Centrometal

HEATING TECHNIQUE

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Technical manual

R32

ENG

CE

for installation, use and
maintenance of heat pump

This manual is an addition to the
Technical manual for Arctic series
Split heat pumps.

**THE FIRST START-UP MUST BE DONE BY AUTHORIZED PERSON
OTHERWISE PRODUCT WARRANTY IS NOT VALID**

Heat pump Tower-S/200

TU-DTT-08-2024-ENG

1. Design and compatibility

1.1 Outdoor units

Table 1.1: Outdoor units

Capacity	6 kW	10 kW	16 kW
Model	SHPAO6RP24CM	SHPAO10RP24CM	SHPAO16RP24P3CM
Power supply (V/Ph/Hz)	220-240/1/50	220-240/1/50	380-415/3/50
Appearance			

1.2 Indoor unit

Table 1.2: Indoor unit

Model	SHPAI60RP24CM-EHT200	SHPAI100RP24CM-EHT200	SHPAI160RP24CM-EHT200
Power supply (V/Ph/Hz)	220-240/1/50		380-415/3/50
Compatible outdoor unit model	SHPAO6RP24CM	SHPAO10RP24CM	SHPAO16RP24P3CM
Appearance			

2. Specifications

Table 2.1: SHPAO6(10,16)RP24(P3)CM specifications[1]

Model name			SHPAO6RP24CM	SHPAO10RP24CM	SHPAO16RP24P3CM
Compatible hydronic box			SHPAI60RP24CM-EHT200	SHPAI100RP24CM-EHT200	SHPAI160RP24CM-EHT200
Power supply		V/Ph/Hz	220-240/1/50		380-415/3/50
Heating (A7W35)	Capacity	kW	6.20	10.0	16.0
	Rated input	kW	1.24	2.00	3.56
	COP		5.00	5.00	4.50
Heating (A7W45)	Capacity	kW	6.35	10.0	16.0
	Rated input	kW	1.69	2.63	4.44
	COP		3.75	3.80	3.60
Heating (A7W55)	Capacity	kW	6.00	9.50	16.0
	Rated input	kW	2.00	3.06	5.52
	COP		3.00	3.10	2.90

Table continues on the next page...

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Heating (A-7W35)	Capacity	kW	6.10	8.25	13.3
	Rated input	kW	2.00	2.62	4.93
	COP		3.05	3.15	2.70
Heating (A-7W55)	Capacity	kW	5.15	6.85	12.5
	Rated input	kW	2.58	3.43	6.19
	COP		2.00	2.00	2.02
Cooling (A35W18)	Capacity	kW	6.55	10.00	14.90
	Rated input	kW	1.34	2.08	4.38
	EER		4.90	4.80	3.40
Cooling (A35W7)	Capacity	kW	7.00	8.20	14.0
	Rated input	kW	2.33	2.48	5.71
	EER		3.00	3.30	2.45
Seasonal space heating energy efficiency class	Main flow temp. 35°C		A+++		
	Main flow temp. 55°C		A++		
SCOP	Warmer climate	35°C	6.57	7.09	6.28
		55°C	4.21	4.62	4.47
	Average climate	35°C	4.95	5.20	4.62
		55°C	3.52	3.47	3.41
	Colder climate	35°C	4.21	4.32	4.02
		55°C	2.85	2.99	3.12
SEER	Main flow temp. 7°C		5.34	5.98	4.67
	Main flow temp. 18°C		8.21	8.78	6.71
MOP		A	18	19	14
MCA		A	14	17	12
Rated water flow		m^3/h	1.07	1.72	2.75
Compressor	Type		Twin rotary DC inverter		
Outdoor fan	Motor type		Brushless DC motor		
	Number of fans		1		
Air side heat exchanger	Type		Finned tube		
Refrigerant (R32)	Factory charge	kg	1.50	1.65	1.84
Throttle type			Electronic expansion valve		
Piping connections	Type		Flare		
	Liquid Dia. (OD)	mm	Φ6.35	Φ9.52	Φ9.52
	Gas Dia. (OD)	mm	Φ15.9		
	Min. pipe length	m	2		
	Max. pipe length	m	30		
Installation height difference	Outdoor unit above	m	20		
	Outdoor unit below	m	20		
Sound power level[2]		dB	58	60	68
Sound pressure level[3]		dB	45	49	55
Net dimensions (W×H×D)		mm	1008×712×426	1118×865×523	1118×865×523
Packed dimensions (W×H×D)		mm	1065×800×485	1180×890×560	1180×890×560
Net/Gross weight		kg	58/64	77/88	112/125
Operating temperature range	Cooling	°C	-5 to 43		
	Heating	°C	-25 to 35		
	DHW	°C	-25 to 43		

Notes:

1. Relevant EU standards and legislation: EN14511; EN14825; EN50564; EN12102; (EU) No 811:2013; (EU) No 813:2013; OJ 2014/C 207/02:2014.
2. Test standard: EN12102-1.
3. Sound pressure level is the maximum value tested under the two conditions of Heating: A7W35 and Cooling: A35W18.

Table 2.2: SHPAI60(100,160)RP24CM-EHT200 specifications

Model name				SHPAI60RP24CM-EHT200	SHPAI100RP24CM-EHT200	SHPAI160RP24CM-EHT200
Compatible outdoor unit model				SHPAO6RP24CM	SHPAO10RP24CM	SHPAO16RP24P3CM
Function				Heating, cooling and DHW		
Setting water temperature range	Cooling		°C	5 to 25		
	Heating		°C	25 to 65		
	DHW[3]		°C	30 to 60		
Power supply			V/Ph/Hz	220-240/1/50		380-415/3/50
Sound power level[1]			dB	38	42	43
Sound pressure level (1m)[2]			dB	28	30	32
Dimension (W×H×D)			mm	600×2004×600		
Net/gross weight			kg	265/275		
Water circuit	Piping connections		R	1"		
	Safety valve set pressure		MPa	0.3		
	Drainage pipe connection		mm	Φ25		
	Buffer tank volume		L	30		
	Expansion vessel	Volume	L	8.0		
		Max. water pressure	MPa	0.3		
		Pre-pressure	MPa	0.1		
	Water side heat exchanger	Type		Plate type		
	Water pump head		m	9		
	Water flow range		m^3/h	0.4~1.25	0.4~2.10	0.7~3.00
DHW	DHW tank volume		L	200		
	DHW expansion vessel		L	11		
	Connections		R	3/4"		
	Safety valve set pressure		MPa	0.6		
	Optional electric heater		kW	2.0 / 3.3		
Backup electric heater	Standard		kW	3		9
	Capacity steps			1		
Refrigerant circuit	Liquid Dia. (OD)		mm	Φ6.35	Φ9.52	
	Gas Dia. (OD)		mm	Φ15.9		
Room temperature range			°C	5 to 35		

Notes:

1. Test standard: EN12102-1.
2. Sound pressure level is the maximum value tested under the two conditions of Heating: A7W35 and Cooling: A35W18 for different combination between outdoor unit and hydronic box.
3. Maximum domestic hot water temperature 60°C is only available with DHW heater support.

