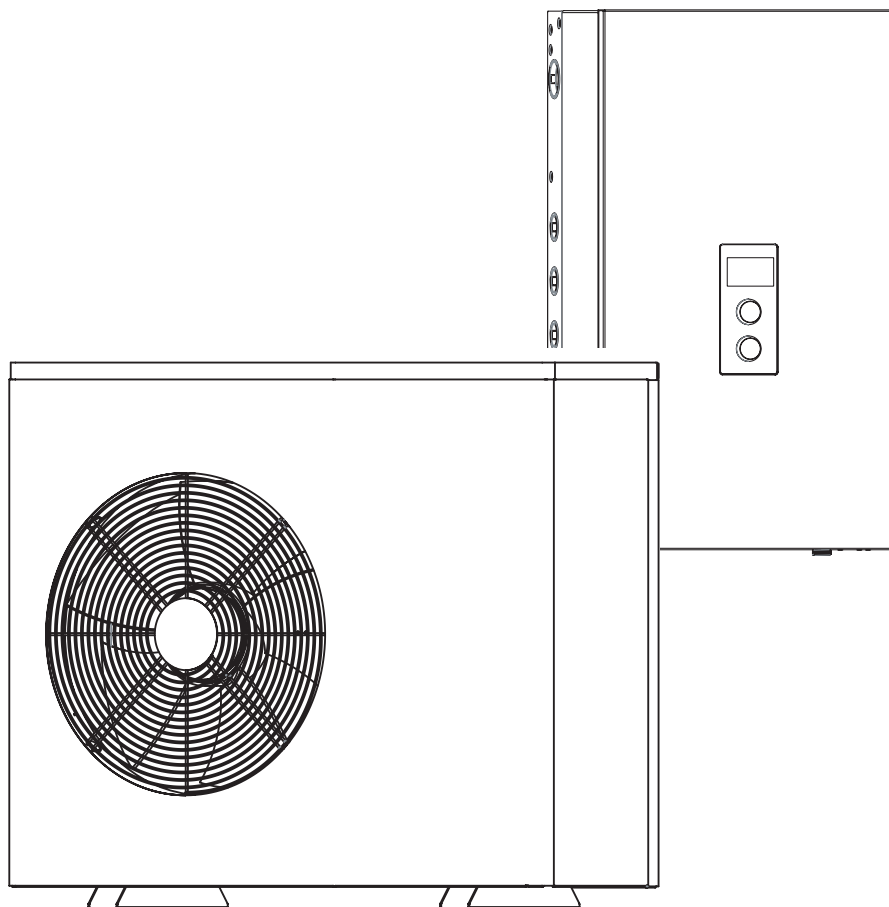# KOSPEL

Heat pump

HPM.Z

Assembly and operating instructions

Heat pump HPM.Z is a device hermetically sealed and contains fluorinated greenhouse gases.

This appliance can be used by children aged from 3 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance.

Cleaning and user maintenance shall not be made by children without supervision.

Description

Heat pump HPM is a device used to heat/cool the building and heat the domestic hot water.

Device is equipped with two units:

- outdoor unit HPMO, compressor heat pump.

  Operation of the device is based on taking heat from the environment and forwarding it to the heating circuit in the building. Low temperature air heat is transferred through the evaporator into the heat pump system filled a refrigerant, which evaporated turns to gas. The gas from the evaporator is sucked in by compressor, which raises its temperature and transfers it when it is compressed to the condenser. In the condenser, heat is transferred to the medium filling the central heating system, cooled liquid flows through the expansion valve and goes back to the evaporator, whereupon the whole process starts again. In the case of cooling, this cycle is reversed and heat is extracted from the building and discharged outdoor.

- indoor HPMI unit with a built-in heating system controller.

  The principle of operation of the device is based on the need-based regulation of the capacity of the heat pump compressor with the switching of the electric heater via the internal module controller. The indoor module control unit regulates the rated power according to the set heating curve. If the heat pump is unable to cover the building's heat demand on its own, the controller will automatically start the additional electric heater which, together with the heat pump, produces the required temperature of the heating medium.

# *Conditions for use and reliable operation of the device*

1. Reading the contents of this instruction manual will enable proper installation and operation of the device, ensuring its long-term and reliable operation.

2. The heat pump must be installed in accordance with the guidelines contained in this user manual.

3. The HPM.P heat pump heating system consists of a set of optimally selected elements:
   - HPMI indoor unit
   - HPMO outdoor unit
   - DHW cylinder SWPC
   - SVK buffer tank

     which guarantee the efficient and reliable operation of the HPM heat pump.

4. The manufacturer guarantees the correct operation and effective parameters of the HPM heat pump only in cooperation with devices of the HPM.P.

5. The manufacturer is not responsible for the installation of the HPM heat pump with other devices which may result in incorrect operation, lack of effective operating parameters and increased operating costs of the heating system or a breakdown of the HPM heat pump.

6. The manufacturer is not responsible for an incorrectly selected device to the heating needs of the installation.

Fig.1 Module HPM0
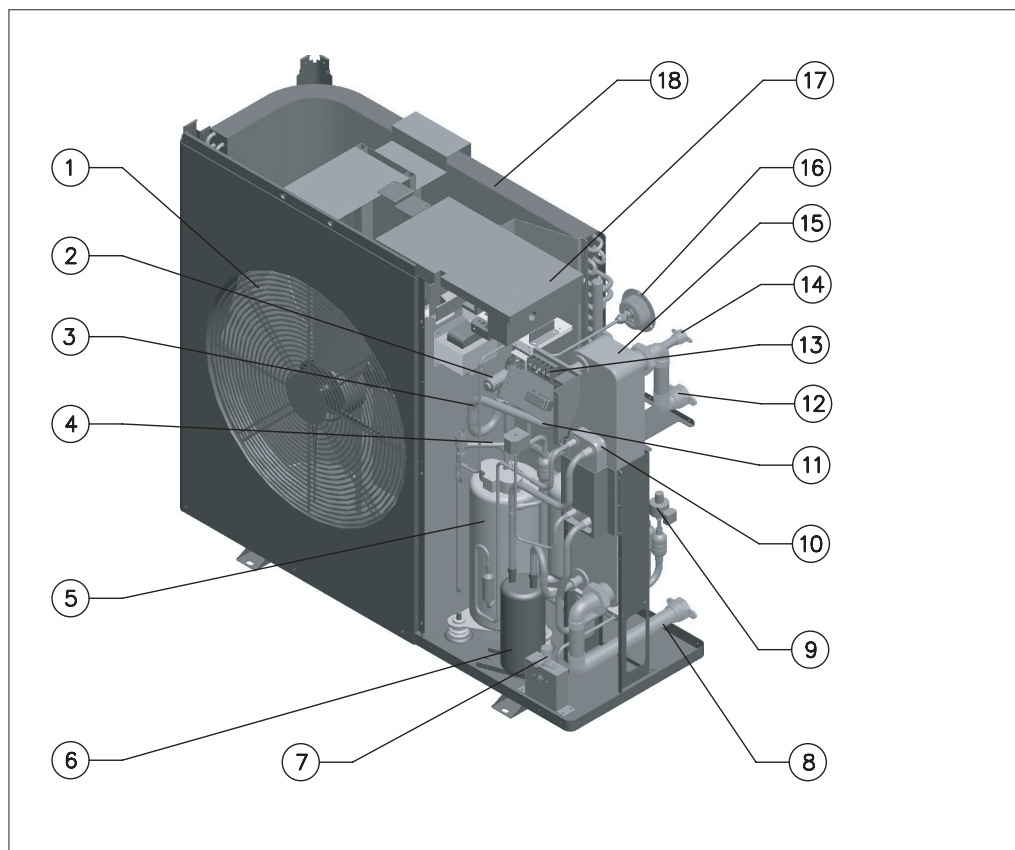
[1] - ventilator	[10] - economizer
[2] - reversing valve	[11] - pressure transducer
[3] - pressure switch	[12] - heating medium outlet G1"
[4] - electromagnetic valve	[13] - connection strip (PNL, modbus)
[5] - compressor	[14] - air vent socket (cork G1/2")
[6] - liquid tank	[15] - condenser
[7] - service valve	[16] - manometer
[8] - heating medium inlet G1"	[17] - compressor controller
[9] - expansion valve	[18] - evaporator

