

## INSTALLATION & OPERATION MANUAL

# inverter heat pump

**HT*i*20** AIR -  
-WATER



ORIGINAL OPERATION MANUAL 02.03.2022



**A+++**

**SCOP** ↙  
**4,49**

● NATURAL  
● REFRIGERANT

**PROPANE R290**

coefficient  
to **COP**  
**5,02** by  
A7W35

# Table of Contents

1. General Description.....	3
1.1. Basic information.....	3
1.2. CE symbol and legal requirements.....	3
1.3. Safety notes and precautions.....	3
2. Transport and assembly.....	4
2.1. Delivery.....	4
2.2. Relocation.....	4
2.3. Assembly.....	5
3. Technical data.....	5
3.1. External unit dimensions.....	5
3.2. Electrical data.....	6
3.3. General data.....	6
3.4. Heating circuit – technical data.....	7
3.5. Cooling circuit – technical data.....	7
3.6. Control module.....	8
3.7. Technical data – noise pollution.....	8
4. Design.....	8
4.1. General data.....	8
4.2. Refrigerant R290.....	9
4.3. Operation range.....	9
5. Heat pump assembly.....	10
5.1. Heat pump position.....	10
5.2. Installation of flat roof.....	14
5.3. Internal unit.....	14
5.4. Hydraulic connection.....	19
5.5. Cooling mode.....	19
5.6. Connecting to swimming pool.....	20
5.7. Reference hydraulic system.....	20
6. Wiring diagram.....	27
6.1. Wiring connecting external unit and internal one.....	27
6.2. Controller diagram.....	29
7. Service.....	33
7.1. Check before commissioning.....	33
7.2. Notes for fitter.....	33
7.4. Cleaning.....	37
7.5. Inspection.....	38
7.6. Heat pump breakdown.....	39
8. Disposal.....	39
8.1. Symbols.....	40
8.2. Recovery of R290 refrigerant.....	40
9. Guarantee terms.....	40

# 1. General Description

## 1.1. Basic information

This Assembly Manual constitutes the integral part of device. Before use firstly the user shall read carefully this manual. Any use and operation not consistent with provisions of this Manual shall void the guarantee.



- **Before connection firstly flushing and cleaning of heating circuit is required.**
- **No obstruction is allowed within air inlet and outlet area.**
- **During device operation water supply is required. Do not operate the device if piping has not been supplied with water and bled.**
- **Regular checks of device are recommended (regarding dirt, deposits and scale). Before cleaning firstly turn off power supply.**
- **Before any works on wiring, firstly ALWAYS turn off power supply. Always protect electric components before contact with water.**
- **Always adhere strictly to wiring parameters and cable size indicated in data sheet of each heat pump.**
- **Note that connection to power supply shall ensure correct phase sequence.**
- **Failure to follow the requirements regarding wiring may result in heat pump damages not covered with guarantee.**
- **Never clean the machine with products containing acids, chlorine, sand or soda.**
- **Works on devices shall be delivered by authorized service only**

## 1.2. CE symbol and legal requirements

Heat pump carries CE symbol. Manufacturer declares that the manufactured device complies with the requirements laid down in electromagnetic compatibility directive (89/36/EEC) and comply with the basic requirements laid down in Low Voltage Directive (73/23/EEC). The device complies also with the requirements laid down in EN 14511, EN 14825 and EN 12102 Standard

## 1.3. Safety notes and precautions

Heat pump has been designed and manufactured using available technology pursuant to applicable safety requirements. The device shall not be operated by any unauthorized persons not possessing experience or knowledge regarding operation of device. Any use contrary to intended purpose or misuse may result in machine damage. A supplier is not liable for any damages caused by misuse or any use contrary to intended purpose. The purpose of device is to provide source of heat for closed central heating systems.

- **Heat pump is purposed for operation outside the building only. Installation inside the building is not allowed.**
- **Ambient temperature range -25° C to 35° C.**

## Do not:

- ➔ operate the heat pump in the presence of corrosive or explosive gases;
- ➔ supply the greasy, contaminated or polluted air;
- ➔ make connection to ventilation ducts containing water vapour.

- Device must be installed pursuant to applicable regulations regarding wiring.
- Always check that installation is properly earthed.
- Heat pump operation follows with refrigerant R290 that is flammable gas.

Any works related to the circuit shall be delivered with tools for this purpose that comply with applicable standards. For filling with or refrigerant recovery, device shall be disconnected from power supply. Smoking is not allowed during device operation

- Do not use fire sources (e.g. lighter, burner).
- Protection zone shall be provided around the device. Protection zone shall be free from windows, doors, ventilation openings, lighting fixtures, basement entry, hatches, roof windows or discharge pipes. Protection zone shall not include any adjacent plot or public circulating routes. Protection zone shall be free from sources of ignition, including power outlets, lighting switches, lamps or electrical switches.

Product contains refrigerant R290. In case of leakage, the refrigerant shall be collected close to the earth. Always prevent discharge of refrigerant into building pits, recess or sewage systems. Prevent accumulation of refrigerant that pose risk related to formation of hazardous, explosive, suffocating or toxic atmosphere.

## 2. Transport and assembly

### 2.1. Delivery



During receipt of delivery always check devices against specification in the order with regard to any missing parts or damages resulted from transport.

### 2.2. Relocation

Heat pump is shipped on pallet and is secured with bolts and nuts that shall be removed before carrying and placing the device in the position where operation will follow. Heat pump may be carried with forklift truck, crane or other equipment that offer appropriate lifting capacity and stability.



**Max. pump inclination is 30°! CAUTION! Risk of injury during device lifting due to heavy weight.**

**Max. pump inclination is 30°. Any extensive inclination during device operation may result in device failure within refrigerant circuit.**

**During shipping max. pump inclination is 30°.**

### 2.3. Assembly

Heat pump shall be installed outside the building, to the foundation or building external wall with dedicated clamps. At this phase of works note to provide the pipe discharging condensate.

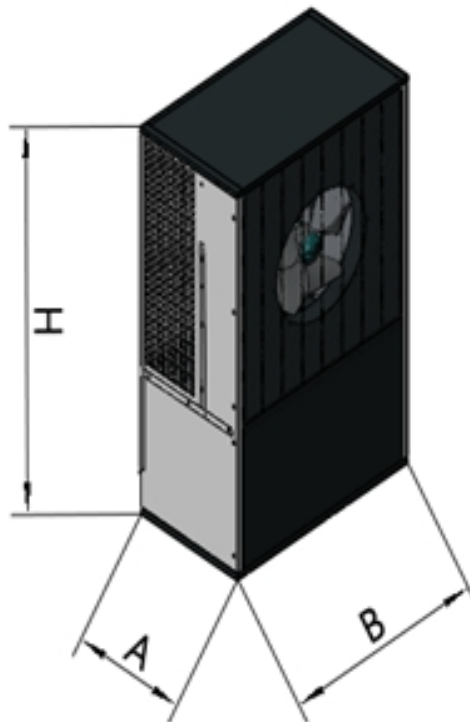
Devices operation site shall not expose the air intake to strong winds. Device shall be positioned transversely to wind direction, if possible. If the site does not protect against wind, protecting wall shall be provided. Note possible noise pollution. Do not install the device in corners, recess or between walls. Operation site shall ensure good noise insulation (e.g. grass, bushes, palisade).



**In case of heat pump suspended and fixed to building external wall always vibration dampers shall be provided at the junction of external and internal part.**

## 3. Technical data

### 3.1. External unit dimensions



*Figure 1. External dimensions*

	<b>HTi 20/12</b>
<b>A</b>	510
<b>B</b>	898
<b>H</b>	1480

### 3.2. Electrical data

Heat Pump Model	HTi 20/12 230V AC	HTi 20/12 3~400V AC
Power supply	1~230V AC	3~400V AC
Max. input power	8.5 kW	8.5 kW
Heat pump adjustment mode	Inverter	
Wire size	3x4mm <sup>2</sup>	5x2.5mm <sup>2</sup>
Protection	B25	B20
Max. current	23A	18A
Temperature measurement tolerance	±2°C	
Protection degree	IP 15B	
Surge protection	II	

### 3.3. General data

Heat Pump Model	HTi 20/12 230V AC	HTi 20/12 3~400V AC
Data acc. to EN 14511	Heat pump coupled with generator	
Operating temp. range	-25°C to +35°C	
Design	Galvanized steel, stainless steel, aluminium	
Dimensions	510x898x1480	
Weight	130kg	
Hydraulic Connection	G1	
Heating circuit pump output	3 - 87W	
Air flow	5100 m <sup>3</sup> /h	
Energy Class Low temperature /high temperature	A+++ / A++	
$\eta_s$ Low temperature /high temperature	176,6% / 129,9%	
Min. /Max. heating output A7W35	4 - 12 kW	
Min. /Max. heating output A-10W35	4 - 12 kW	

Heat Pump Performance acc. to EN 14511		
Heating Power A7W35	4,031 kW	4,031 kW
COP A7W35	5,02	5,02
Heating Power A7W55	3,378 kW	3,378 kW
COP A7W55	2,81	2,81
Heating Power A2W35	3,1 kW	3,1 kW
COP A2W35	4,22	4,22
Heating Power A2W55	3,685 kW	3,685 kW
COP A2W55	2,43	2,43
Cooling Power A35W7	5,113kW	5,113kW
Energy Efficiency Rating EER A35W7 EN	2,70	2,70

### 3.4. Heating circuit – technical data

Heat Pump Model	HTi 20/12 230V AC	HTi 20/12 3~400V AC
Min. / Max.heating water temperature	20 – 60 °C	
Working pressure Min. / Max.	0,05bar / 2,5bar 0,05MPa / 0,25MPa	
Min./Max. flow	600 / 2100 l/h	
Min. qty of water of heating circuit	100 l	
Hydraulic resistance	55 kPa	
Max. length of heating water pipe	20m	

### 3.5. Cooling circuit – technical data

Heat Pump Model	HTi 20/12 230V AC	HTi 20/12 3~400V AC
Refrigerant type	R290	
Refrigerant qty	1,3 kg	
GWP R290	3	
Equivalent CO2	0,0039 t	
Allowed working pressure	25,8 bar 2,58 MPa	

### 3.6. Control module

	Smart	Smart Tower
Power supply	3~400V AC lub 1~230V AC	3~400V AC lub 1~230V AC
Dimensions	285x335x710	625x625x1790
Hydraulic connection	G1	G1 G <sup>3</sup> / <sub>4</sub>
Additional heat source	Electric heater output 2kW - 1~230V AC Electric heater output 6kW - 3~400V AC	
DHW tank capacity	-	200 / 190 [l]
Buffer tank capacity	-	40 [l]
Heating circuits	Direct heating circuit Connection option for a mixer circuit	Direct heating circuit Option for retrofitting a mixer circuit
Maximum hydraulic pressure	2,5 bar 0,25 MPa	

### 3.7. Technical data – noise pollution

Heat Pump Model	HTi 20/12 230V AC	HTi 20/12 3~400V AC
Noise level acc. To EN 11202 A7W35	64 dB (A)	
Noise level acc. To EN 11202 A2W35 Operation at 50% output	51 dB (A)	

## 4. Design

### 4.1. General data

During heat pump operation the energy is transferred from the outside into the building (lower heat source), and then the air heated up to 62°C is transferred to the central heating system.

Heat accumulated inside the evaporator increases temperature of refrigerant flowing into the compressor. Refrigerant of increased temperature and pressure ensures heat transfer inside the evaporator and returns to the evaporator through the expansion valve. The heating water collects heat from refrigerant inside the evaporator. Then circulating pump ensures flow of heating water into building heating system.

**Heat pump shall be coupled with building heating system operating at low output, preferably underfloor heating system or wall radiators. Higher output of heating radiators may result in poor heating during cold days and increased costs of device operation.**



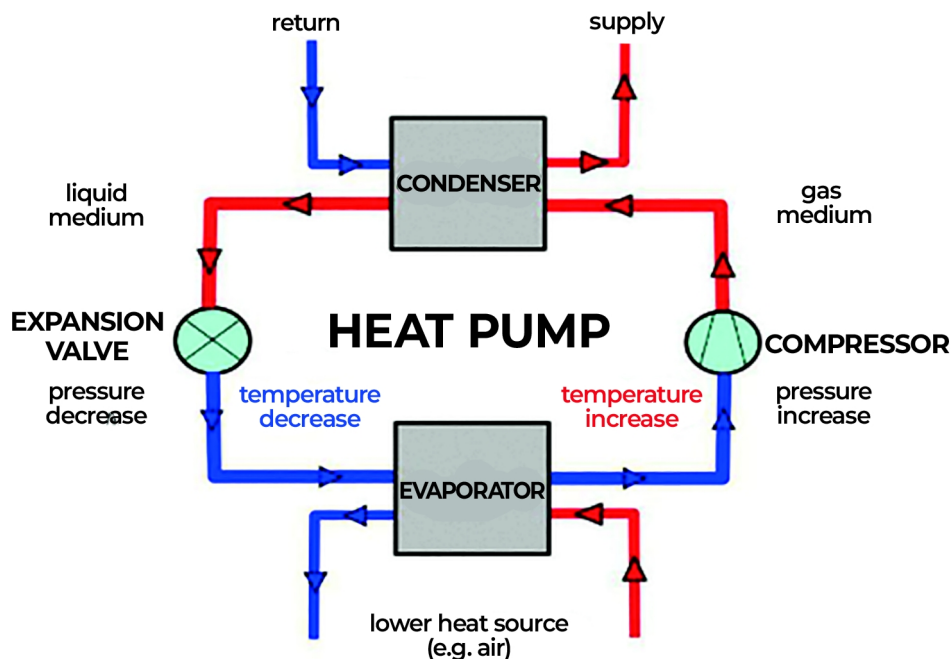


Figure 2. Heat pump operation diagram

## 4.2. Refrigerant R290

Refrigerant R290 is a naturally occurring hydrocarbon in natural gas deposits. It has no ozone depletion potential (ODP = 0) and a negligible direct global warming effect (GWP = 3). It well mixes up with mineral oil, and with regard to heating efficiency offers performance corresponding to HCF refrigerants e.g. R134A , R404A.

