



***TC 80-120 Z/ZNT***



## WARNINGS!

⚠ The appliance may be used by children older than 8 years old, elderly persons and persons with physical, sensory or mental disabilities or lacking experience and knowledge, if they are under supervision or taught about safe use of the appliance and if they are aware of the potential dangers.

⚠ Children should not play with the appliance.

⚠ Children should not clean or maintain the appliance without supervision.

⚠ Always transport the heat pump in an upright position; exceptionally, it may be tilted by 35° in all directions. Be careful not to damage the housing or the vital component parts of the heat pump during transport.

⚠ The heat pump is not intended for industrial use and use in premises where corrosive and explosive substances are present.

⚠ The connection of the heat pump to the mains should be performed in accordance with standards for electrical appliances. An all-poles disconnect switch should be installed between the heat pump and the mains in accordance with the national installation standards.

⚠ The heat pump should not be in operation without water in the hot water tank, because of danger of destruction of the compressor!

⚠ The installation should be performed in accordance with the valid regulations and the instructions of the manufacturer. It should be performed by a professionally trained installation expert.

⚠ It is necessary to install a safety valve with a rated pressure of 0.6 MPa (6 bar) to the inlet pipe of the heat pump, to prevent the pressure in the boiler from rising for more than 0.1 MPa (1 bar).

⚠ Water may drip from the outlet opening of the safety valve, so the outlet opening should be set to atmospheric pressure.

⚠ The outlet of the safety valve should be installed facing downwards and in a non-freezing area.

⚠ To ensure proper functioning of the safety valve, the user should perform regular controls to remove limescale and make sure the safety valve is not blocked.

⚠ Do not install a stop valve between the heat pump and the safety valve, because it will impair the functioning of the safety valve!

⚠ Before the beginning of the operation two 90° elbows must be installed to the top of the appliance (ø125 mm), each facing in the opposite direction. The premises must be properly ventilated.

⚠ The elements in the electronic control unit are live even after pressing the off field (9) on the heat pump.

⚠ If you disconnect the heat pump from the power supply, please drain any water from the pump to prevent freezing.

⚠ Water can be drained from the pump through the boiler inlet pipe. For this purpose it is advisable to install a special element or outlet valve between the inlet pipe and safety valve.

⚠ Please do not try to fix any defects of the heat pump on your own. Call the nearest authorised service provider.

⚠ This product contains fluorinated greenhouse gases. Hermetically sealed.



Our products incorporate components that are both environmentally safe and harmless to health, so they can be disassembled as easily as possible and recycled once they reach their final life stage.

■ Recycling of materials reduces the quantity of waste and the need for production of raw materials (e.g. metals) which requires a substantial amount of energy and causes release of harmful substances. Recycling procedures reduce the consumption of natural resources, as the waste parts made of plastic and metal can be returned to various production processes.

For more information on waste disposal, please visit your waste collection centre or the store where the product was purchased.

## INTRODUCTION

### Dear Customer,

Thank you for purchasing this product. This heat pump for heating sanitary water is one of the most advanced appliances in its class. Its material, design and testing were made in compliance with related applicable standards.

Power, capacity and safety systems were thoroughly tested. Tests were made individually for each component part, as well as for the finished product, according to international quality standards.

Please read these **Instructions for Installation and Use** carefully before use in order to prevent eventual problems that may cause damage to the product.

Keep this Manual for future reference, as a source of information on the details of the heat pump operation or its maintenance. Instructions for Installation and Use can also be found on our website <http://www.tiki.si>.

Of course, you can always contact any of our experienced authorised servicing technicians for occasional maintenance.

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## USE

This unit is designed for production of sanitary water in households and at premises where daily consumption of hot water (40 °C) does not exceed 150 l to 250 l. The appliance must be connected to water supply mains and to the power supply grid. The air intake and air exhaust may also be provided by designing the inlet and outlet drain from and to the adjacent room.

In case of installing the unit in a room with a bathtub or shower tub, take into account the requirements defined in the IEC 60364-7-701 standard (VDE 0100, Teil 701). To mount the unit on the wall, use special wall bolts with a nominal diameter of minimum 8 mm and always mount the unit in an upright position. Make sure the mounting location on the wall is adequately reinforced if the wall is not strong enough. We recommend leaving enough space between the floor and unit as to provide easy access to the Mg anode (for maintenance or replacement purposes – Fig. 4). If not, the unit will need to be dismantled from the wall before servicing.

The heat pump may not be used for purposes other than those defined in these Instructions. The unit is not designed for industrial use or use in rooms where corrosive or explosive substances are present.

The manufacturer shall not assume any liability for damages caused by incorrect installation or misuse that are not in compliance with the Instructions for installation and use.

The **instructions for use** are a component and important part of this product and must be delivered to the customer. Read the warnings carefully, as they contain important directions related to safety during operation, use and maintenance. Keep these Instructions for later use.

The marking of the heat pump is stated on the nameplate located on the bottom side of the unit, between both inlet pipes for sanitary water.

Once the packaging is removed, check the contents. When in doubt, contact your dealer. Never let children play with the packaging parts (clamping, plastic bags, expanded polystyrol, etc.) – potential risk. Make sure to remove and dispose of the packaging safely and in an environmentally friendly way.

### STORAGE AND TRANSPORT

Store the heat pump in an upright position, in a clean and dry place.

## THE PRINCIPLE OF OPERATION

The heat pump is in fact a thermodynamic heat generator, drawing heat from a low temperature level (e.g.: heat from the ambient air) to a higher temperature level (e.g.: hot sanitary water).

The heat drawn from the ambient air, along with the electric energy, generates heating energy, which is available for heating the sanitary water.