Fig. 2 Module HPMI
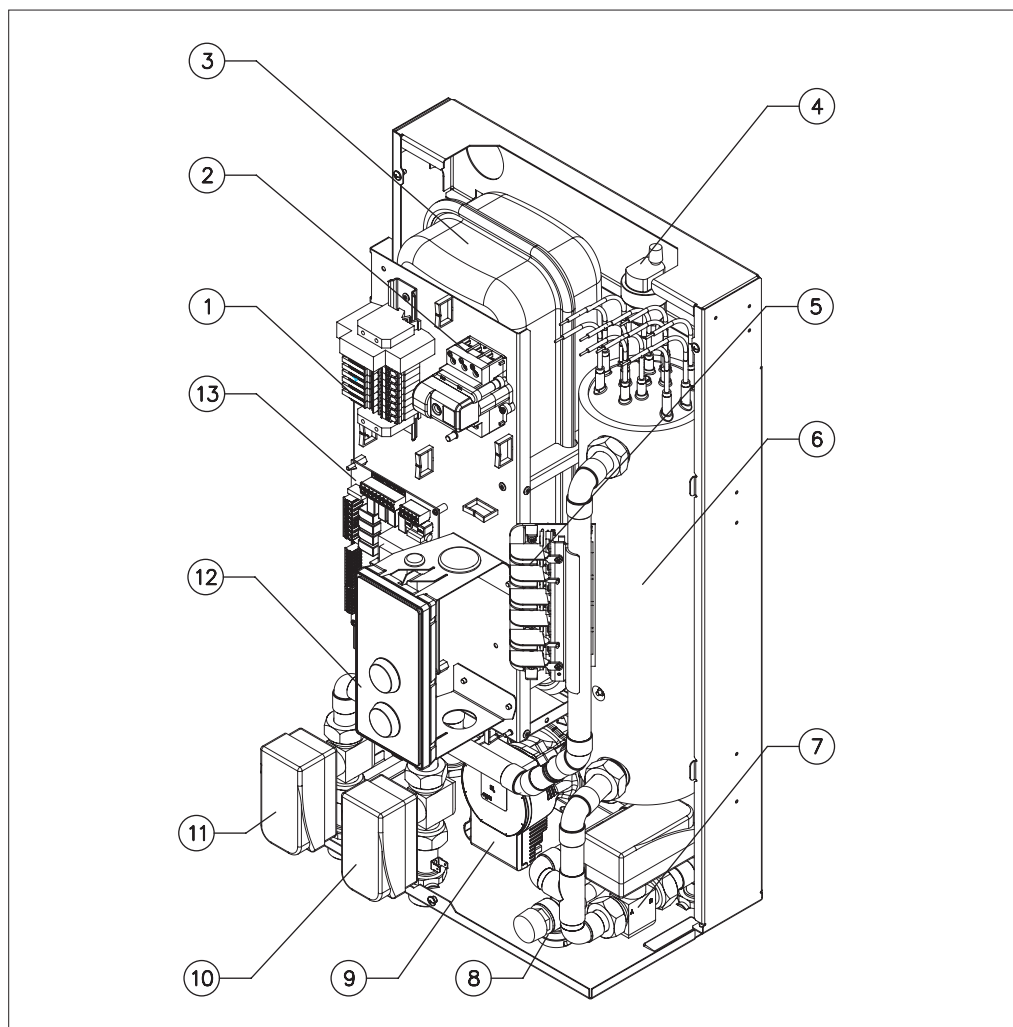
[1] - electrical connection
[2] - thermal cut-off
[3] - expansion vessel
[4] - automatic air vent
[5] - rated power
[6] - heating element
[7] - cooling circuit valve

[8] - safety valve
[9] - circulation pump
[10] - CH valve
[11] - DHW valve
[12] - control panel
[13] - device driver

Heating and DHW mode with the heat pump switched off

When the outdoor temperature drops below the set shut-down temperature value, the heat pump is automatically turned off and cannot produce heating water. In this case, the heating and DHW mode is automatically performed by the additional electric heater of the indoor unit.

Automatic defrost

Defrosting of the evaporator surface is done by reversing the refrigerant's circulation. During the defrosting process the compressed gas is discharged from the compressor to the evaporator, which melts the existing frost. The heating system cools down slightly during this time. Duration the defrosting process depends on the degree of frosting and the current external temperature. Active defrosting process is signaled on the control panel by the icon .

Transport and storage

The HPMO heat pump should be transported and stored in a horizontal position.

Assembly

The heat pump is designed for outdoor installation and connection to indoor hydraulic module with integrated additional electric heater. The device must be placed on a solid, level base or foundation concrete. For fastening, use the attached vibration isolators. To protect the device against snow and excessive moisture, base or the foundation should protrude around 300mm above the ground level.

Prepare the ground under the foundation for free drainage of the condensate from the drip tray. Drainage should be below the freezing zone. The layer thickness and level must comply with local requirements and principles of construction technique. The hole diameter should not be less than 100mm.

Condensate drain pipe should be thermally insulated. Thorough leveling the HPMO outdoor unit will allow for free drainage of the condensate from the drip tray.

The heat pump should not be placed against the wall of rooms where noise could interfere; e.g. by the bedroom wall. In order to maintain the high efficiency of device it is necessary to keep minimum distance against building's walls and other obstacles. Restriction of the air flow can lead to the intake of cooled (heated in cooling mode) air and lead to an increase in energy consumption of the compressor.

Connect the heating medium pipes to the heat pump and hydraulic module.

Noise

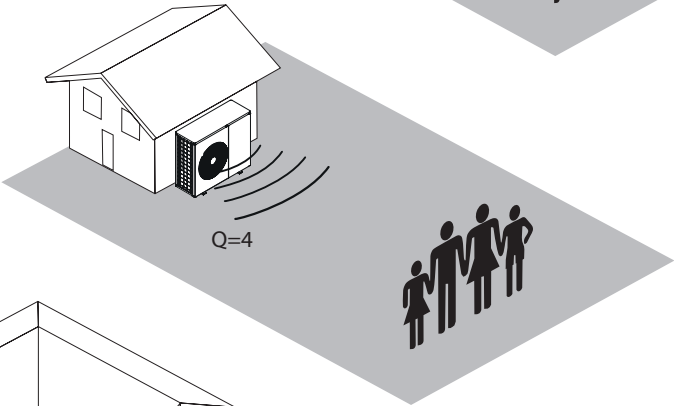Sound pressure level for different distances from the device.

Power level acoustic Lw [dB (A)]	Directivity factor Q	Distance from the noise source r [m]									
		1	2	3	4	5	6	8	10	12	15
		Sound pressure level Lp [dB (A)]									
64	2	56	50	46	44	42	40	38	36	34	32
	4	59	53	49	47	45	43	41	39	37	36
	8	62	56	52	50	48	46	44	42	40	39

Q = 2: freestanding heat pump on the outside of the building.
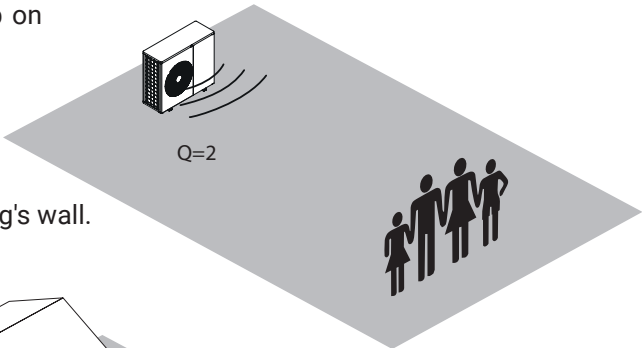
Q = 4: heat pump on the building's wall.

Q = 8: heat pump on the building's wall situated in the corner
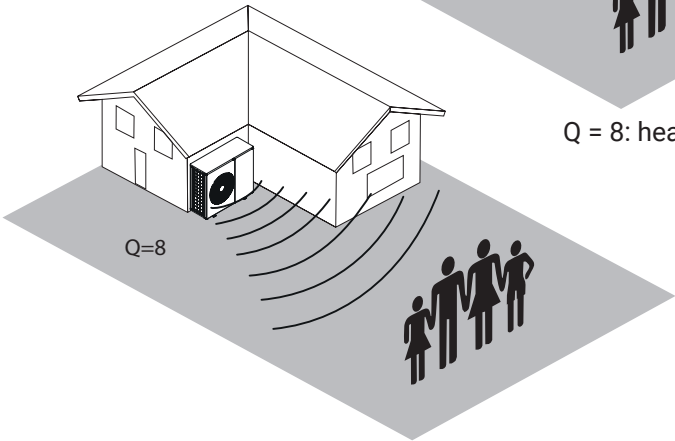
Fig.3 The assembly of outdoor unit HPMO

Proposed distance from right, left, top and behind wall - 50cm, front - 3m
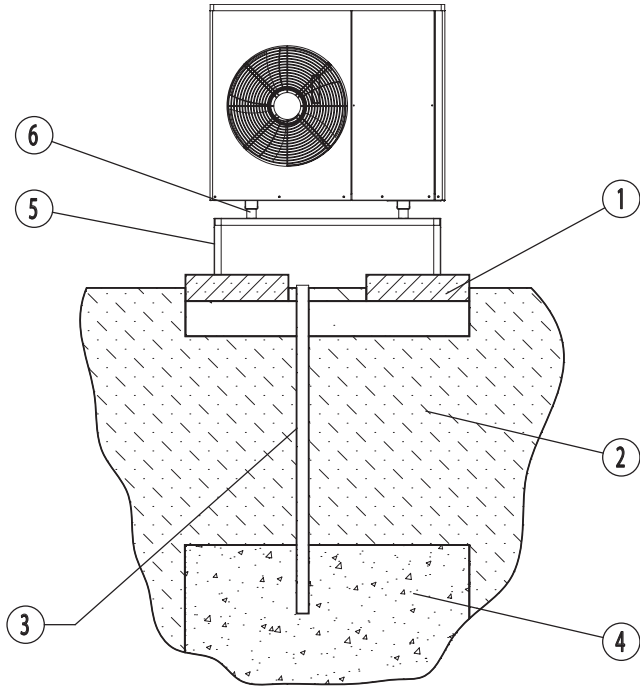
[1] - *concrete foundation*
[2] - *gravel*
[3] - *the pipe for the condensate*
[4] - *gravel ground*
[5] - *base*
[6] - *vibration isolator*

air inlet

≥50cm

air outlet
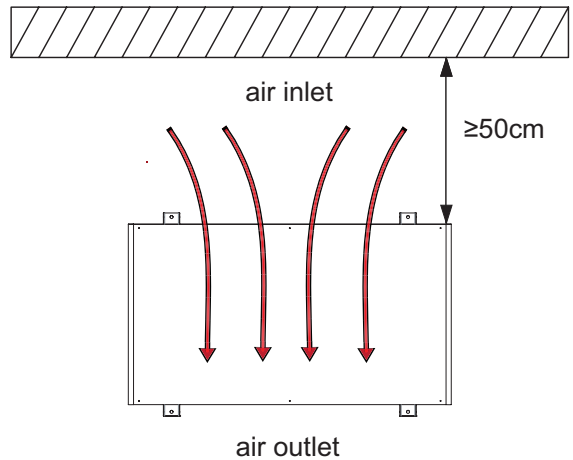
Fig.4 The assembly of indoor unit HPMI