Technical data:

- Standard evaporation temperature (at 1bar abs.): -42°C;
- Critical temperature: 97°C;
- Explosion limits: 2.1÷9.5% vol. in the air;
- Compatibility of materials: does not cause corrosion.

## 4.3. Operation range

The below performance diagram relates to safe heat pump operation depending on T2 temperature (heated water temperature) up to T1 temperature (air temperature). Ther4 controller automatically adjusts temperature of heated water to weather conditions, what ensures safe compressor operation and extends its service life.

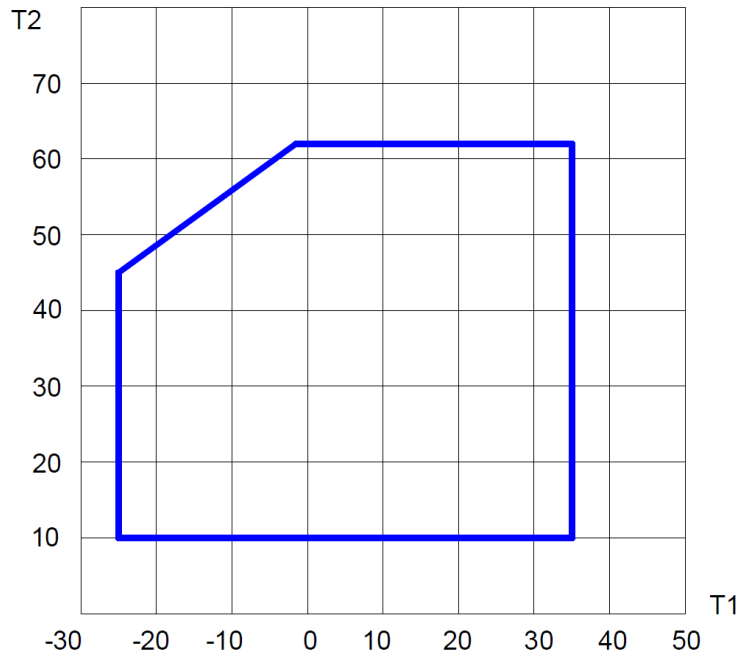


Figure 3. Compressor operation temperature range

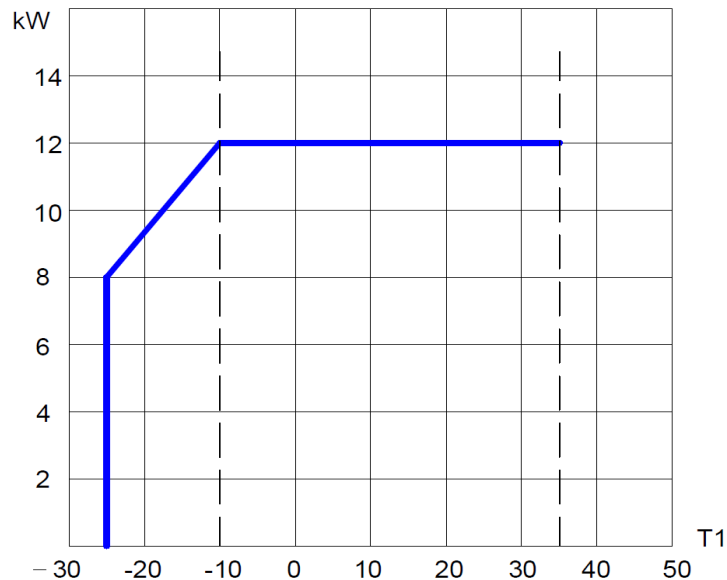


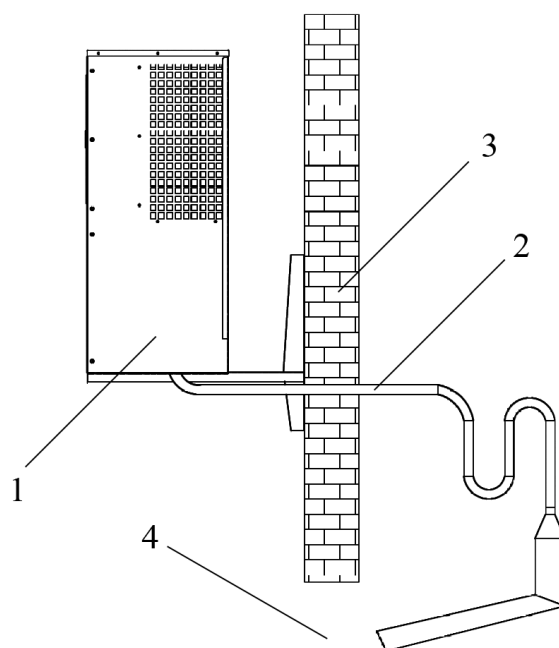
Figure 4. Power range of the HTi20 / 12 heat pump

## 5. Heat pump assembly

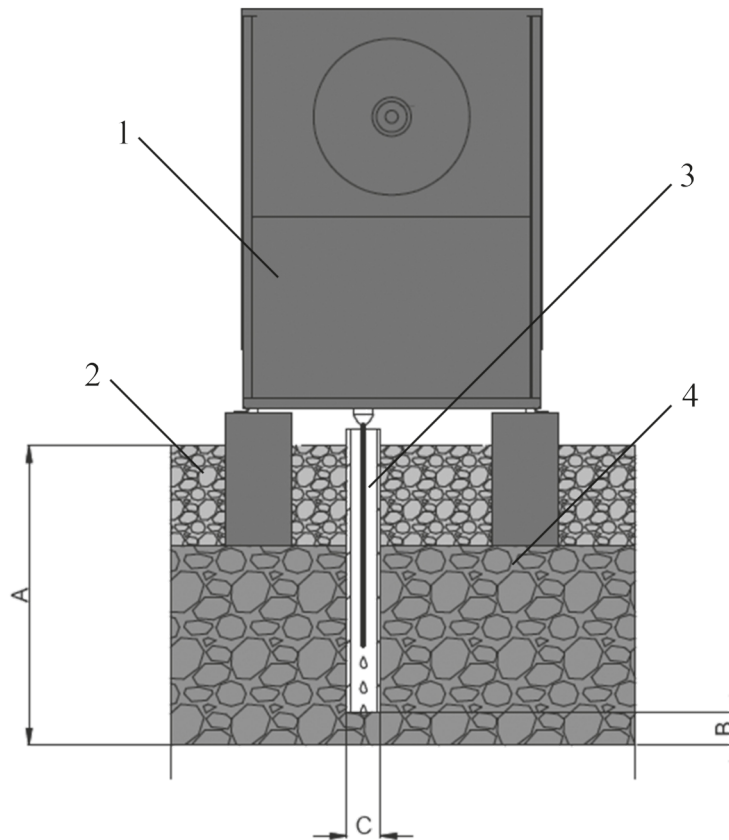
### 5.1. Heat pump position

It is recommended to deliver concrete foundation where the heat pump is to be seated, providing rubber vibration dampers that allow unrestricted positioning of device. Heat pumps are fitted with drip tray that collects any condensate generated during device operation and discharged with drain pipe into the soil or provided fixture drain. Other option is hanging the device onto building external wall with dedicated clamps..

To connect an external unit and interior system the opening in the wall shall be delivered for pipe and ducts penetration. Note to adhere to required minimum safety distance and zone. Temperature within air outlet area is ca. 5°C below ambient temperature, therefore formation of icing is possible at specific weather conditions. Note to ensure heat pump position where air outlet is not directed towards circulating routes. Always adhere to required distance from wall, wall openings, windows, basement windows. Note to ensure condensate discharge to prevent accumulation of moisture on building foundation.

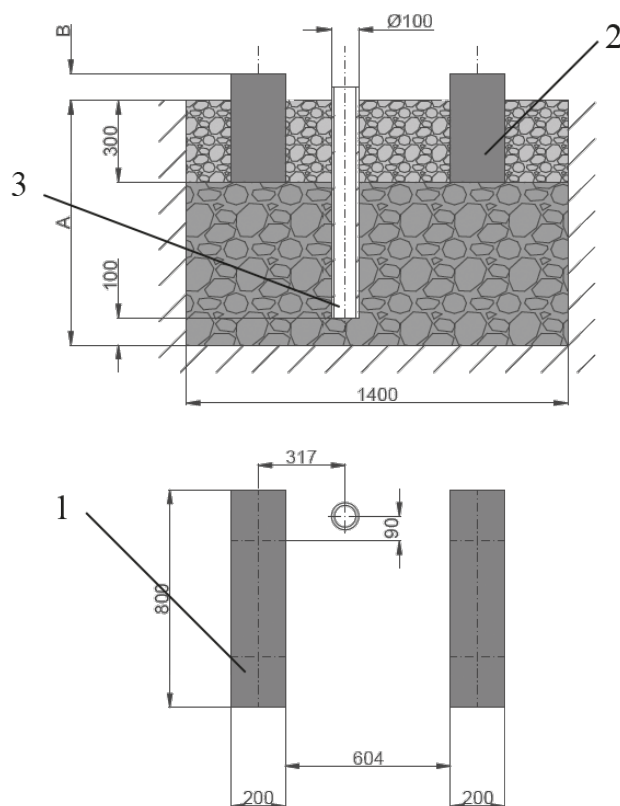


*Figure 5. Heat pump position and assembly.*  
1 – Heat pump; 2 – Condense drain; 3 – Building wall; 4 – Discharge pipe



*Figure 6. Heat pump position and assembly.*

*1 – Heat pump; 2 – Absorbent subbase (gravel); 3 – Pad foundation; 4 - Stone, crushed stone*



*Figure 7. Heat pump foundation – top view*

*1 – Pad foundation; 2 – Absorbent subbase (gravel, sand); 3 – Condensate drain*

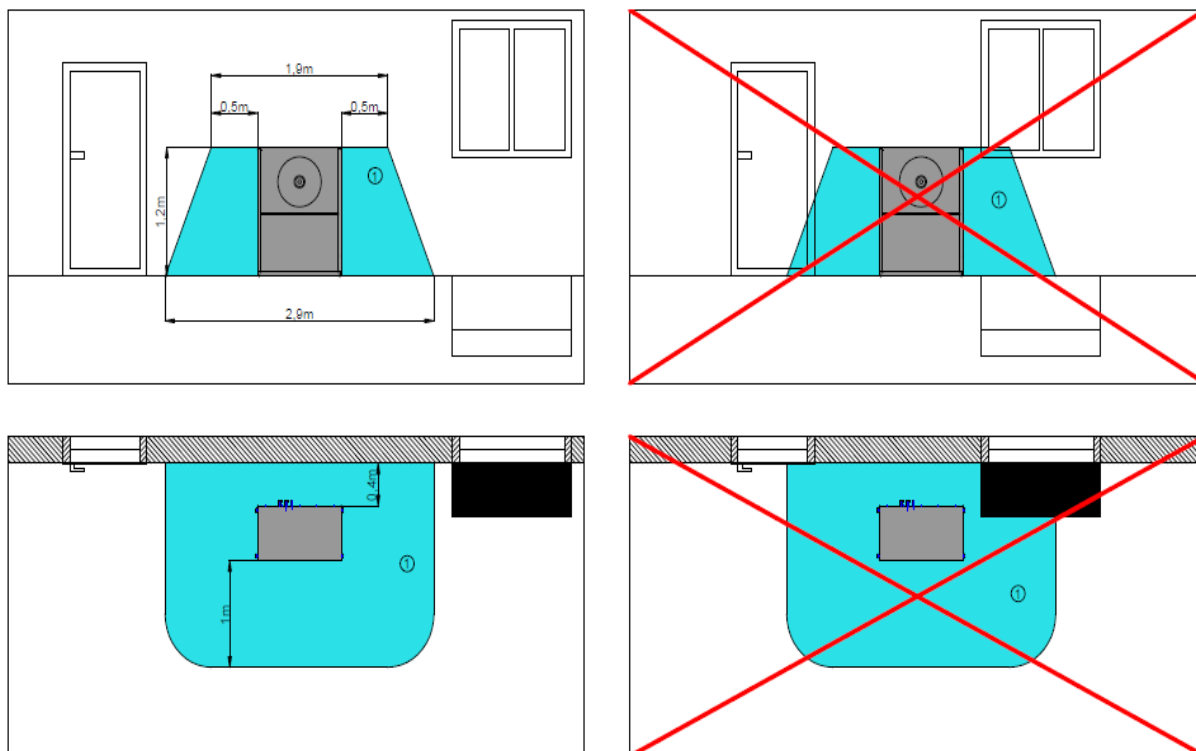


Figure 8. Wall installed heat pump  
1- Protective zone



**Do not install heat pump on the lawn or other surface of poor stability.**

**Heat pump position shall ensure that no window or door is near the exhaust.**

- **When determining position of heat pump always prevailing wind shall be taken into account.**
- **Do not install the device near flammable substances and ventilation openings.**
- **Fan shall be always be positioned against the windows.**
- **Always prevent exposure of product to dusty or contaminated air.**
- **Do not install the device under deciduous trees.**
- **Do not install heat pump near heat sources, flammable materials or intake vents.**
- **Note to ensure unrestricted access to heat pump to enable maintenance inspections and required repairs.**
- **Do not install device near windows and corners**
- **During selection of site noise generated by device shall be taken into account**

## 5.2. Installation of flat roof

Heat pump may be installed on the flat roof, however the following shall be taken into account.

