



# Technical manual

WELLEA HT

Air to Water heat pump

*EN*

Dear Customer,

Thank you for purchasing this device.

We invite you to read this manual carefully before using your appliance. Keep this document in a safe place for future reference.

To ensure safe and efficient operation, we recommend that you carry out the necessary maintenance operations regularly. Our After-Sales service can help you with these operations.

We hope that you will be satisfied with our services for many years.

**AIRWELL**

This manual is referring to the following unit :

Designation	Code
<b>BDHX-260R-04T35</b>	7MB140030
<b>BDHX-300R-04T35</b>	7MB140031
<b>BDHX-350R-04T35</b>	7MB140032
<b>BDHX-400R-04T35</b>	7MB140033

The data contained in this manual are not binding and may be modified by the manufacturer without prior notice.

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# 1. SYSTEM DESIGN AND UNIT SELECTION

## 1.1. System configurations

Wellea M DF HT can be configured to run with the electric heater either enabled or disabled and can also be used in conjunction with an auxiliary heat source such as a boiler.

The chosen configuration affects the size of heat pump that is required. Three typical configurations are described below.

### Configuration 1: Heat pump only

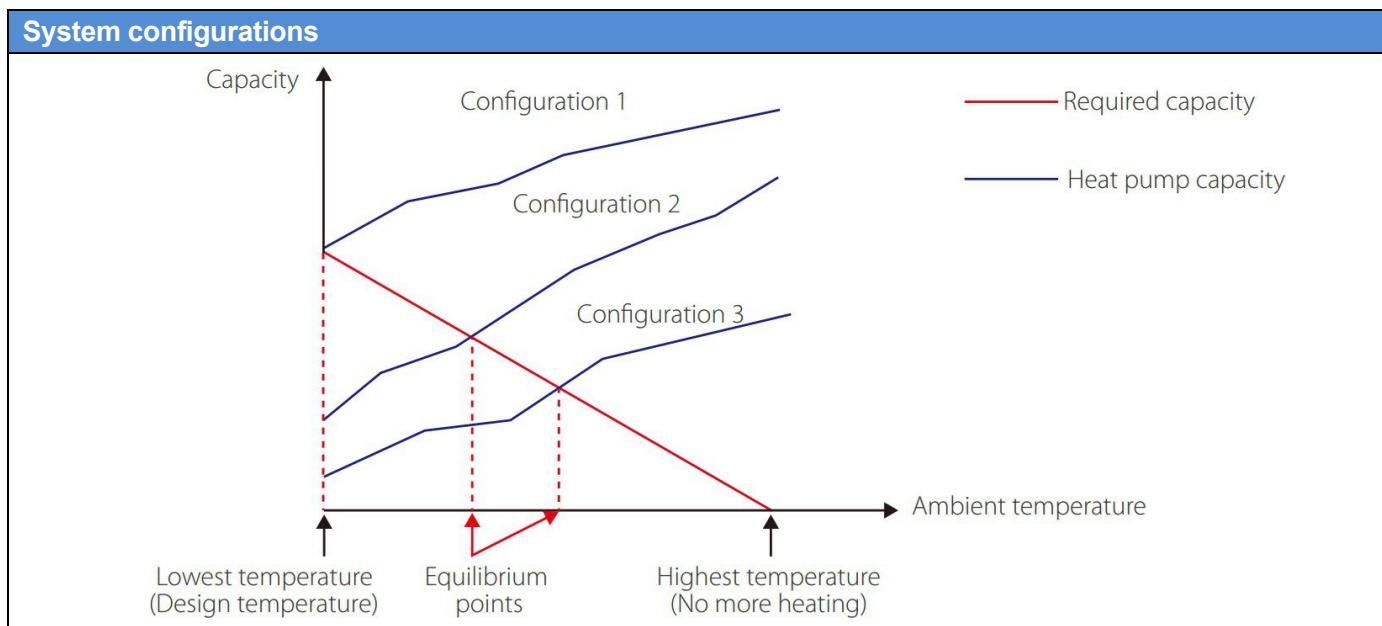
- The heat pump covers the required capacity and no extra heating capacity is necessary.
- Requires selection of larger capacity heat pump and implies higher initial investment.
- Ideal for new construction in projects where energy efficiency is paramount.

### Configuration 2: Heat pump and backup electric heater

- Heat pump covers the required capacity until the ambient temperature drops below the point at which the heat pump is able to provide sufficient capacity. When the ambient temperature is below this equilibrium point (as shown below), the backup electric heater supplies the required additional heating capacity.
- Best balance between initial investment and running costs, results in lowest lifecycle cost.
- Ideal for new construction.

### Configuration 3: Heat pump with auxiliary heat source

- Heat pump covers the required capacity until the ambient temperature drops below the point at which the heat pump is able to provide sufficient capacity. When the ambient temperature is below this equilibrium point (as shown below), depending on the system settings, either the auxiliary heat source supplies the required additional heating capacity or the heat pump does not run and the auxiliary heat source covers the required capacity.
- Enables selection of lower capacity heat pump.
- Ideal for refurbishments and upgrades.



## 1.1.Selection Procedure

### Step 1: Total heat load calculation

Calculate conditioned surface area  
Select the heat emitters (type, quantity, water temperature and heat load)

### Step 2: System configuration

Decide whether to include AHS and set AHS's switching temperature  
Decide whether backup electric heater is enabled or disabled

### Step 3: Selection of outdoor units

Determine required total heat load on outdoor units  
Set capacity safety factor  
Select power supply

Provisionally select R290 M thermal Mono unit capacity based on nominal capacity

Correct capacity of the outdoor units for the following items:  
Outdoor air temperature / Outdoor humidity / Water outlet temperature1 / Altitude / Anti-freeze fluid

Is corrected R290 M thermal Mono unit capacity  $\geq$  Required total heat load on outdoor units2

Yes

R290 M thermal Mono system selection is complete

No

Select a larger model or enable backup electric heater operation

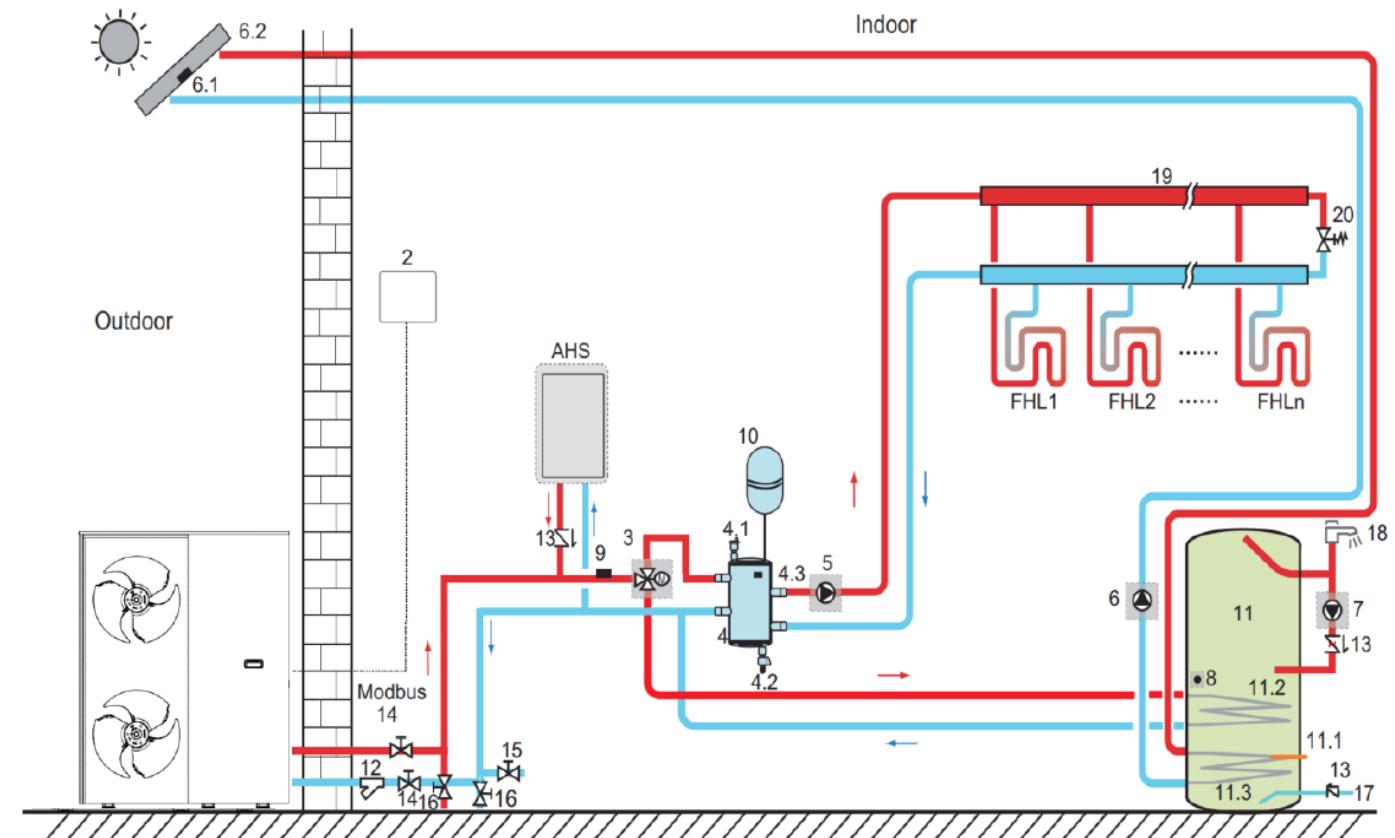
#### Notes:

1.If the required water temperatures of the heat emitters are not all the same, the R290 M thermal Mono's outlet water temperature setting should be set at the highest of the heat emitter required water temperatures. If the water outlet design temperature falls between two temperatures listed in the outdoor unit's capacity table, calculate the corrected capacity by interpolation.