Fig.4a The assembly of outdoor unit HPMO

G1" DHW supply — | — CH buffer supply

G3/4" drainage of safety valve

292
196
53
181
40

55.8   108   158.3   49

G1" outdoor unit return (HPMO)

G1" circuit cooling supply
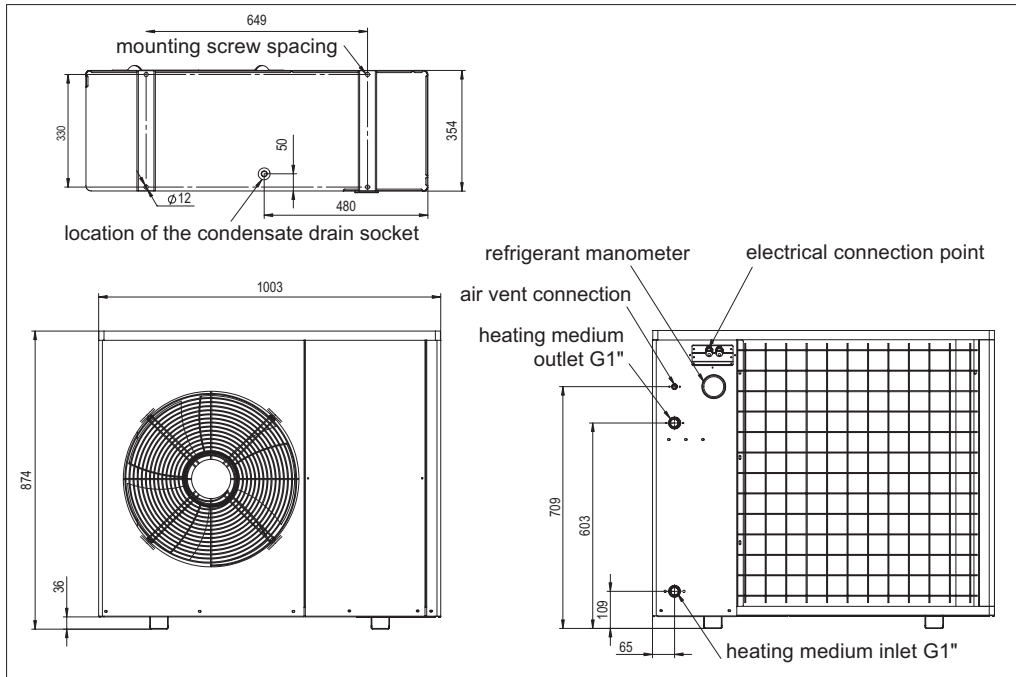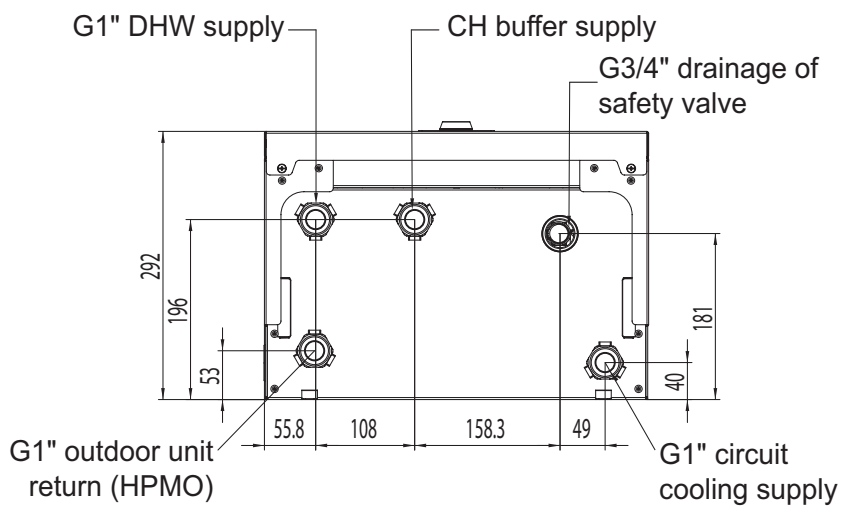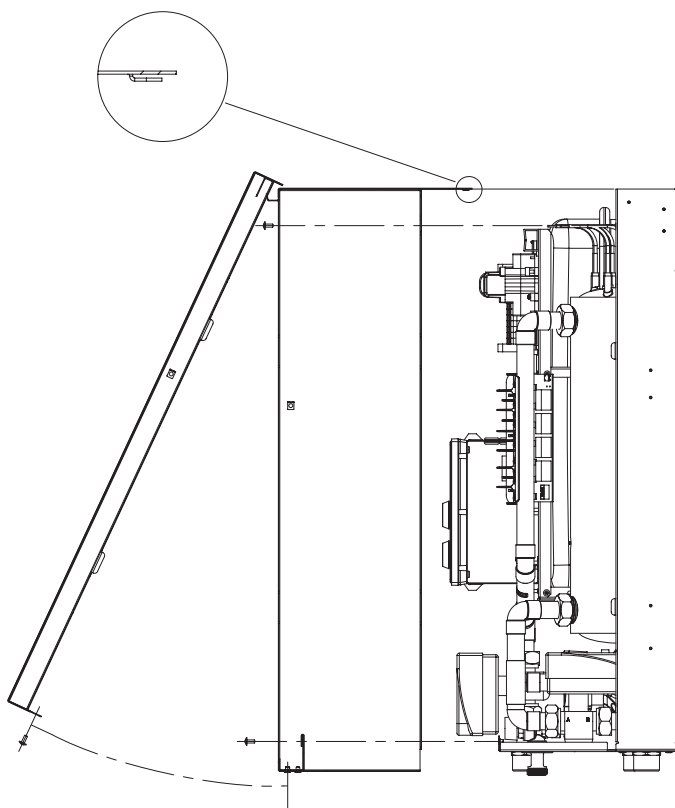
Connection to the electric installation

Fig.5 Outdoor unit HPMO connection
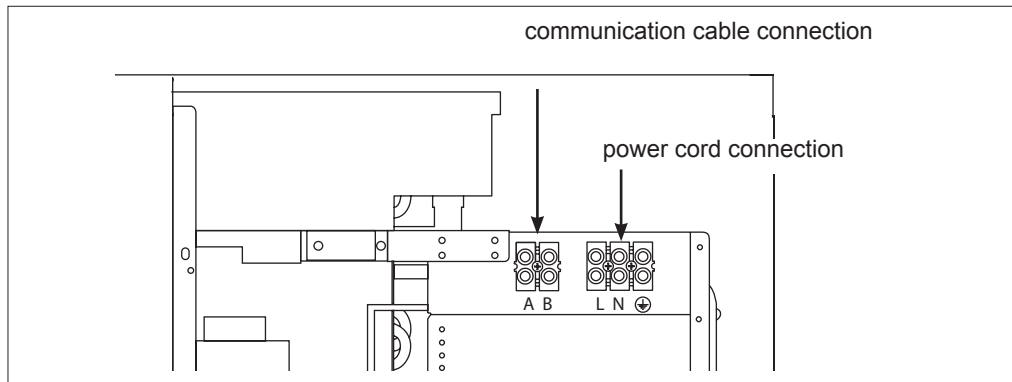
Fig.6 Indoor unit HPMI connection

PCRK - circulation pump DHW
PO - Circulation pump CH1 (radiator circuit)
PG - Glycol pump
PM - Mixing valve pump
ZM - Mixing valve
TBCH - Buffer temperature sensor
TZM - Temperature sensor behind mixing valve
TCRK - DHW circulation temperature sensor
TZAS - DHW cylinder temperature sensor
TPOK - Room temperature sensor
TZEW - outside temperature sensor
C.MI (Slave) - Internet module C.MI
HPMO (Master) - outdoor unit of heat pump
FN1 - outdoor heating blocked CH
FN2 - outdoor forcing the demand for cooling