3. Dimensions

3.1 Outdoor units

Figure 3.1: SHPAO6RP24CM dimensions (unit: mm)

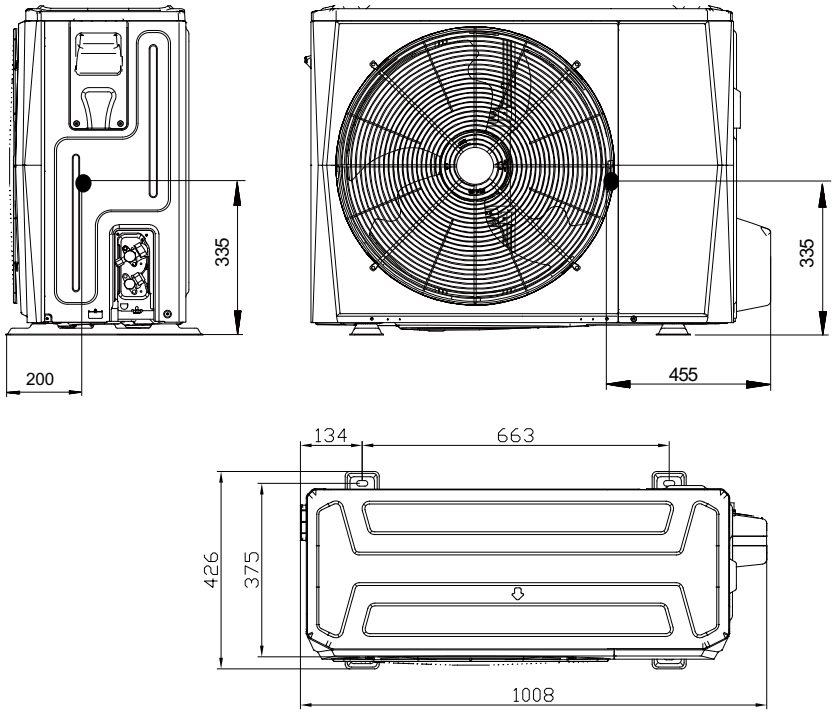


Figure 3.2: SHPAO10RP24CM dimensions (unit: mm)

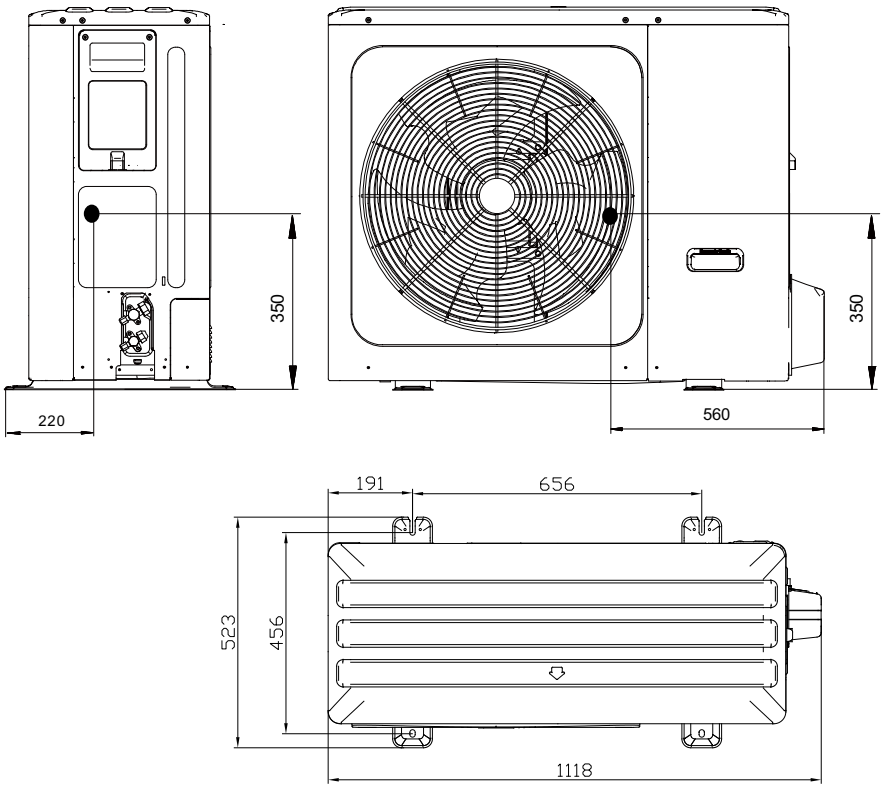
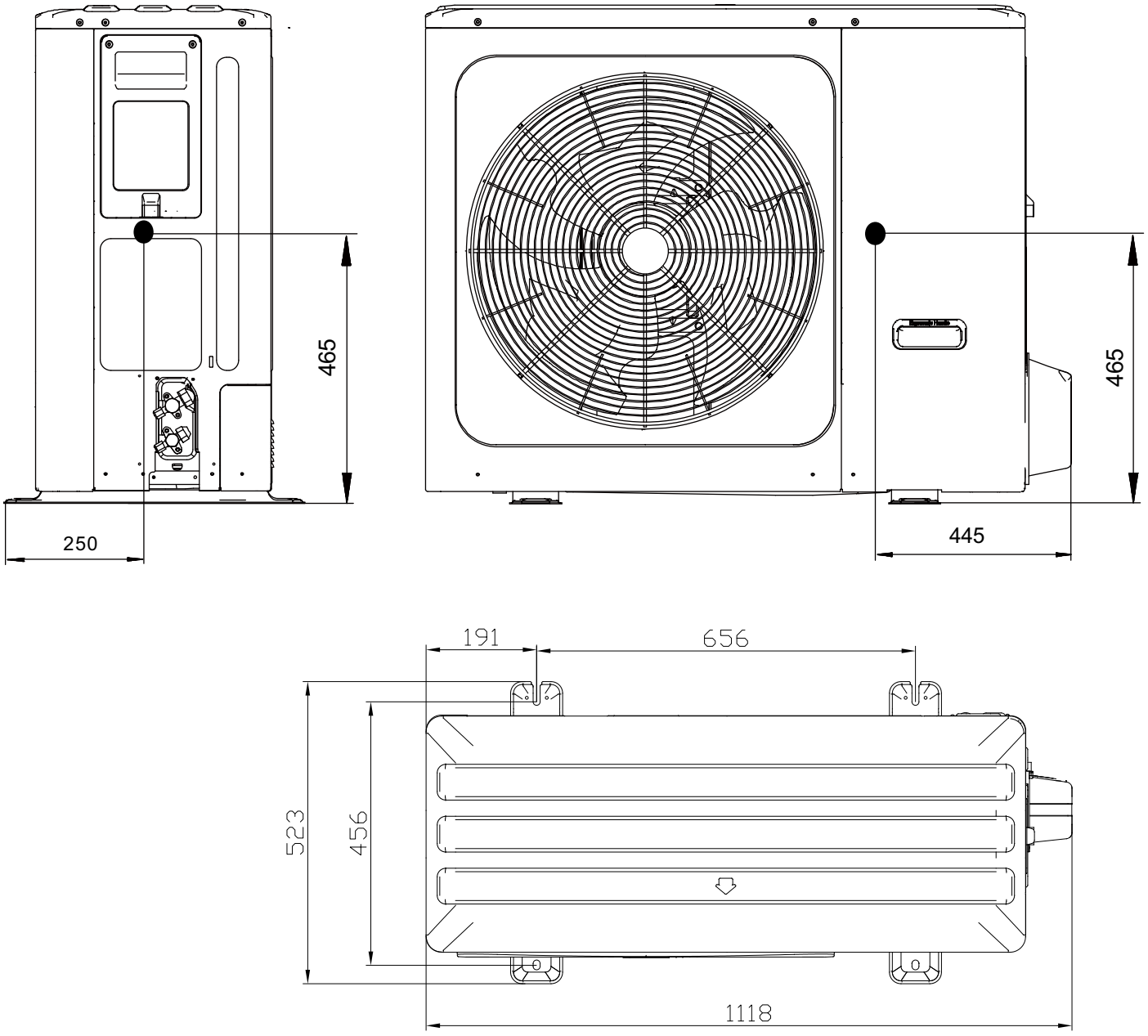


