OPERATING and INSTALLATION MANUAL

DRAŽICE
MEMBER OF THE NIBE GROUP

HEAT PUMP FOR HOT WATER PREPARATION

TC80E; TC100E; TC120E

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

Dear Customer,
Družstevní závody Dražice - strojírna s.r.o. would like to thank you for your decision to use a product of our brand.

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

1. APPLICATION

TC 80-100-120E is a device designed for hot water preparation in households and small plants where the daily consumption of hot water (40 °C) does not exceed 150 to 250 l. The device has to be connected to water service pipe and requires connection to power supply to be able to run. Air can be supplied and discharged by means of a suitable connection to the ventilation air distribution within the building.
In case you install the device in a room with a tub or shower, the requirements stipulated in standards IEC 60364-7-701 (VDE 0100, Teil 701) need to be observed. The heater can only be mounted on the wall in vertical position using wall screws of minimum diameter 8 mm. Wall with low bearing capacity has to be stiffened at the point where the pump is fixed to it. In order to simplify the control and exchange of magnesium anode we recommend that there is enough space between the device and the floor. Otherwise the device will have to be dismantled from the wall prior to any service intervention.
Any use of this equipment other than described in the directions for use is not allowed. The device is not designed for industrial use and applications in areas with occurrence of corrosive and explosive substances. The manufacturer shall not be held liable for any damages caused by improper placement and use of the device that violates the directions for operation and installation.

NOTICE FOR USERS

This equipment is not intended to be used by persons with limited psychical-physical abilities and children. Parents and custodians must make sure that children do not play with the equipment. The equipment can only be used by an adult person who is properly familiarised with its function, way of use and conditions of operation, in accordance with the operating and installation manual.

The **Operating and Installation Manual** is the fundamental and important part of the product. Read carefully the advice in the manual since it contains important instructions relating to safety during the assembly, use and maintenance of the device.
Store the **Operating and Installation Manual** for future reference.

The designation of the heat pump is noted on the type plate located on the bottom part of the device, among the water connecting tubes.

After removing the cover check the content of the package. If you have any doubts do not hesitate to contact the supplier. Do not leave any parts of the container (clamps, plastic bags, polystyrene, etc.) in the reach of children since those are potential source of danger, or do not throw them away in the environment.

⚠ The assembly must follow applicable regulations and instructions of the manufacturer. It has to be performed by a professionally qualified fitter.

STORAGE & TRANSPORT

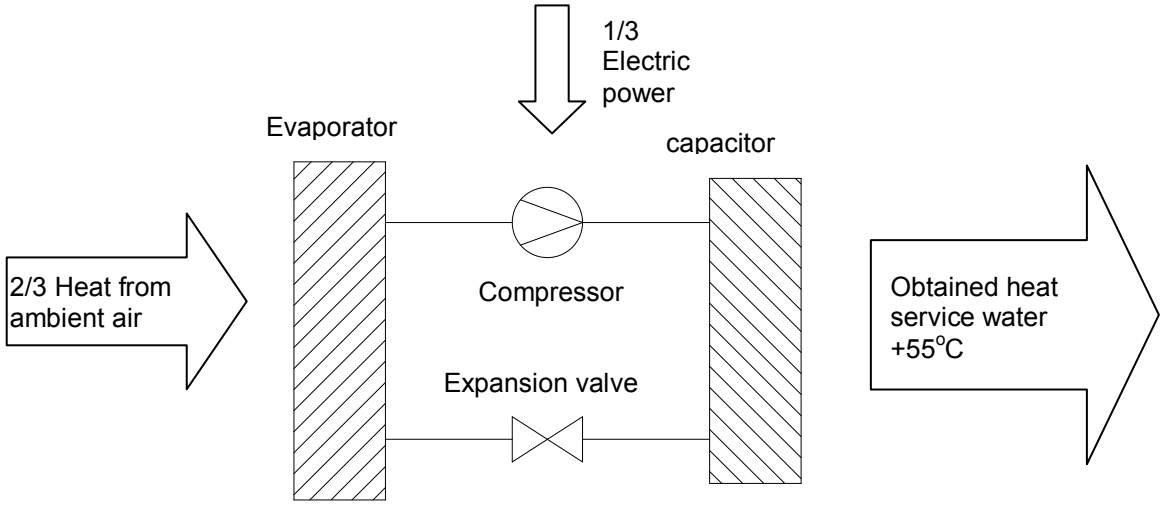
The heat pump must be stored secured in vertical position in a dry and clean area.