Fig.7 Diagram of connection the heat pump to three-phase installation

configuration of microswitches
device driver [13]
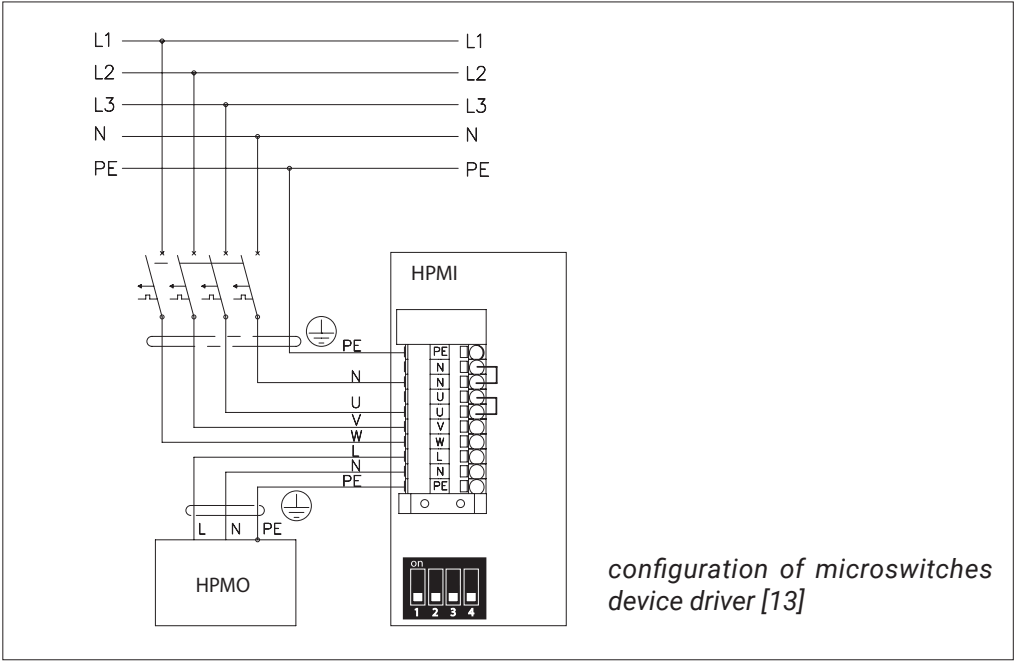
Fig.8 Diagram of connection the heat pump to one-phase installation

configuration of microswitches
device driver [13]
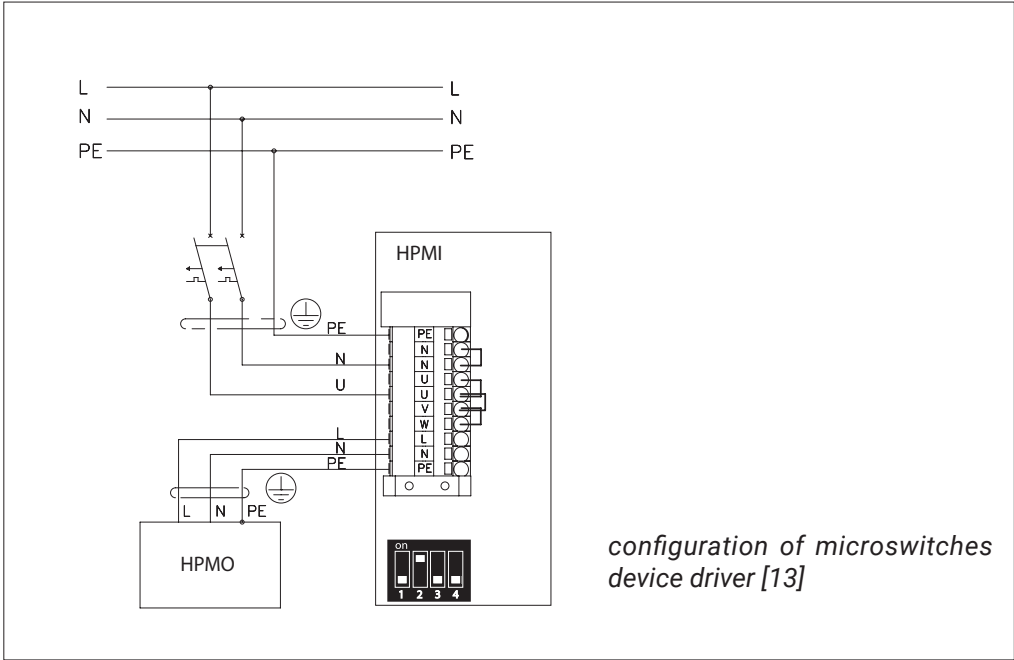
Connection of outdoor sensors and devices

Circulation temperature sensors (TCRK)
The assembly of sensor was shown on the diagram of hydraulic installation. The connection cable of the temperature sensor should be as short as possible, it should not be placed in close proximity to the power cords and twisted around other cords.

Attention, the connection of the sensor is optional, in case of its absence, circulation pump works continuously according to circulation schedule. If the sensor is connected, the circulation pump also works according to schedule, however until the temperature in the circuit is stabilized. The circulation temperature is checked at certain intervals, if there is a need to raise the water temperature, then the pump is turned on.

In the absence of a sensor, the pump works continuously, but with connected sensor, the pump works when the temperature in the circulation circuit drops. System control automatically detects the presence of the sensor and accordingly adjusts circulation pump's control algorithm.

Cooling buffer temperature sensor (TBCH)
The sensor mounting location is shown on the diagram of the hydraulic installation with cooling fan coil. The connection cable of the temperature sensor should be as short as possible, it should not be placed it in close proximity to the power cords and twisted around other cords. The sensor is required if the device is configured for cooperation with fan coil *[SERVICE / CONFIGURATION -> Configuration -> Cooling -> Type: Fan coil]*.

Temperature sensor in the surface heating circuit (TZM)
The sensor mounting location is shown on the diagram of the hydraulic installation. Sensor is required, if CH2 circuit is active *[SERVICE / CONFIGURATION -> Configuration -> CH2 circuit -> circuit: Yes]*.

Buffer temperature sensor (TZAS)
Buffer temperature sensor should be placed in the tank's socket.

Room temperature sensor (TPOK)
The connection cable of the temperature sensor should be as short as possible, it should not be placed in close proximity to the power cords and twisted around other cords. At a minimum height of 150 cm.

Outside temperature sensor (TZEW)
The sensor should be mounted in a shaded place, on the north or north-west siede of the building's facade, away from windows and vents. The connection cable of the temperature sensor should be as short as possible, it should not be placed in close proximity to the power cords and twisted around other cords.

Function input 1 (FN1 input)
Opening the input causes the device heating to be blocked. The input is active in winter mode.

Function input (FN2 input)
Forcing the cooling demand externally. The input is active in summer mode. A short circuit causes the unit to run in cooling mode as per set parameters.
In order to protect the hydraulic system against condensation, an HP.HS.24 humidity sensor / switch can be connected to the circuit.

Connection to the hydraulic installation

The HPM heat pump can operate in a closed hydraulic installation system (minimum pressure of the heating medium is 0.6 bar).

Hydraulic installation should be made in accordance with applicable standards. Wires connecting the heat pump to the indoor module should have an inside diameter of min. 25mm. In order to protect against the transmission of vibrations to the system, flexible hoses must be used to connect the heat pump. Attach the hose to condensate drain. The heating medium pipes and the drain pipe should be thermally insulated. The outlet of the drain hose should be placed below depth exposed to freezing.
In case of minus temperatures, do not switch off the device. This will protect the outdoor unit condenser from damage. If there is a risk of interruptions in the supply of electricity, the circuit must be separated from hydraulic module by means of an additional heat exchanger and the heat pump's heating circuit should be filled with glycol.

A prerequisite for maintaining the warranty is the installation of a dirt separator fixed at the inlet to the device.
The hydraulic installation must be made in such a way that the internal HPMI unit can operate in the heating circuit without external HPMO unit (according to the following installation diagrams). In case of a failure of the HPMO outdoor unit this will ensure the functioning of the heating system.