Figure 3.3: SHPAO16RP24P3CM dimensions (unit: mm)



3.2 Indoor unit

Figure 3.4: SHPAI60(100,160)RP24CM-EHT200 dimensions (unit: mm)

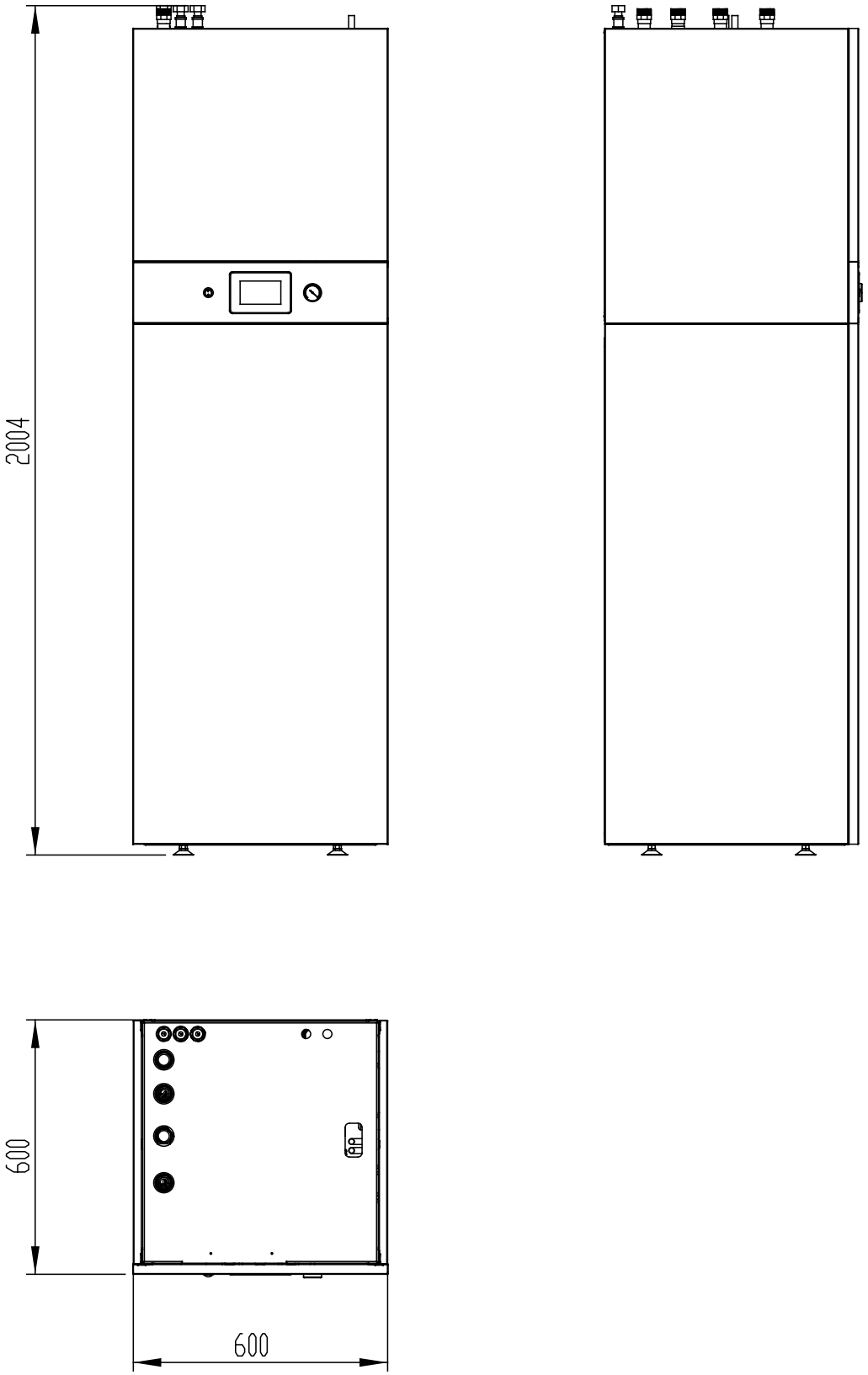
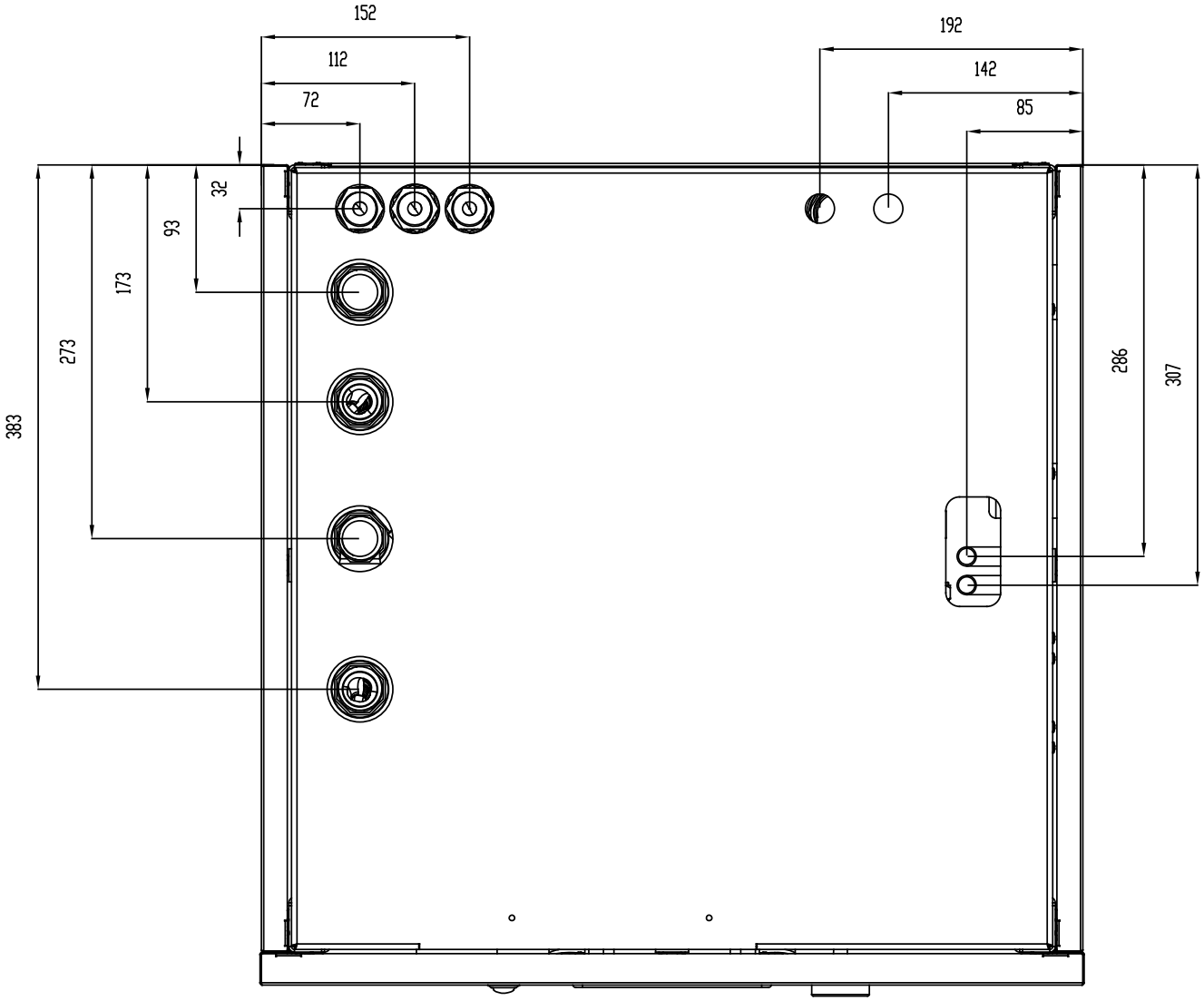