⚠ **Transport the heat pump in vertical position, only exceptionally you can incline it by 35° max in all directions. Make sure not to damage the frame and other machine components during transport.**

HEAT PUMP FUNCTION PRINCIPLE

Heat pump is a thermodynamic heat generator that increases heat from lower heat level (e.g. temperature of air in area) to higher heat level (e.g. hot water).

This heat, along with drive (electric) energy, forms heat power available to heat water.

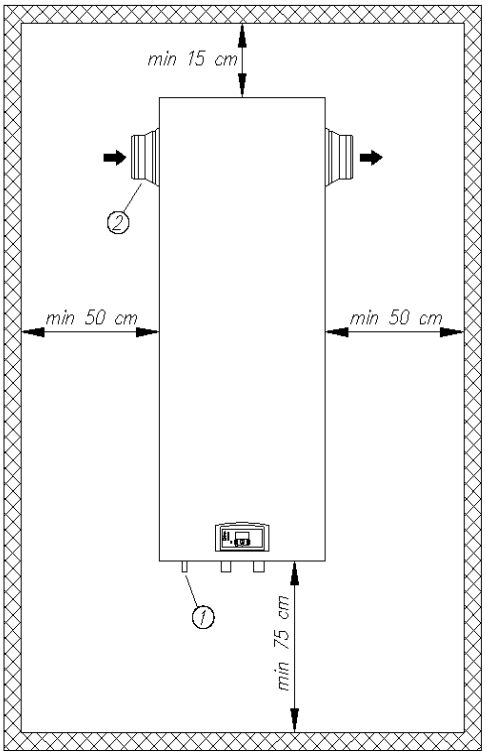


Scheme of power circulation through heat pump unit

LOCATION

Place the heat pump in a dry room with temperature between 10 to 35°C of minimum size 20 m^3 (applies only for the version without air discharge). Make sure the temperature of the air in the room from where the air is supplied does not drop below 10°C.
In general, we recommend that the room was sufficiently big and airy with temperature between 20 to 25°C which represent ideal conditions for the heat pump operation.
When choosing a place to install the heat pump, besides the above instructions you additionally need to make sure that the place from where air is supplied was not dusty since dust layer affects negatively the discharge of the heat pump.
When choosing a place for installation you need to consider the strength of the wall to have sufficient loading capacity for the heat pump weight, along with the weight of water in the heater. Make sure that the noises and vibrations produced by the device are not transferred through the wall to the areas where they can disturb (bedrooms, living rooms).
Do not place the heat pump and air supply needed for its operation in an area where other devices are installed that need air to run (gas boilers, solid fuel boilers, suction equipment, etc.).

When assembling the device consider the minimum distances of the device from the wall, floor and ceiling.
The required air flow through the device is 400 m^3/hour.
The guards at the air inlet and outlet (2) are supplied including screws.
In case of a model with air integrated, you need to consider the below conditions: the lowest admissible tube diameter is 125 mm, the maximum length of air pipe is 6 m in total.
Each 90° direction change (elbow) means additional resistance and shortening of the maximum tube length by 1 m.
Besides the resistance in the tubes and elbows, one needs to take into account that in case if increased air resistance also the noisiness of run increases.
Similarly, cooled air flowing in the discharge piping may cause formation of condensate on the piping. To avoid the occurrence of the condensate, the piping has to be thermally insulated in a suitable manner.



The condensate drains (1) off the heat pump in a plastic outlet on the left bottom part. The outer diameter is 14 mm (inner diameter is 10 mm). You need to connect to this tube from outside, the recommended inner diameter of the piping for draining the condensate to waste or to a container is minimum 15 mm. The amount of condensate depends on the temperature and moisture of air during the pump operation.