Always an unrestricted access shall be ensured to the heat pump. During any works related to the device, the hazardous zone shall be provided within 2m from device, plus a required distance. No person is allowed within the hazardous zone. If not possible, note to install equipment protecting against fall, e.g. a barrier withstanding loading. Alternately the device protecting against fall shall be provided, e.g. scaffolding or fall protection cover. Always keep safe distance from roof opening and flat roof windows. During works protect roof opening and flat roof windows to prevent a fall e.g. by installing fencing.

## 5.3. Internal unit

Heat pump internal module shall be installed inside the building only to prevent exposure to water and humidity, as well as to ensure an unrestricted access for user and service engineer. Boiler room control panel shall be installed to the wall in vertical position using expansion plugs.

Note that an unrestricted access is required to ensure reliable and proper operation of control panel.

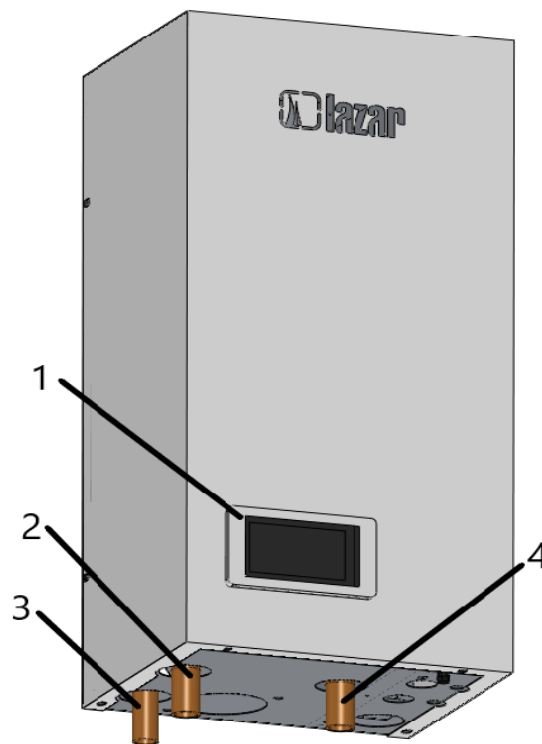
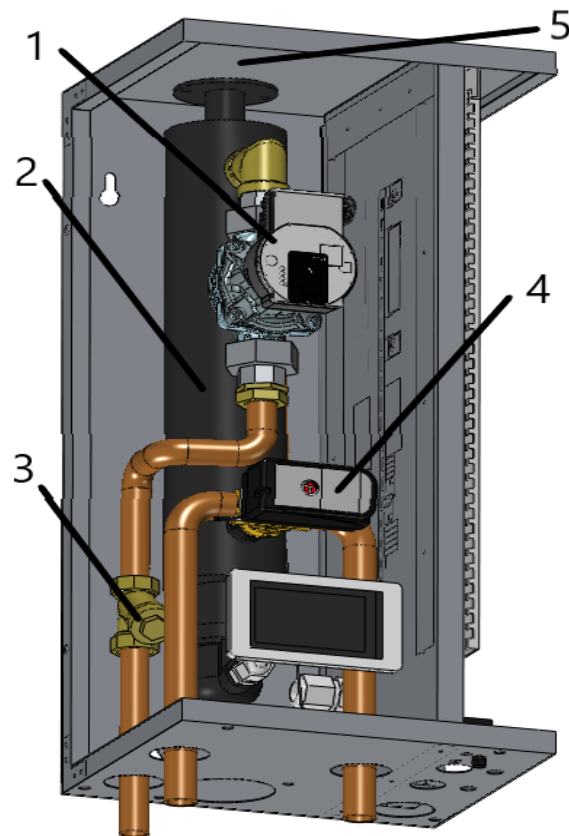


Figure 9. Smart internal unit

*1 – Control panel, touch screen; 2 – Hot water supply; 3 – Supply from heat pump; 4 – Central heating supply*



*Figure 10. Smart internal unit*  
*1 – Top supply water pump; 2 – Flow heater; 3 – Water filter; 4 – Central heating/Hot water switching valve; 5- Safety assembly position*

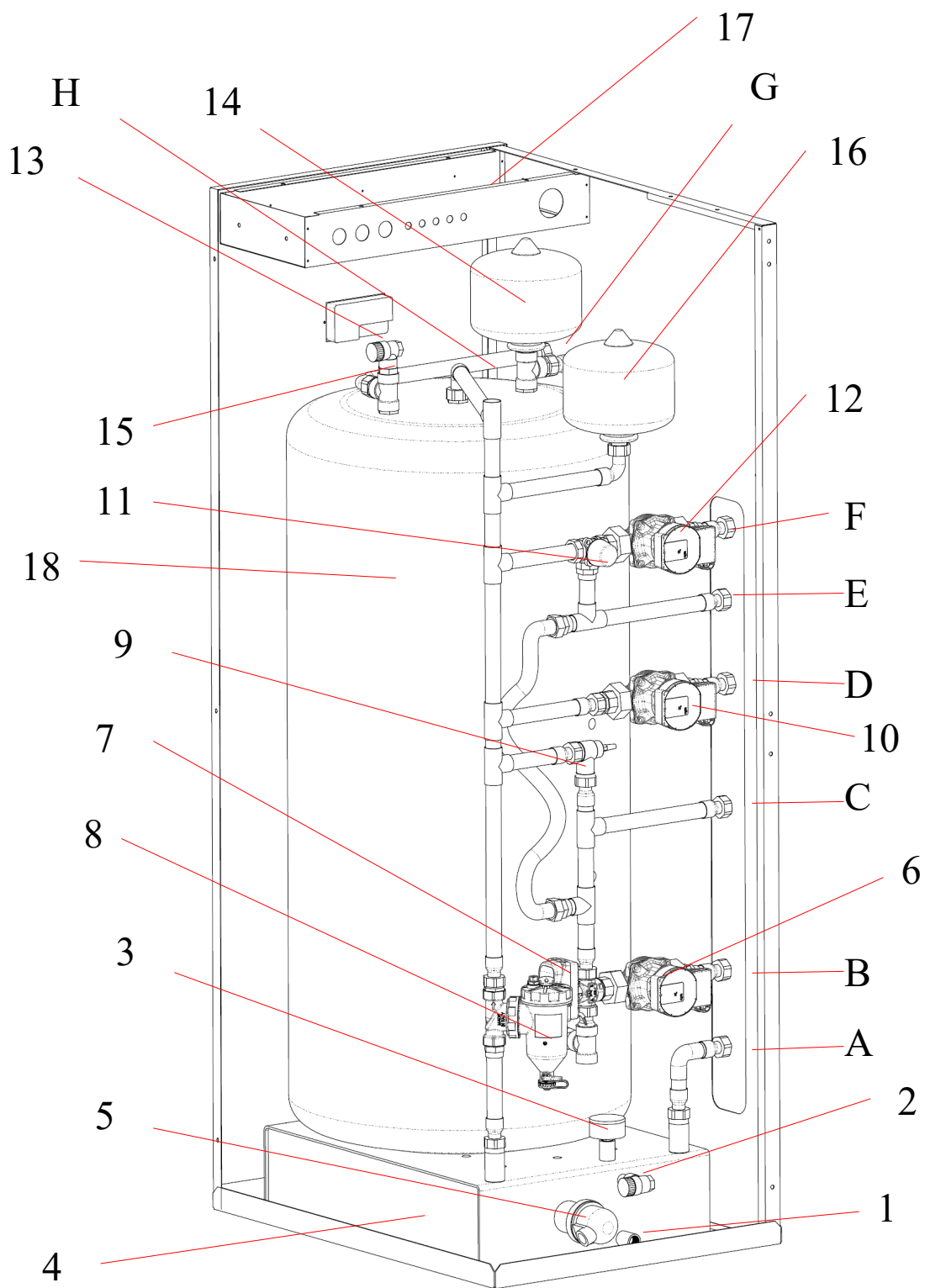


Figure 11. Smart Tower indoor unit - rear view



No.	Description of components
1	Drain valve
2	Safety valve CO
3	Pressure gauge CH
4	Buffer Tank
5	Heater
6	Upper source pump
7	Switching valve CH/DHW
8	Magnetic filter
9	Differentail valve
10	Direct circuit pump (option)
11	Mixing valve with actuator (option)
12	Circulation pump of circuit 2 (option)
13	Air vent
14	Expansion vessel CH
15	DHW safety valve
16	Expansion vessel for DHW
17	Electric box
18	DHW tank

A	Flow from the heat pump
B	Return to the heat pump
C	Return from the direct circuit
D	Supply to the direct circuit
E	Return to circuit 2
F	Supply circuit 2
G	Supply DHW
H	DHW return

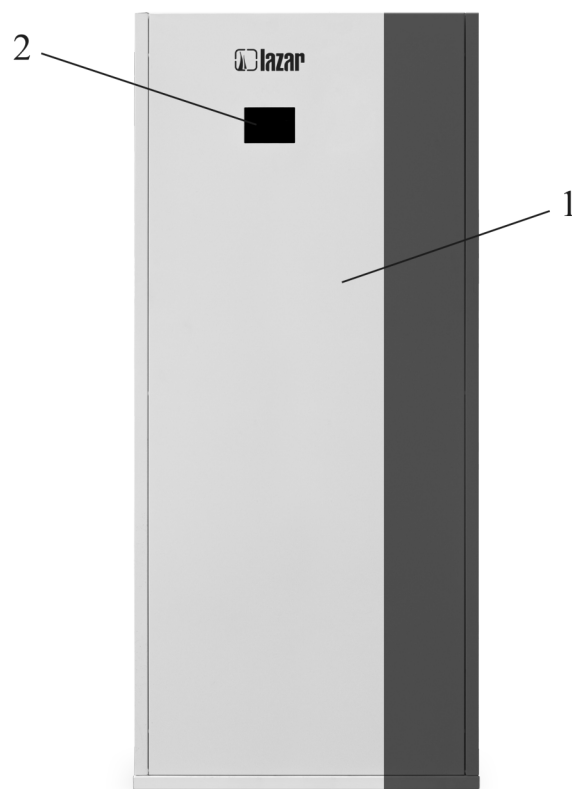


Figure 12. *Jednostka wewnętrzna Smart Tower*  
1- Obudowa; 2- Panel sterujący

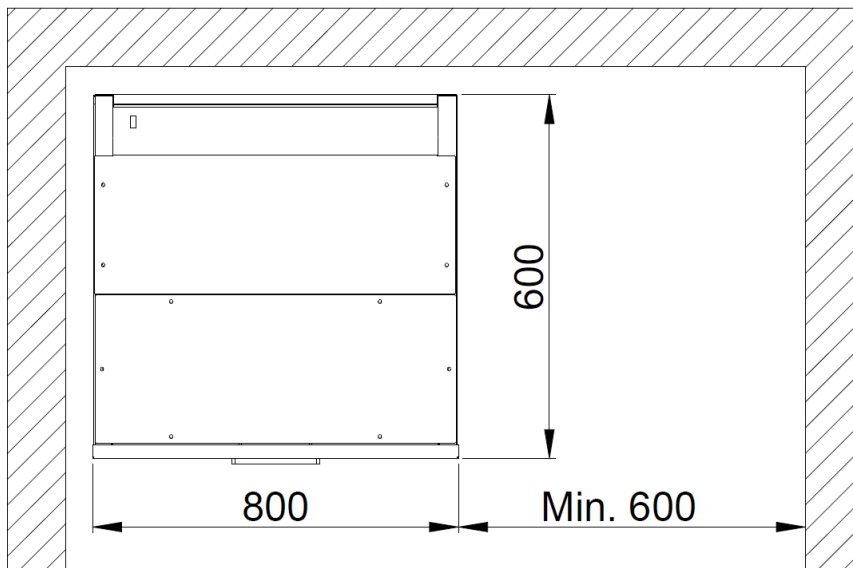


Figure 13. *Exemplary location of Smart Towerz with minimum service space*



**When connecting the indoor unit, be sure to use shut-off valves for subsequent service work**

## 5.4. Hydraulic connection

Note to ensure proper diameter of hydraulic connection pipes between control panel and heat pump, appropriate to length and quantity of elbows.

Heat pump connection shall be provided with two pipes: one supplying the top source and return pipe. Note to adhere to specification regarding pipe diameter and hose, to ensure proper water flow through the heat exchanger located near the heat pump.