2.If the outdoor unit selection is to be based on total heating load and total cooling load, select Mono units which satisfy not only the total heating load requirements but also the total cooling load requirements.

## 1.2.Application exemple

### 1.2.1.Controlled through the user interface



#### Legend

1	Main Unit	11	Domestic hot water tank (Supplied by the user)
2	User interface	11.1	TBH: Domestic hot water tank booster heater (Supplied by the user)
3	SV1:3-way valve (Supplied by the user)	11.2	Coil 1, heat exchanger for heat pump
4	Balance tank (Supplied by the user)	11.3	Coil 2, heat exchanger for Solar energy
4.1	Automatic air purge valve	12	Filter (Accessory)
4.2	Drainage valve	13	Check valve (Supplied by the user)
4.3	Tbt1: Upper temperature sensor of balance tank (Optional)	14	Shut-off valve (Supplied by the user)
5	P_o: Outside circulation pump (Supplied by the user)	15	Filling valve (Supplied by the user)
6	P_s: Solar pump (Supplied by the user)	16	Drainage valve (Supplied by the user)
6.1	Tsolar: Solar temperature sensor (Optional)	17	Tap water inlet pipe (Supplied by the user)
6.2	Solar panel (Supplied by the user)	18	Hot water tap (Supplied by the user)
7	P_d: DHW pipe pump (Supplied by the user)	19	Collector/distributor (Supplied by the user)
8	T5: Temperature sensor of domestic water tank (Accessory)	20	Bypass valve (Supplied by the user)
9	T1: Final Water flow temperature sensor (Optional)	FHL1...n	Floor heating loop (Supplied by the user)
10	Expansion vessel (Supplied by the user)	AHS	Auxiliary heat source (Supplied by the user)

#### Notes:

- The example is just for application illustration; please confirm the exact installation method according to the installation manual.
- A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.

### **Space heating**

The ON/OFF signal, operation mode, and temperature are set on the user interface. P\_o keeps running as long as the unit is ON for space heating, while SV1 remains OFF.

### **Domestic water heating**

The ON/OFF signal and target tank water temperature (T5S) are set on the user interface. P\_o stops running as long as the unit is ON for domestic water heating while SV1 remains ON.

### **AHS (auxiliary heat source) control**

The AHS function is set on the HMI (for maintenance personnel).

- 1) When the AHS is set to be valid only for heating mode, AHS can be turned on in the following ways:
  - a.Turn on the AHS via BACKHEATER function on the user interface;
  - b.AHS will be turned on automatically if the initial water temperature is too low or the target water temperature is too high at low ambient temperature. P\_o keeps running as long as the AHS is ON while SV1 remains OFF
- 2)The AHS is set to be valid for heating and DHW modes. In heating mode, AHS control is the same as item 1) listed above; In DHW mode, AHS will be turned on automatically when the initial domestic water temperature T5 is too low or the target domestic water temperature is too high at low ambient temperature. P\_o stops running while SV1 remains ON.
- 3)When the AHS is set to be valid, M1M2 can be set to be valid on the user interface. In heating mode, AHS will be turned on when the MIM2 dry contact closes. This function is invalid in DHW mode.

### **TBH (tank booster heater) control**

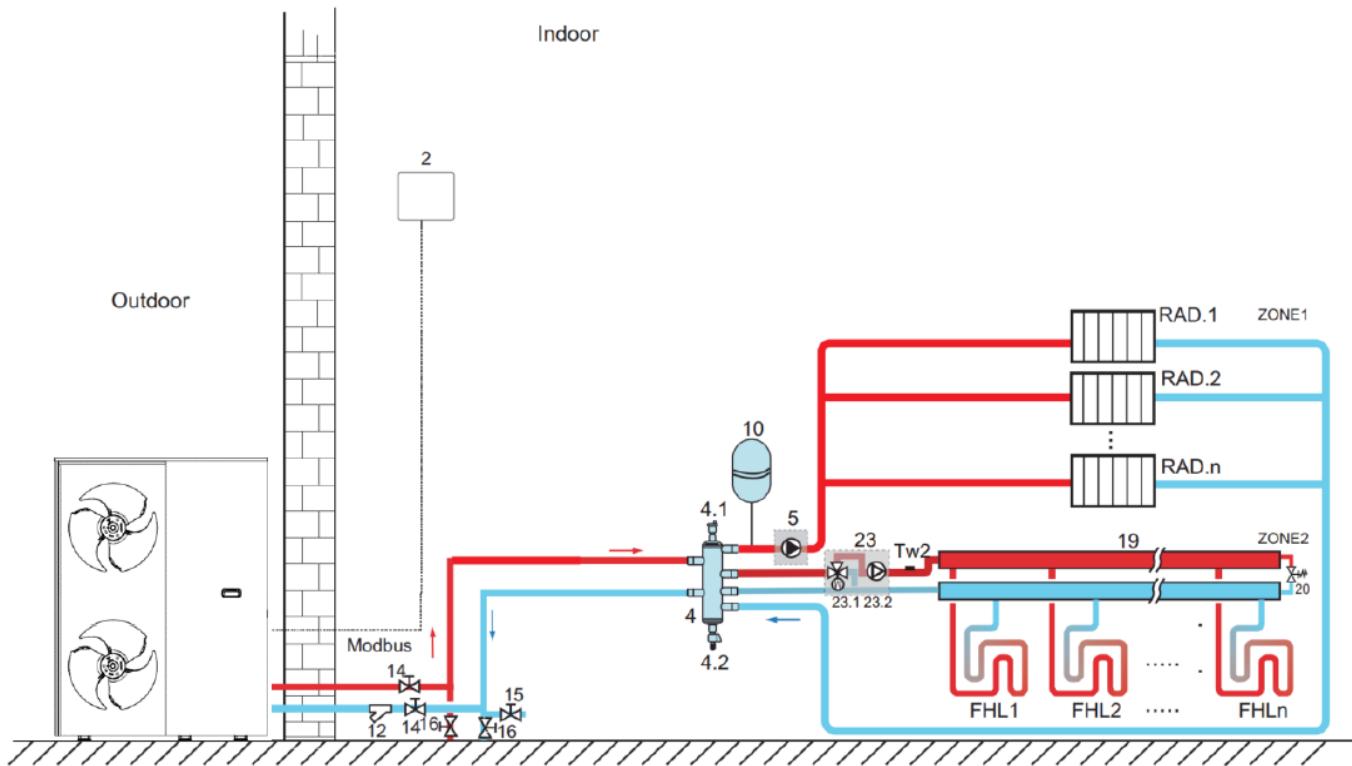
The TBH function is set on the user interface.

- 1)When the TBH is set to be valid, TBH can be turned on via TANKHEATER function on the user interface; In DHW mode, TBH will be turned on automatically when the initial domestic water temperature T5 is too low or the target domestic water temperature is too high at low ambient temperature.
- 2)When the TBH is set to be valid, M1M2 can be set to be valid on the user interface. TBH will be turned on when the MIM2 dry contact closes

### **Solar energy control**

The unit recognizes solar energy signals by judging Tsolar or receiving SL1 SL2 signals from the user interface. The recognition method can be set via SOLAR INPUT on the user interface.

- 1)When Tsolar is set to be valid, solar energy turns ON when Tsolar is high enough, and P\_s starts running; Solar energy turns OFF when Tsolar is low. and P\_s stops running.
- 2)When SL1 SL2 control is set to be valid, solar energy turns ON after receiving solar kit signals from the user interface, and P\_s starts running; If no solar kit signals are received, solar energy turns OFF, and P\_s stops running.



### Legend

1	Main Unit	16	Drainage valve (Supplied by the user)
2	User interface	19	Collector/distributor (Supplied by the user)
4	Balance tank (Supplied by the user)	20	Bypass valve (Supplied by the user)
4.1	Automatic air purge valve	23	Mixing station (Supplied by the user)
4.2	Drainage valve	23.1	SV3: Mixing valve (Supplied by the user)
5	P_o: Outside circulation pump (Supplied by the user)	23.2	P_c: Zone 2 circulation pump (Supplied by the user)
10	Expansion vessel (Supplied by the user)	Tw2	Temperature sensor of Zone 2 water flow
12	Filter (Accessory)	FHL1...n	Floor heating loop (Supplied by the user)
14	Shut-off valve (Supplied by the user)	RAD.1...n	Radiator(Supplied by the user)
15	Filling valve (Supplied by the user)		

### Notes:

1.The example is just for application illustration; please confirm the exact installation method according to the installation manual.