Fig.9 An examplary diagram of an installation with a plane heating circuit / cooling circuit, radiator circuit, heating buffer and storage tank domestic hot water. .
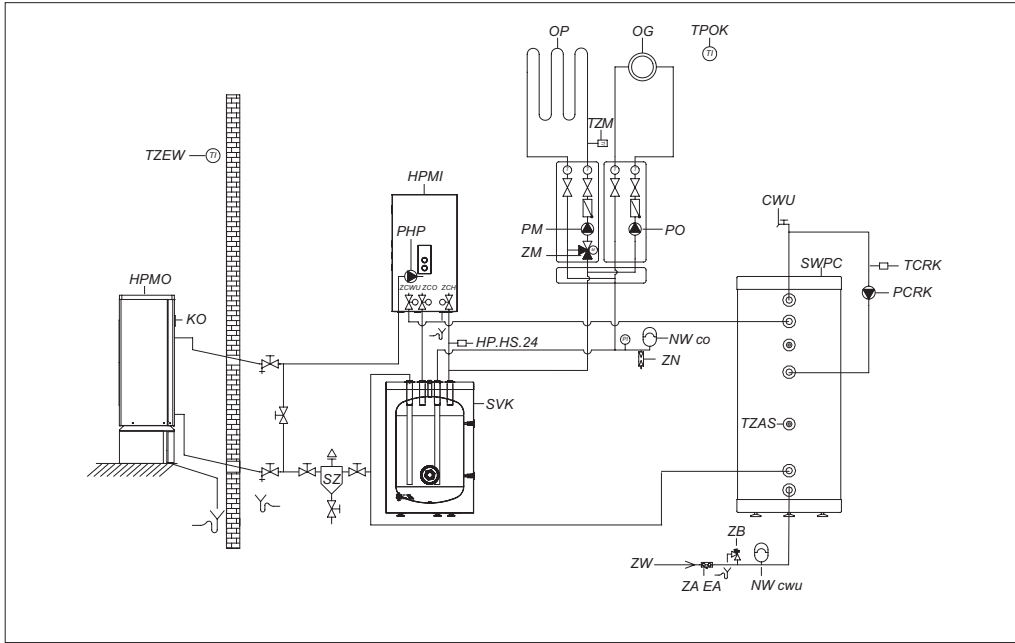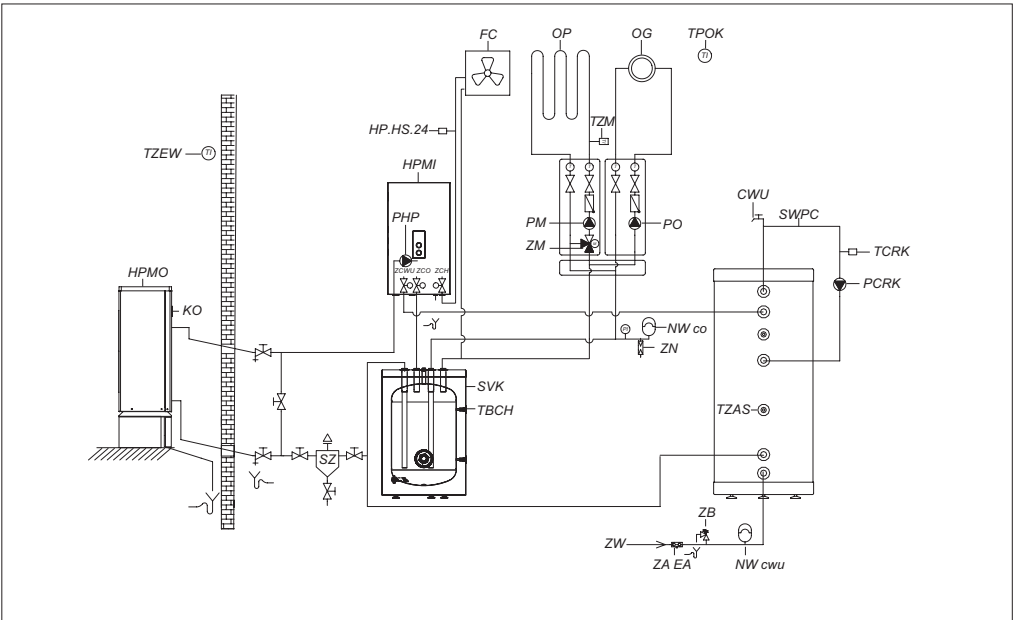

Fig.10 An examplary diagram of an installation with a plane heating circuit, radiator circuit, heating buffer, storage tank domestic hot water and cooling circuit with fan coil.

HPMO	-	heat pump (10kW A7/W35)
HPMI	-	hydraulic module (4/6/8kW)
KO	-	venting connection
SZ	-	dirt separator
TZEW	-	outside temperature sensor
ZCWU	-	zone valve, loading the domestic hot water cylinder
ZCO	-	zone valve, loading the buffer tank CH
ZCH	-	zone valve, circuit cooling supply
PHP	-	circulation pump
OG	-	radiator heating
TPOK	-	room temperature sensor
OP	-	plane heating
PM	-	plane heating circulation pump
TZM	-	circuit plane heating temperature sensor
ZM	-	mixing valve
SWPC	-	DHW cylinder
SVK	-	heating/cooling water buffer tank
TZAS	-	temperature sensor in the DHW cylinder (WE-019/01)
PCRK	-	DHW circulation pump
FC	-	fan coil
HP.HS.24	-	humidity switch for 1 cooling circuit
CWU	-	domestic hot water
ZW	-	cold water inlety
ZA	-	EA class anti-contamination valve
ZB	-	safery valve
NWcwu	-	DHW expansion vessel
NWco	-	CH expansion vessel
PO	-	circulation pump
ZN	-	relief valve
TBCH	-	factor temperature sensor in the buffer
TCRK	-	water temperature sensor in the circulation circuit

Filling and venting

The heating medium system must be filled with water to the required pressure and vented. The indoor module has an automatic air vent. Fig. 2 pos. 4, while the heat exchanger in the outdoor unit can be vented by loosening the nut of the venting socket Fig. 1, pos. 14. Filling and refilling water the heating circuit should be clean, without visible deposits and correspond to the quality of water intended for consumption and the requirements contained in VDI 2035.

Maintenance

Regularly clean the surface of the evaporator from leaves, dust and others. Switch off the device before cleaning. In order to disable the device, select the Stand-by mode with the knob and disconnect electric power supply. The evaporator fins are made of aluminium strips. Do not use hard objects or detergents to clean the evaporator fins containing chlorine, acids or abrasives; use generally available preparations for cleaning evaporators and condensers in air-conditioning and cooling installations. After cleaning, check the condensate drain. While plentiful snowfall, snow can accumulate on the evaporator and on the top cover of the heat pump. Snow must be cleared to avoid ice formation.

Necessary steps including zero commissioning are:

1. Start-up of the HP heating system and checking its operation (proper setting of operating parameters and matching them to the properties of the thermal insulation of the building, installation).
2. Configuration and setting of basic operating parameters (programming room temperature and DHW).
3. Assessment of the assembly in terms of leaks, disturbing noises (e.g. noise at poor deaeration).
4. Initial user instruction in the use of the HP system
5. Record the relevant parameters in the Start-up chart form in the HPM.Z operating instruction.
6. Zero Commissioning registration by the installation company in the Aura Kospel system, https://aura.kospel.pl/commission/createFromShortcut? shortcut_id = 27.

Activities to be performed at the Zero Commissioning:

Electrical system condition control
- Measurement of the supply voltage of the HPMI indoor unit - _ _ _ V.
- Checking the correctness of the installed electric wires in the internal HPMI unit (tightening the electric wires).

Assessment of tightness of the hydraulic system
- Reading the pressure of the heating medium on the control panel of the indoor HPMI unit- _ _ _bar.

Cleaning the dirt separator
- Checking the pressure in the expansion vessel of the HPMI indoor unit - _ _ _bar.
- Reading the flow value in the heating circuit during operation - _ _ _ l min, inlet _ _ _ °C, outlet _ _ _ °C.

Checking zone valves.

Cleaning the filters.

Checking the operation of zone valves.

HPMO outdoor unit refrigerant pressure check.

Evaluation of the technical condition and cleaning the evaporator.

Checking the drainage of the condensate.

Checking the correctness of the installed electric wires in the external HPMO unit (tightening electric wires).

Assessment of the technical condition of the outdoor unit.

Control panel

Use the operating dial [3] to set one of the modes:
- winter ▯▯▯+♨
- summer ♨ + ❄
- off ⏻.

By turning the navigation dial [2] (left or right), with winter or summer mode active, change between function screens on the display [1].

- main: informs about the basic heat pump's (details in the table),
- settings: it allows on the customization of heat pump's parameters to user's preferences,
- service / configuration: allows to heating system configuration to object's conditions (available for installation company and specialized services after entering the access code) and preview of input and output heat pump's signals and current parameters,
- PARTY / HOLIDAY / MANUAL: it allows to the fast change of work's algorithm depending on the needs.

Entering individual functions takes place after selecting a corresponding function screen and pressing the navigation dial.

1 - display
2 - navigation dial
3 - operating dial

Heat pump's error is signalled on the main function screen Err or ⚠ after pressing the navigation dial, there is a list of detected errors.

MAIN SCREEN:

- *1 - heat reception signaling*
- *2 - executing of a heating program*
- *3 - immersion heater is turned on signaling*
- *4 - compressor operation signaling*
- *5 - realized temperature in the room signaling*
- *6 - room temperature*
- *7 - outside temperature*
- *8 - outside temperature*
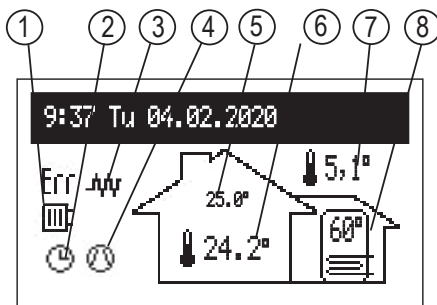
	Signalling of heating program implementation:
🕒	According to the daily/weekly schedule
🗓️+	DHW cylinder disinfection
❄	Frosting
🍸	PARTY – maintaining a comfortable temperature in the room and the DHW cylinder
💼	HOLIDAY - maintaining a comfortable economical temperature or anti-freeze protection in the DHW cylinder
❄	Implementation of the frost protection program
✋	MANUAL - keeping the set room temperature
	Heat reception:
▥	Heat reception signalling > CH
🚰	Heat reception signalling > DHW
⊛	Cooling operation signalling
	Other symbols
Err	Error signalling
⚠	Warning occurrence signalling
⎎⋀⋀	Immersion heater is turned on signalling
⊘	Compressor operation signalling. The flashing symbol indicates the bivalent mode

SETTINGS:

Adjusting boiler parameters to user preferences.

```
9:37 Thu 22.04.2021

        ⚙

     Settings
```

- Room temp.
  - Economy temp. ☾, Comfort - ☼, Comfort ☼, Comfort + ☼: setting temperature values available in schedules,
  - Party, Holiday: select temperature parameters for programs.
  - Cooling: room temperature setting in cooling mode (available with active plane cooling).