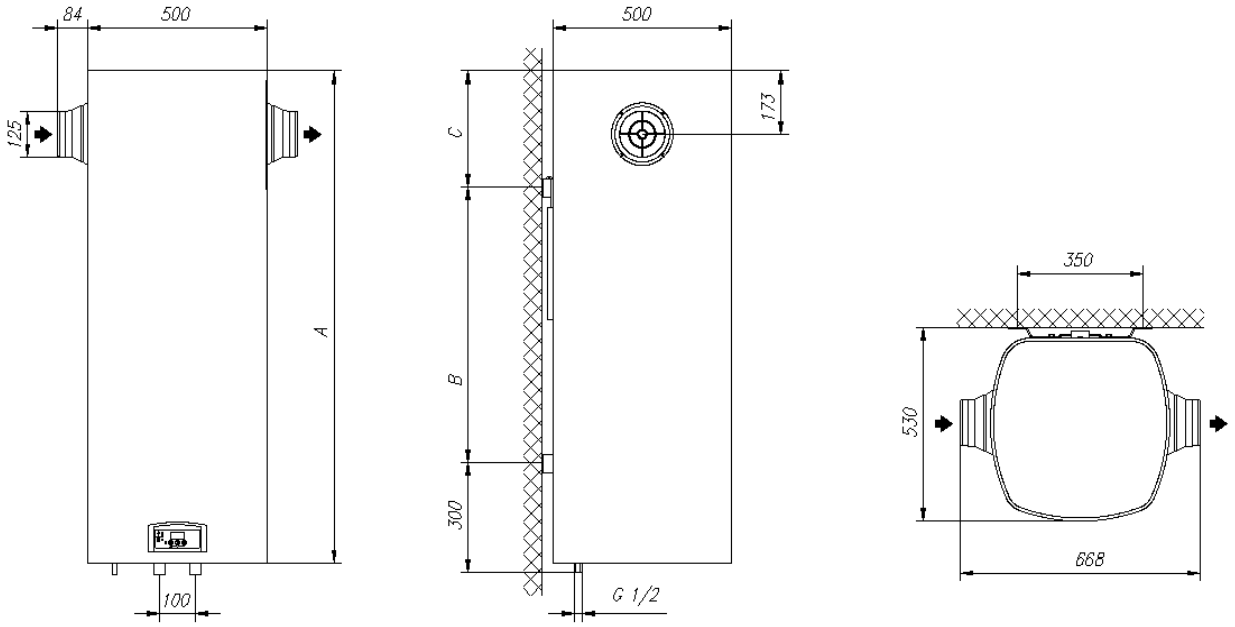
TECHNICAL PARAMETERS

MODEL		**TC120E**	**TC100E**	**TC80E**
Capacity	l	120	100	80
WEIGHT				
Net weight / weight with water	kg	68 / 188	62 / 162	58 / 138
HEAT PUMP				
Heat output	W	1316	1410	1410
Power input	W	470	470	470
Heat factor*		2,8	3,0	3,0
Time of heating*	h:min	3:00	2:10	1:35
Coolant		R134a	R134a	R134a
Air temperature working area	°C	10 – 35	10 – 35	10 – 35
Acoustic pressure	dB (A)	48,5	48,5	48,5
POWER CHARACTERISTICS				
Voltage / frequency	V / Hz	230 / 50	230 / 50	230 / 50
Electric protection	A	16	16	16
Level of protection		IP 24	IP 24	IP 24
Number of electric stencils x discharge	W	2 x 1000	2 x 1000	2 x 1000
Connecting voltage / maximum input	V / W	230 / 2800	230 / 2800	230 / 2800
Nominal current – electric heating elements only	A	8,7	8,7	8,7
Programme Anti-Legionella	°C	65	65	65
Water tank				
Enamelled steel		YES	YES	YES
Magnesium anode		YES	YES	YES
Insulation thickness	mm	25 - 60	25 - 60	25 – 60
RUNNING PRESSURE				
Water tank	MPa (bar)	0,6 (6)	0,6 (6)	0,6 (6)
MAX TEMPERATURE				
Heat pump only	°C	55	55	55
With electric heating elements	°C	65	65	65
Air flow	m^3 / h	400	400	400
Air connection	mm / m	Ø 125 / 6	Ø 125 / 6	Ø 125 / 6

* at inlet air temperature of 15°C, 71% humidity and 15°C inlet temperature, water is heated to 45 °C