2.A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.

### Space heating

The ON/OFF signal, operation mode, and temperature are set on the user interface. Zone1 can operate in cooling mode or heating mode, while Zone 2 can only operate in heating mode; During operation, Zone1 is controlled by Final Water flow temperature (T1), Zone2 is controlled by Zone2 water outlet temperature(Tw2) or room temperature(Ta).

### Circulation pump operation

When Zone1 turns ON, P\_o starts running; When Zone1 turns OFF, P\_o stops running;

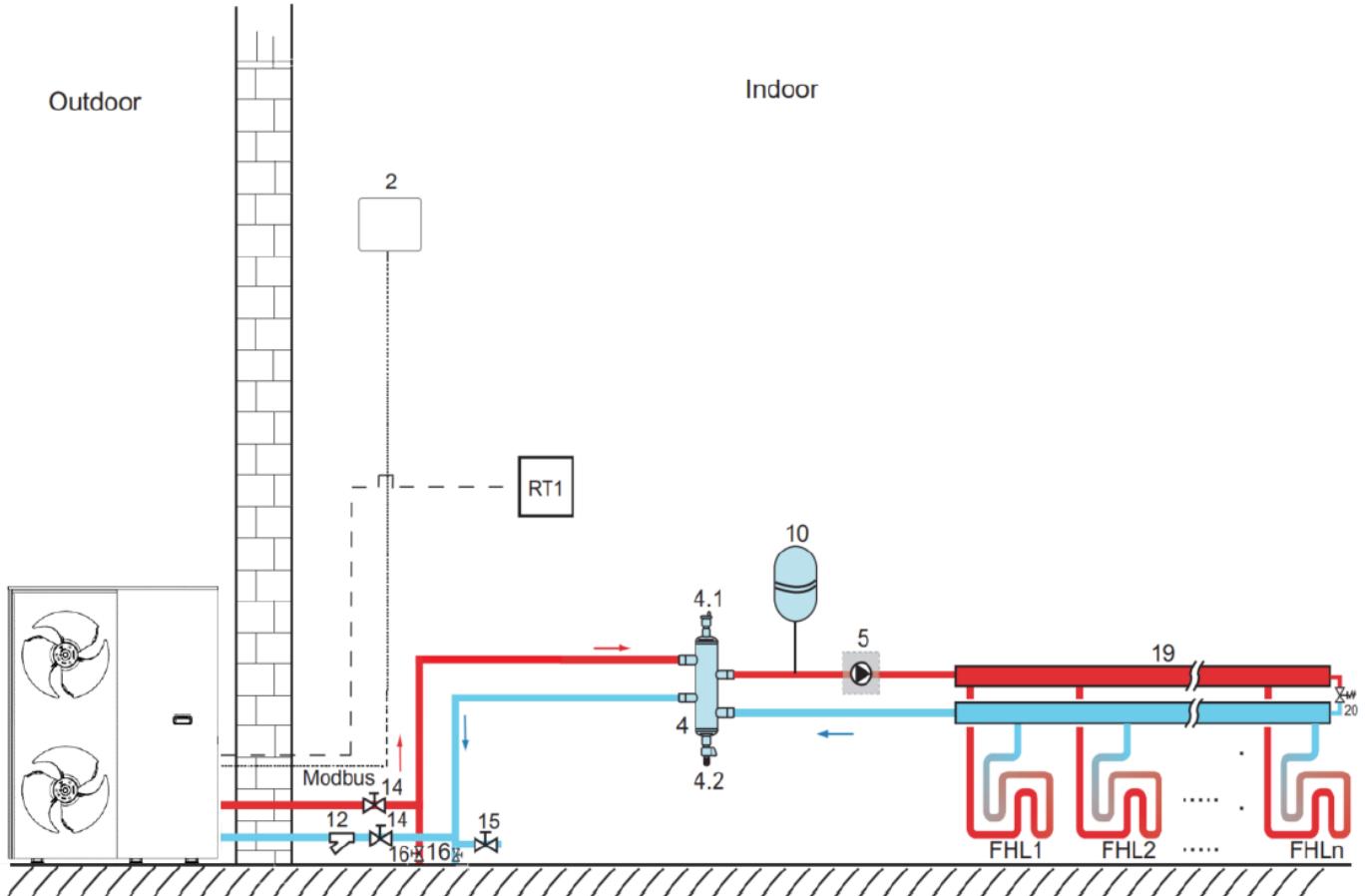
When Zone2 turns ON, SV3 switches between ON and OFF according to the set TW2, and P\_c remains ON; When Zone 2 turns OFF, SV3 remains OFF and P\_c stops running.

The floor heating loops require a lower water temperature in heating mode than radiators or fan coil units. To reach the set temperature points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The radiators are directly connected to the unit's water circuit and the floor heating loops and after the mixing station. The mixing station is controlled by the unit.

The domestic water tank, AHS (auxiliary heat source), TBH (water tank electric auxiliary heat), and solar control can be connected. The control method is the same as what is described in the above section.

### 1.2.2. Control through the user interface and room thermostat

Space heating or cooling control through the room thermostat needs to be set on the user interface. It can be controlled through mode setting, single-zone control or double-zone control. The monoblock can only be connected to a low voltage room thermostat.



#### Notes:

1.The example is just for application illustration; please confirm the exact installation method according to the installation manual.

2.A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.

Legend			
1	Main Unit	14	Shut-off valve (Supplied by the user)
2	User interface	15	Filling valve (Supplied by the user)
4	Balance tank (Supplied by the user)	16	Drainage valve (Supplied by the user)
4.1	Automatic air purge valve	19	Collector/distributor (Supplied by the user)
4.2	Drainage valve	20	Bypass valve (Supplied by the user)
5	P_o: Outside circulation pump (Supplied by the user)	RT1	Low voltage room thermostat(Supplied by the user)
10	Expansion vessel (Supplied by the user)	FHL1...n	Floor heating loop (Supplied by the user)
12	Filter (Accessory)		

#### Space heating

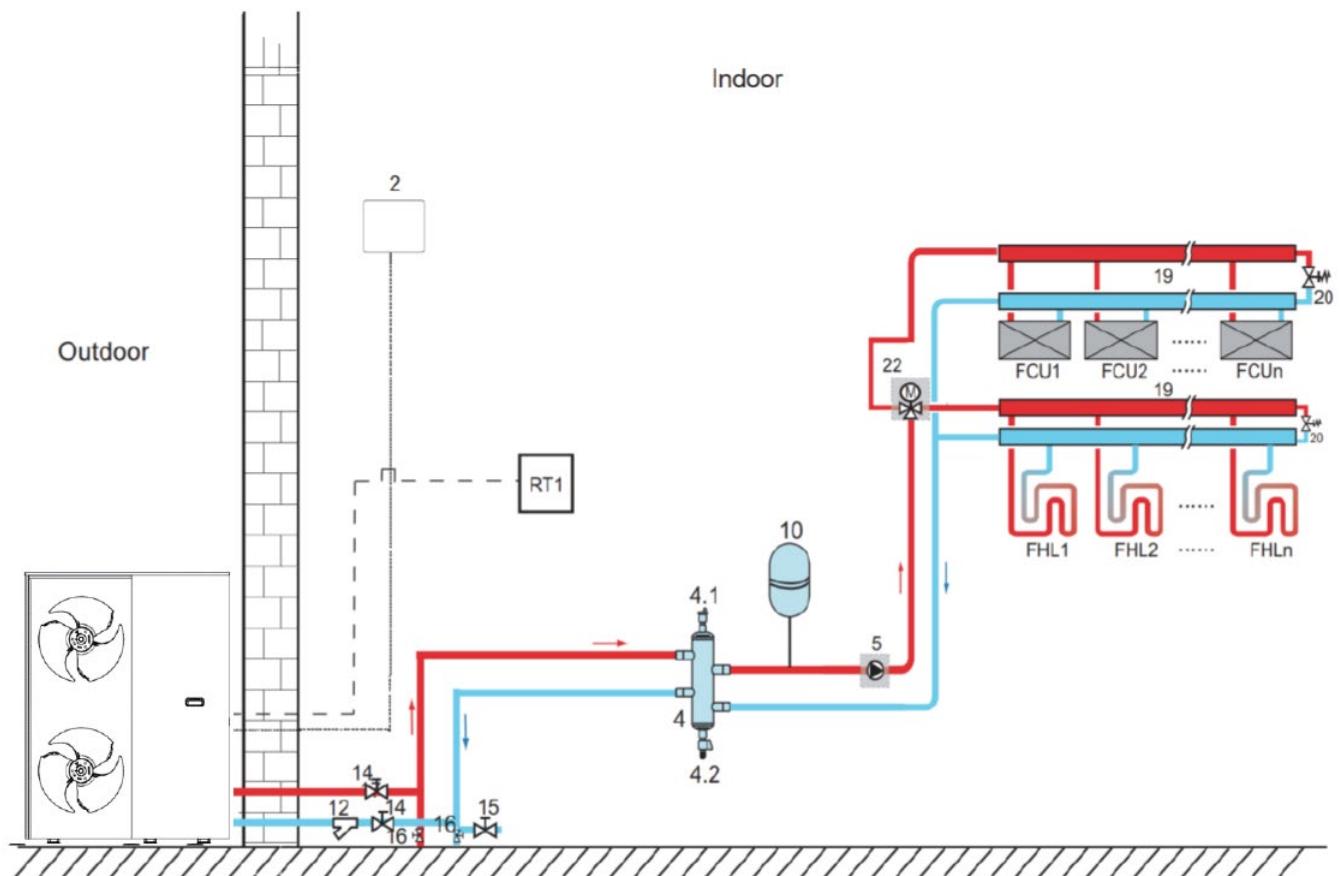
Single-zone control: the unit ON/OFF is controlled by the room thermostat. The cooling or heating mode and outlet water temperature are set on the user interface. The system is ON when "HT" of the thermostat closes. When "HT" open, the system turns OFF.