- DHW cylinder temperature (available only in installation with domestic hot water cylinder and with activated inside regulation.
  - Economy temp. ☾, Comfort ☼: setting hot water temperature values available in schedules.

- CH program
  - No. 1...No. 8 > setting 8 daily programs, in each daily program there are 5 editable time frames, which can have one of the room temperature sets (❄, ☼, ☼, ☼). In any other case, the economy temperature will be activated(☾).

```
        ①    ②    ③    ④

CH program              No1
1  6:00  —  9:15    ☼
2 15:20  —  22:15   ☼
```
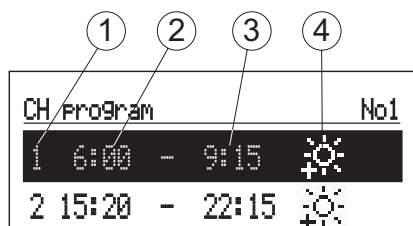
1 - no. of time frame (max 5)
2 - time of starting the selected temperature
3 - time of finishing the selected temperature
4 - temperature selection: ❄ ☼ ☼ ☼

Setting up daily programs procedure is described in **Daily Schedule** paragraph.
- WEEKLY: assigning for each week day one of the previously set daily programs.

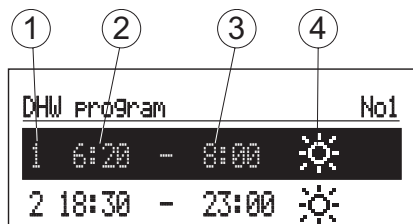- DHW program (only available in DHW cylinder systems with internal adjustment activated
  - No. 1...No. 8 > setting 8 daily programs. In each daily program there are 5 editable time frames, which can have one of the room temperature sets (✳,☼).
    In any other case, the economy temperature will be activated (☽).

```
 1      2        3        4

DHW program              No1
1  6:20  -   8:00    ☼

2 18:30  -  23:00   ☼
```

1 - the number of the time interval (max.5)
2 - start time of the selected temperature
3 - finish time of the selected temperature
4 - temperature selection ✳,☼

Setting up daily programs procedure is described in **Daily Schedule** paragraph.
  - WEEKLY: assigning for each week day one of the previously set daily programs.

- Circulation program (available only within active circulation in system DHW)
  - No. 1 ... No. 8> setting of 8 daily programs in each daily program. There are 5 adjustable time intervals in which it will work circulation pump

```
 1      2        3

Circulation program      No1
1  6:00  -   8:00

2 18:30  -  23:00
```

1 - no. of time frame according to schedule (max 5)
2 - start time of circulation pump operation
3 - finish time of circulation pump operation

Setting up daily programs procedure is described in **Daily Schedule** paragraph.
  - WEEKLY: assigning for each week day one of the previously set daily programs.
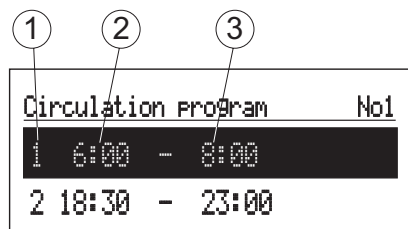
- DISINFECTION (only available in systems with DHW):
  - WEEK DAY: the day for disinfection during.
  - TIME: the time it takes to disinfect with automatic program.
  - WORKING TIME: time of disinfection (calculated from the moment the temperature has reached disinfection).
  - AUTOMATIC WORK:
    - Yes - automatic work start of disinfection at the set time (time, day of the week, beginning time)
    - No-automatic disinfection turned off. Disinfection is carried out at the user's demand.
  - CIRCULATION: it is possible to set disinfection of the entire installation or only DHW.
  - ACTIVATE NOW: manual start of disinfection (independent of the day's or time's set).

- TIME / DATE:
  - setting of the current system time (YEAR / MONTH/ DAY / HOUR / MINUTE).
  - AUTOMATIC TIME CHANGE:
    - Yes - automatic system time changeover from summer to winter and vice versa,
    - No - automatic change turned-off
    - *Attention, in case of cooperation with the Internet module, automatic time change should be switched off.*

- INTERFACE:
  - LANGUAGE - choice of language menu
  - BRIGHTNESS MIN: setting of the brightness of the display in stand-by mode.
  - BRIGHTNESS MAX: setting of the brightness of the display during the work.
  - SOUND:
    - Yes - the sound of working dial/
    - No - there is no sound of the working dial.
  - DIAL SENSITIVITY: 1 - high / 4 - low.

- SYSTEM:
  - MSPC PROGRAM: shows the version of indoor unit controllers program
  - PW PROGRAM: shows the version of panel's program
  - RESET: heat pump's start-up
  - FACTORY SETTINGS: restore

SERVICE / CONFIGURATION:

```
9:37 Thu 22.04.2021


        ⚒

Service / Configuration
```

Configuration
Adaptation of the heat pump:

*Changes in the configuration menu are possible after entering an access code. When prompted for an access code, turn the navigation dial to the required code and confirm the code by pressing the dial. If you want to retract from the code request screen, hold the navigation dial or wait until automatic return to main function screen.

Code: 987

- Central heatinge:
  - Regulation:
    Per curve - temperature in CH installation is calculated on the basis of outside temperature and room temperature based on scheduleu,
    Constant - in CH installation is equivalent to Supply temperature MAN, set individual for CH1 and CH2.
  - Glycol exchanger:
    Yes - there is an additional exchanger in the system
    No - there is no addeitional exchanger.
  - Building protection:
    Yes - if the temperature in the building drops below 7C in the stand-by mode and the outside temperature is lower than 2C, heating will be turned on ,
    No - protection is disabled..
  - Time of turning on the immersion heater: this parameter defines the time after which the heat pump is assisted it will be additional source of heat if it does not reach the set values parameters. The time is counted from the moment the point temperature is reached bivalent *[Configuration -> Heat pump -> Bivalent point]*. In case of if the outside temperature is above the bivalent point temperature, the additional heat source will not be turned on. In case of need for an additional heat source, the condition for its activation is the activation of the immersion heaters *[Configuration -> Heating element -> use of immersion heaters: Yes]*,
  - Outside temp. Off: setting of selected temperature above which CH circuit will be switched off.

- CH1 circuit:
  - Heating curve no.: selection of a heating curve (see Chapter Heating curve).
    Note, the parameter is present when the control according to a curve is set heating [Configuration -> Heating -> Regulation type: Acc. curve],
  - Curve offset: Heating curve offset (see section Curve heating).
    Note that the parameter is present when the control is set according to heating curve [Configuration -> Heating -> Regulation type: acc. curve].
  - MAN flow temperature system flow temperature when operating with constants parameters (manual setting of the heating medium) *[Configuration -> Heating -> Regulation type: Fixed parameters],*
  - *Temp. MAX: maximum flow temperature of the heating circuit.*
    ATTENTION: setting too high temperatures, not suitable for building parameters, type of heating used and degree building insulation can be carried out, among others, by to generate high operating costs.
  - Circulation:
    Yes - activation of the CH1 circuit,
    No - turning off the circuit.

    Nothe, the CH1 circuit is intended for heating connection radiator.

- CH2 circuit:
  - Heating curve no.: selection of a heating curve (see Chapter Curve heating).
    Note that the parameter is present when the control is set according to heating curve [Configuration -> Heating -> Regulation type: acc. curve],
  - Curve offset: heating curve offset (see section Curve heating).
    Attention, the parameter is present when the regulation is set according to the heating cuve [Configuration -> Heating -> regulation type: Fixed parameters].
  - MAN flow temperature system flow temperature when operating with constants parameters (manual setting of the heating medium) *[Configuration -> Heating -> Regulation type: Fixed parameters],*
  - Temp. MAX: maximum flow temperature of the heating circuit.
    ATTENTION: setting too high temperatures, not suitable for building parameters, type of heating used and degree building insulation can be carried out, among others, by to generate high operating costs.
  - - valve time: time needed to switch the valve by 90 degrees C. Adjustment range from 60 to 480 seconds, factory default 120 seconds. During configuration, please check the set value with the value of the valve drive used,
  - Dynamics of regulation: the response speed of the valve drive to achieve the corresponding parameter in the CH2 circuit. PL-102B ... Default valve - average, in case of too slow investigation temperature of the CH2 circulation medium to the set value, should be increased dynamics. In the event of an overregulation of the medium temperature, dynamics should be reduced.
  - circulation:
    Yes - activation of the CH2 circuit,
    No - turning off the circuit.

- Cooling:
  - Type:
    Off: cooling function inactive,
    Fan coil,
    Plane.
  - Temperature of the medium: temperature of the refigerant,
  - Hysteresis: Hysteresis for the refigerant.

- Cylinder:
  - Time without immersion heater: the parameter defines the time after which the heat pump is supported it will be an additional source of heat (immersion heater) if it does not reach the set value water temperature in the tank. Time is counted from the moment of reaching temperature of bivalent point [Configuration -> Heat pump -> Bivalent point]. In case the outside temperature is above temperature of the bivalent point, the additional heat source will not remain included. If there is a need for an additional heat, the condition for its activation is the activation of the immersion heaters *[Configuration -> Heating element -> use of immersion heaters: Yes]*.
  - Frost protection:
    Yes - activation of the storage tank frost protection in stand-by mode,
    No - function inactive.
  - Cylinder:
    Yes - DHW tank circuit activation,
    No - cylinder inactive.