Figure 3.5: Positions of connections



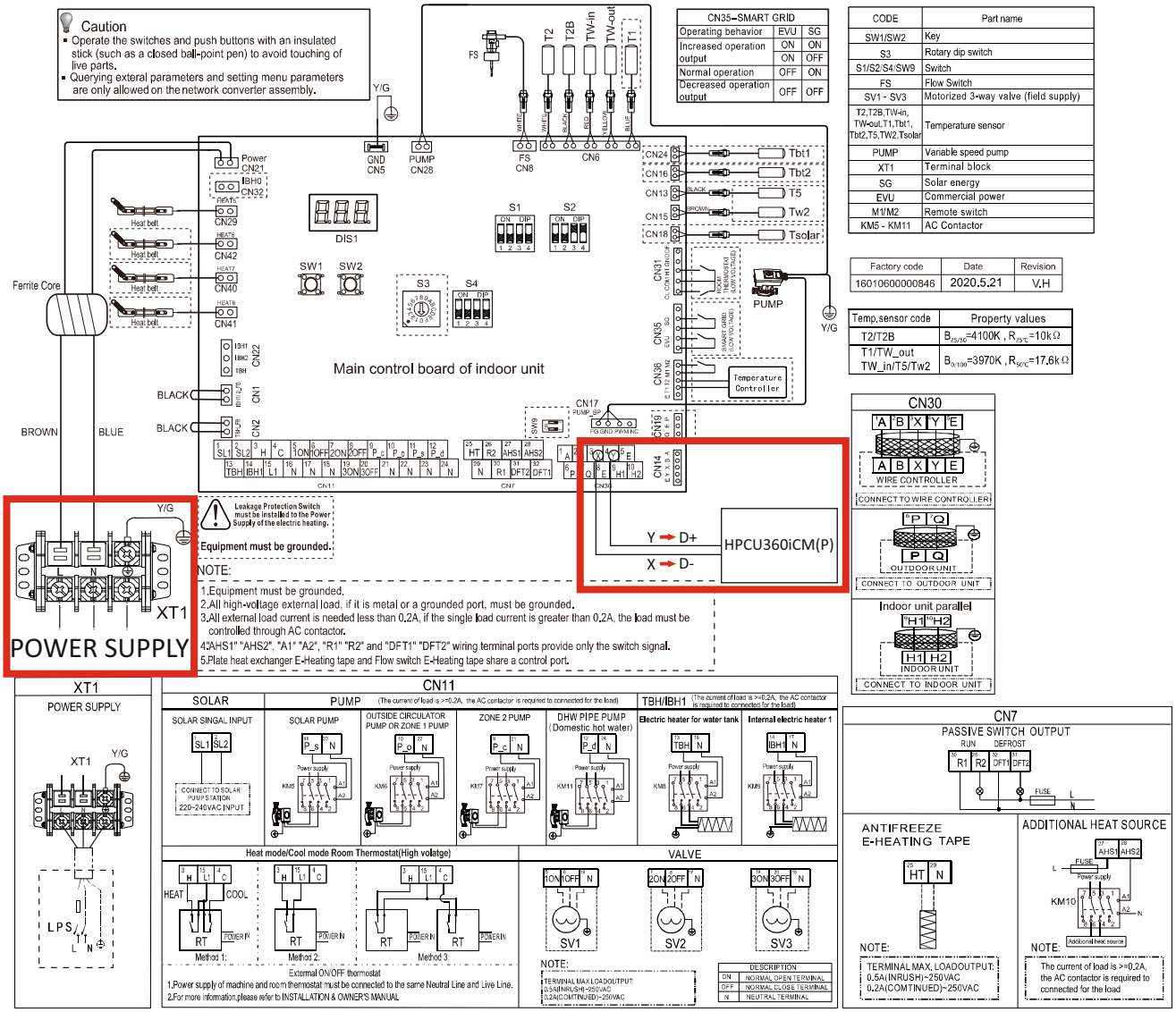
Connections are labeled on Figure 5.2 in chapter "Indoor unit installation".

4. Wiring diagrams

Wiring diagrams of outdoor units SHPAO6RP24CM, SHPAO10RP24CM and SHPAO16RP24P3CM can be found in technical manual “Heat pumps Arctic Split series”. Wiring diagram of indoor unit SHPAI60(100,160)RP24CM-EHT200 is shown in technical manual “Heat pumps Arctic Split series” as well as below on Figure 4.1. Wiring diagram of control unit HPCU360iCM(P) (black box + panel) can be found in technical manual “Technical manual for control unit”. Control unit is factory connected with the hydronic box PCB.

Hydronic box PCB is in the electronic box underneath the front cover. Wiring and communication cables should be installed through the cable glands on top of the unit. Wiring diagram is shown on picture 4.1.

Figure 4.1: Indoor unit wiring diagram



CN35–SMART GRID		
Operating behavior	EVU	SG
Increased operation output	ON	ON
	ON	OFF
Normal operation	OFF	ON
Decreased operation output	OFF	OFF

CODE	Part name
SW1/SW2	Key
S3	Rotary dip switch
S1/S2/S4/SW9	Switch
FS	Flow Switch
SV1 - SV3	Motorized 3-way valve (field supply)
T2,T2B,TW-in, TW-out,T1,Tbt1, Tbt2,T5,TW2,Tsolar	Temperature sensor
PUMP	Variable speed pump
XT1	Terminal block
SG	Solar energy
EVU	Commercial power
M1/M2	Remote switch
KM5 - KM11	AC Contactor

Factory code	Date	Revision
16010600000846	2020.5.21	V.H

Temp.sensor code	Property values
T2/T2B	$B_{25/50}$=4100K , $R_{25℃}$=10kΩ
T1/TW_out TW_in/T5/Tw2	$B_{0/100}$=3970K , $R_{50℃}$=17.6kΩ

After connecting the unit power supply, put the main switch in position “I”. If control unit digital display does not turn on, check the main switch of control unit HPCU360iCM (black box placed behind electronics).