#### Circulation pump operation

When the system turns ON, which means "HT" of the thermostat closes, P\_o starts running; When the system turns OFF, which means "HT" open, P\_o stops running.

The domestic water tank, AHS (auxiliary heat source), TBH (water tank electric auxiliary heat), and solar control can be connected. The control method is the same as what is described in the above section

## Control through mode setting



### Notes:

- 1.The example is just for application illustration; please confirm the exact installation method according to the installation manual.
- 2.A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.

Legend			
1	Main Unit	15	Filling valve (Supplied by the user)
2	User interface	16	Drainage valve (Supplied by the user)
4	Balance tank (Supplied by the user)	19	Collector/distributor (Supplied by the user)
4.1	Automatic air purge valve	20	Bypass valve (Supplied by the user)
4.2	Drainage valve	22	SV2:3-way valve (Supplied by the user)
5	P_o: Outside circulation pump (Supplied by the user)	RT1	Low voltage room thermostat(Supplied by the user)
10	Expansion vessel (Supplied by the user)	FHL1...n	Floor heating loop (Supplied by the user)
12	Filter (Accessory)	FCU1...n	Fan coil unit (Supplied by the user)
14	Shut-off valve (Supplied by the user)		

### Space heating

The cooling or heating mode is set via the room thermostat, and the water temperature is set on the user interface.  
1)When "CL" of the thermostat closes, the system will be set to work in cooling mode.

2)When "HT" of the thermostat closes and all "CL" open, the system will be set to work in heating mode.

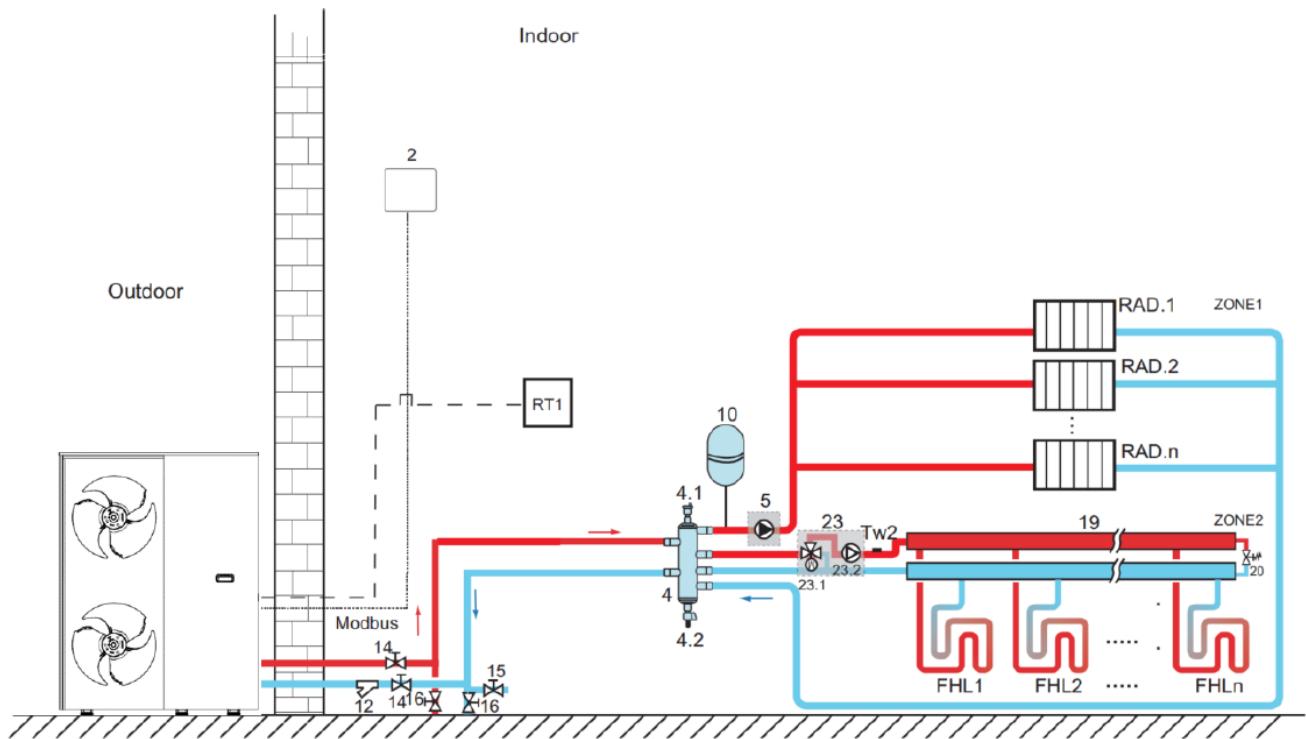
### Circulation pump operation

1)When the system is in cooling mode, which means "CL" of the thermostat closes, SV2 remains OFF while P\_o starts running.

2)When the system is in heating mode, which means "HT" close and "CL" open, SV2 remains ON while P\_o starts running.

The domestic water tank, AHS (auxiliary heat source), TBH (water tank electric auxiliary heat), and solar control can be connected. The control method is the same as what is described in the above section.

## Dual-zone control



### Notes:

- 1.The example is just for application illustration; please confirm the exact installation method according to the installation manual.
- 2.A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.

Legend			
1	Main Unit	16	Drainage valve (Supplied by the user)
2	User interface	19	Collector/distributor (Supplied by the user)
4	Balance tank (Supplied by the user)	20	Bypass valve (Supplied by the user)
4.1	Automatic air purge valve	23	Mixing station (Supplied by the user)
4.2	Drainage valve	23.1	SV3: Mixing valve (Supplied by the user)
5	P_o: Outside circulation pump (Supplied by the user)	23.2	P_c: Zone 2 circulation pump (Supplied by the user)
10	Expansion vessel (Supplied by the user)	RT1	Low voltage room thermostat (Supplied by the user)
12	Filter (Accessory)	Tw2	Temperature sensor of Zone 2 water flow
14	Shut-off valve (Supplied by the user)	FHL1...n	Floor heating loop (Supplied by the user)
15	Filling valve (Supplied by the user)	RAD.1...n	Radiator(Supplied by the user)

### Space heating

Zone1 can operate in cooling mode or heating mode, while Zone 2 can only operate in heating mode; During installation, for thermostat in Zone1, only "HT" terminal need to be connected. For thermostat in Zone2, only "CL" terminals need to be connected.

1)The ON/OFF of Zone1 is controlled by the room thermostat there. When "HT" of thermostat in Zone1 closes, Zone 1 turns ON. When "HT" turn OFF, Zone 1 turns OFF; The target temperature and operation mode are set on the user interface.

2)In heating mode, the ON/OFF of Zone2 is controlled by the room thermostats there. When "CL" of temperature is set on the user interface; Zone 2 can only operate in heating mode. When cooling mode is set on the user interface, Zone2 remains OFF.