- The heat pump:
  - Bivalent point: outside temperature limit to which the heat pump works independently. Below this point, an additional heat source is activated (immersion heater),
  - Switch-off temp.: outside temperature limit at which it will be reached turning off the heat pump. If it is necessary to heat with central heating or DHW , the only heat source will be the immersion heater. Activation is a precondition for its activation *[Configuration -> Heating element -> use of immersion heaters: Yes]*.
- Room temperature:
  - Room control: room temperature control.
    Yes - if the set temperature in the room is reached, heating on CH will be turned off,
    No-no control of exceeding the temperature in the room.
  - Hysteresis: room temperature hysteresis. The parameter is available, if enabled there is room temperature control.

- Circulation:
  Yes - DHW circulation pump control system enabled,
  No - DHW circulation pump system turned off.

- Pumps:
  - Pumps protection: short-term activation time of the circulation pumps with a longer one standstill (blocking protection),
  - Venting:
    - Off - venting turned off,
    - CH1 - CH1 circulation venting enabled,
    - CH2 - CH2 circulation venting enabled,
    - VCH - cooling circuit venting enabled,

  During the venting procedure (10min) the heat pump in the hydraulic module runs alternately at maximum and minimum speed and the pumps the respective circuits are on. Thanks to this, concentration occurs air bubbles, which makes it easier to remove them from the installation.

- Heating element:
  - Maximum rated power of immersion heaters: the maximum power that can be turned on in the case of reaching the bivalent point or the switch-off point of the heat pump,
  - use of immersion heaters:
    - Yes - immersion heaters are allowed to turn on ,
    - No   - immersion heaters are forbidden to turn on.

    Note, it is not recommended to turn off the use of immersion heaters due to:
  - the possibility of underheating the building,
  - failure to perform the frost protection procedure for equipment, which may can lead to damage to parts of the heat pump, installation or indoor unit.

    Note, the heaters must be turned on in the first start-up procedure.

- Communication:
  - Device no.: device number on the communication system.

PARTY/HOLIDAY (available in the system with cylinder)

```
9:37 Thu 22.04.2021

       ⛱/🧳

   Party/Holiday
```

Fast switching algorithm of work depending on the needs.
- PARTY: SET DURATION TIME [HOURS] (from 1 to 24 hours or until the user's change).
- HOLIDAY: SET DURATION TIME [DAYS] (from 1 to 60 days or until the user's change).

* If any of the above modes is ON then after entering PARTY/ HOLIDAY there is a possibility to turn it off.
* The symbol of the activated mode is signalled on the main function screen.

DAILY SCHEDULE:

```
①    ②    ③      ④      ⑤    ⑥

CH program              No1
1  6:00  -   9:15   ☀   ☒
2 15:20  -  22:15   ☀
End
```
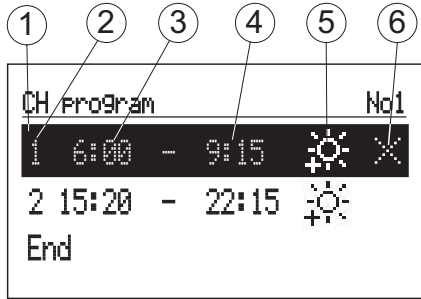
1 - time period panel
2 - no. of time frame according to schedule (max 5)
3 - start time
4 - finish time
5 - temperature selection (CH and DHW cylinder)
6 - command (active when editing):
  ☑ accept
  ☒ delete
  ⊞ add

In daily schedule CH circuit and DHW cylinder have defined starting time (3) and finishing time (4) of maintaining selected temperature value (5) in the room (CH) or DHW cylinder. Outside defined time frames economy temperature will be maintained in the room/cylinder. For circulation circuit within the schedule there is an adjustment of start time (3) and finish time (4) of circulation pump's operation. In buffer mode there is an adjustment of start time (3) and finish time (4) of buffer's charging. To change the parameters for the daily schedule select chosen program number and press navigation dial.

The first parameter flashes (start time) - use the navigation dial to set the new time frame value (hour and minutes separately) by turning the dial left/right and confirm it by pressing the dial again. At the same time next screen starts to flash allowing edition of next parameters (finish time). Last editable position is a command. In order to save changes select command ☑ and press the dial to finish editing. To delete selected time frame start editing chosen time frame and by pressing the dial go to command position, select command ☒ and press the dial. To add new time frame, select last defined time frame and by pressing the dial go to command position, select command ⊞ and press the dial to add new time frame (edition of new time frames described above).

```
┌─────────────────────────────┐
│ CH program            No3   │
├─────────────────────────────┤
│ 1  0:00   -   23:59    ☀    │
└─────────────────────────────┘

┌─────────────────────────────┐
│ CH program            No1   │
│ 1  6:00   -   9:15     ☀    │
│ 2 15:20   -   22:15    ☀    │
│ End                         │
└─────────────────────────────┘
```

Protection against frost

In stand-by and summer mode, if the room temperature drops below 7°C, the heating of the central heating circuit will be turned on. It is required to run the function Troom sensor.

Heating curve

Heat pump's controller is responsible for maintaining proper temperature in central heating installation depending on the outside temperature. While the temperature outside the facility is low, heat demand within the facility is higher, whereas while the temperature outside is high, analogically, there's no need to maintain high temperature within the installation. Correlation between outside temperature and heating installation's temperature can be presented in a graphical form of so called heating curve. The diagram below presents a compilation of heating curves for the set point of room temperature characteristics, climate zone, and the type of heating installation one must select appropriate heating curve.
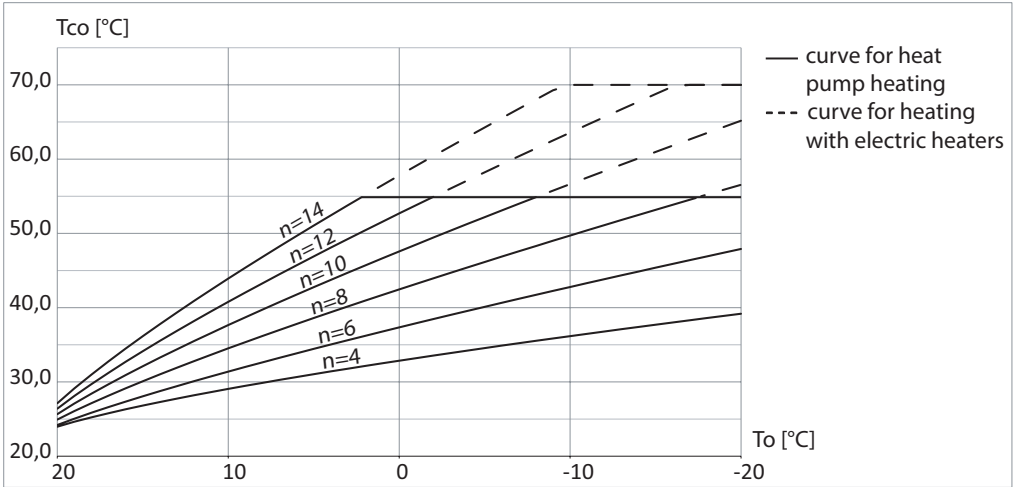
In case of the need to offset the heating curve, it is necessary to change the parameter [heating curve]. The diagram below presents heating curve no. 8 with the offset -10°C and 10°C.
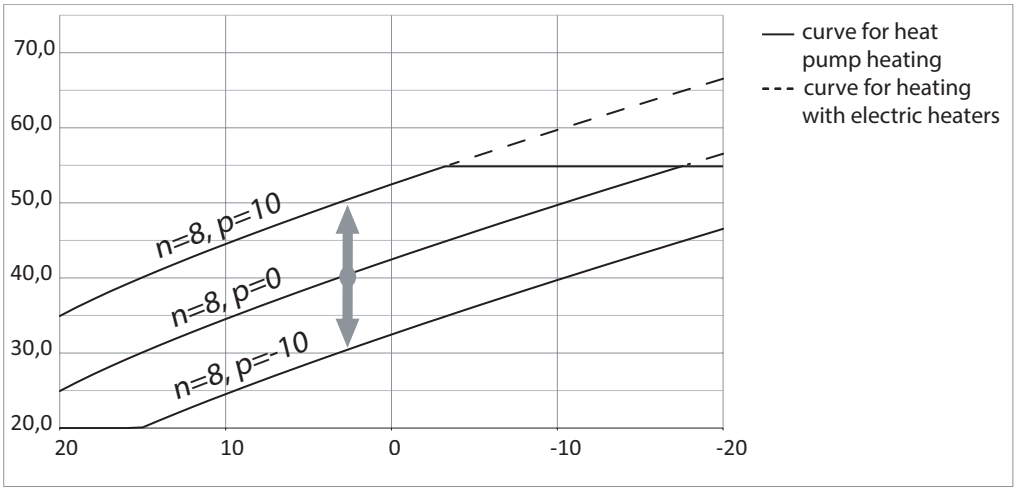
Technical data