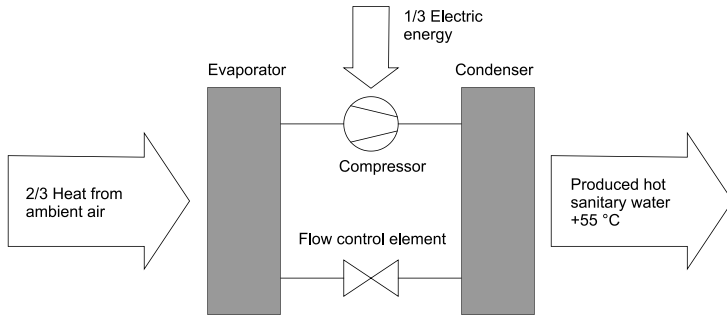


Fig. 1: Chart of energy flow through the heat pump unit

## DIMENSIONS

	A	B	C	D	E
<b>TC 80</b>	1197	345	100	100	G 1/2
<b>TC 100</b>	1342	490	100	100	G 1/2
<b>TC 120</b>	1497	645	100	100	G 1/2

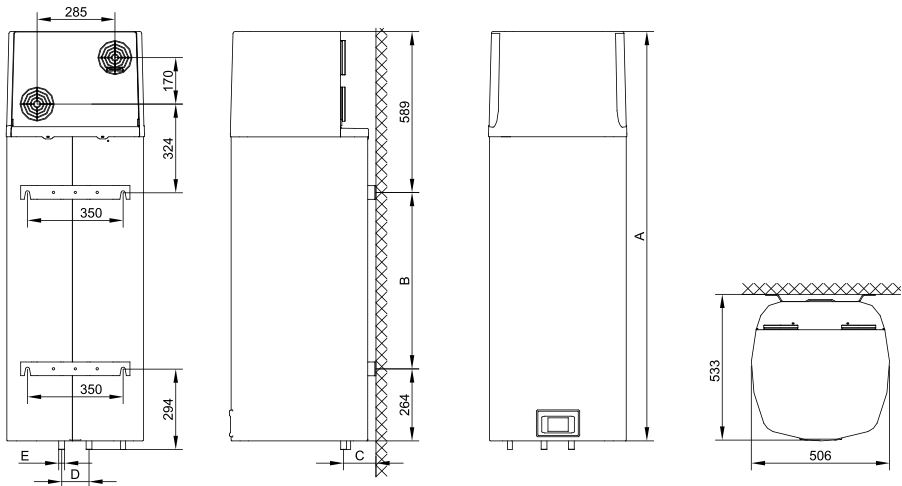


Fig. 2: Connection and installation dimensions of the heat pump [mm]

## INSTALLATION OF THE HEAT PUMP

The heat pump can be used using the ambient air or air from other premises. The heat pump must be installed in a frost-free room. When selecting a place for installation, particular attention should be paid that the selected air intake location is dust free, because dust has adverse effects on the heat pump performance. When selecting the place of installation, pay attention to the solidity of the wall – can it take the weight of the heat pump together with the weight of the water inside the boiler? Take all the necessary precautions to prevent the operation noise and vibrations from transferring through the walls to the premises where this would be disturbing (bedrooms, rest areas). Do not install the heat pump and its air intake in premises with other air consumption appliances (gas boilers, solid-fuel fireplaces, dust extraction appliances etc.) During installation, please bear in mind the minimum distances from the wall, ground and ceiling. The condensate outlet from the heat pump is placed on the bottom left side in the form of a plastic tube with an external diameter of  $\varnothing 18$  mm. This tube should be connected to the external condensate outlet pipe and led to the sewage system or a container. The quantity of condensate depends on air temperature and humidity when the heat pump is in operation.

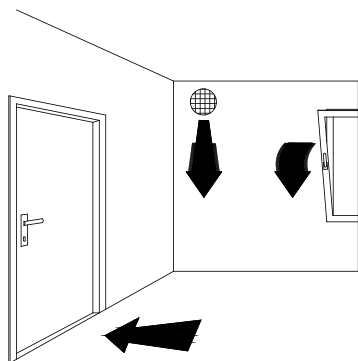


Fig. 3: Ventilation

To prevent pressure depression in the building, fresh air must be regularly supplied to the premises. The desired rate of air exchange for a residential building is 0.5. This means that the entire quantity of air in the building is exchanged every two hours. Connecting the heat pump to the same pipeline as the kitchen extractor fan or taking air out of several smaller apartments or suites is not allowed.

To minimize the transfer of noise and vibrations through walls into the premises where this would be disturbing (bedrooms, rest areas), please take the following measures:

- install flexible joints for hydraulic connections
- install a flexible tube for the pipeline of inlet/outlet air
- plan vibration insulation for wall openings
- plan noise dampers for inlet/outlet air
- pipelines for inlet/outlet air should be attached using noise dampers
- plan vibration insulation against the wall

### a) Operation using ambient air

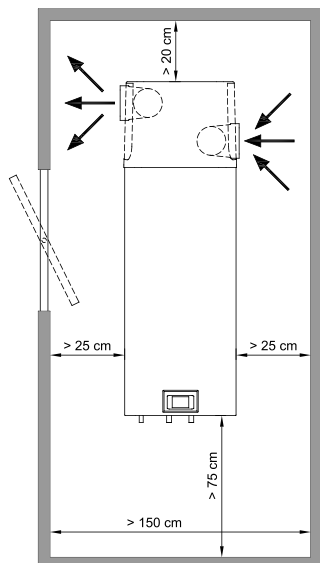


Fig. 4: Minimum requirements for the installation of HP

In this type of operation, the device heats domestic water using only the amount of energy generated by the air from the room where the device is installed. The heat pump must be installed in a ventilated, frost-free room, possibly in the vicinity of other heating sources. For optimal performance of the heat pump, we recommend a sufficiently large and well ventilated room with the temperature ranging between 15 °C and 25 °C. It is vital to ensure sufficient intake of air in the room. Elbows must be installed on the heat pump and turned so that they prevent the mixing of air. Heat losses are greater in premises with colder air.

#### Models TC...Z

If the heat pump is installed in a frost-free room and the temperature is under 7 °C, heaters for the heating of domestic water will be switched on. The heat pump operates in reserve mode.

#### Models TC...ZNT

If the heat pump is installed in a frost-free room and the temperature is under 7 °C, the heat pump operates in the normal mode of operation.

### b) Operation using air from other premises

In this type of operation, the heat pump uses air from other premises via a pipeline system. It is advisable to insulate the pipeline system to prevent the formation of condensate.

In case of using air from outside, the external part must be covered so as to prevent the intrusion of dust or snow into the appliance. Besides the drag in the pipes and elbows, the user should be aware that increased drag also increases noise levels.

In case of using air from outside, the user should adhere to the minimum diameter of the pipes  $\varnothing 125$  mm or  $\square 150 \times 70$ .

#### Models TC...Z

To ensure normal operation of the heat pump, the temperature of the captured external air should be at least 7 °C. To make sure the operation of the pump is effective at all times, you can install dampers to take air from the premises and then return it either to the premises or outside. If the temperature of air is under 7 °C, heaters for the heating of domestic water are switched on. The heat pump operates in reserve mode.