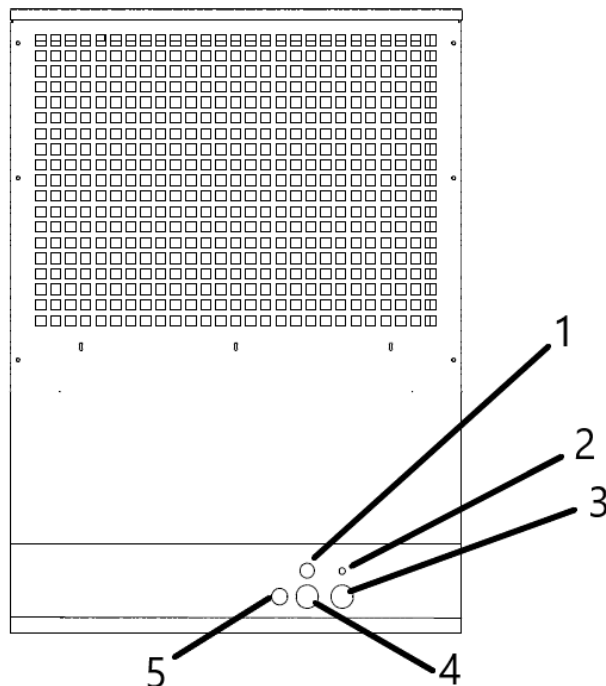


Figure 14. External unit

1 – External unit power supply; 2 – Communication wiring, 3 - Water return;  
4 - Water supply; 5 – Condensate drain.

When delivering water connection to the exchanger, ensure that stub pipes are connected to water supply and return respectively. Water connection is recommended to be provided with pipe diameter min. 25mm. After water connection, ensure that insulation is installed of water pipes.



When connecting water supply to the external unit, note the direction of water flow through the exchanger. Water supply shall be connected to lower stub pipe of exchanger, whereas hot water return to top stub pipe of plate exchanger.

## 5.5. Cooling mode

Heat pump enables generation of chilled water for spaces cooling.

Note to follow the following rules during device operation:

- **System shall be provided with materials resistant to low temperature**

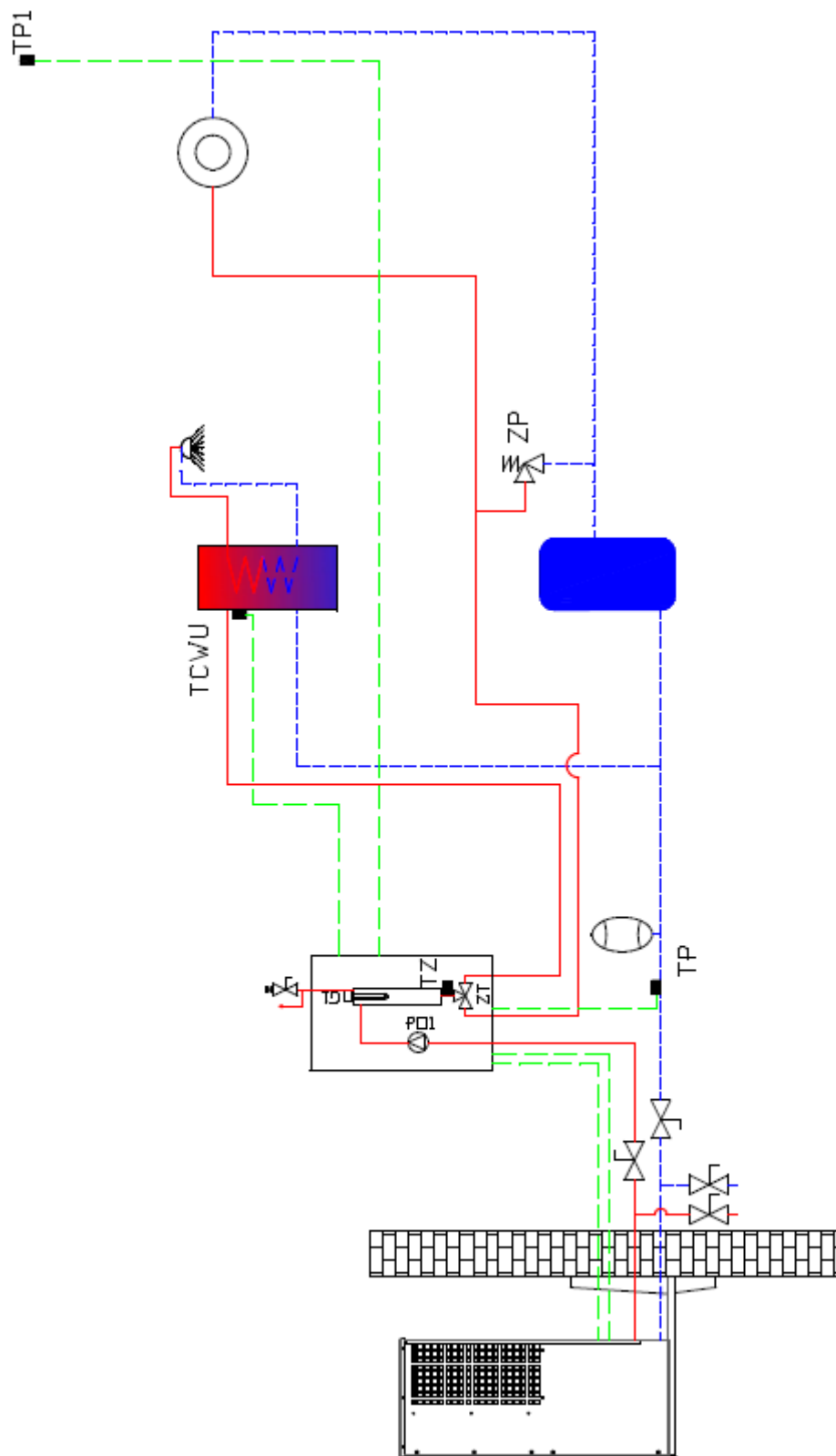
- **Icing water temperature shall be always over 7°C**
- **System shall be filled with Propylene glycol solution**
- **When operating HTi 20 heat pump note to ensure surface cooling by programming refrigerant temperature that is below dew point**
- **Use of condensation sensor is recommended**
- **Use of flow-meter is recommended**

## **5.6. Connecting to swimming pool**

Heat pump connection to swimming pool heating system is possible, however the following issues shall be taken into account: do not connect device heating circuit directly to swimming pool system. Always heat exchanger shall be installed and other components required for such installation.

## **5.7. Reference hydraulic system**

The following diagrams indicate heat pump connection to buffer tank, hot water tank and building heating system. To ensure heat pump reliable and good operation, always follow the instructions regarding device connection to hydraulic system.



*Figure 15. Heating diagram 1*  
 System including a single heating circuit and buffer in series

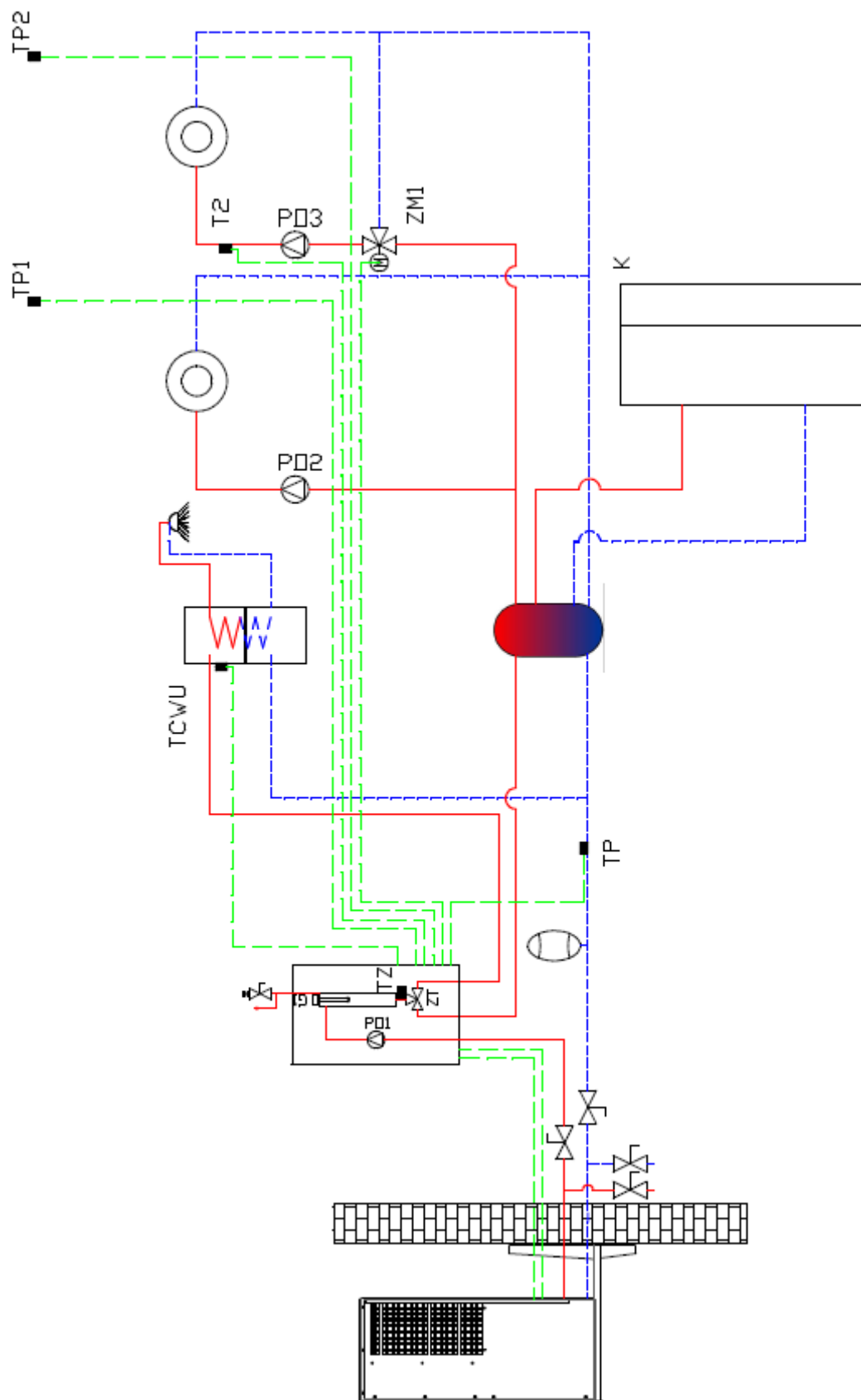


Figure 16. Heating diagram 2  
System including two heating circuits, additional boiler and buffer in parallel connection

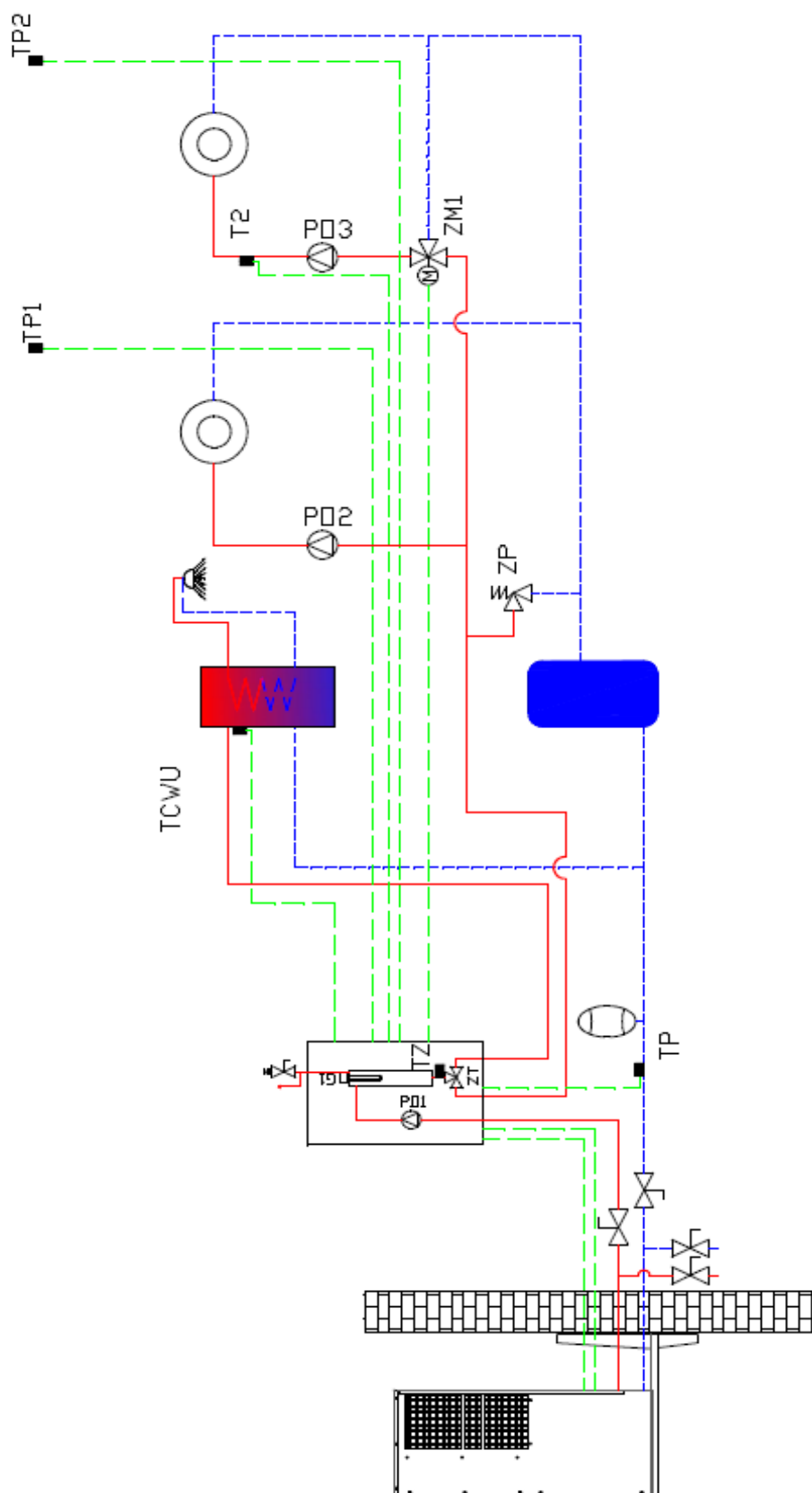


Figure 17. Heating diagram 3  
System including two heating circuits and buffer in series