Figure 4.2: Placement of elements on the front side of the unit

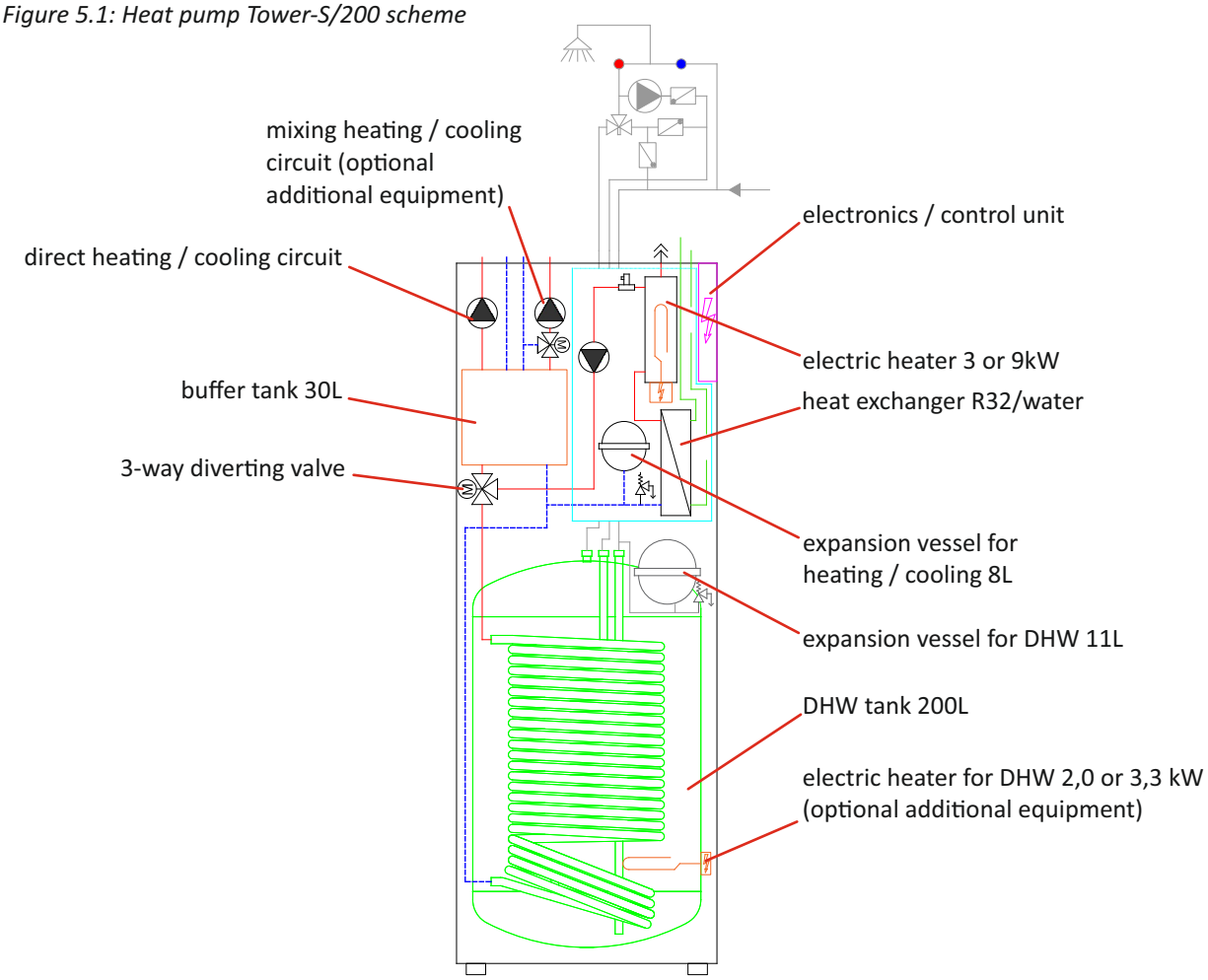
5. Installation and connection to the heating and cooling system

5.1 Outdoor unit installation

For installation and connection of outdoor and indoor unit follow directions given in Part 3 of technical manual “Heat pumps Arctic Split series”.

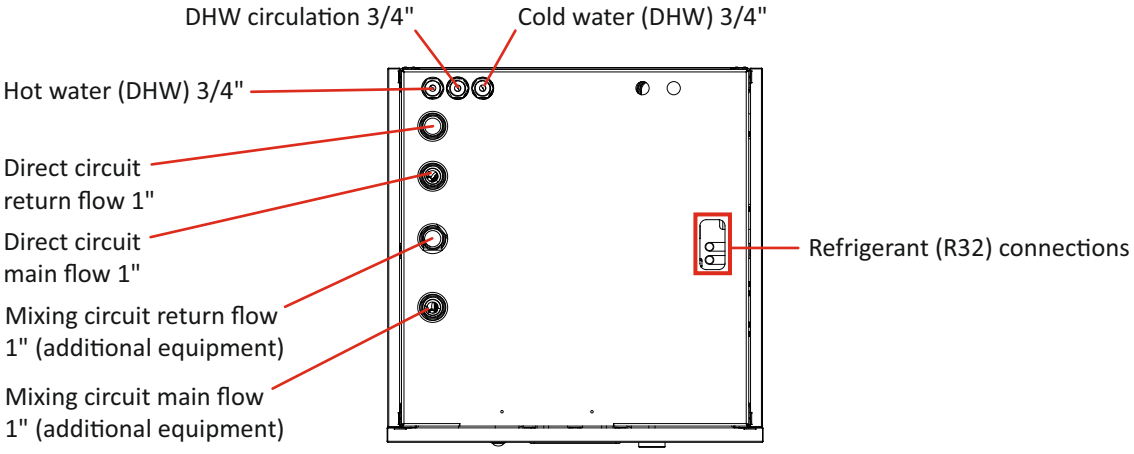
5.2 Indoor unit instalation

