 kW			
Performance (kW)	2,2	3	3	4	6
Voltage	1 PE-N AC 230 V 50 Hz	1 PE-N AC 230 V 50 Hz	2 PE-N AC 400 V 50 Hz	3 PE-N AC 400 V 50 Hz	3 PE-N AC 400 V 50 Hz
IP Protection	IP 44				
Number of heating elements	1	3			
Performance of one element (kW)	2,2	2			

After the heater is connected to electric network, the heating element starts heating water. The element is turned on and off by a thermostat. Thermostat can be set as per your need within the range from 5°C to 74°C. We recommend setting the service water temperature to maximum temperature of 60°C. This temperature ensures an optimal operation of the heater, reduces heat losses and saves electricity. 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). When putting the heater out of service for an extended period, in winter you can set the thermostat to the “snowflake” symbol preventing the water from freezing, or turn off the electricity supply to the heater. Connection, repairs, and wiring inspections may only be implemented by company (person) authorised to such activity. Expert connection must be confirmed on the warranty certificate. The heater is connected to the electric network using a solid moving conductor with a switch that turns off all network poles and the circuit breaker (protector).

Installations in bathrooms, laundromats, rest rooms and showers, must obey ČSN 33 2000-7-701.

The degree of protection of electric parts of the heater is IP 44.

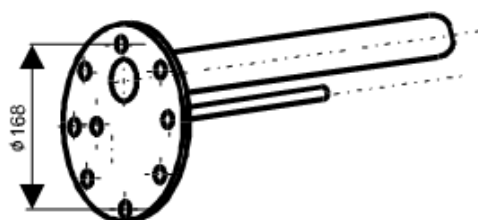
Respect rules of protection against electrical injuries in accordance with ČSN 33 2000-4-41.

Heating unit - flanges

OKCE 300 NTR/2,2 kW, OKCE 300 NTRR/2,2 kW

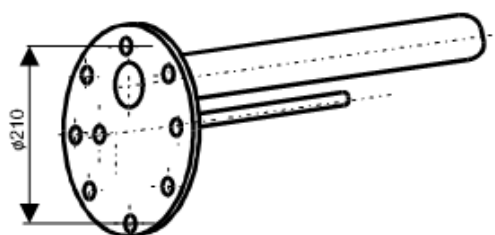
OKCE 160 NTR/2,2 kW, OKCE 200 NTR/2,2 kW,
OKCE 200 NTRR/2,2 kW, OKCE 250 NTR/2,2 kW,
OKCE 250 NTRR/2,2 kW

Flange 2,2 kW



Fastening 8 x M10

Flange 2,2 kW

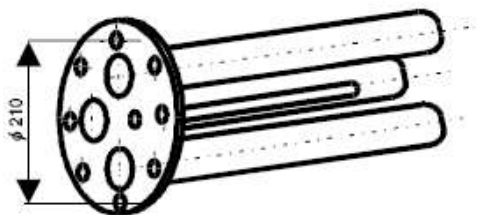


Fastening 12 x M12

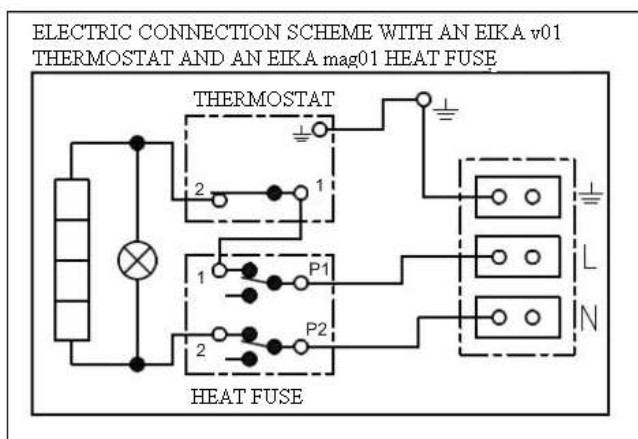
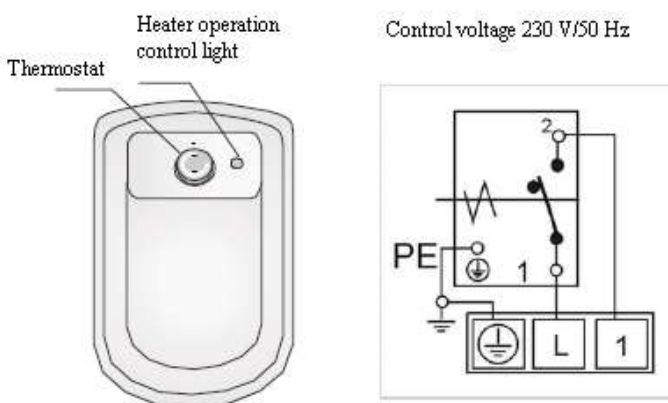
OKCE 300 NTR/3-6 kW, OKCE 300 NTRR/3-6 kW