### Circulation pump operation

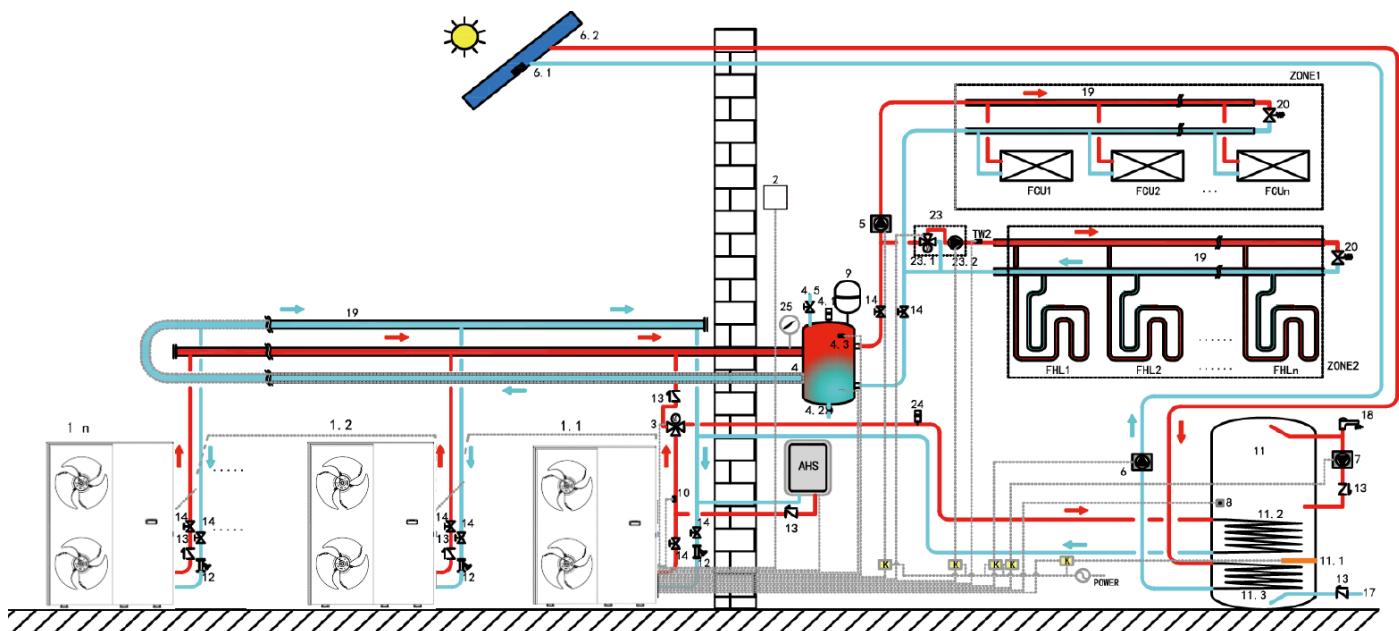
When Zone1 turns ON, P\_o starts running; When Zone1 turns OFF, P\_o stops running;

When Zone2 turns ON, SV3 switches between ON and OFF according to the set TW2, and P\_c remains ON; When Zone 2 Turns OFF, SV3 remains OFF and P\_c stops running.

The floor heating loops require a lower water temperature in heating mode than radiators or fan coil units. To reach the set temperature points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The radiators are directly connected to the unit's water circuit and the floor heating loops and after the mixing station. The mixing station is controlled by the unit.

The domestic water tank, AHS (auxiliary heat source), TBH (water tank electric auxiliary heat), and solar control can be connected. The control method is the same as what is described in the above section.

### 1.3.Cascade system



Notes:

- 1.The example is just for application illustration; please confirm the exact installation method according to the installation manual.
- 2.A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.

Legend			
1.1	Master Unit	12	Filter (Accessory)
1.2...n	Slave Unit	13	Check valve (Supplied by the user)
2	User interface	14	Shut-off valve (Supplied by the user)
3	SV1:3-way valve (Supplied by the user)	17	Tap water inlet pipe (Supplied by the user)
4	Balance tank (Supplied by the user)	18	Hot water tap (Supplied by the user)
4.1	Automatic air purge valve	19	Collector/distributor (Supplied by the user)
4.2	Drainage valve	20	Bypass valve (Supplied by the user)
4.3	Tbt1: Upper temperature sensor of balance tank (Optional)	23	Mixing station
4.5	Filling valve	23.1	SV3: Mixing valve
5	P_o: Outside circulation pump (Supplied by the user)	23.2	P_c: Zone 2 circulation pump (Supplied by the user)
6	P_s: Solar pump (Supplied by the user)	24	Automatic air purge valve(Supplied by the user)
6.1	Tsolar: Solar temperature sensor (Optional)	25	Water manometer (Supplied by the user)
6.2	Solar panel (Supplied by the user)	TW2	Zone 2 water flow temperature sensor (Supplied by the user)
7	P_d: DHW pipe pump (Supplied by the user)	FCU1...n	Fan coil unit (Supplied by the user)
8	T5: Temperature sensor of domestic water tank (Accessory)	FHL1...n	Floor heating loop (Supplied by the user)
9	T1: Final Water flow temperature sensor (Optional)	K	Contactor (Supplied by the user)
10	Expansion vessel (Supplied by the user)	ZONE 1	Only heating mode is applicable to the space
11	Domestic hot water tank (Supplied by the user)	ZONE 2	Only heating mode is applicable to the space
11.1	TBH: Domestic hot water tank booster heater (Supplied by the user)	AHS	Auxiliary heat source (Supplied by the user)
11.2	Coil 1, heat exchanger for heat pump		
11.3	Coil 2, heat exchanger for Solar energy		

### **Domestic water heating**

Only the master unit can operate in DHW mode. T5S is set on the user interface. In DHW mode, SV1 remains ON. When the master unit operates in DHW mode, the slave units can operate in space cooling/heating mode.

### **Heating mode of slave units**

All slave units can operate in space heating mode. The operation mode and temperature are set on the user interface. Due to changes of the outdoor temperature and the required load indoors, multiple outdoor units may operate at different time points.

In cooling mode, SV3 and P\_c remains OFF while P\_o remains ON.

In heating mode, when both Zone 1 and Zone 2 work, P\_c and P\_o remain ON, and SV3 switches between ON and OFF according to the set TW2.

In heating mode, when only Zone 1 works, P\_o remains ON while SV3 and P\_c remain OFF.

In heating mode, when only Zone 2 works, P\_o remains OFF while P\_c remains ON, and SV3 switches between ON and OFF according to the set TW2.

### **AHS (Auxiliary heat source) control**

The AHS should be set via the DIP switch on the main board. The AHS is only controlled by the master unit. When the master unit operates in DHW mode, the AHS can only be used for producing domestic hot water; When the master unit operates in heating mode, the AHS can only operate in heating mode.

1)When the AHS is set to be valid only in heating mode, it will be turned on in the following conditions:

a.The BACKUPHEATER function is enabled on user interface;

b.The master unit operates in heating mode. When the inlet water temperature or ambient temperature is too low while the target leaving water temperature is too high, the AHS will be turned on automatically.

2)When the AHS is set to be valid in heating mode and DHW mode, it will be turned on in following conditions:

When the master unit operates in heating mode, conditions for turning on the AHS is same as 1); When the master unit operates in DHW mode, if T5 or the ambient temperature is too low while the target T5 temperature is too high, the AHS will be turned on automatically.

3)When the AHS is valid, the operation of the AHS is controlled by M1M2. When M1M2 closes, the AHS is turned on. When the master unit operates in DHW mode, the AHS cannot be turned on by closing M1 M2.

### **TBH (Tank booster heater) control**

The TBH should be set via the DIP switch on the main board. The TBH is only controlled by the master unit.

### **Solar energy control**

Solar energy is only controlled by the master unit.

## 2. SPECIFICATIONS

			BDHX-260R-04T35	BDHX-300R-04T35	BDHX-350R-04T35	BDHX-400R-04T35
Power supply	V/Ph/Hz		380-415 / 3 / 50			
Heating A7W35	Capacity W		26 000	30 000	35 000	39 000
	Rated input W		5 450	6 670	8 400	9 750
	COP		4.77	4.50	4.17	4.00
Heating A7W55	Capacity W		26 000	30 000	35 000	39 000
	Rated input W		7 850	9 570	11 750	14 000
	COP		3.31	3.13	2.98	2.79
Heating A7W70	Capacity W		26 000	30 000	35 000	39 000
	Rated input W		10 610	12 200	14 900	17 490
	COP		2.45	2.46	2.35	2.23
Heating A7W80	Capacity W		25 800	28 430	32 820	36 580
	Rated input W		11 370	12 890	16 830	18.17
	COP		2.27	2.20	1.95	1.85
Heating A-7W35	Capacity W		26 060	29 040	33 150	36 520
	Rated input W		10 620	11 600	14 460	15 590
	COP		2.45	2.50	2.29	2.33
Heating A-7W55	Capacity W		27 430	30 220	34 900	38 010
	Rated input W		13 350	15 140	18 180	20 750
	COP		2.05	2.00	1.92	1.83
Heating A-7W70	Capacity W		28 630	31 540	36 420	39 670
	Rated input W		16 110	18 260	21 930	25 040
	COP		1.78	1.73	1.66	1.58
Heating A-7W80	Capacity W		24 320	26 800	30 940	33 700
	Rated input W		15 430	17 490	21 000	23 980
	COP		1.58	1.53	1.47	1.41
Heating A-10W35	Capacity W		25 580	28 180	32 540	36 260
	Rated input W		9 760	10 750	13 280	16 370
	COP		2.62	2.62	2.45	2.23
Heating A-10W55	Capacity W		27 520	30 050	35 010	39 010
	Rated input W		13 190	14 820	17 950	20 750
	COP		2.09	2.03	1.95	1.83
Heating A-10W70	Capacity W		28 460	31 360	36 210	40 350
	Rated input W		15 830	17 950	21 550	25 290
	COP		1.80	1.75	1.68	1.60
Heating A-10W80	Capacity W		21 980	24 220	27 970	31 160
	Rated input W		13 170	14 930	17 930	21 040
	COP		1.67	1.62	1.56	1.48