#### Models TC...ZNT

To make sure the operation of the pump is effective at all times, you can install dampers to take air from the premises and then return it either to the premises or outside. If the temperature of air is under -7 °C, heaters for the heating of domestic water are switched on. The heat pump operates in reserve mode.



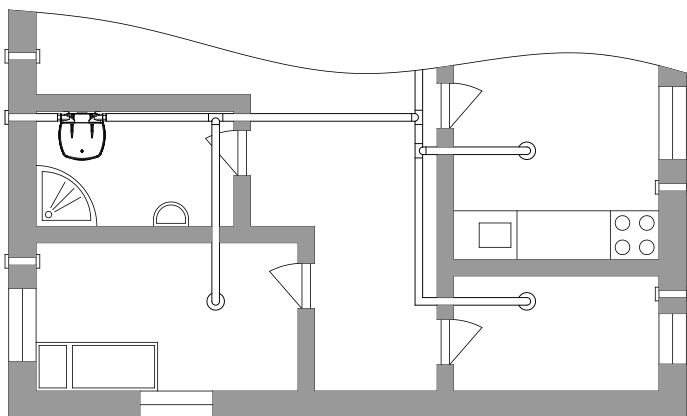


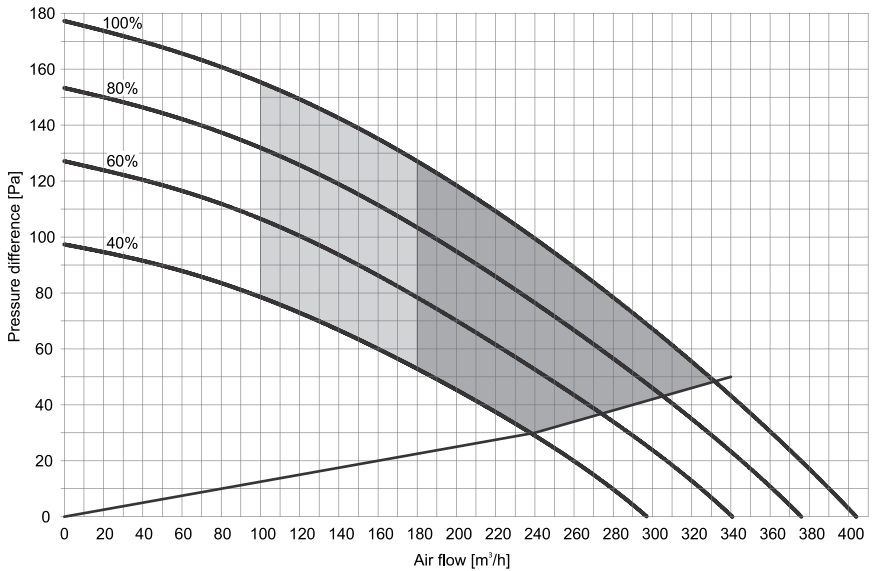
Fig. 5: Possible installation of a heat pump

## PRESSURE LOSS IN CASE OF USING THE PIPELINE SYSTEM

In planning the pipeline system for the inlet and outlet of air to and from the heat pump, the key element is to take into account the aerodynamic character of the fan which also causes the loss of static pressure.

### Presentation of the diagram of aerodynamic characteristics for different speeds of the fan

The diagram (**Diagram 1**) includes aerodynamic characteristics of the operation of the fan. The top line represents the curve of air flow depending on the pressure drop at maximum speed of the fan (100 %). The bottom line represents the operation of the fan at minimum speed (40 %). The curves between (60 %, 80 %) represent the aerodynamic characteristics at lowered revolutions of the fan. The bottom line that lies between points (0,0) and (340,50) represents the internal drop of static pressure created by the evaporator alone, without overloading the pipeline system. This pressure drop cannot be eliminated.



- Operating area with a normal air flow with respect to the pressure drop and fan setting.
- Area of more efficient use – volumetric flow of air is higher here, which requires a lower pressure drop (channel system with minimum pressure drop). Fan is set to higher speeds.

Diagram 1: Aerodynamic characteristics

### Air inlet and outlet pipeline system

When connecting the sanitary heat pump to an existing pipeline system, we use the basic pipe elements that we connect into a pipeline system for air inlet and outlet. The air pipeline should consist of round pipes with an inner diameter of  $\varnothing 125$  mm, or rectangular pipes with a cross section of  $\square 150 \times 70$  mm.

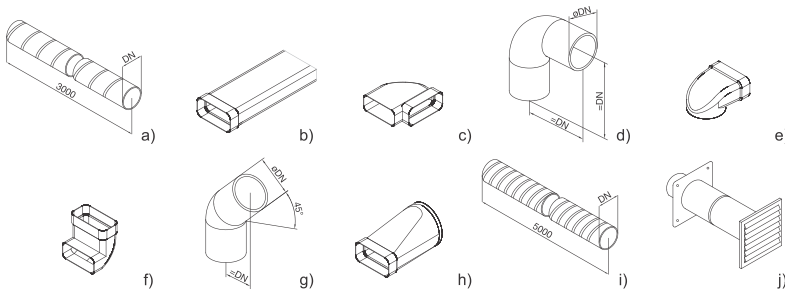


Fig. 6: Schematic demonstration of the basic elements in a pipeline system for inlet and outlet of air

### Calculation of pressure drops

The values of total static pressure drop can be calculated by adding up the losses from individual elements built into the air pipeline system and the internal static pressure. The values of static pressure drops of individual elements (static pressure drops of elements relate to the internal diameter  $\varnothing 125\text{mm}$  or  $\square 150 \times 70\text{mm}$ ) are shown in **Table 1**.