Electric installation guard and wiring scheme

Flange 3-6 kW



Fastening 12 x M12



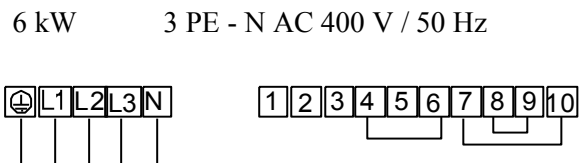
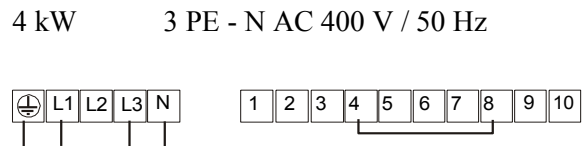
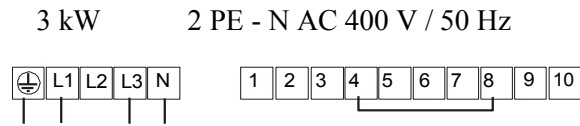
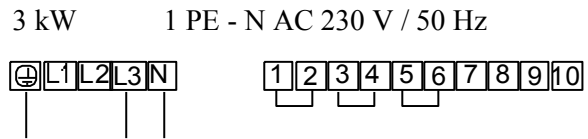
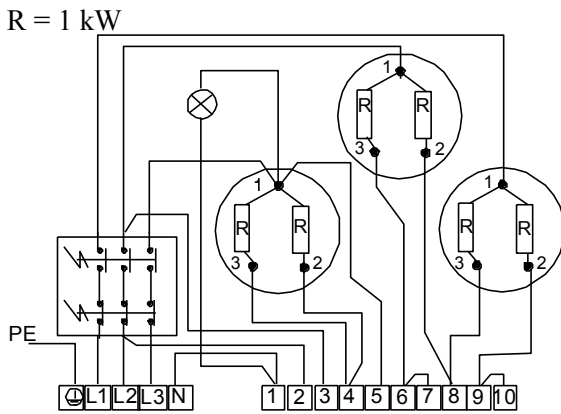
Wiring scheme

Notice: Factory connection must not be changed!

Heating unit 2.2 kW

Heating unit 3-6 kW

The 3-6 kW heating unit allows 4 universal types of connection based on either the required time of heating, or possibilities of electric network in the place of use. To achieve the chosen performance of the heating unit, connect the inlet conductor to the terminal board L1-L2-L3-N and interconnect the terminals on the terminal board 1 – 10 according to the below schemes:



11. SECURITY EQUIPMENT

Each hot service water pressure heater must have a safety valve with a membrane spring. Nominal clearance of safety valves is defined in the ČSN 0 60830 standard. The safety valve must be well accessible, as near to the heater as possible. The input 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 the branch led above the heater in order to simplify the exchange without the necessity of drain the water from the heater. Safety valves with fixed pressure settings from the manufacturer are used for the assembly. Starting pressure of a safety valve must be identical with the maximum allowed heater 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. No stop valves can be put between the heater and the safety valve. During the assembly, follow the guide provided by the safety equipment manufacturer.

Before putting the safety valve into operation it always needs to be checked by manual removal of the membrane from the valve seat and 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 heater shutdown for more than 5 days.

Water may be dripping off the safety valve through a drain pipe. The pipe has to be therefore freely open to the atmosphere, placed vertically and shall be in an environment free of temperatures below the freezing point.

When draining the heater, use a recommended drain valve. First, close water input into the heater.

Find necessary pressure values in the following table.

For proper safety valve operation, a backflow valve must be mounted on the inlet pipes, preventing spontaneous heater draining and hot water penetrating back into the water main.

Notice: The 300 litre heaters are not equipped with a safety valve.

Safety valve starting pressure (MPa)	Admissible operating water heater pressure (MPa)	Max. pressure in the cold water pipe (MPa)
0.6	0.6	do 0.48
0.7	0.7	do 0.56
1	1	do 0.8

When assembling the security equipment, follow ČSN 06 0830.

12. SPARE PARTS

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

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

13. HEATER 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 heater, the mixing valve of the hot water tap must be open in order to avoid creating underpressure that would prevent water discharge.

14. INSTALLATION REGULATIONS

Regulations and instructions that must be obeyed during heater assembly:

a) to the heating system

ČSN 06 0310 – Thermal systems in buildings – Designing and Installation

ČSN 06 0830 – Thermal systems in buildings – Protecting devices

b) to the electrical network

ČSN 33 2180 - Connecting of electric devices and appliances

ČSN 33 2000-4-41 - Low voltage electric installations Protective measures to ensure safety – Protection against electric shock

ČSN 33 2000-7-701 - Low voltage electric installations Single-purpose devices and devices in special premises - Premises with tub or shower to hot service water heating system

c) to the hot service water heating system

ČSN 06 0320 - Thermal systems in buildings - Hot water preparation – Design and Project Engineering

ČSN 06 0830 – Thermal systems in buildings – Protecting devices

ČSN 73 6660 – Internal water mains

ČSN 07 7401 - Water and steam for thermal energy equipments with working steam pressure up to 8 MPa

ČSN 06 1010 - Tank water heaters with water and steam heating; and combined with electric heating

Technical requirements. Testing.

ČSN EN 12897 – Water supply – Indirectly heated closed tank-type water heaters

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

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 water heater 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 heater to a waste recycling centre (collecting yard), or contact the manufacturer.