			BDHX-260R-04T35	BDHX-300R-04T35	BDHX-350R-04T35	BDHX-400R-04T35
Cooling A35W18	Capacity	W	26 000	30 000	35 000	39 000
	Rated input	W	5 600	6 800	8 500	9 850
	EER		4.64	4.41	4.12	3.96
Cooling A35W7	Capacity	W	26 000	30 000	32 000	32 000
	Rated input	W	8 400	10 700	11 980	11 980
	EER		3.10	2.80	2.67	2.67
Seasonal space heating energy efficiency class	Water outlet at 35°C		A+++	A+++	A+++	A++
	Water outlet at 55°C		A+++	A++	A++	A++
	SCOP	Warmer climate	35°C	6.57	6.26	6.08
			55°C	4.94	4.90	4.75
		Average climate	35°C	4.95	4.92	4.48
			55°C	3.84	3.79	3.63
		Colder climate	35°C	3.95	3.91	3.85
			55°C	3.23	3.14	3.03
SEER	Water outlet	7°C	5.21	4.99	4.82	4.82
		18°C	7.17	6.80	6.43	6.22
ErP Sound power level		dB	69	74	75	76
Sound power level	Heating A7W35	dB	70	75	75.5	77
	Heating Max.	dB	74.5	75	75.5	77.5
	Heating Silence mode 1	dB	63	65	65.5	69
	Heating Silence mode 2	dB	62	62	63.5	65
	Cooling A35W18	dB	70	74	74	73.5
	Cooling max	dB	75	76	75	74
	Cooling Silence mode 1	dB	66	66.5	68.5	65.5
	Cooling Silence mode 2	dB	62	63	65	62
Sound pressure level (1m)	Heating A7W35	dB(A)	55	61	62	62
	Heating Max.	dB(A)	61	61	63	63
	Heating Silence mode 1	dB(A)	48.5	50.5	51	54
	Heating Silence mode 2	dB(A)	45	47	48	50.5
	Cooling A35W18	dB(A)	60	60	61	60
	Cooling max	dB(A)	60	60	61	60
	Cooling Silence mode 1	dB(A)	50	54	53.5	52
	Cooling Silence mode 2	dB(A)	47	48	49.5	49
Sound pressure level (2m)	Heating A7W35	dB(A)	53	58	58	/
	Heating Max.	dB(A)	58	58	59	/
	Heating Silence mode 1	dB(A)	48	48	50	/
	Heating Silence mode 2	dB(A)	45	46	47.5	/
	Cooling A35W18	dB(A)	56	56	57	/
	Cooling max	dB(A)	56	57	57	/
	Cooling Silence mode 1	dB(A)	46	49	49	/
	Cooling Silence mode 2	dB(A)	44	45	46.5	/

			<b>BDHX-260R-04T35</b>	<b>BDHX-300R-04T35</b>	<b>BDHX-350R-04T35</b>	<b>BDHX-400R-04T35</b>
Water flow range	m3/h		1.2-5.4	1.2-6.2	1.2-7.2	1.2-8.1
Compressor	Type			Scroll		
Outdoor fan	Motor type / Nb of fans			DC fan / 2		
Air side heat exchanger				Finned tube heat exchanger		
Refrigerant				R290 2900g		
Unit dimension (W×H×D)	mm			1384×1816×523		
Packing dimension (W×H×D)	mm			1480×2000×570		
Net weight	kg			260		
Gross weight	kg			285		
Water side heat exchanger				Plate heat exchanger		
Water side Connection dimension				DN32		
Water pump	Max. pump head	m		12		
Expansion vessel (Primary circuit)	Nominal volume	L		5		
	Max. working pressure	Bar		8		
Safety valve	Bar			3		
Flow switch	m3/h			0.87		
Outdoor air temperature range	Cooling	°C		-15~48		
	Heating	°C		-25~43		
	DHW	°C		-25~43		
Water setting temperature range	Cooling	°C		5~25		
	Heating	°C		25~85		
	DHW	°C		20~75		
<b>Notes:</b>						
The above data test reference standard EN14511; EN14825; EN50564;EN 12102; ( EU) No:811						

## 2.1.Electrical characteristics

### Main power supply

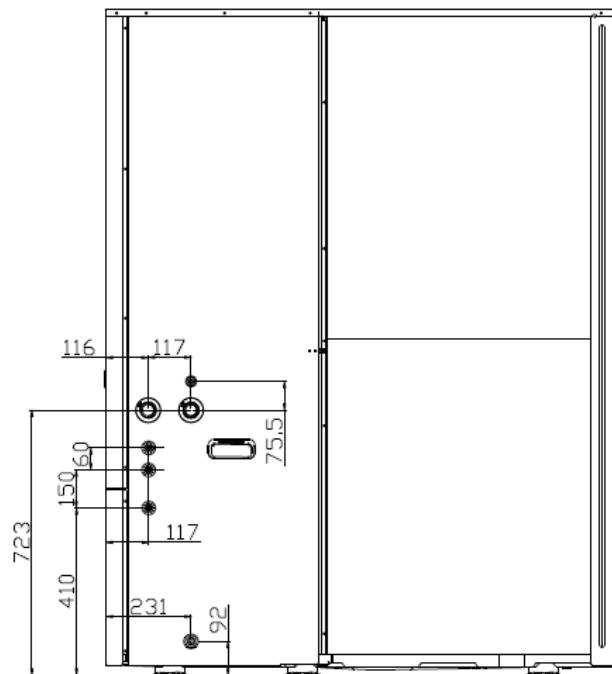
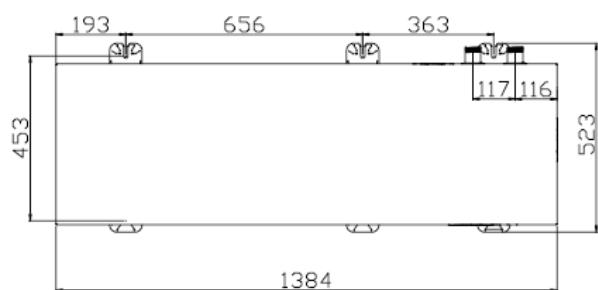
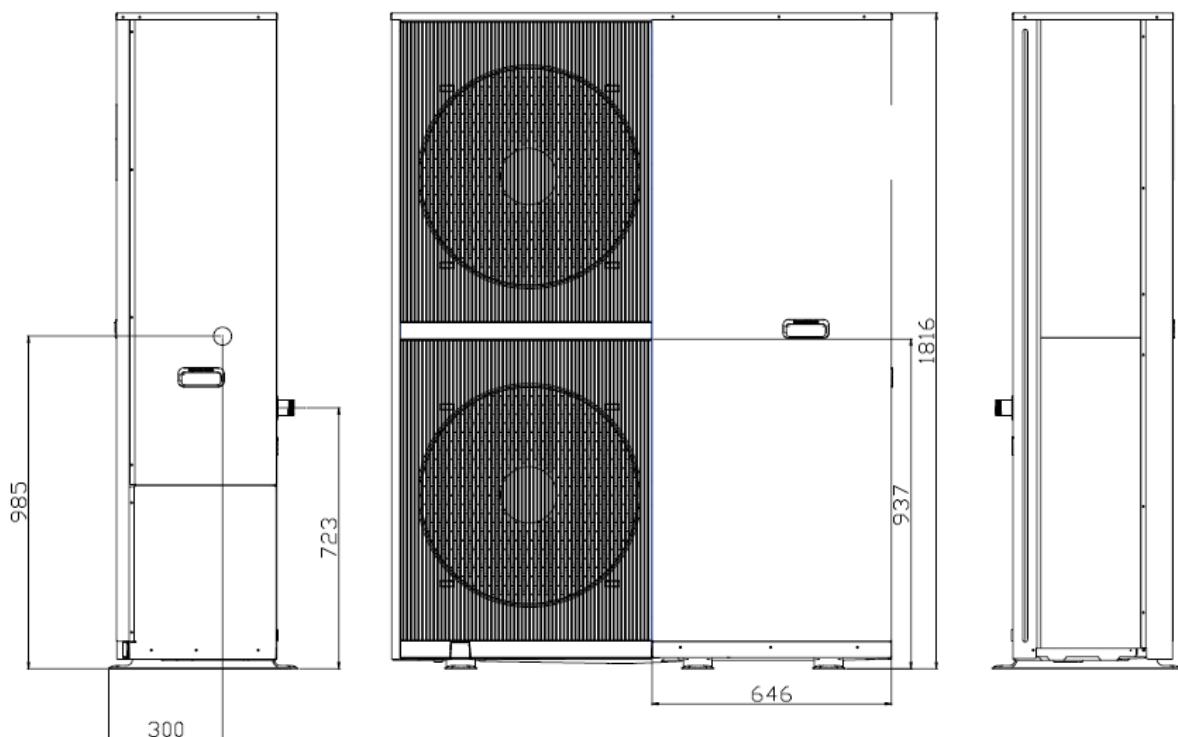
System	Outdoor unit			Power current			Fan	
	Power supply	Min. (V)	Max. (V)	MCA (A)	TOCA (A)	MFA (A)	kW	FLA (A)
BDHX-260R-04T35	380~415V / 3N / 50Hz	342	456	28	35	32	0.2	1.1
BDHX-300R-04T35	380~415V / 3N / 50Hz	342	456	30	35	40	0.2	1.1
BDHX-350R-04T35	380~415V / 3N / 50Hz	342	456	32	35	40	0.2	1.1
BDHX-400R-04T35	380~415V / 3N / 50Hz	342	456	32	35	40	0.2	1.1