DIMENSIONS

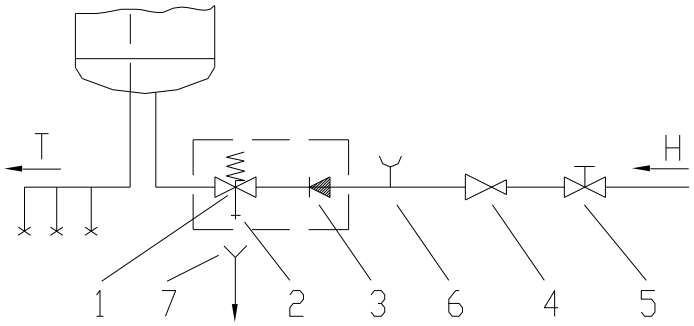
(mm)	TC 80	TC 100	TC 120
A	1090	1229	1345
B	505	605	755
C	315	354	320



CONNECTION TO WATER SUPPLY

The heat pump can be connected to water supply without a pressure control valve if the pressure in the piping is below 0.5 MPa (5 bar, nominal pressure). Otherwise a pressure control valve can be fitted which ensures that the pressure on the water inlet to hot water tank does not exceed the nominal pressure.

For the reason of safe operation, a safety valve has to be mounted on the supply piping in order to prevent increase of the pressure in the ehater by more than 0.1 MPa (1 bar) above the nominal pressure. During water heating, the water pressure in the tank increases up to the limit set on the safety valve. Since return of water to the supply piping is not possible, the water from the safety valve drain hole can drip.
Drip of the safety valve must be outfalled in waste or in a container with dip for spontaneous drainage. If the device is installed in areas where there is a risk of occurrence of temperatures below the freezing point, sufficient protection against freezing must be provided in winter.
To ensure correct operation of the safety valve, it has to be checked regularly by cranking the valve controller at least once a month. During that check, water has to flow out through the drainng nozzle, which indicates correct function of the valve.
If you cannot drain dripping water off the safety valve to waste due to improperly performed installation, dripping of water can be prevented by installing an expansion vessel. The capacity of the expansion vessel should be at least 4% of the heater capacity. The expansion vessel must have a membrane for permanent contact with drinkable water, and has to be installed on the supply piping, between the safety valve and the heater.



Closed (pressure) system

Description:
1 – safety valve
2 – test valve
3 – back pressure valve
4 – pressure control valve
5 – shut-off valve
6 – test adaptor
7 – funnel with drain connector

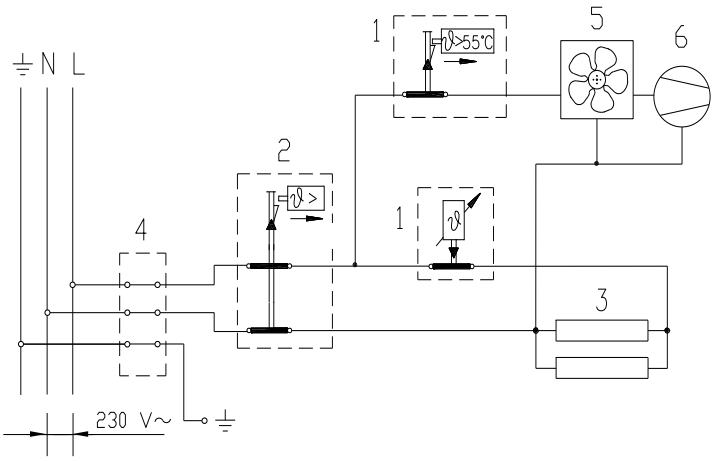
H – cold water
T - hot water

⚠ WARNING: The heat pump shall not be operated without water in the heater due to the risk of damaging the device!

CONNECTION TO POWER SUPPLY

Connecting the heat pump to power supply must comply with the standards applicable for electric connection. Since the device does not contain an element that would separate it permanently from power supply, a breaker has to be mounted on the cable lug between the device and power supply which can interrupt both poles and has at least a 3 mm spacing between open contacts.

Description:
1 – electronic controller
2 – bimetallic safety fuse
3 - electric heating element (2 x 1000 W)
4 – terminal board
5- ventilator
6 - compressor
L – phase conductor
N – neutral conductor
⏚ – protective conductor



HEAT PUMP CONTROL

When the heat pump is connected to water and power supply, and has the heater filled with water, the device is ready to run. The pump heats water within 10 – 55°C and up to 65°C with a power heating stencil.