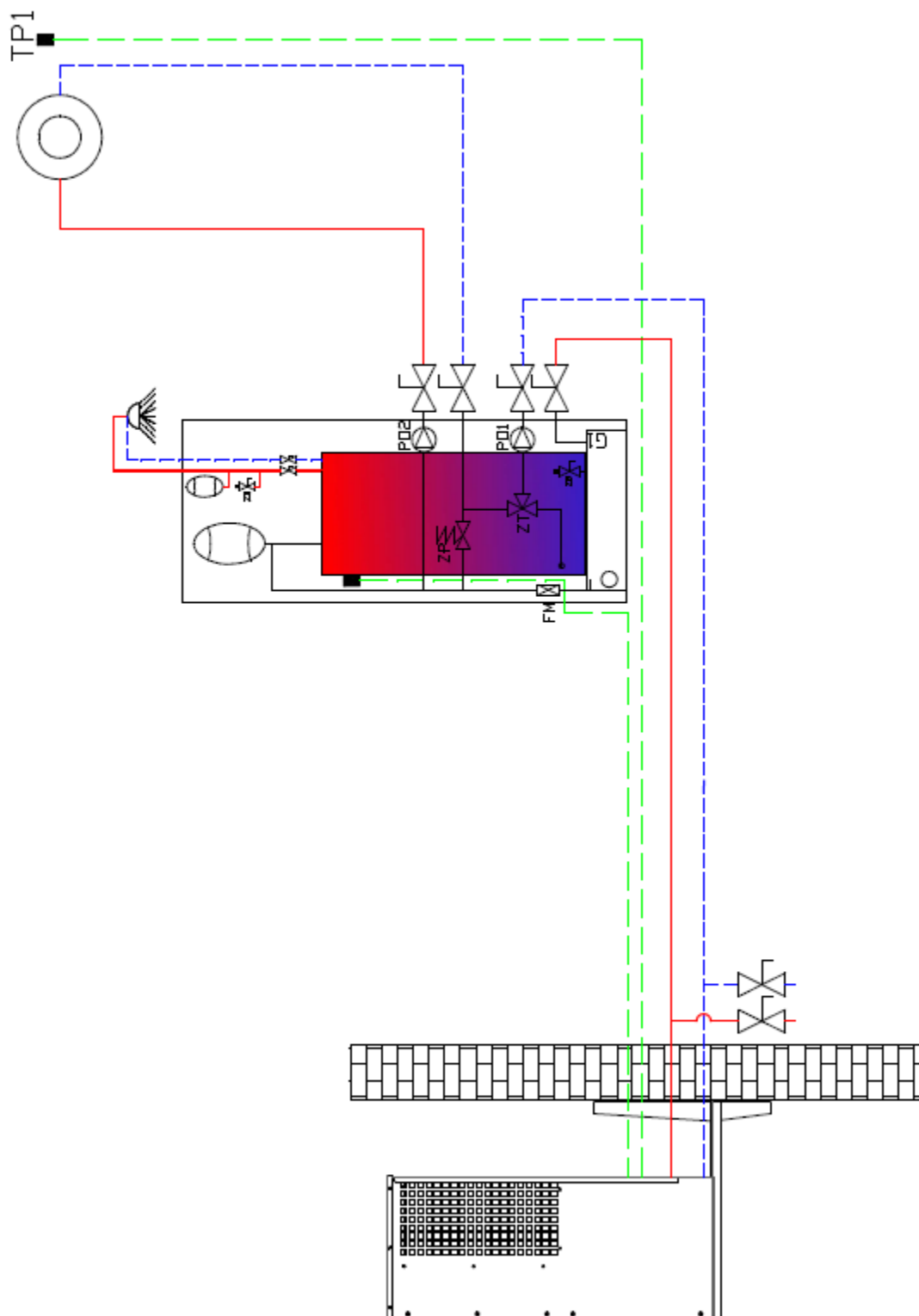


Figure 18. Heating diagram with the use of Smart Tower with one heating circuit



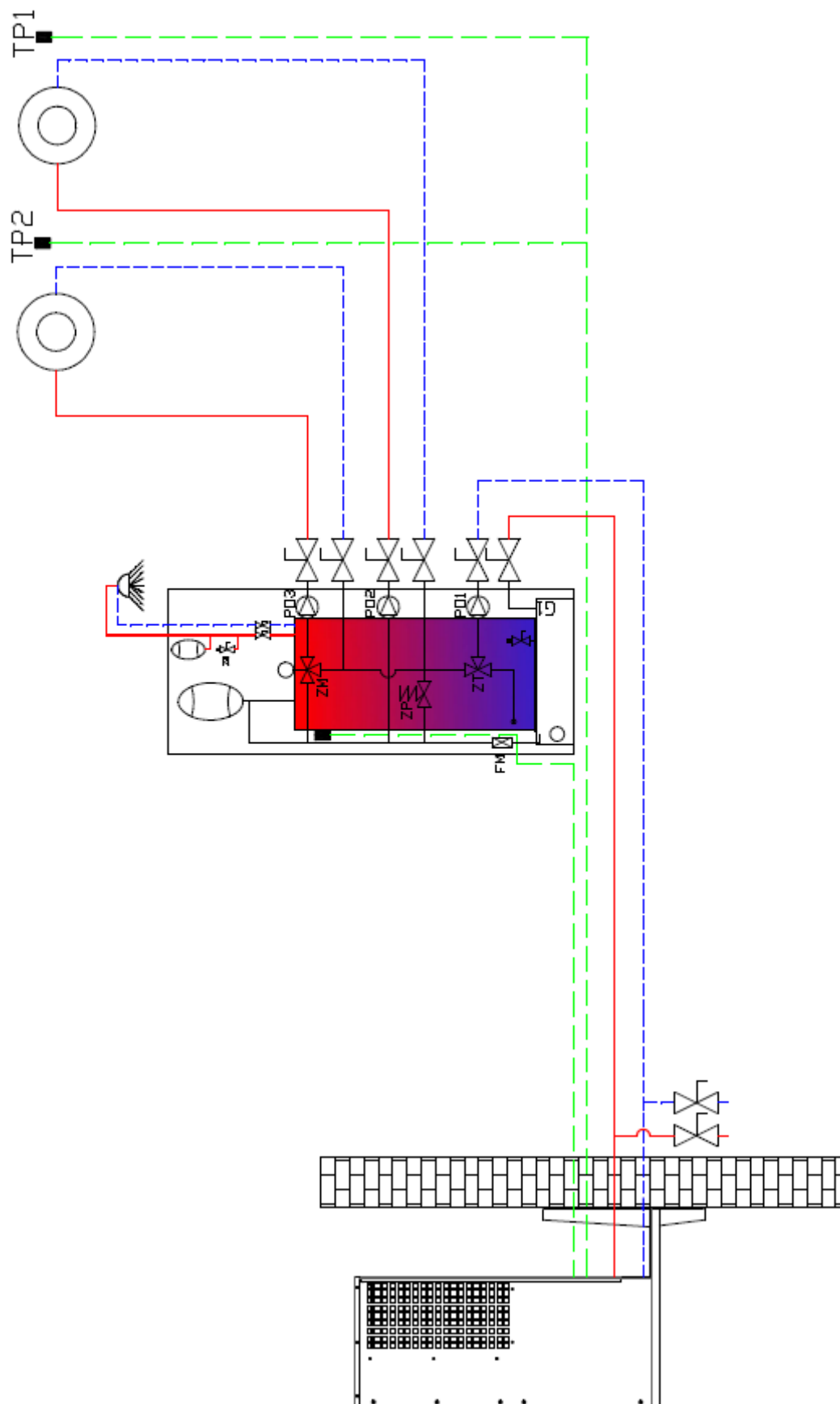


Figure 19. Heating scheme with the use of Smart Tower With two heating circuits



Symbol	Contact No	Description
G1	NO1-N	Heater
ZM	N07-N	Circulation 2 mixers - opening
	N08-N	Circulation 2 mixers - closing
ZT	NO5-N-L1	Three-way valve
P01	NO4-N-PE	Main pump
P02	NO6-N-PE	Heating circuit pump 1
P03	NO9-N-PE	Heating circuit pump 2
Tz	B1-GND	Supply temp. sensor
TP	B3-GND	Return temp. sensor
T <sub>cwu</sub>	B2-GND	Hot water temp. sensor
T2	B7-GND	Flow temperature sensor circuit 2
TP1	B4-GND	Ambient temp. sensor 1
TP2	B5-GND	Ambient temp. Sensor 2
ZT2	N02-N-L1	3-way valve cooling/ heating
K	-	Additional heat source
ZP	-	Differential valve
ZB	-	Safety valve
FM	-	Magnetic filter
A	-	Fancoil



**All diagrams are for reference only.**

**Systems shall be installed according to applicable standards and design specification. Water system capacity is min. 100L, and min. 50L buffer is recommended.**

## 6. Wiring diagram

### 6.1. Wiring connecting external unit and internal one

Connection between the external unit and internal unit is provided with two cables– power supply cable and communication cable.

Device is delivered along with cables 6 m long.

**Any works related to wiring shall be provided pursuant to the following guidelines.**

- **Any works related to wiring shall be provided by professional fitters only.**
- **Before opening guards, firstly device shall be disconnected from power supply and protected against accidental operation!**
- **Any works related to wiring shall be provided pursuant to the requirements indicated in applicable regulations.**
- **Always adhere to technical requirements regarding connection indicated by local power plant (is applicable)!**
- **Check connection of earthing cable to internal and external unit**

Operation Manual and Guarantee Card v.010

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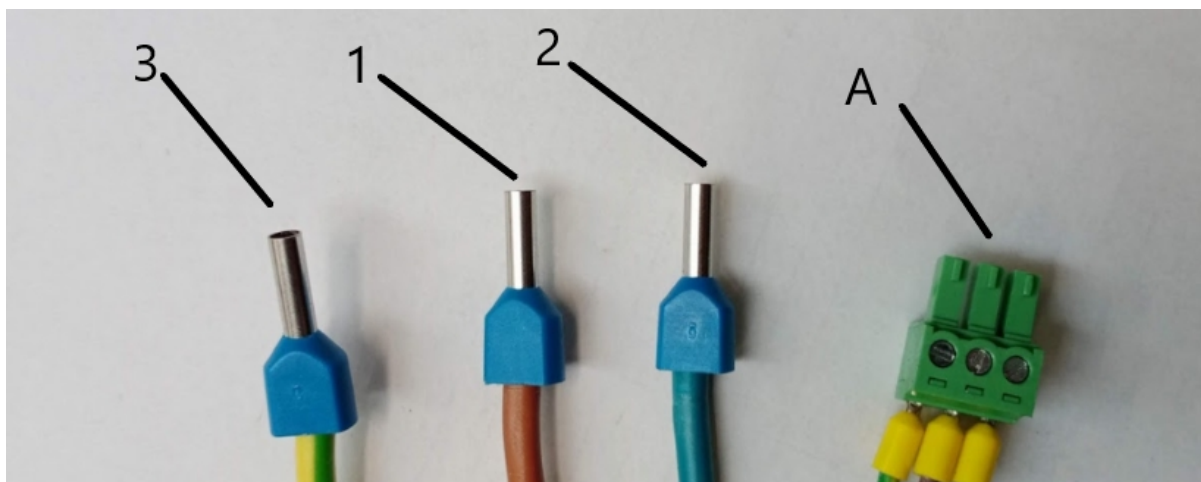


Figure 21. Wiring connection of two units – 1 phase version  
1 – L1; 2 – N; 3 – PE; A – Modbus connection