Note :

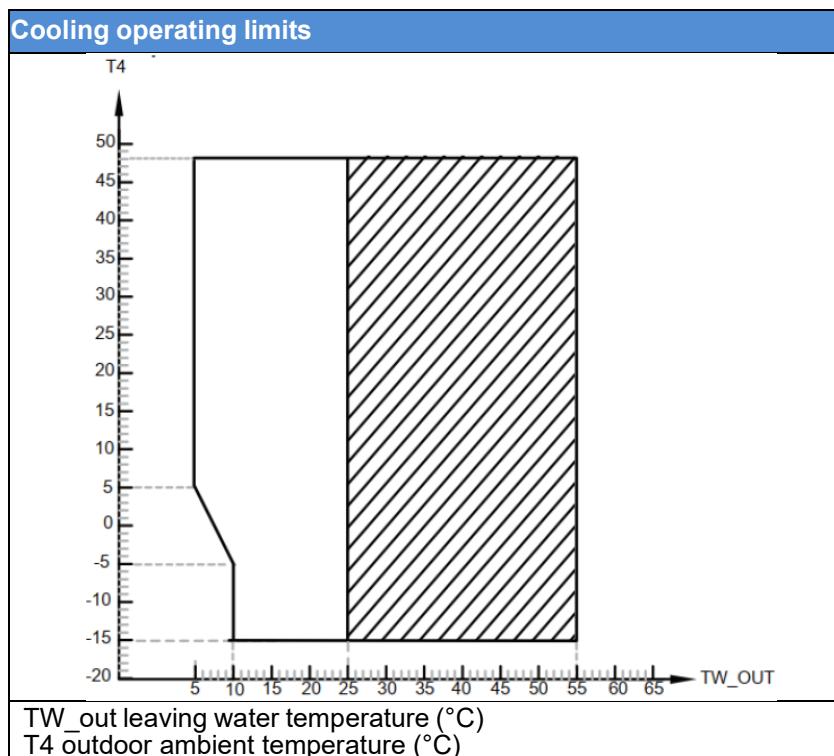
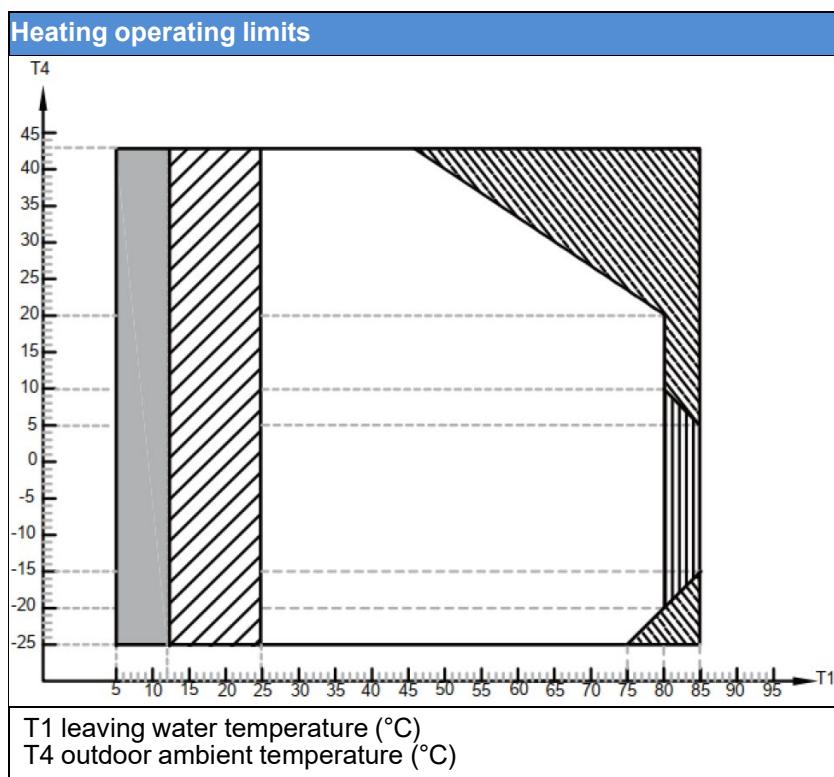
Name	Description	Explanation
Min. & Max.	Minimum & Maximum running voltage (V)	Required voltage range for system operation
MCA	Min. Circuit Amps. (A)	To determine the minimum wire diameter
TOCA	Total Over-current Amps. (A)	The maximum current for protecting system
MFA	Max. Fuse Amps. (A)	To determine air-break switch /circuit breaker/ Fuse
MSC	Max. Starting Amps. (A)	The starting current of the inverter compressor is very small and can be ignored.
FLA	Full Load Amps. (A)	The current measured by the motor at rated voltage and rated speed (usually the highest speed of Motor) under rated load.

## 2.2.Dimensions and Center of Gravity

unit: mm

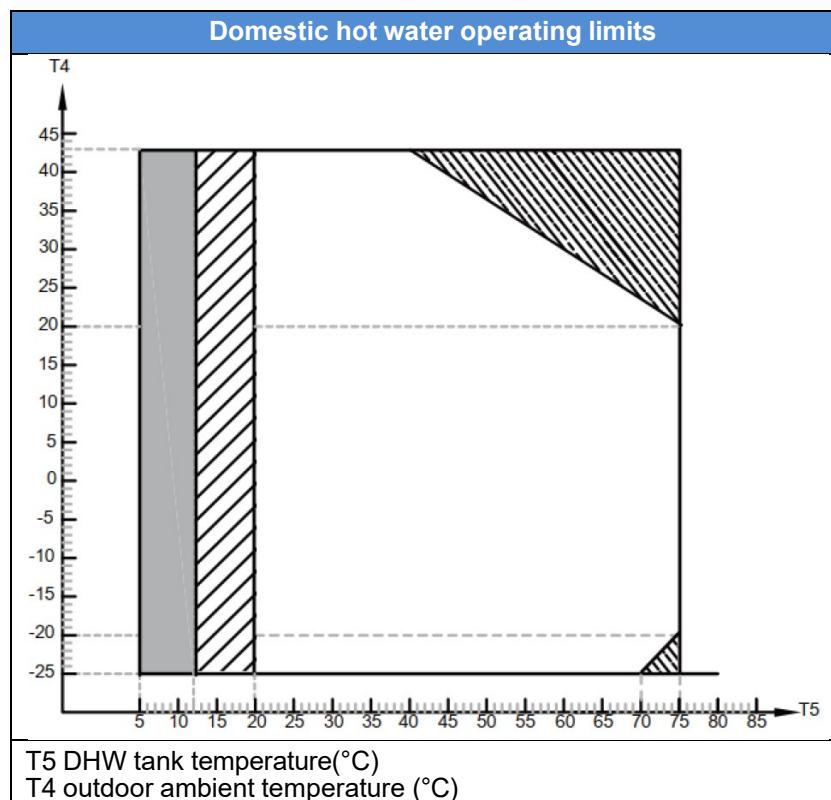


## 2.3.Operating limit



Notes:

1. ■ If IBH/AHS setting is valid, only IBH/AHS turns on; If IBH/AHS setting is invalid, only heat pump turns on. Limitation and protection may occur during heat pump operation.
2. ▹ Operation range by heat pump with possible limitation and protection.
3. ▲ Heat pump turns off, only IBH/AHS on.
4. ▲▲ The minimum adjustable water flow of the pump needs to be as low as 1.2m<sup>3</sup>/h.

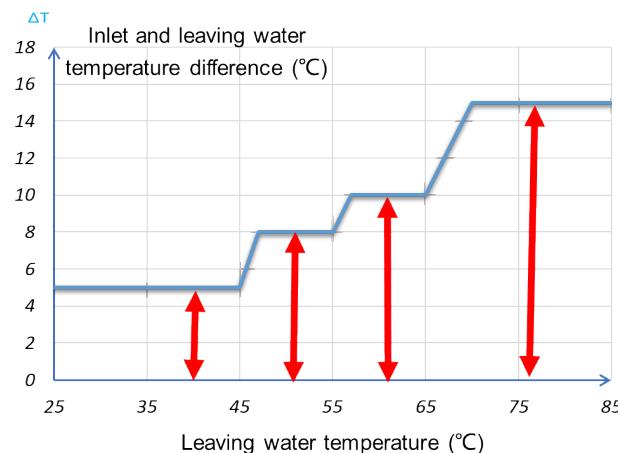


**Notes:**

1. If IBH/AHS setting is valid, only IBH/AHS turns on; If IBH/AHS setting is invalid, only heat pump turns on. Limitation and protection may occur during heat pump operation.
2. Operation range by heat pump with possible limitation and protection.
3. Heat pump turns off, only IBH/AHS on.