Type of element	Value of static pressure loss
a.) Spiral ribbed pipe	<b>Diagram 2</b>
b.) Rectangular pipe $\square 150 \times 70$ mm	<b>Diagram 2</b> (according to DN 125)
c.) Rectangular elbow - horizontal $90^\circ$	5 Pa
d.) Elbow $90^\circ$	4 Pa
e.) Angular reducer $\varnothing 125$ to $\square 150 \times 70$	5 Pa
f.) Rectangular elbow - vertical $90^\circ$	5 Pa
g.) Elbow $45^\circ$	3 Pa
h.) Reducer $\varnothing 125$ to $\square 150 \times 70$	3 Pa
i.) Flexible tube	<b>Diagram 2</b>
j.) Air intake grid	25 Pa

Table 1: Types of elements and corresponding pressure loss values

- Flexible pipe according to DN 125
- Spiral ribbed pipe DN 125

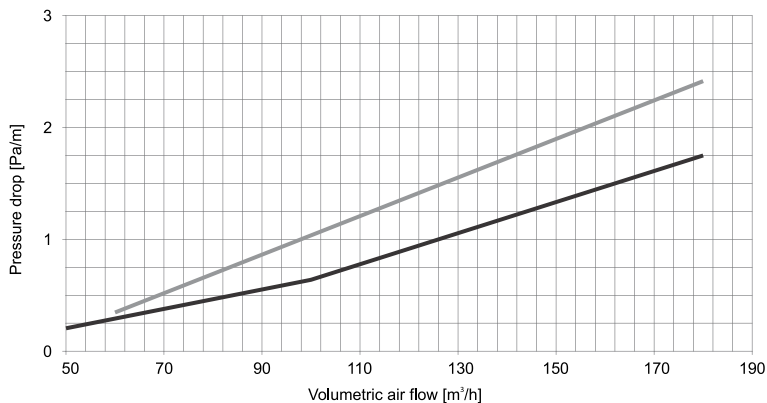


Diagram 2: Value of the static pressure drop for selected pipes

	Number of elements	$\Delta p$ (Pa)	$\Sigma \Delta p$ (Pa)
Rectangular elbow horizontal 90°	4	5	20
Flexible tube (DN125)	13.5 m	1.85 (at 150 m <sup>3</sup> /h)	25
Air intake grid	1	25	25
<b>Total:</b>			<b>70</b>

Table 2: Example of pressure drop calculation

### Note:

As mentioned above, the total loss of static pressure, which can be calculated by adding up the losses of individual elements built into the pipeline system, may not exceed 95 Pa. If they do, the values of COP start dropping more dramatically.

## DETERMINING THE FAN SETTING

When pressure drop is determined, select the mode in which the fan will operate. This determines the speed of the fan. The mode is selected using Diagram no. 1, which shows the aerodynamic characteristics of the fan depending on the air flow and pressure drop in the pipeline\*.

### Note:

\*Pressure drop in the pipeline – in diagram 1 this is marked as pressure difference.

### Zone of operation of the sanitary heat pump

On diagram 1 there are two zones of operation of the sanitary heat pump among the curves:

- The dark zone represents the area of use with higher efficiency. The volumetric air flow is higher in this zone, which requires a lower pressure drop (channel system version with minimum pressure drop).
- The light zone represents the area of use with lower air flow in relation to the pressure drop and fan setting.

### Noise

Like the aerodynamic characteristics rise from the lowest to the highest, the noise increases as well. Between the aerodynamic characteristics 80% and 100 % there is a zone with increased noise.

### Checking the calculation of pressure drop

Determining the aerodynamic characteristics based on the calculation of pressure drop while taking into account individual elements of the pipeline and air flow is an iteration. Once the aerodynamic characteristic has been determined and set, we must measure the air flow in the pipeline. If the air flow does not correspond to the ventilation system, we select the next higher or lower aerodynamic characteristic that corresponds to the ventilation system.

### Selecting the operating point of the fan for the ventilation system

When determining the speed of the fan, we must know the maximum air flow for ventilation and pressure drop caused by the pipeline. In Diagram 1, find the desired air flow and draw a vertical line, then draw a horizontal line at the pressure drop that

you have calculated (based on the existing pipeline). Select the fan characteristic curve that lies the closest to the point where the lines cross.

**Example of selecting the aerodynamic characteristic**

In diagram 3 at air flow of 150 m<sup>3</sup>/h draw a vertical line. The pipeline represents 70 Pa of pressure drop, which is added to the below (red) line\*\*. Total pressure drop is thus 90 Pa. Draw a horizontal line at the pressure drop of 90 Pa. The point where the lines meet lies on the curve that corresponds to 60% speed of the fan. This is the standard setting of the fan that has also been preset by the manufacturer.

Note:

\*\*Line, represents the internal static pressure drop created by the evaporator.

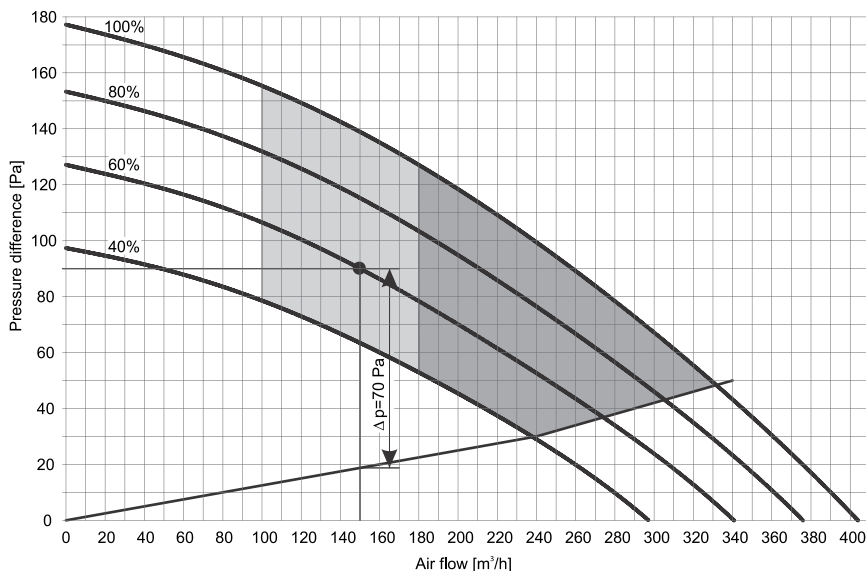


Diagram 3: Example of determining aerodynamic characteristic

## CONNECTION TO WATER SUPPLY MAINS

Water inlet and outlet on the heat pump are marked with colours. Cold water inlet is marked with blue, and warm water outlet is marked with red. The heat pump is designed for connection to indoor water supply mains without using the relief valve if the pressure in the supply mains is lower than 0.6 MPa (6 bar). If the pressure is higher, a relief valve needs to be installed so as to provide that the pressure at the inlet to the hot water tank does not exceed the nominal pressure.