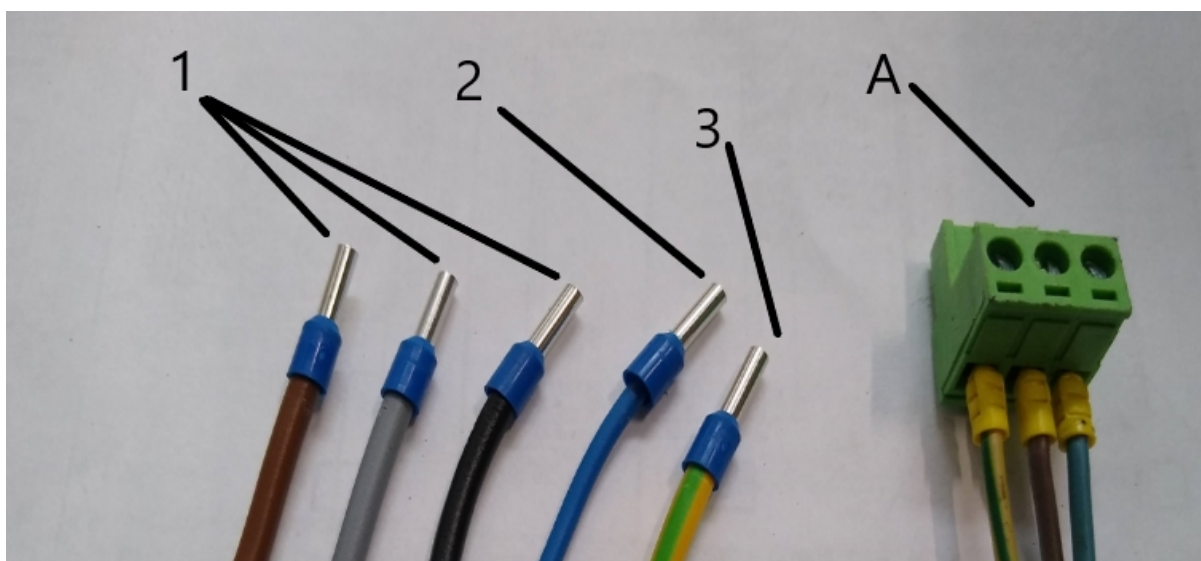


Figure 22. Wiring connection of two units – 3-phase version  
1 – L1, L2, L3; 2 – N; 3 – PE; A – Modbus connection

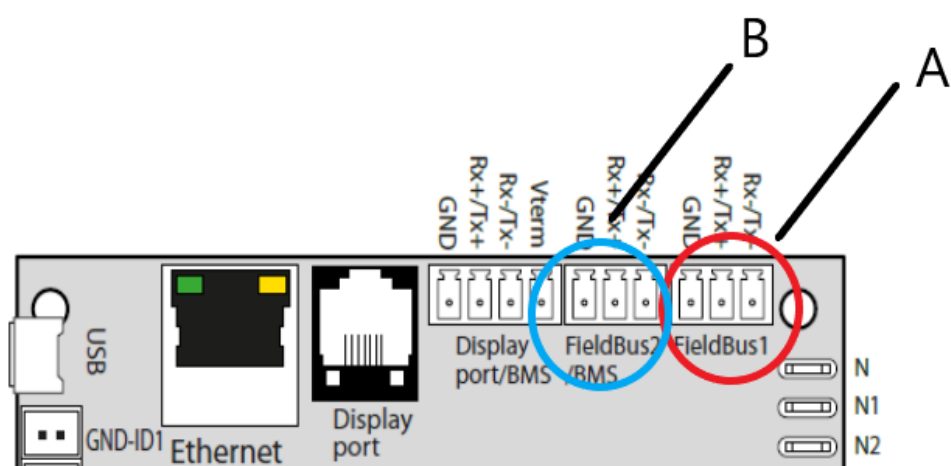


Figure 23. Modbus connection  
A – Modbus connection; B – Internet module connection

Communication cable – terminated with appropriate plug shall be connected to terminal block indicated on Figure No. 20.