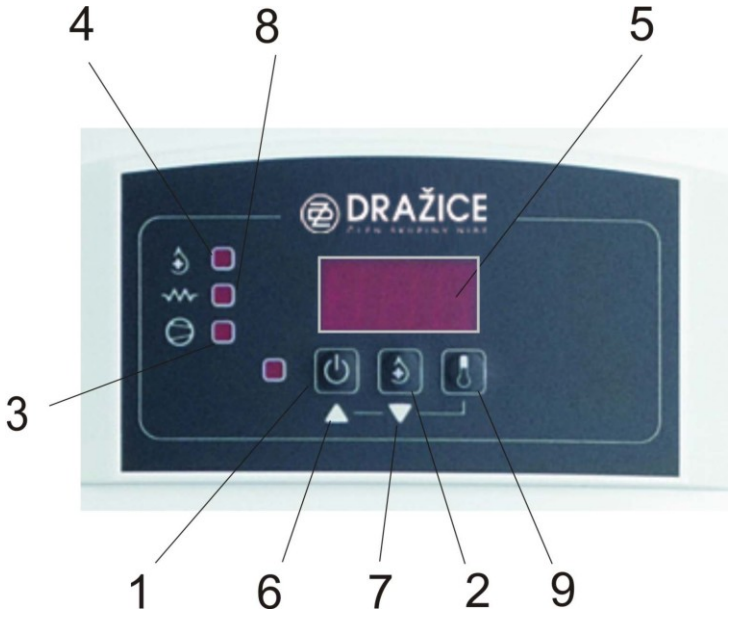
You can turn the heat pump and off by pressing the ⏻ button (1). The display (5) shows water temperature in the heat pump. If the air temperature at the inlet to the heat pump drops below 10°C (sensor T1), the control unit trips the compressor, and for the next 6 hours the water is heated by the electric heating elements only. The sign for heat pump goes off the display and alternately the writing **tLo** and the temperature of water in the heater are displayed. Next switching the heat pump on follows in 6 hours if the temperature of induced air exceeds 12°C (sensor T1).

The device is also equipped with protection against freeze: If the temperature of water in the heater drops below 10°C (sensor T2), the electric heating elements activate and remain active until the temperature detected by sensor T2 achieves 12°C.

Note: *Short pressing the* 🔥 *button (2) allows you to check the instantaneous ambient temperature or – more precisely – the temperature of the incoming air.*

WARNING: ***The components of the electronic control unit are under voltage even if the heat pump breaker (1) is pressed, the screen (5) displays the temperature of water in the heat pump, and also the antifreeze programme runs.***

Description:
1 – switching the heat pump on / off
2 – turning on the heating element and the Anti-Legionella programme
3 – heat pump ON indicator lamp
4 - Anti-Legionella programme ON indicator lamp
5 - display
6 – temperature setting - increase
7 – temperature setting – reduction
8 – heating element ON indication
9 – button with function of displaying the set temperature



Temperature setting:

- The preset temperature is 55°C.
- By pressing the (9) you will learn the set temperature. If you intend to change the set value, first press the button (9) and then use the (6) or button (7) to select a new desired temperature. By pressing the buttons you can either reduce or increase the temperature by 0.1°C. By holding down the (6) or (7) button you will set the desired temperature faster.
- Once the desired temperature is set, the display starts flashing – it saves the set temperature. Then it displays the temperature in the heat pump, the screen flashes – it saves the value even though we only check the set value.
- If the line voltage drops out, the instrument returns to the last value set.
- If you quickly need more hot water than the ehat pump can heat continuoulsly, press and hold down the button (2) for at least two seconds. The indicator lamps (4), (8) and (3) light up on the control unit. Both the heat pump and the electric heating element are in run. The heat pump shuts off at 55°C, the electric heating element heats water to the temperature of 65°C (the Anti-Legionella programme).