Installing a safety valve is mandatory in order to assure safe operation. The valve prevents an increase of the pressure in the boiler by any more than 0.1 MPa (1 bar) above the rated pressure. The outflow nozzle on the safety valve must have an outlet into the atmosphere. To assure correct operation of the safety valve, the valve must be regularly checked.

When checking the valve, push the lever or unscrew the nut of the valve (depending on the type of the valve) and open the drain from the safety valve. Water must flow from the valve nozzle, showing that the valve operation is faultless. During the heating of water, the water pressure in the hot water tank is increased up to the level preset in the safety valve. Since the system prevents backflow of water into the water supply mains, water may be dripping from the outlet opening on the safety valve. The dripping water may be drained via trap into the drains; the trap is mounted under the safety valve. The outlet pipe, which is mounted under the safety valve, must be directed downwards, in a place with a temperature above freezing.

If the installation does not allow draining of the water from the safety valve into the drains, dripping can be avoided by installing an expansion vessel onto the heat pump inlet pipe. The volume of the expansion vessel must be ca. 3% of the hot water tank volume.

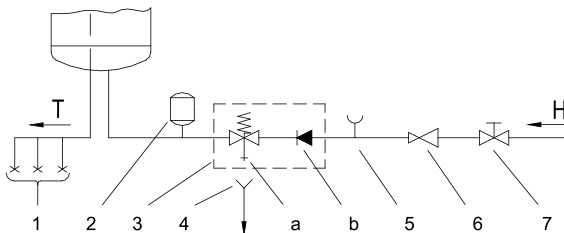


Fig. 7: Closed (pressure) system

Legend:

- |                                   |                              |
|-----------------------------------|------------------------------|
| 1 - Pressure mixer taps           | 5 - Checking fitting         |
| 2 - Expansion tank                | 6 - Pressure reduction valve |
| 3 - Safety valve                  | 7 - Closing valve            |
| a - Test valve                    |                              |
| b - Non-return valve              | H - Cold water               |
| 4 - Funnel with outlet connection | T - Hot water                |

# CONNECTING THE HEAT PUMP TO THE POWER SUPPLY NETWORK

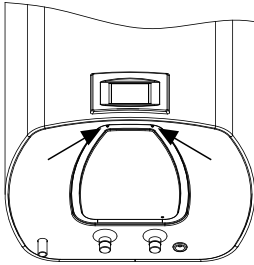


Fig. 8: Protective cover

Before connecting to the power supply network, install a power supply cord in the heat pump, with a min. diameter of 1.5 mm<sup>2</sup> (H05VV-F 3G 1.5 mm<sup>2</sup>). To do this, remove the protective cover from the heat pump. The cover is attached using two screws (Fig. 8). Connecting the heat pump to the power supply network must take place in accordance with the standards for electric appliances. To comply with the national installation regulations, an all poles disconnect switch must be installed between the heat pump and the power supply network.

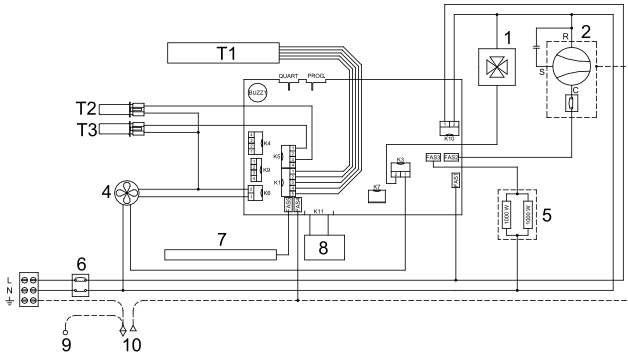


Fig. 9: Electrical circuit diagram

**Legend:**

- |                                |   |
|--------------------------------|---|
| T1 - Bar with sensors          | 5 - Electric heating element (2 x 1000 W) |
| T2 - Evaporator – temp. sensor | 6 - Thermal cut-out                       |
| T3 - Air temperature sensor    | 7 - Magnesium anode                       |
| 1 - 4-way valve                | 8 - LCD touch screen                      |
| 2 - Compressor                 | 9 - Boiler - ground                       |
| 4 - Fan                        | 10 - Housing - ground                     |

## HEAT PUMP OPERATION

The heat pump can be operated using an LCD touch screen (Fig. 10). If you press anywhere on the screen, the screen lights up. When the screen is lit up, the operation fields are active.

When the heat pump is connected to the water and power supply mains and the boiler is filled with water, the heat pump is ready to be used. The heat pump heats the water in the range 10 °C - 55 °C. From 55 °C - 75 °C the water is heated by electrical heaters.

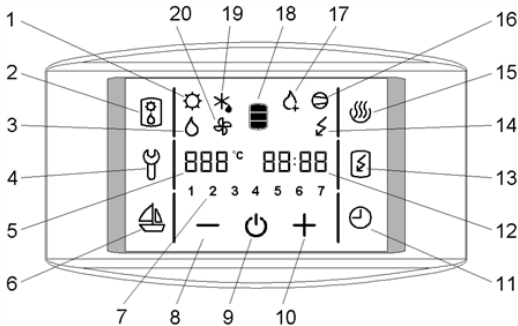


Figure 10: Operation display

Legend:

- |  |   |
|--|---|
| 1 - Signalisation of the operation of the PV feature **                      | 11 - TIMER start and setup                                |
| 2 - Activation of ventilation / Activation of the backup mode                | 12 - Time setup and display                               |
| 3 - Signalization of the backup operation                                    | 13 - Start-up of quick heating "TURBO"                    |
| 4 - Indication, overview of operation errors, entrance into the service menu | 14 - Indicator of the heating element operation           |
| 5 - Display and setup of temperature in °C                                   | 15 - Start-up of heating to the maximum temperature level |
| 6 - Start and setup of the VACATION programme                                | 16 - Signalization of compressor operation                |
| 7 - Day of the week (1 .. Monday, ..., 7 .. Sunday)                          | 17 - Signalization of anti-legionella programme operation |
| 8 - Reducing the value   | 18 - Warm water quantity display                          |
| 9 - Heat pump on/off switch  | 19 - Signalization of defrosting                          |
| 10 - Increasing the value  | 20 - Signalization of fan operation                       |
- \*\* function is not used in versions TC-Z, TC-ZNT

### Starting/stopping the heat pump

#### • To start the heat pump, hold field no. 9.

When the appliance is switched on, the fan starts first and operates for one minute (symbol no. **20** is displayed). If the temperature of inlet air is appropriate, the controlling unit switches on the compressor and the heat pump operates in normal mode (symbols **16** and **20** are displayed). The heat pump is on, the screen remains unlit and inactive.