Figure 5.1: Heat pump Tower-S/200 scheme



The pipes of the heating / cooling system are connected to the indoor unit with straight connectors. It is necessary to follow the labels in Figure 5.2. The flow and return of the mixing heating circuit only exist if the mixing heating circuit is selected as an additional equipment.

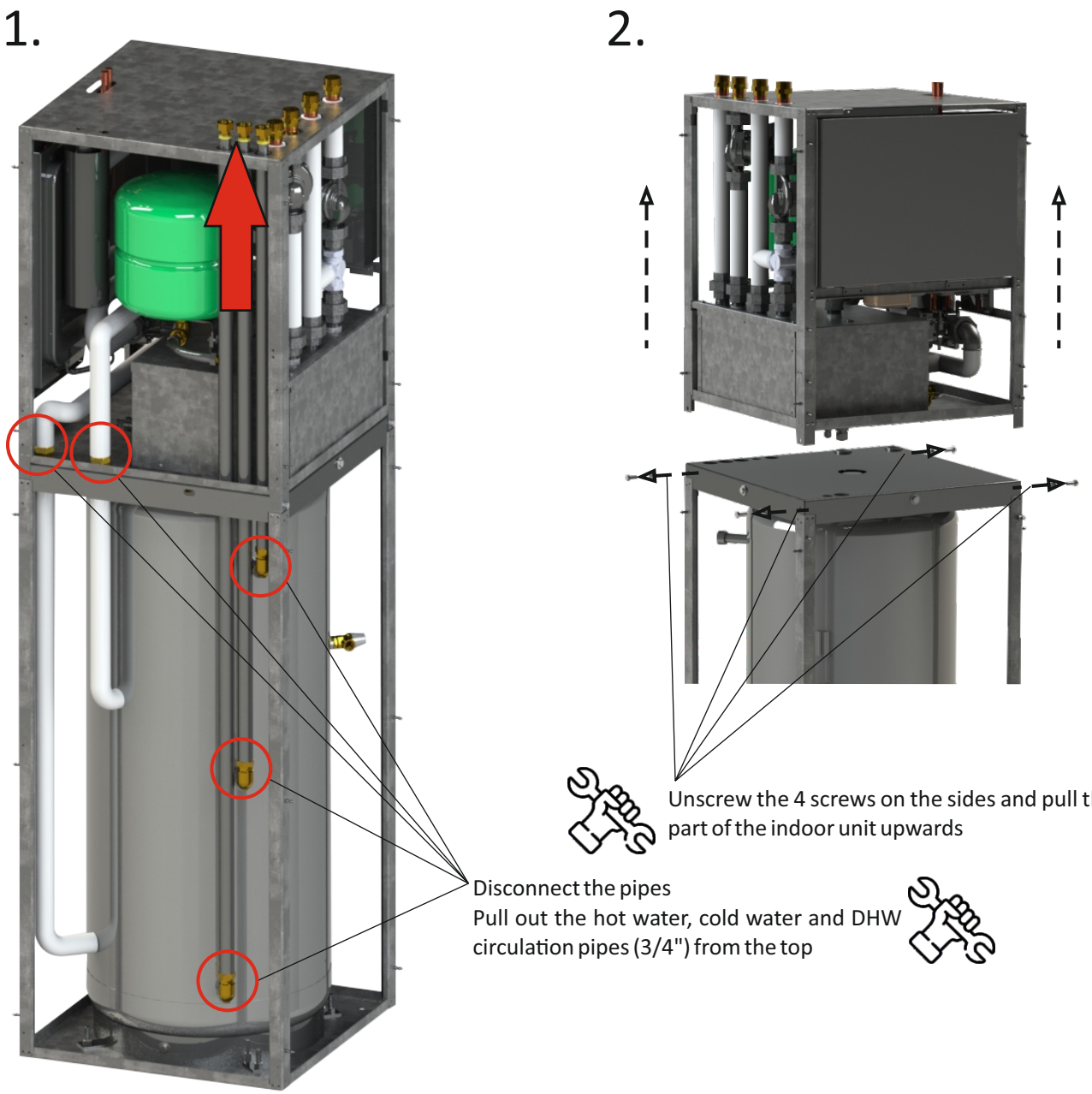
Figure 5.2: Tower heat pump top view with labeled connections