Anti-Legionella programme

The function is only active when the heat pump is on.
- Automatic activation: every 13 days of the heat pump's operation.
- Manual activation: Hold down the button (2). The indicator lamps (4), (8) and (3) light on the control unit. Both the heat pump and the electric heating element are in run. The heat pump shuts off at 55°C, the Anti-Legionella programme shuts off and the electric heating element heats water to the temperature of 65°C. During the Anti-Legionella programme, the screen (5) displays alternately the temperature of water in the ehater and the writing **LEG**.
- You can shut the programme off by pressing the button (1).

Indication of run:

- ***of the Anti-Legionella programme:*** the red indicator lamp next to the sign (4)
  - activation programme – the lamp is on
  - deactivation programme – the lamp is off

- ***of the electric heating element:*** the red indicator lamp next to the sign (8)
  - the heating element ON – the indicator lamp is on
  - the heating element OFF – the indicator lamp is off

- ***of the heat pump:*** the red indicator lamp next to the sign (3)
  - the heat pump is heating water – the indicator lamp is on
  - the heat pump is not heating water – the indicator lamp is off
    (the set temperature has been achieved)
  - power supply interrupted – the indicator lamp flashes for 20 seconds
    (power supply dropout below 1 minute, power supply interrupted or switching the heating pump on and off within 1 minute)
- ***turning on/off:*** the red indicator lamp next to the sign (1)
  - the heat pump is off – the indicator lamp does not light

WARNING: ***If you disconnect the heat pump from power supply, the water has to be drained to avoid freeze-up. To do so, open the discharge valve located at the margin of the heat pump under the bottom guard.***

MAINTENANCE & SERVICE

If assembled and used correctly, the heat pump will function several years without the necessity of service and maintenance.
Clean the outer part of the heat pump using detergents in low concentration. Do not use aggressive cleaning agents. If the heat pump is exposed to dust, the lamellas of the evaporator may get clogged which affects negatively the operation of the pump. In such case, you need to clean the evaporator carefully. During cleaning the evaporator you need to disconnect the heat pump from the power supply, loosen the upper guard screws and remove the guard. Clean the lamellas with a vacuum cleaner so that they were not bent and the airflow through the evaporator was not subsequently reduced.

The anode bar in the heater has to be exchanged regularly. Through regular inspections and exchange of the anode you will ensure smooth operation and long service life of the heat pump. At first, the loss of the anode mass after two years of operation has to be checked and, depending on the anode material loss, next anode exchange has to be scheduled. In doing so, the sediment deposits formed during the operation in the inner space of the heater have to be removed. Wash the sediment deposits with water, in no case tear them off using tools – there is a high danger of damaging the enamel.

Although high quality of production and final inspection are emphasised in the production of water heater with heat pump, some failures may occur during the heat pump operation.

Before calling the service shop if a failure occurs, check the following:
- Is everything OK with the power supply?
- Are there no obstacles at the air inlet and outlet?
- Is the ambient temperature not too low?
- Can you hear the run of the compressor and the fan?

We would like to advise you no to attempt to repair any potential failures that may occur on the heat pump by yourselves but notify the nearest authorised service shop.

FAILURES & TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
The heat pump operation indicator lamp is flashing	Thermoregulation has an in-built protection against frequent switching on of the compressor. When the LED flashes, the protection is active. The time delay of the compressor start-up is 30 seconds.	Disconnect the device from the power supply for 5 minutes. Switch the device on - the ⏻ button (1).
The display is dark (does not show figures or symbols)	If the heat pump is connected to power supply, the display is illuminated.	Check electric voltage at the inlet. Visit the service shop.
The device does not heat water (LED is not on)	The set temperature is lower than the temperature of water in the heat pump.	Set higher temperature (button 🌡 (8) and ▲(8). Visit the service shop.
The temperature of water too low	The set temperature of water is too low, or the hot water consumption is too high.	Set higher temperature (button 🌡 (8) and ▲(8). Reduce the amount of hot water consumption.
Water from the heat pump drain tube is dripping.	Condensate originates as a byproduct of heating water by the heat pump.	The condensate must be drained in waste or in a container.
Run is too noisy	The device consists of components the run of which creates a certain level of noise	Notifying the customers
Er1	Error on the thermal sensor in the heater – sensor T2	Visit the service shop
Er2	Error on the thermal sensor of the heat pump – sensor T1	Visit the service shop

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