In 60 seconds after the last touch of the screen, the illumination and activity of the screen are turned off, but that does not affect the operation of the heat pump. Pressing anywhere on the screen re-activates the screen and its illumination.



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If trying to start up at a lower temperature, please see chapter "Operation at lower temperatures".

- **By holding field no. 9, the heat pump is switched off.**

The appliance stops functioning and the only field visible on the screen is field no. 9. (If you switch off the heat pump for a longer period of time, the water must be drained from the pump if there is any danger of freezing).

### **Power failure protection**

In case of power failure, the settings remain stored for up to 23 hours.

After restarting, the heat pump operates in the same mode it was operating in before the power failure.

### **Operation at lower temperatures**

#### a) The ZNT version

When the appliance is switched on, the fan starts first and operates for one minute (symbol no. **20** is displayed). If the temperature of inlet air is lower than  $-7\text{ }^{\circ}\text{C}$ , the fan is turned off. Domestic water is heated with heaters. The heat pump operates in the reserve mode (symbol no. **14** is displayed). The possibility of switching to normal mode is checked every 2 hours by switching on the fan for one minute. If the temperature of inlet air is higher than  $-7\text{ }^{\circ}\text{C}$ , the heat pump switches to normal mode of operation (symbols **16** and **20** are displayed). The heaters switch off. The heat pump is on, the screen remains unlit and inactive.

At lower air temperatures, the evaporator defrosting cycle is started if necessary. Symbol no. **19** is displayed on the screen. The fields **2**, **4**, **6**, **11**, **13** and **15** remain inactive. Defrosting takes place until the conditions for normal operation of the heat pump are achieved.

After successful defrosting, the heat pump returns to normal operation (symbols **16** and **20** are displayed).

If defrosting is unsuccessful, the controlling unit displays an error message. Field no. **4** starts flashing, accompanied by warning beeps. By pressing field no. **4** the warning beeps can be turned off. Error code **E247** appears in field no. **12** and the pump switches automatically to heating with electric heaters. The screen displays symbol no. **14**. The error code can be deleted at any time by pressing field no. **4**. Field no. **12** resumes to displaying time.

#### b) The Z version

When the appliance is switched on, the fan starts first and operates for one minute (symbol no. **20** is displayed). If the temperature of inlet air is lower than  $7\text{ }^{\circ}\text{C}$ , the fan is turned off. Domestic water is heated with heaters. The heat pump operates in the reserve mode (symbol no. **14** is displayed). The possibility of switching to normal mode is checked regularly. If the temperature of inlet air is higher than  $7\text{ }^{\circ}\text{C}$  the heat pump switches to normal mode of operation (symbols **16** and **20** are displayed). The heaters switch off. The heat pump is on, the screen remains unlit and inactive.

### **Setting the clock and day of the week**

- Hold field no. **12**, until field no. **7** shows a flashing number of the day of the week.
- By pressing **+** or **-** you can set the number of the day of the week (1 – Monday, ..., 7 – Sunday).
- Press field no. **12** again (flashing hour setting is displayed).
- By pressing **+** or **-** set the hour (by holding **+** or **-** you can speed up the setting).
- Press field no. **12** again.
- Flashing minute setting is displayed.

- By pressing **+** or **-** set the minutes (by holding **+** or **-** you can speed up the setting).
- The setting is stored when you press field no. **12**, or when the field stops flashing.

### Setting the temperature

- Press field no. **5** (the set temperature starts blinking).
- By pressing **+** or **-** you can change the temperature setting from 10 °C to 75 °C (preset to economic temperature of 55 °C).
- The setting is stored by pressing field no. **5** again, or when field no. **5** stops flashing. After a few seconds, the display shows the actual temperature. The set temperature should suffice actual needs. Recommended temperature settings are between 45 and 55 °C. Higher temperatures are not recommended as they reduce the efficiency (COP) and extend the time of heating or increase the number of operating hours.
- In case of power failure, the last stored value is restored.

### Switching on the "TURBO" mode

- If you need more warm water than the heat pump can heat up in a short period of time, press field no. **13** (switches on the "TURBO" mode). The heat pump and heater work simultaneously. The screen shows symbols no. **14**, **16** and **20**. When the temperature reaches 55 °C the heat pump returns to the mode used before the "TURBO" mode.

### Switching on the "HOT" mode

- If you want to heat the water to the maximum temperature of 75 °C, press field no. **15**. The heat pump will heat water to 55 °C. The screen displays symbols no. **16** in **20**. When the temperature in the boiler reaches 55 °C the electric heater turns on to heat the temperature up to 75 °C. The screen displays the symbol no. **14**. When the temperature reaches 75 °C the heat pump returns to the mode used before the "HOT" mode.

### Display of the quantity of water in the heat pump

The display shows the symbol 18:



- no warm water



- low quantity of warm water



- high quantity of warm water

### Setting the vacation mode

In the vacation mode, you can set the number of days (maximally 100), when the heat pump shall maintain the minimal temperature of water (approximately 10 °C).

- Hold field no. **6** for a while (fields **5** and **6** start to flash).
- By pressing fields **+** or **-** you can set the number of vacation days shown in field no. **5**.
- By pressing field no. **6** again, or when field no. **6** stops flashing, the set number of days is stored.
- If you set the value to 0, then the heat pump will resume its normal operating mode after confirming the setting, and illumination of field no. **6** will turn off.
- After the set number of days has elapsed, the heat pump returns to the normal mode and illumination of field no. **6** turns off.