Outdoor unit HPMO-10		
Rated heating output A+2/W35	kW	4,2/9,5
Power consumption A+2/W35 w	kW	1,2/2,9
Performance factorA+2/W35	-	3,6/3,2
Rated heating output A+7/W35	kW	5,2/10,5
Power consumption A+7/W35	kW	1,2/3,1
Performance factor A+7/W35	-	4,5/3,5
Rated heating output A-7/W35	kW	2,7/7,3
Power consumption A-7/W35	kW	1,2/2,7
Performance factor A-7/W35	-	2,2/2,7
Electrical values		
Rated voltage		230V 1N AC, 50Hz
IP rating		IP X4
Max. rated current	kW	4,5
Cross-section of power cables*	mm^2	3x2,5
Heating system		
Hydraulic connection		G1 (gwint wew.)
Rated current	m^3/h	1,8
Minimum flow	m^3/h	0,85
Internal pressure drop	kPa	20
Maximum temperature of heating element	°C	62
Air and noise		
Maximum ventilator power DC	W	85
Maximum air flow	m^3/h	3500
Minimum/maximum air temperature	°C	-20/43
The maximum sound pressure level at a distance of 1m	dB(A)	53
Maximum sound power level	dB(A)	64
Refrigerant		
Refrigerant type		R410A
Compressor		Rotacyjna
Refigerant amount	kg	1,8
Refigerant GWP	t CO2	2,088
CH2 equivalent	t	3,75
Dimensions (HxWxD)	mm	877x1003x350
Weight	kg	86,5

*Recommended outdoor unit power cord H07BQ-F3x2,5mm2 450/750V for outdoor applications. The maximum outer diameter of the cable is 11,5mm.

Indoor unit HPMI

Electrical installation					
Power supply		230V~ /400V 3N AC, 50Hz			
Safety class		IP 22			
Maximum rated power of electrical additional heater	kW	4	6	8	
Cross-section of power cable	for 1F system	mm²	min 3x6; max 3x10		
	for 3F system		min 5x4; max 5x10		
Circuit breaker rated current overcurrent	for 1F system	A	40	50	63
	for 3F system		25	32	32
Heat pump communication cable		mm²	min.2x0,34; max 2x1,5		

Heating system			
Hydraulic connection		G1 (outside thread)	
Maximum/minimum working pressure	bar	3/0,5	
Maximum temperature of heating element	work with heat pump	°C	55
	work w/o heat pump		70
	DHW disinfection		80
Expansion vessel		l	12
Rated current		m³/h	1,8
Minimum flow		m³/h	0,85
Internal pressure drop		kPa	25
Dimensions (HxWxD)		mm	752x419x303
Weight		kg	29,5

Product card

(in accordance with EU Regulation 811/2013; Annex IV)

A	Supplier's name or trademark	**KOSPEL Sp. z o.o.**	
B	Supplier's model identifier	**HPMO-10**	
C	Seasonal energy efficiency class space heating for the model, in conditions temperate climate (*)	**A++**	
D	Rated thermal power, including rated thermal power of any additional heaters under temperate climate conditions	**10**	kW
E	Seasonal heating energy efficiency rooms in moderate climate conditions	**157**	%
F	Annual energy consumption under climate conditions moderate	**5259**	kWh
G	Sound power level L WA, indoors	**0**	dB(A)
H	Special precautions it applies during assembly, installation or maintenance space heater	**Before installation or maintenance please read the manual operation and follow the instructions with the guidelines it contains.**	
I	N/A		
J	Rated thermal power, including rated thermal power of any additional heaters, in cool climate conditions	**9**	kW
J	Rated thermal power, including rated thermal power of any additional heaters, in warm climate conditions	**10**	kW
K	Seasonal heating energy efficiency rooms in cool climate conditions	**135**	%
K	Seasonal heating energy efficiency rooms in warm climate conditions	**200**	%
L	Annual energy consumption under climate conditions cool	**6565**	kWh
L	Annual energy consumption under climate conditions warm	**2665**	kWh
M	Sound power level L WA, outdoors	**64**	dB(A)

(*) low temperature application

Product card

(in accordance with EU Regulation 811/2013; Annex IV)

A	Supplier's name or trademark	**KOSPEL Sp. z o.o.**	
B	Supplier's model identifier	**HPMO-10**	
C	Seasonal energy efficiency class space heating for the model, in conditions temperate climate (*)	**A+**	
D	Rated thermal power, including rated thermal power of any additional heaters under temperate climate conditions	**8**	kW
E	Seasonal heating energy efficiency rooms in moderate climate conditions	**116**	%
F	Annual energy consumption under climate conditions moderate	**5689**	kWh
G	Sound power level L WA, indoors	**0**	dB(A)
H	Special precautions it applies during assembly, installation or maintenance space heater	**Before installation or maintenance please read the manual operation and follow the instructions with the guidelines it contains.**	
I	N/A		
J	Rated thermal power, including rated thermal power of any additional heaters, in cool climate conditions	**7**	kW
J	Rated thermal power, including rated thermal power of any additional heaters, in warm climate conditions	**8**	kW
K	Seasonal heating energy efficiency rooms in cool climate conditions	**98**	%
K	Seasonal heating energy efficiency rooms in warm climate conditions	**138**	%
L	Annual energy consumption under climate conditions cool	**7045**	kWh
L	Annual energy consumption under climate conditions warm	**3087**	kWh
M	Sound power level L WA, outdoors	**64**	dB(A)

(*) medium temperature application

Set data sheet

I	The value of the seasonal space heating energy efficiency for basic space heating	116	%
II	A factor that weighs the thermal power of the primary heaters and additional heaters included	0	-
III	The value of the mathematical expression: 294/(11 · Prated)	3,34	-
IV	The value of the mathematical expression: 115/(11 · Prated)	1,31	-
V	The value of the difference between seasonal energy efficiencies space heating under average and cold climate conditions	18	%
VI	The value of the difference between seasonal energy efficiencies space heating under warmer and average climate conditions	22	%

❶

Seasonal space heating energy efficiency for heat pump $\boxed{\text{'I'}}$ **%**

❷

Temperature controller product card temperature

class I =1%, class II+ 2%, class III = 1,5% class IV = 2%, class V = 3%, class VI = 4%, class VII = 3,5%, class VIII = 5%

+ $\boxed{2}$ **%**

❸

Additional boiler from the card the product

Seasonal energy efficiency space heating (%)

($\boxed{}$ - 'I') x 'II' = **-** $\boxed{}$ **%**

❹

Solar energy share from the product sheet solar device

| Collector size (m²) | Cylinder's capacity (m³) | Efficiency collector (%) | Cylinder's class A⁺ = 0,95, A = 0,91, B = 0,86, C = 0,83, D-G = 0,81 |

('III' x $\boxed{}$ + 'V' x $\boxed{}$) x 0,45 x ($\boxed{}$ /100) x $\boxed{}$ **+** $\boxed{}$ **%**

❺

Seasonal space heating energy efficiency of the package under temperate climate conditions $\boxed{\textbf{118}}$ **%**

Seasonal space heating energy efficiency class of the package under temperate climate conditions

☐ ☐ ☐ ☐ ☐ ☐ ☐ **X** ☐ ☐

G F E D C B A A⁺ A⁺⁺ A⁺⁺⁺

Seasonal space heating energy efficiency under conditions cool and warm climate

❺ cool: $\boxed{118}$ -'V' = $\boxed{100}$ **%**   ❺ warm: $\boxed{118}$ + 'VI' = $\boxed{140}$ **%**

The energy efficiency of the product mix stated in this product sheet may not be the actual one energy efficiency of the appliance installed in the building, since this performance is additionally influenced factors such as heat loss in the distribution system and dimensioning of products with respect to size the building and its characteristics.

Heat pump HPM.Z Kospel Sp. z o.o. start-up card

Start-up date			
Assembly address			
Installer's data	Stamp		Certificate no.
Data	Outdoor unit no.	Indoor unit no.	C.MI2 module no.
Data of additional devices	Type of plate exchanger	DHW cylinder type	Buffer CH type
Heating system*	Floor heating	Radiators	Mixed system
Heating system filled*	Drinking water	Treated water + corrosion inhibitor	Glycol solution propylene

Checking activities outside*

When unpacking the outdoor unit, check that the R410A pressure is correct with ambient temperature (indicator on the pump cover)

Outdoor unit:

Installed without restriction of air supply	YES	NO
On a pedestal (stand)	YES	NO
Mounted vibro-isolators	YES	NO
Condensate is drained (infiltration at the level below freezing)	YES	NO
Condensate discharge to the gutter - siphoned pipe, insulated, preferably with a heating cable	YES	NO
Hydraulic connection made with a flexible hose	YES	NO
Power and communication cable connected	YES	NO
The outside temperature sensor is placed on the wall (according to the instructions)	YES	NO

Checking activities inside*

Internal temperature sensor placed in the room representative	YES	NO
Internet module C.MI2 connected and configured (according to the instructions)	YES	NO
A desilter filter is installed at the pump inlet	YES	NO
Valves with discharge and bypass, pipes with a slight slope were installed (to drain the water from the outdoor unit when necessary)	YES	NO
ZA thing at input FN1 has been installed - deactivation of the device operation lock	YES	NO
Enter the values for the pressure and flow rate of the refrigerant in the heating circuit after commissioning	pressure (bar)	flow rate (l/min)

*cross out unnecessary