## 6.2. Controller diagram

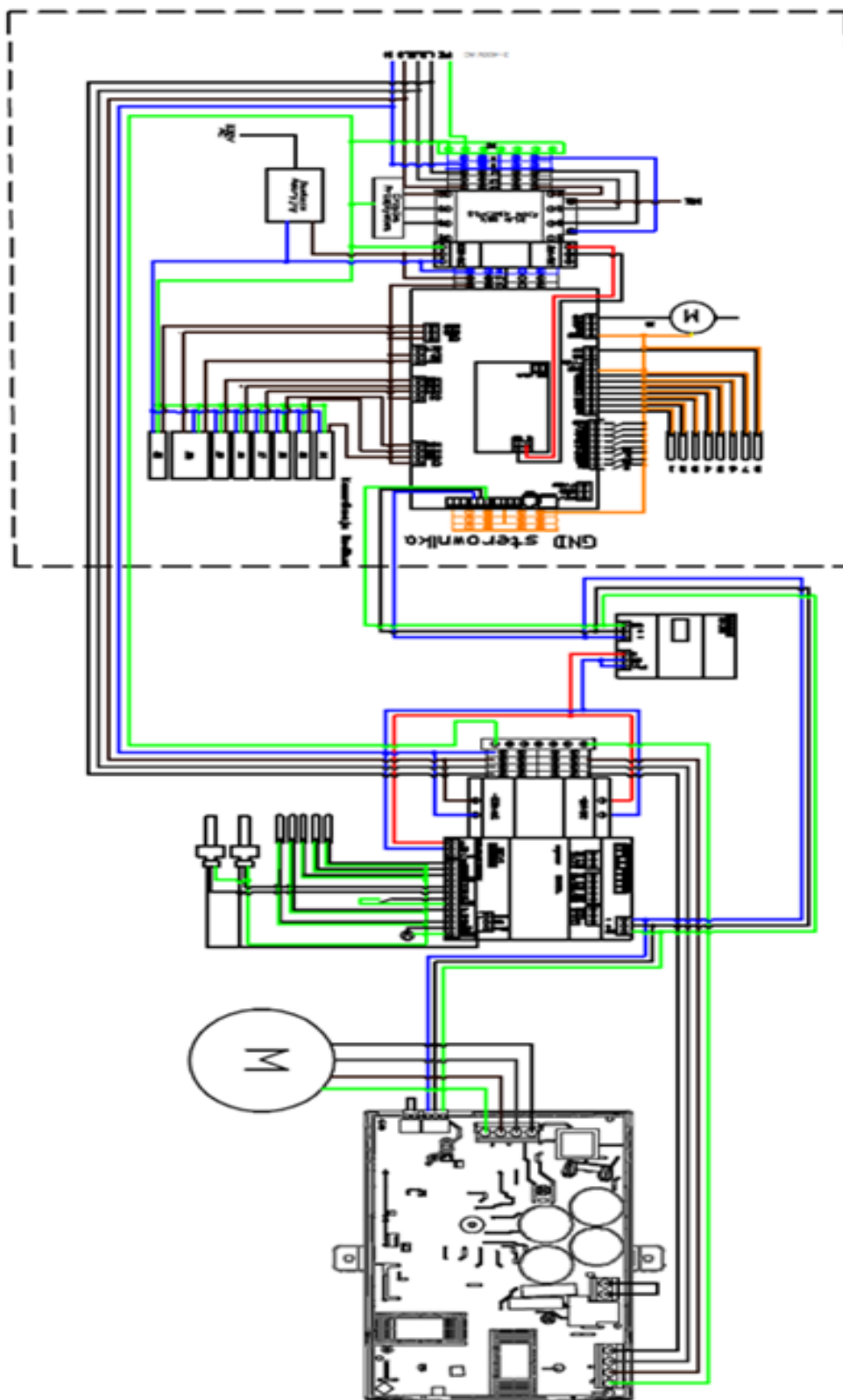


Figure 24. Wiring diagram

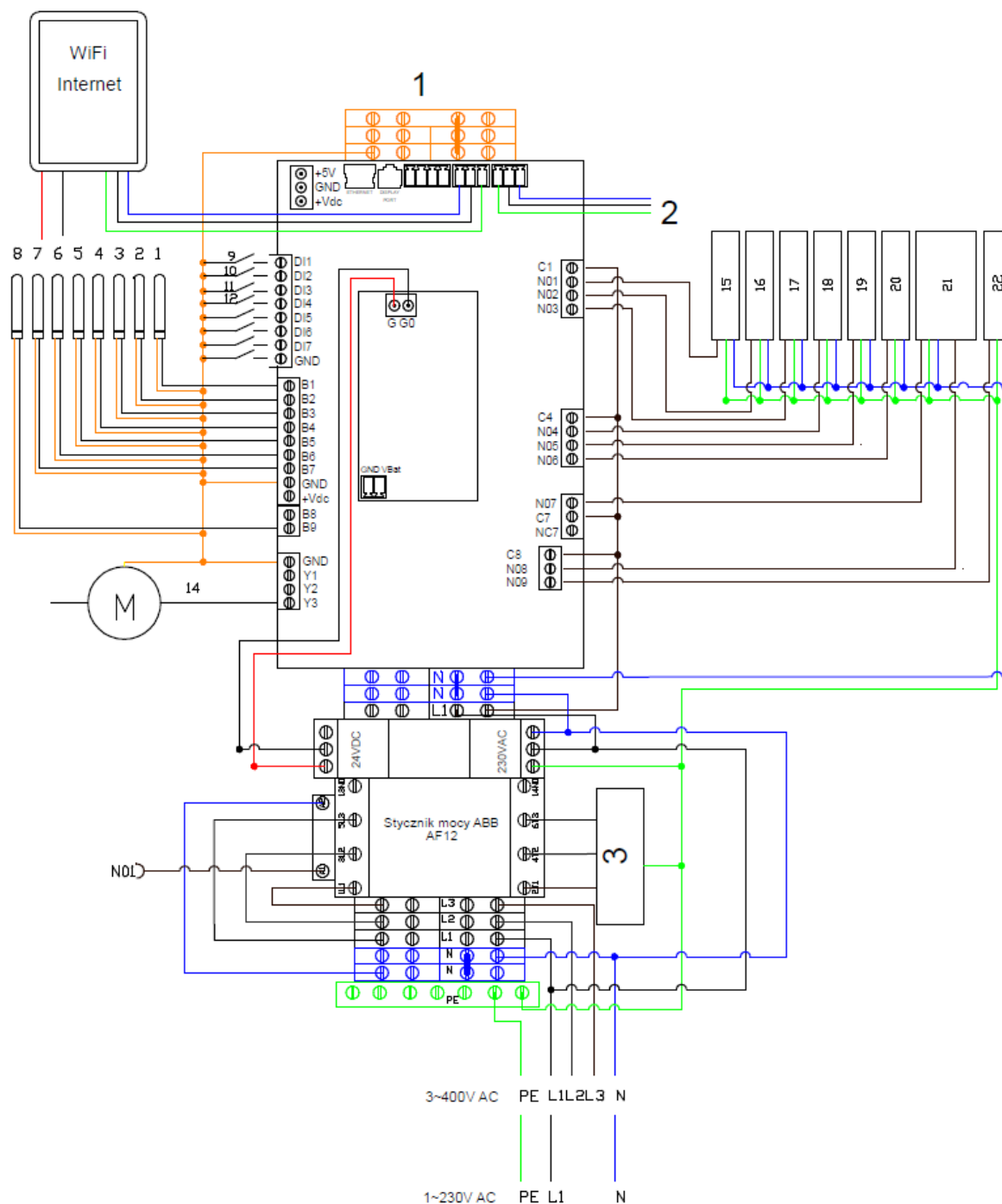


Figure 25. Controller diagram

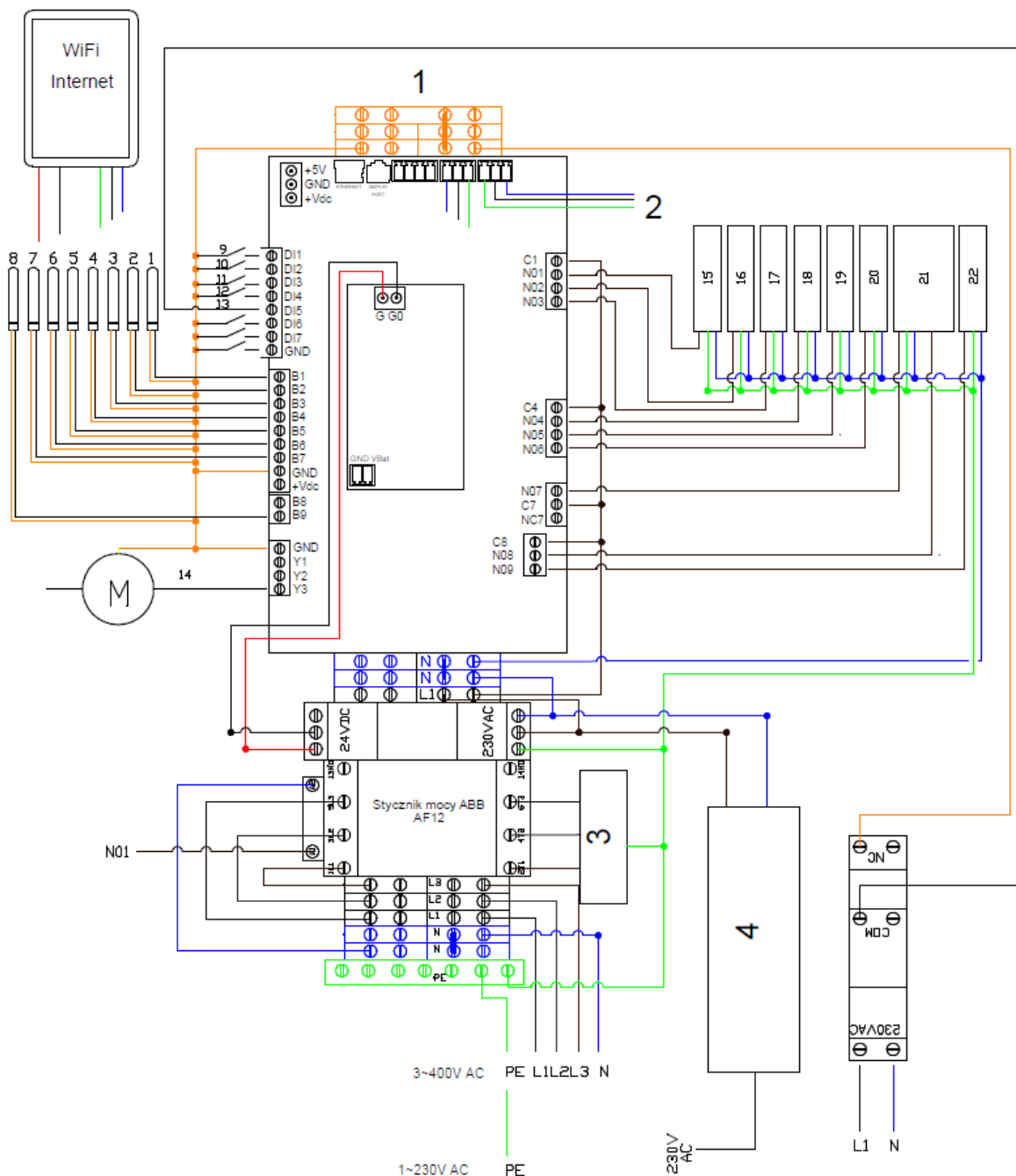


Figure 26. *Diagram of controller including redundancy power supply*

1	GND
2	Modbus communication
3	Water heater
4	UPS

## List of inputs and outputs

No.	DESCRIPTION	Contact 2	Contact 2	Contact 3	
1	Supply temperature sensor	B1	GND	-	Digital inputs NTC 10K
2	Hot water storage cylinder temp. sensor	B2	GND	-	
3	Return temperature sensor	B3	GND	-	
4	1 circuit indoor temperature sensor	B5	GND	-	
5	2 circuit indoor temperature sensor	B5	GND	-	
6	1 circuit indoor temperature sensor	B6	GND	-	
7	2 circuit indoor temperature sensor	B7	GND	-	
8	Additional temperature sensor	B9	GND	-	
9	Flow meter	DI1	GND	-	Digital inputs
10	Circuit lock 1 (option)	DI2	GND	-	
11	Circuit lock 2 (option)	DI3	GND	-	
12	Digital output ON-OFF	DI4	GND	-	
13	Power failure signal	DI5	GND	-	
14	PWM system main pump	Y3	GND	-	Analogue outputs
15	Flow heater contact	NO1	GND	-	Current outputs 230V
16	Heating/cooling switching valve	NO2	GL1	N	
17	Reserve boiler	NO3	GND	N	
18	System main pump	NO4	GND	N	
19	Central heating/hot water switching valve	NO5	L1	N	
20	Circulating pump 1	NO6	GND	N	
21	2 circuit mixing valve – opening	NO7	-	N	
	2 circuit mixing valve – closing	NO8	-	N	
22	Circulating pump 2	NO9	GND	N	



## 7. Service

Pre-commissioning, inspections and any repairs shall be provided exclusively by HKS LAZAR authorized service. HKS LAZAR service partners are authorized to the HKS LAZAR service for start-ups, inspections and repairing failures of HKS LAZAR devices.

### 7.1. Check before commissioning

User shall report to the manufacturer the commissioning of device within 7 days since completion of assembly. Pre-commissioning (the first start-up) of device shall be provided exclusively by HKS LAZAR authorized service. The manufacturer's guarantee shall be void, if the pre-commissioning has been provided by any fitter other than HKS LAZAR authorized service. Costs related to pre-commissioning shall be incurred by the user according to HKS LAZAR price list. Contact data and Any after-service requests regarding pre-commissioning performed by HKS LAZAR Sp. z o.o. are available on manufacturer's website: [www.hkslazar.pl](http://www.hkslazar.pl)

If pre-commissioning is not possible on site after arrival of authorized service due to reasons beyond its control (improper installation, poor heat pump position, power failure, etc.) the user shall incur costs related to such pre-commissioning and any subsequent one. In such case user shall within 14 days notify the manufacturer about readiness of system for pre-commissioning.

To ensure safe pre-commissioning, a precise check shall be performed of heat pump, system and boiler room. It is required to check in particular all components regarding proper assembly and location of device outside the building. Moreover before pre-commissioning it is required to:

- Check if heat pump has been installed pursuant to the instructions.
- Check if central heating system is filled with proper quantity of water. Any water used for filling shall be clean, colourless and without any additives. Failure to adhere to these requirements may result in device damage.
- Check pump and internal module wiring connection to power supply.

### 7.2. Notes for fitter

Before any works related to start-up, connection, operation, repair or dismantling, always follow the following guidelines.

#### ➤ Pressure protecting devices

It is recommended to install safety valves up to 3bar and membrane expansion vessels – see piping diagrams

#### ➤ Excess flow valves

Installation including buffer in series shall be fitted with excess flow valve that will ensure min. central heating water flow through heat pump. Its parameters and size shall ensure maintenance of flow also in case of heating circuit cut-off.

➤ **Circulating pumps**

Circulating pumps shall ensure required water flow.

➤ **Domestic hot water**

If domestic hot water is to be provided by heat pump, it required to ensure additional circuit, in parallel to heating circuit. At the phase of design and installation note that water is not supplied through central heating circulation buffer.

➤ **Domestic hot water storage tank**

If heat pump is to be used to deliver domestic hot water, specially designed domestic hot water storage tanks shall be provided, adapted for operation along with heat pump. Capacity of such domestic hot water storage tank shall be appropriate to ensure hot water supply also when power failure follows. Heat exchange surface shall be appropriate to ensure transfer of heat pump output at the smallest differential temperature. Also a tank having min. 200L capacity shall be provided for toilet and bath purposes. **The minimum heating surface of the coil is 1.8 m<sup>2</sup>**

➤ **Filters**

Any system including heat pump shall be provided with filters to protect heat exchanger against contamination. Filters shall be installed before the top pump.

➤ **Floor slab**

Optionally the external unit may be installed next to the wall or within free spaces. Heat pump position shall ensure protection against exposure to wind, however if it is not possible it is recommended to install heat pump perpendicularly to prevalent wind direction. Devices shall be placed on load-bearing, strong and horizontal base appropriate to device mass. Device foundation shall not be connected with building. Always check that foundation provided is appropriate to heat pump weight. When delivering wall penetration always ensure distance from wall, as required.

➤ **Read carefully controller operation manual**

➤ **Condensate drain**

Note to ensure safe condensate drain. Product contains R290 refrigerant. In case of leakage refrigerant penetration into soil may follow through condensate drain. Always prevent refrigerant discharge into sewers. In case of device installed to the ground, note to ensure condensate drain with discharge pipe to gravel subbase provided within area protected against freezing.

**WARNING! Freezing causes damages! Refrigerant freezing prevents its discharge from heat pump and poses risk of evaporator damage.**

In case of risk related to icing formed inside condensate drain, piping shall be fitted with dedicated heating system. Heat pump condensate shall be discharged with the pipe protected against freezing, alternately the pipe fitted with heating. Note that discharge pipe gradient size shall be appropriate to prevent any blockage. Condensate shall be discharged into gravel or stone subbase or into storm-water runoff effluent.

#### ➤ **Connection to heating system**

- ➔ Flushing is required of heating circuits before pump connection.
- ➔ Any contamination and deposits inside heating circuit may cause poor operation of heat pump.
- ➔ Central heating outlet (supply) and central heating inlet (return) shall be provided with cut-off valve on the side of heat pump.
- ➔ Connect the device to heating system according to hydraulic diagram.
- ➔ Check heating system pipes regarding size and length and type (including pipes between heat pump and building).
- ➔ Protect heat pump connection against over-tightening to prevent damage of device internal connections. Firstly supply pipe shall be connected and then return one.

#### ➤ **Quality of water**

Heating water have impact on system performance, but also on service life of heating device and other components of heating system. Therefore always follow guidelines indicated in VDI 2035 part I and II. According to our experience, use of desalted water enables to ensure safe and reliable operation. VDI 2035 part I includes guidelines and recommendations regarding protection against scale deposits inside heating system and domestic hot water systems. VDI 2035 part II includes mostly indications regarding protection against heating water corrosive action inside domestic hot water system. To mitigate risk related to scale and corrosion inside domestic hot water/central heating system, it is required to:

- ➔ Ensure that design and pre-commissioning is performed by professionals only;
- ➔ Ensure that system is protected against exposure to external corrosive agents;
- ➔ Provide system with equipment of appropriate size and compensating pressure;
- ➔ Adhere closely to standards regarding heating water parameters;
- ➔ Perform maintenance inspections and checks on regular basis.

#### ➤ **Glycol**

Glycol solution shall be prepared according to instructions provided by glycol's supplier. Glycol is required for cooling and failure to adhere to supplier's instructions voids manufacturer's guarantee. Use of glycol results in output decrease ca. 10 - 15 %. To reduce output decrease, it is recommended to increase medium flow by ca. 10%. Also it is recommended to use ca. 15 - 30% Propylene glycol solution.

### ➤ Hydraulic connections insulation

- ➔ Any outdoor central heating pipes shall be provided with thermal insulation resistant to vapour and UV radiation.
- ➔ Insulation shall be delivered according to applicable regulations
- ➔ Check hydraulic connections regarding tightness.
- ➔ Carry out a pressure test;
- ➔ Insulate all connections and heating circuit pipes (in case of reverse system the diffusion barrier is required).

### ➤ Back-up supply

HTi 20 heat pump may be fitted with back-up power pack whose electrical connection shall be provided with NC relay using potential-free contacts..

Back-up power pack and relay connection is indicated on Figure 20 on page 32.

In case of power failure, a signal will be forwarded to controller from NC relay and back-up power mode will be activated. In back-up power mode only P01 circulation pump operation follows to provide PC protection against freezing.

### ➤ Zawór różnicowy

W celu prawidłowego ustawienia zaworu przelewowego należy otworzyć całkowicie zawór i zamknąć wszystkie obiegi grzewcze. Uruchomić pompę obiegową na 100% mocy. Po osiągnięciu maksymalnej mocy pompy obiegowej zamknąć na tyle zawór różnicowy aby zapewnić maksymalny przepływ wody

## CAUTION !



- Time of PC protection against power failure depends on type of back-up power pack used
- Regular checks of back-up power pack are required
- Use of back-up power pack does not ensure total protection for heating system against freezing.

### Differential valve

To correctly set the overflow valve, open the valve fully and close all heating circuits. Run the circulation pump at 100% power. After reaching the maximum power of the circulation pump, close the differential valve enough to ensure the maximum water flow.

### 7.3. Pre-commissioning

Pump heat pre-commissioning includes start-up, checks and set-up of heat pump and internal unit parameters, as well as providing the training for user regarding device operation. Pre-commissioning shall be performed HKS Lazar authorized service. During pre-commissioning always check carefully heat pump operation and provide necessary correction. Device contains R290 refrigerant that relates to flammable gas. Therefore

smoking or use of open flames is not allowed during pre-commissioning and heat pump operation. In particular always check:

- Cooling circuit regarding tightness caused by transport related damages.
- Qty of heat pump system refrigerant, pressure on suction and delivery side;
- Wiring regarding connection and sequence of phases.
- In case of heat pump assembled inside the building erected recently, a heater or other heat source should be provided, for circulating water heating and heat pump proper operation if risk is possible of indoor temperature decrease below 0°C. Use of heaters is recommended to ensure heating of spaces.
- System water temperature shall be above 15°C

During pre-commissioning training shall be performed for the user regarding controller and heat pump operation. Pre-commissioning and training provided for the user shall be confirmed with records made In the guarantee card.

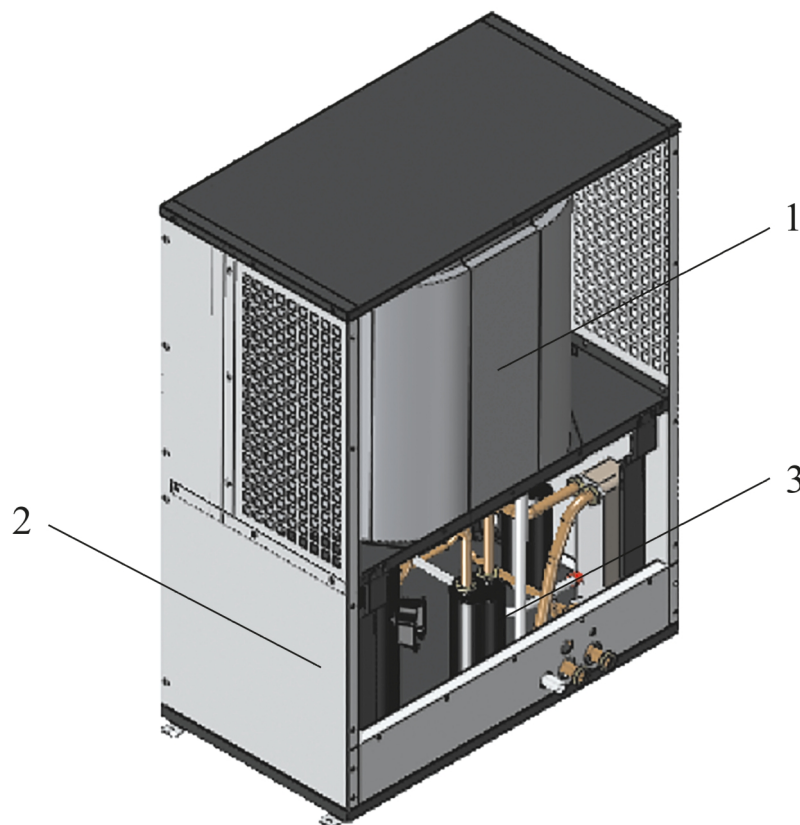
Heat pump is maintenance free device which does not require fuel, regular cleaning or inspections..