### Setting the TIMER mode

In the TIMER operating mode, you can set the times when the heat pump will start and stop. For each timer combination you can set up to three time periods in which the heat pump will not heat the water.

a) Setting the timer combinations

- Hold field no. **11** for a while (fields **7** and **11** start to flash).
- By pressing fields **+** or **-** choose among three timer modes of operation:
  - Timer mode of operation of the heat pump for the entire week (numbers 1-7 flash in field no. **7**),
  - Timer mode of operation of the heat pump for Monday to Friday and Saturday to Sunday (numbers 1-5 and then 6 and 7 flash in field no. **7**),
  - Timer mode of operation of the heat pump for each day at a time (individual numbers 1-7 flash in field no. **7**). Press field **+** or **-** to select each day of the week.
- To set the time, press field no. **12**.
- On the field no. **5**, the text 1OF appears and field no. **12** starts to blink.
- By pressing fields **+** or **-** set the time of shutdown.
- Press field no. **12** again.
- On the field no. **5**, the text 1ON appears and field no. **12** starts to blink.
- By pressing fields **+** or **-** set the time of start-up.
- By pressing field no. **12** again, you can use the above procedure to set the second and third period.
- If you do not want to set the second and third periods, confirm the setting by pressing field no. **11** or wait for field no. **12** to stop flashing and the setting to be saved automatically.
- To set the second and third periods, set the start and end of periods 2 and 3 and confirm the setting following the procedure described above by pressing field no. **11** or wait for field no. **12** to stop flashing and the setting to be saved automatically.
- To set the timer operating mode "for each day of the week" or "for the period from Monday to Friday and from Saturday to Sunday", set all 3 time periods following the procedure described above.

b) Activation, deactivation of timer

- By pressing field no. **11**, you can activate the set timer mode.
- The heat pump heats the water in the ON periods (to the set temperature) and in the OFF periods, it does not heat the water.
- By pressing field no. **11** again, you can deactivate the set time mode of operation.

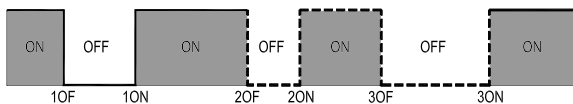


Fig. 11: Time periods

**Ventilation**

- The feature can be activated by pressing field no. 2 shortly. The feature automatically switches off after the time set at parameter: 13 expires (default 30 minutes, see setting the time of operation of the fan, parameter :13).
- Symbol **2** is active and visible.
- By shortly pressing the field **2** again, the ventilation is deactivated.
- By shutting down the heat pump with the on/off options the ventilation is deactivated.
- In case of power failure during the functioning of the ventilation feature, once the power comes back the ventilation continues until the end of the set interval.
- In the event of any other failure the ventilation is deactivated.

- Ventilation cannot be activated:
  - in case of any kind of failure
  - during antilegionella function operation
  - during defrosting.

### Backup mode

- Activate backup mode by holding field no. **2** (for 3 s).
- Symbol **3** is displayed.
- Backup mode uses heaters and is activated when an error occurs on the aggregate. The water is heated with heaters.
- By holding field no. **2** again, backup mode is deactivated.
- If the backup mode is activated, please contact the maintenance services.

### Maintenance level access

- By pressing field no. **4**, you can activate the maintenance mode (Figure 10).
- A display menu with an inscription "code" in the field CLOCK appears. Enter the maintenance code (fields FN1, FN2, FN3, FN4, FN5 in FN6 for numbers 1, 2, 3, 4, 5, 6).

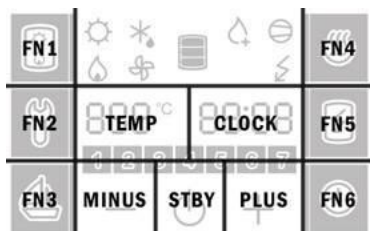


Fig. 12: Fields display

- If you do not press any field for 10 s, the programme returns to the start menu.
- If the code is incorrect, the programme returns to previous operation.
- If the code is correct, the first parameter appears on the display. The number on the right is the serial number of the parameter and the field on the left is intended for its value.
- The first parameter :00 is a version of a software code and serves information purposes only.
- By pressing the right number (Field CLOCK in Figure 12) you proceed to the next parameter.

### Installation level (code: 1166)

After the first code entry for the installation level the programme allows access to the following parameters:

- :00 programme code
- :13 time of operation of the fan - ventilation (5, ... , 180, ON)
- :21 fan speed (40, 45, ..., 95, 100)
- :39 interval setting for anti-legionella function activation (0, ..., 60)
- :45 temperature settings °C or °F

Setting the time of operation of the fan (parameter :13)

- When the parameter (:13) is selected, press either (+) or (–) to set the desired time of operation of the fan (default: 30 minutes). Time up to 30 minutes can be set in 5 min steps, and above 30 minutes in 10 min steps. After the maximum time setting, ON appears, which means that the fan functions constantly until manually switched off.
- When the time of operation of the fan is set, the setting is stored automatically after a short time, or after pressing field no. 4.

Fan speed settings (parameter :21)

- Select the parameter :21 and set the fan speed by pressing (+) or (–) (40% - 100%). See the numerical value settings on the left side in field 5. When the fan speed is set, you can save the changes by waiting a few moments or by pressing no. 4.

Anti-legionella function (parameter :39)

- Select the parameter (:39) and set the interval for the anti-legionella function activation (0 to 60 days) by pressing (+) or (–). See the numerical value settings on the left side in field 5. When the interval of the anti-legionella function activation is set, the changes are saved automatically after a few moments, or manually by pressing field no. 4. If the parameter (:39) is set to 0, the anti-legionella function is inactive.
- Factory settings of the anti-legionella function activation: Every 14 days of the heat pump operation, if the water temperature in the previous 2-week period did not exceed 65 °C continuously for at least an hour.
- The anti-legionella function works only when the heat pump is switched on. When activated, symbol no. 17 is displayed.
- The anti-legionella function can be activated manually by pressing field no. 15.
- The anti-legionella function can be disabled by switching off the heat pump when pressing field no. 9.

**Warning: If heating when the anti-legionella function is activated, the boiler water temperature is 65 °C regardless of the temperature set on the appliance.**

Selecting temperature display (parameter: 45)

- When parameter (:45) is selected, press either (+) or (–) to select the manner of temperature display in °C or °F (default value is °C).
- When the desired manner of display is selected, the setting is stored automatically after a short time, or after pressing field no. 4.