5.3 Disassembling unit for the easier carrying

The Tower-S/200 can be disassembled into two parts to facilitate entry into the room. In order to disassemble the unit, it is necessary to remove the cover from the sides, and it is recommended to remove the front cover as well, so that there is no damage when separating the parts. In addition, it is necessary to separate the DHW pipes and the pipes to the DHW tank heat exchanger. DHW pipes must be pulled out from the top. After that, on the sides of the unit, it is necessary to unscrew four screws (2 on each side - see picture 5.3). The DHW temperature sensor must be removed from the DHW tank. When all connections are separated, it is necessary to lift the upper part of the device to separate it from the lower part.
When reassembling the lower and upper parts of the indoor unit, it is necessary to place the upper part of the indoor unit on the lower part and return the DHW pipes from the upper side and reconnect the DHW pipes and the pipes to the DHW tank heat exchanger. After connecting the pipes, it is necessary to check the watertightness of the joints. Fasten the connection of the upper and lower parts of the device with screws on the sides of the tank. The DHW temperature sensor must be returned to its intended position.

Figure 5.3: Tower-S/200 disassembly



5.3 Installation and connection of mixing circuit - additional equipment

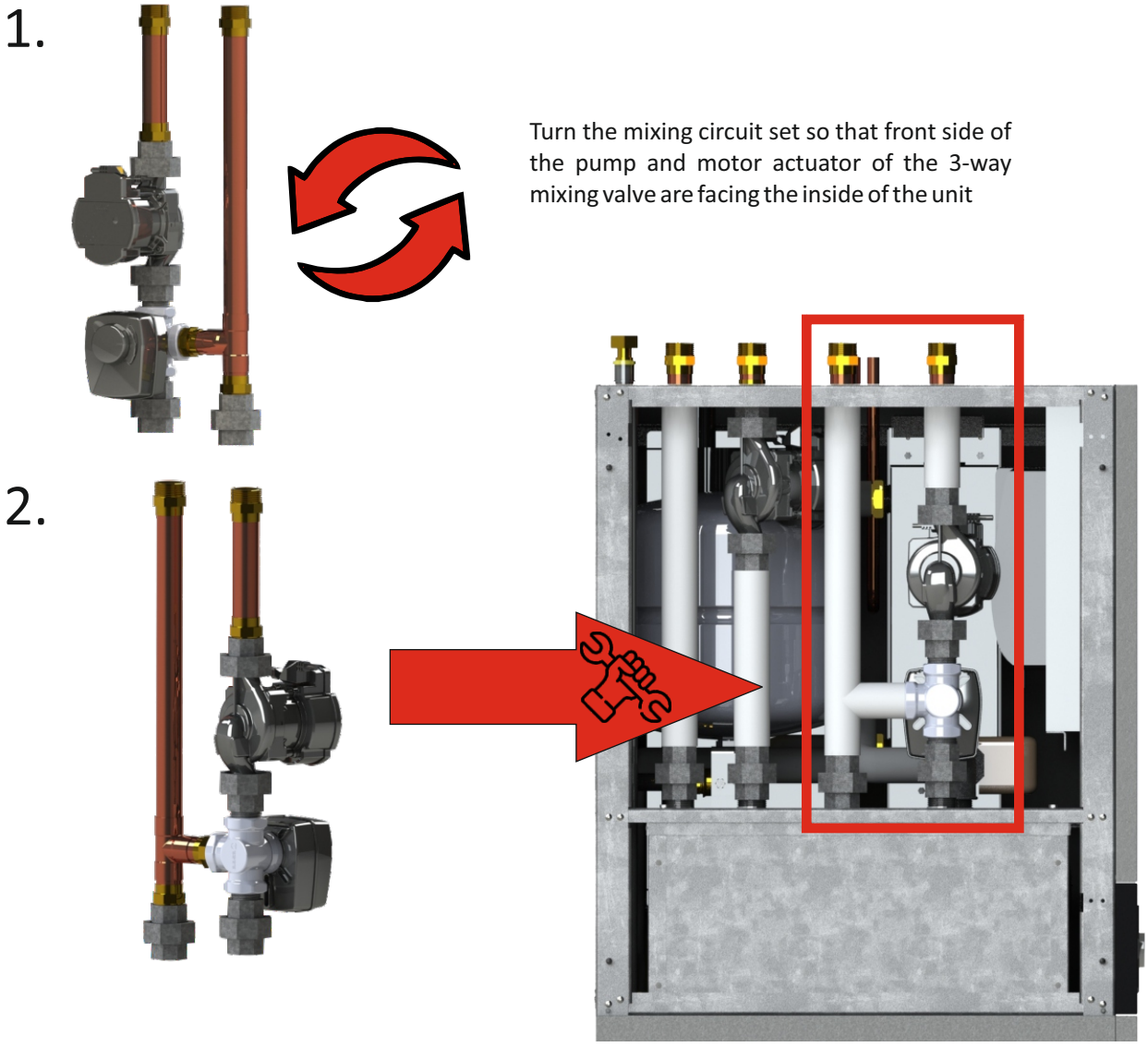
Mixing heating circuit is additional equipment and, if selected, it should be mounted on Tower unit.