#### 7.4. Cleaning

Casing components shall be cleaned with wet cloth and widely available detergents. Cleaning with abrasive agents, acids or chlorine is not allowed because it may cause damages of casing, as well as poor performance of device..



**Note to check evaporator regarding contamination with leafs, grass and dust etc..  
Any identified contaminations shall be removed carefully. Always remove snow covering the roof. Cleaning with pressurised water is not allowed!**



*Figure 27. Heat pump*  
*1 – Evaporator; 2 - Casing; 3 – Compressor chamber*

## **7.5. Inspection**

User shall notify the manufacturer about his readiness to perform a period inspection. Any periodic inspection performed by any person other than HKS LAZAR authorized service voids the guarantee. Costs related to an annual inspection shall be incurred by the user according to HKS LAZAR price list. The inspection shall be performed every year on regular basis during device operation, counting from date of pre-commissioning. Inspection shall be performed every year, no more often than every 8 months and no more less than every 14 months. System components shall undergo an annual check performed by HKS Lazar service engineer including cleaning, if required. Regular check regarding possible contamination and cleaning, if required shall be performed of air inlet and outlet (interval depends on device location). Also check is required of condensate drain regarding blockage to ensure unrestricted condensate outflow. Note that temperature below freezing point and high air humidity may result in icing. Remove icing to ensure heat pump proper operation! No not use agents to accelerate defrosting.

Description of works	Interval
Bleeding valve closing	During first maintenance inspection
Product cleaning	Every year
Check of fan and condensate drain	Every year
Check of evaporator	Every year
Check of refrigerant	Every year
Cleaning the magnetic filter	Every year
Checking the operation of the circulation pumps	Every year
Checking the safety valves	Every year
Bleeding valve closing	Every year

## 7.6. Heat pump breakdown

Any defect of failure shall be reported immediately to manufacturer. During guarantee period any repairs shall be provided by HKS LAZAR service or persons authorized by HKS LAZAR service. If delivery of repairs is not possible on site after arrival of authorized service due to reasons beyond its control (improper installation, improper heat pump position, power failure, restricted access to device etc.), the user shall incur travel costs pursuant to HKS LAZAR price list.

Before any repair of identified and reported failure, firstly examination shall be performed regarding a root cause of failure. Note that most failures were caused by improper parameters, poorly installed sensors, poor installation. Any defective assembly shall be dismantled and replaced with brand new one.

## 8. Disposal

As the boiler components are made from various materials, they should be transported to the licensed waste collection centre to ensure proper disposal and recycling of steel, plastics, etc..

CAUTION- Risk of electric shock!

Any works related to wiring shall be provided by professional fitters only. Before opening guards, firstly device shall be disconnected from power supply and protected against accidental operation!



Device contains flammable refrigerant!

Any refrigerant leakage poses risk of explosion. Therefore it is required to:

- Switch off device
- Contact authorized service
- Keep safe distance from fire sources.

Any works related to dismantling of heat pump shall be provided by professionals trained in the area of heating or cooling devices. Disposal of refrigerant, oil and any heat pump components shall be provided pursuant to applicable regulations regarding recycling and environmental protection. Note that works related to dismantling shall be delivered by professional familiarized with methods of refrigerant recovery and disposal. We recommend recovery of the total quantity of refrigerant. Before disposal of refrigerant firstly tests shall be performed regarding oil and refrigerant.

- Familiarize with device operating principle and its functions. .
- Disconnect device from power supply.



## 8.1. Symbols

Device shall be provided with labels indicating clearly dismantling and absence of refrigerant. The tag shall carry date and signature. Ensure that device is provided with symbol warning against flammable substance.

## 8.2. Recovery of R290 refrigerant

If device was emptied and refrigerant was drained during repair or re-assembly, always ensure that refrigerant was properly secured. When re-filling the device with cylinder, ensure that cylinder type is compatible with the refrigerant. Any used cylinders must be properly marked, fitted with safety valve and cut-off valves.

Used cylinders shall be emptied and, if possible cooled before commencement of recovery. Cylinders and recovery stations must be in good repair and compatible with flammable refrigerant. Recovery station shall be fitted with instructions indicating the whole procedure of recovery. Additionally calibrated scale in good repair is required. Hoses shall be fitted with tight clutch and shall be in good repair also. Before operation of recovery station, firstly the check is required regarding its technical condition, maintenance inspections and insulation of electrical devices, to prevent ignition in case of refrigerant leakage. In case of doubt consult a manufacturer. Recovered refrigerant shall be stored in secured cylinders and returned to supplier. Mixing refrigerants is not allowed. During disposal of compressor or compressor oil, always check that these devices underwent depressurising, and whole refrigerant contained in the oil was removed. Before shipping the compressor to manufacturer, firstly always empty the compressor carefully. You can accelerate emptying of compressor by heating the casing only. Extraordinary caution is required when draining the oil. Recovery of refrigerant may be performed by trained professional only.

## 9. Guarantee terms

**The HKS LAZAR company provides a 5-year warranty for the compressor and 2 years for the remaining components of the heat pump from the date of installation, but no later than 6 months from the date of production. The territory of coverage under guarantee relates to the territory of the Republic of Poland for heat pumps purchased in Poland or territory of HKS LAZAR authorized vendor.**

**The guarantee is void in case of non-adherence to instructions included in heat pump operation manual, as well as applicable standards and regulations:**

- a) The heat pump installation in the system must be performed by the qualified and licensed fitter pursuant to the instructions included in this manual. Upon completion of works related to installation, the fitter shall make relevant records in the Guarantee Card
- b) Pre-commissioning, inspections, repairs and any other works, not included in the user's responsibility must be performed by HKS LAZAR authorized service only. HKS LAZAR service partners are authorized to perform works related to pre-commissioning, inspections and repairs of HKS LAZAR branded devices.
- c) The repair does not include the activities obligatory for the user.



### **9.1 The guarantee is void if:**

- a) Zero start-up and annual inspections with an entry in the warranty card were not performed
- b) User prevented or did not ensure access to the heat pump for HKS LAZAR authorized service or performance of engineering evaluation regarding boiler room, heating system and hot water system.
- c) The manufacturer takes no responsibility for the damages resulted from heat pump operation contrary to provisions of this manual, as well as applicable standards and regulations.

### **9.2 The user is obliged to cover the service costs in case of:**

- a) an unjustified call;
- b) defects not covered with guarantee;
- c) repairs of damages resulted from user's fault;
- d) Impossible repair due to reasons beyond control of service (e.g. electricity failure, central heating system leaks);
- e) If user did not ensure access to the heat pump for HKS LAZAR authorized service or performance of engineering evaluation regarding boiler room, heating system and hot water system.
- f) User should immediately report to service engineer any abnormality related to heat pump operation

### **9.3 During the guarantee period the user has right to:**

- a) repairs delivered free of charge (except the user's activities described in the user manual); repairs delivered free of charge (except the user's activities described in the user manual);
- b) replacement of the device with new one, when repair is impossible in opinion of HKS LAZAR service;

### **9.4 The guarantee does not cover any mechanical damage of heat pump;**

### **9.5 Manufacturer takes no responsibility for incorrect heat pump output;**

### **9.6 Damages resulting from failure to follow this manual, in particular the terms and conditions of guarantee shall not be the subject to claims under the guarantee;**

### **9.7 Manufacturer reserves the right to implement any modification related to heat pump design, which are not included in this user manual.**

The user shall protect the device against freezing by using anti-freeze liquid or any other device preventing freezing. The guarantee does not cover any damage resulting from freezing.

Upon connection to heating system the device shall be supplied with power without interruption. Do not disconnect the device from power supply, even during downtime period. The guarantee does not cover any damage or failure resulting from disconnecting the device from power supply.

# NOTES

# Product Data Sheet



	HTi 20/12
Series	...../...../12
Class	A+++ / A++
Output [Moderate climate]	12kW
$\eta_s$ [Moderate climate]	176,6 % / 129,4%
$Q_{he}$ [Moderate climate]	3627kWh / 3485kWh
$L_{WA}$	64 dB

Product Data Sheet according to Directive 811/2013/EU.

User shall always adhere to all guidelines regarding assembly and operation indicated in the operation manual.

## Heat Pump Start-Up

Address:

.....

.....

.....

Date of start-up .....

Heat pump model .....

Output .....

Building area.....

Estimate heat demand .....

.....  
Service engineer signature and date

## Notice regarding personal data protection.

### **HKS Lazar Sp. z o.o. hereby informs that:**

1) The personal data administrator is HKS Lazar Sp. z o.o. with seat in Jastrzębie-Zdrój, at ul. Wodzisławska 15B, hereinafter referred to as the Administrator; The Administrator performs processing operations on personal data including:

- Name, surname,
- Place of residence,
- Phone, fax, e-mail address,
- Place of device incorporation

2) Your personal data is processed for performance of obligations under HKS Lazar Sp. z o.o. guarantee and warranty against defects and can be made accessible to some recipients, namely accounting office, legal office, HKS Lazar sp. z o.o. authorized service, an expert in heating technology and related devices— on basis of personal data processing agreement.

3) Personal data processing will follow on basis of your consent regarding personal data processing and provision of personal data required for conclusion and performance of agreement.

4) Providing the personal data is voluntary, but necessary to enter into the agreement and performance of obligations arising from the guarantee or warranty for defects, complaint processing, keeping service records by the manufacturer, namely HKS Lazar Sp. z o.o. Absence of personal data prevents conclusion of the agreement regarding guarantee and performance by the manufacturer of obligations arising from the guarantee. Providing the personal data is voluntary for marketing purposes.

5) You have the right to:

- Access your personal data any time and the right to correct any inaccurate or incomplete information, or to remove or limit processing of data,
- Object to the processing of such personal data,
- Data transfer,
- Complain to a national data protection supervisory authority,
- Revoke your consent for personal data processing.

6) Your personal data does not subject to automated decision-making and profiling.

7) Your personal data will be processed by the Administrator for 5 years since expiry of the guarantee and claims under guarantee or warranty for defects.

**HKS LAZAR sp. z o.o.**

# **DECLARATION OF CONFORMITY EC**

HKS LAZAR Sp. z o.o. hereby declares that the following heat pump type:

- HTi 20.8
- HTi 20.12
- HTi 20/14
- HTi 20.16

comply with the requirements laid down in the following regulations and directives:

- |   |  |
|---|--|
| • Machinery Directive                         | 2006/42/EC                               |
| • EMC Directive                               | 2014/30/EC                               |
| • Low Voltage Directive                       | 2014/35/EC                               |
| • Pressure vessels                            | PED 2014/68/EC acc. to A2 module         |
|   | Certificate No. <b>COCH/OZ/2/2021/A2</b> |
| • Directive setting of ecodesign requirements | 2009/125/EC 813/2013                     |
| • Applied standards                           | EN 14511:2018                            |
|   | EN 14825:2016                            |
|   | EN 12102-1 1:2017                        |

Notified body:  
"COCH" Kraków 1462  
30-133 Kraków

## **Were manufactured pursuant to the following standards:**

PN-EN ISO 12100-1, PN-EN ISO 12100-2, PN-EN ISO 60204-1:2010, PN-EN ISO 61000-6-4,  
PN-EN ISO 378-2:2017-03, PN-EN 14511

This declaration is valid only, if heat pump was installed according to the instructions and guidelines in assembly and operation manual and if no product alteration or modification was provided.

Jastrzębie Zdrój, 30.04.2020

.....  
Marcin Lazar- HKS Lazar Board Member

HKS LAZAR Sp. z o.o.  
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ul. Wodzisławska 15B

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Phone: +48 32 472 19 60

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TIN: PL 6381598232

## Guarantee Card and Heat Pump Integrity and Quality Conformation HTi 20/12

Heat pump model..... Serial number .....

User (surname, name) .....

Address (street, city, postal code.).....

Parameters setup is to be performed by HKS Lazar authorized service.

HKS Lazar grants guarantee regarding completeness and equipment. Only completed and undersigned Guarantee Card is valid.

..... Date of manufacture	..... Company stamp	..... Quality control (Signature)
------------------------------	------------------------	--------------------------------------

Hereby service engineer confirms that:

- Device proper operation was identified, and no abnormality followed during commissioning YES NO

NOTES .....

.....

.....

.....

.....

.....

.....

Date Legible service engineer signature

User hereby confirms that:

- The device revealed no defect during commissioning performed by service engineer,
- He was given the Installation and Operation Manual along with completed Guarantee Card,
- He was familiarized with heat pump operations and maintenance,
- Training was provided regarding response to defects and failures, as well as placement of complaints and performance of annual inspections..

.....

Date Legible user signature

Fitter:

.....

Assembly Date Company stamp Fitter legible signature

The above information is for reference only. Any works related to assembly of heat pump shall be delivered pursuant to applicable regulations, standards and good building practice. The system shall undergo inspection by competent authorities, if required!

**Supplement to Guarantee Card purposed for Client.**

<b>Records of warranty and non-warranty repairs, start-up and annual inspections of the HTi20 heat pump.</b>			
<b>Date</b>	<b>Description of works</b>	<b>Signature and Stamp of Authorized Service</b>	<b>Client Signature</b>





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