### Operation signalization:

#### Anti-legionella programme:

- activated – control field 17 is displayed
- deactivated – control field 17 is not displayed

#### Electrical heater:

- activated – control field 14 is displayed
- deactivated – control field 14 is not displayed

#### Heat pump:

- activated – control field 16 is displayed
- deactivated – control field 16 is not displayed

#### On/off:

- activated – control field 9 and other fields are displayed
- deactivated – control field 9 is displayed

**Defrosting:**

- activated – control field **19** is displayed
- deactivated – control field **19** is not displayed

**Fan on/off:**

- activated – control field **20** is displayed
- deactivated – control field **20** is not displayed

**Ventilation on/off:**

- activated – control field **2** is displayed

**Backup mode on/off:**

- activated – control field **3** is displayed
- deactivated – control field **3** is not displayed

## SERVICE AND MAINTENANCE

If installed and used correctly, the heat pump will last for years without service. The exterior of the heat pump should be cleaned with a mild detergent solution. Do not use solvents or abrasive cleaning agents.

If the heat pump was exposed to dust, evaporator lamellas might become blocked, which can have a detrimental effect on the functioning of the heat pump. In this case the evaporator should be cleaned. The cleaning of the evaporator must be carried out by an authorised service provider.

By providing regular service checkups, you can ensure flawless operation and long life of the heat pump. The product is under warranty in accordance with the conditions from the warranty statement.

Before calling your service provider, check the following:

- Is everything OK with the power supply network?
- Is the air outlet obstructed?
- Is ambient temperature too low?
- Can you hear the operation of the compressor and fan?
- Pipeline system pressure drop

**Do not try to eliminate malfunctions by yourself, call your nearest authorized service provider!**

### OPERATION ERRORS

Despite careful production and control, the heating pump can produce errors that must be solved by an authorised service provider.

**Indicator of errors**

- In case of an error on the appliance, the beeper starts beeping and field no. **4** starts flashing. When you press field no. **4** the error code is displayed in field no. **12**.

<b>Error</b>	<b>Description of error</b>	<b>Solution</b>
E004	Freezing. The error appears if the temperature in the heat pump is below 4 °C.	Call the service.
E005	Overheating (temperature > 85 °C, electronic regulator failure).	Unplug the heat pump from the power supply. Call the service.
E006	Mg anode error.	Call the service (heat pump functions normally).
E007	Volume and/or temperature sensors error.	Call the service.
E042	Anti-legionella function error.	Press field no. <b>4</b> to restart.
E247	Defrosting error.	Automatically turns on heating with the electric heater. When the error is deleted, the aggregate resumes its normal operation.
E361	External air sensor error.	Call the service (automatically switches to the electric heater).
E363	Defrosting sensor error.	Call the service (automatically switches to the electric heater).

## TECHNICAL CHARACTERISTICS

Type		TC80Z	TC80ZNT	TC100Z	TC100ZNT	TC120Z	TC120ZNT
Declared load profile		M	M	M	M	M	M
Energy efficiency class <sup>1)</sup>		A+	A+	A+	A+	A+	A+
Water heating energy efficiency ( $\eta_{wh}$ ) <sup>1)</sup>	[%]	111,3	111,3	110,7	110,7	111,8	111,8
Annual electricity consumption <sup>1)</sup>	[kWh]	461	461	464	464	459	459
Daily electricity consumption <sup>2)</sup>	[kWh]	2,205	2,205	2,225	2,225	2,240	2,240
Thermostat temperature settings	[°C]	55	55	55	55	55	55
Value of "smart"		0	0	0	0	0	0
Volume	[l]	78,2	78,2	97,9	97,9	117,6	117,6
Quantity of mixed water at 40 °C V40 <sup>2)</sup>	[l]	90	90	130	130	142	142
Rated pressure	[MPa (bar)]	0,6 (6)					
Weight / Filled with water	[kg]	58 / 138	58 / 138	62 / 162	62 / 162	68 / 188	68 / 188
Anti-corrosion protection of tank		Enamelled / MG Anode					
Insulation thickness	[mm]	40 - 85					
Degree of protection		IP24					
Max connected load	[W]	2350					
Voltage		230 V / 50 Hz					
Number and power of heating elements	[W]	2 x 1000					
Electricity protection	[A]	16					
Adjusted water temperature	[°C]	55					
Maximum temperature (HP / el. heater)	[°C]	55 / 75					
Legionella control programme	[°C]	70					
Temperature range of installation	[°C]	2 / 35					
Operation zone – air	[°C]	7 / 35	-7 / 35	7 / 35	-7 / 35	7 / 35	-7 / 35
Refrigerating agent		R 134a					
Quantity of coolant	[kg]	0,490	0,540	0,490	0,540	0,490	0,540
Global Warming Potential		1430	1430	1430	1430	1430	1430
Carbon dioxide equivalent	[t]	0,700	0,772	0,700	0,772	0,700	0,772

1) EU Regulation 812/2013; EN16147:2011, Average climate conditions

2) EN16147:2011



Type		TC80Z	TC80ZNT	TC100Z	TC100ZNT	TC120Z	TC120ZNT
*Heating time A15 / W10-55	[h:min]	4:40	4:40	5:40	5:40	6:40	6:40
*Energy consumption in the selected cycle of emissions A15 / W10-55	[kWh]	2,04	2,04	2,05	2,05	2,08	2,08
*COP <sub>DHW</sub> in the selected cycle of emissions A15 / W10-55		3,10	3,10	3,10	3,10	3,10	3,10
**Heating time A7 / W10-55	[h:min]	5:20	5:20	6:50	6:50	8:41	8:41
**Energy consumption in the selected cycle of emissions A7 / W10-55	[kWh]	2,45	2,45	2,35	2,35	2,51	2,51
**COP <sub>DHW</sub> in the selected cycle of emissions A7 / W10-55		2,65	2,65	2,63	2,63	2,61	2,61
Power in standby mode according to EN16147	[W]	19	19	20	20	27	27
Sound power / Sound pressure at 1m	[dB(A)]	51 / 39,5					
Air connections	[mm/m]	ø125 (□150x70) / 10					
Working Air Flow	[m <sup>3</sup> /h]	100-230					
Max acceptable pressure drop in the pipeline (volumetric flow rate of air 150 m <sup>3</sup> /h)	[Pa]	90					

(\*) Heating of water to 55 °C at inlet air temperature of 15 °C, 74% humidity and inlet temperature of water of 10 °C; in accordance with the EN16147 standard.

(\*\*) Heating of water to 55 °C at inlet air temperature of 7 °C, 89% humidity and inlet temperature of water of 10 °C; in accordance with the EN16147 standard.

WE RESERVE THE RIGHT TO ANY MODIFICATIONS NOT AFFECTING THE FUNCTIONALITY OF THE APPLIANCE.



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