Mixing circuit set consists of:

- 3-way mixing valve
- motor actuator of 3-way mixing valve
- circulation pump for heating circuit
- insulated pipes
- heating circuit temperature sensor

Mixing heating / cooling circuit set must be connected with a straight connector to the connection on the buffer tank (factory installed plug). Mixing valve motor actuator must be installed according to manual delivered with the motor actuator. Additional mixing circuit is installed according to figure 5.4. Mixing valve motor actuator should be facing inside of the unit. The pump and the motor actuator of the three-way mixing valve must be connected to the HPCU360iCM(P) control unit at ports 17, 18, PE - pump, and 6, 7, 8, PE - motor actuator of the three-way mixing valve according to the diagram in Figure 5.5. The heating circuit temperature sensor must be installed under the pipe insulation after the circulation pump (figure 5.6) and connected to the HPCU360iCM(P) control unit (ports 41, 42). The mixing heating circuit must be enabled and set in the control unit settings. After installation of the additional mixing valve, system should be filled with water and checked for any leakage.

Figure 5.4: Installation of additional mixing circuit



Place the additional heating mixing circuit in the intended place and tighten the straight connector firmly. After connecting, check the tightness of the joints.

Figure 5.5: Control unit HPCU360iCM(P) wiring diagram - additional mixing circuit

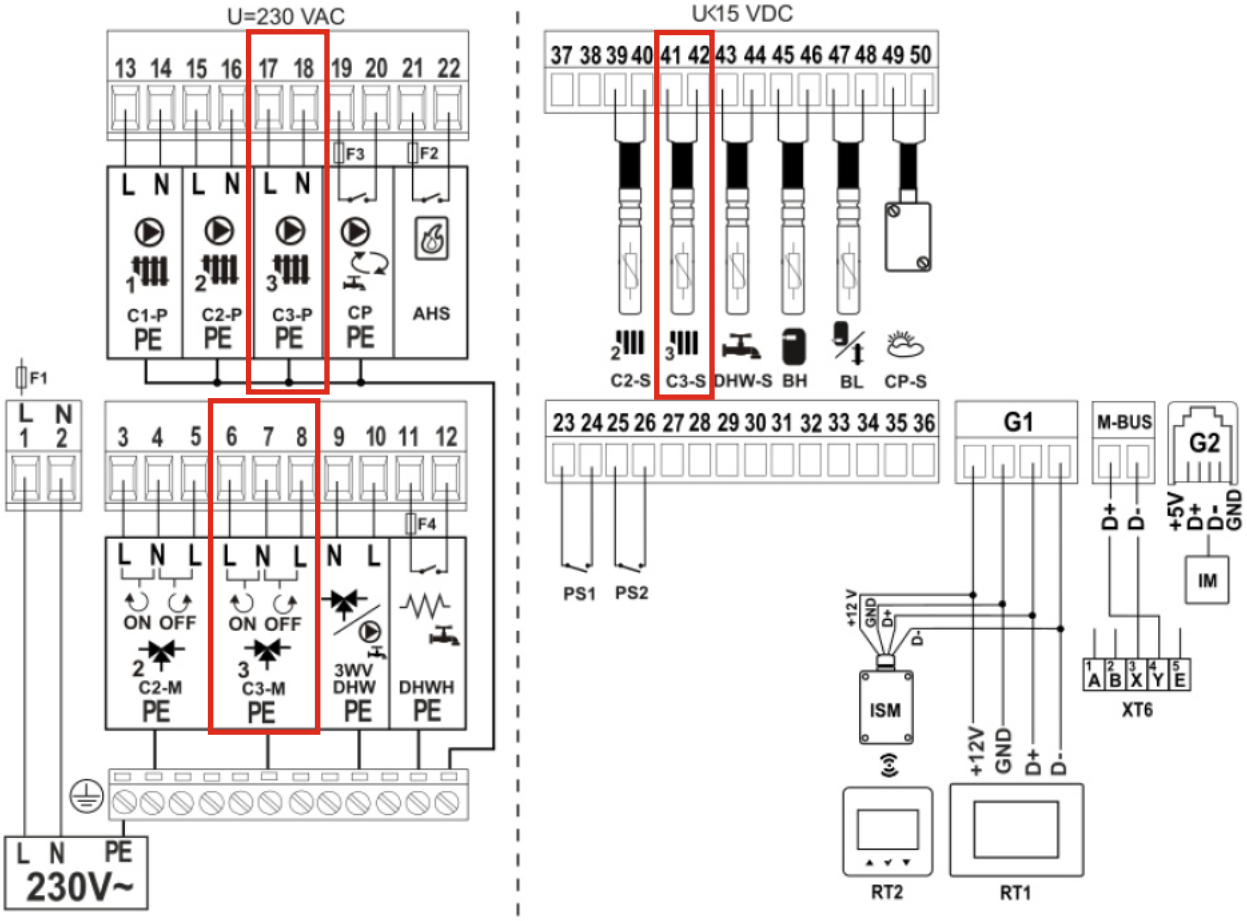
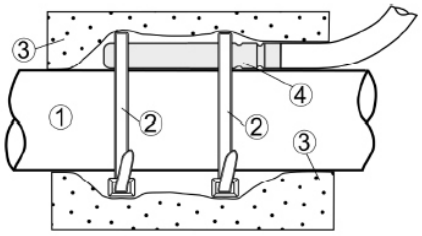


Figure 5.6: Additional circuit temperature sensor installation



1 - pipe
2 - clamps
3 - thermal insulation
4 - temperature sensor

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