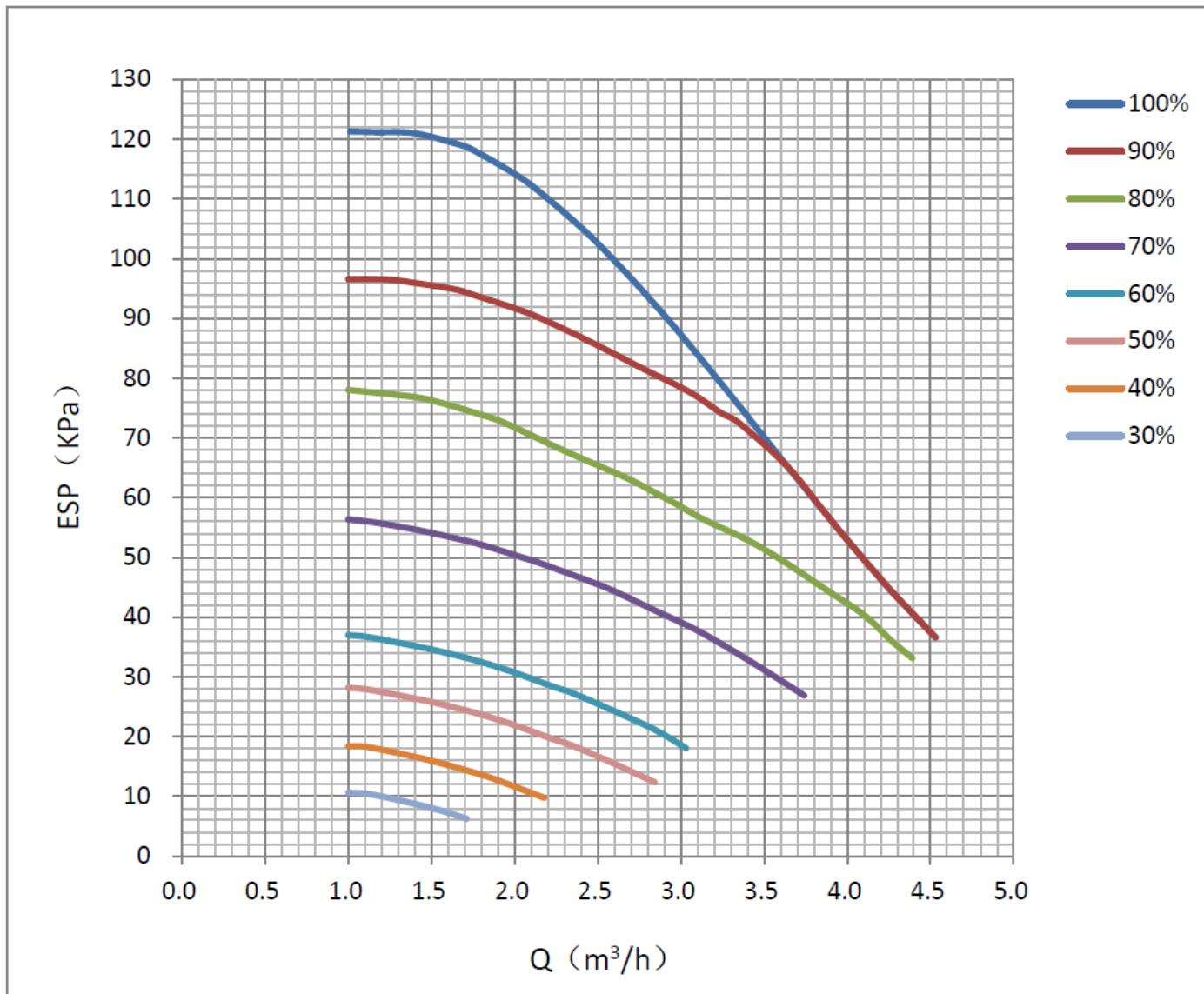
## 2.4.Water flow temperature according water temperature target

In the heating mode, the temperature difference between the inlet and leaving water of the unit is shown in the figure below :



Water temperature target	$\Delta T$
$T < 47^\circ\text{C}$	5°C
$47^\circ\text{C} \leq T < 57^\circ\text{C}$	8°C
$57^\circ\text{C} \leq T < 65^\circ\text{C}$	10°C
$T \geq 70^\circ\text{C}$	15°C

## 2.5.Hydronic Performance



Abbreviations:

ESP: External static pressure

















































## 2.7.Sound levels

### 2.7.1.Sound pressure levels<sup>1</sup>

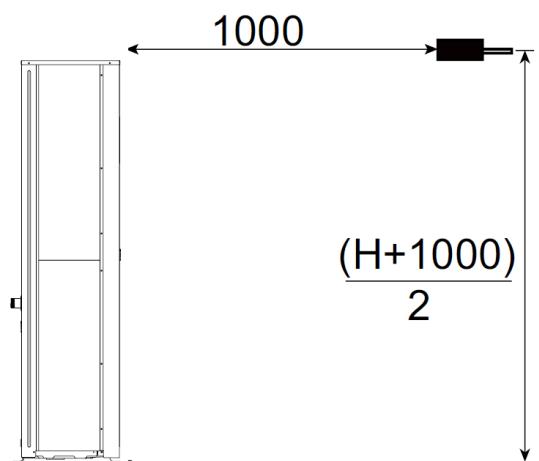
Model name	dB(A) <sup>2</sup>
BDHX-260R-04T35	74,5
BDHX-300R-04T35	74,8
BDHX-350R-04T35	75,5
BDHX-400R-04T35	77,5

Notes:

1.Sound pressure level is measured at a position 1m in front of the unit and  $(1+H)/2$ m (where H is the height of the unit) above the floor in a semi-anechoic chamber. During on-site operation, sound pressure levels may be higher as a result of ambient noise.

*Sound pressure level measurement (unit: mm)*

Front

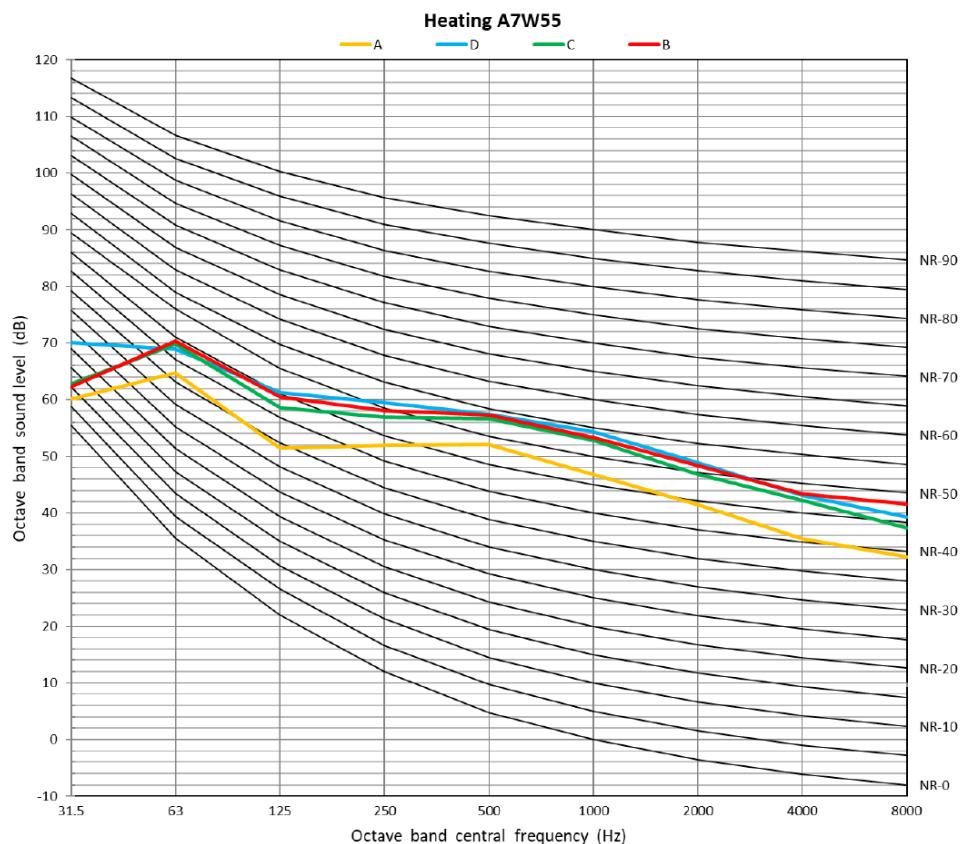
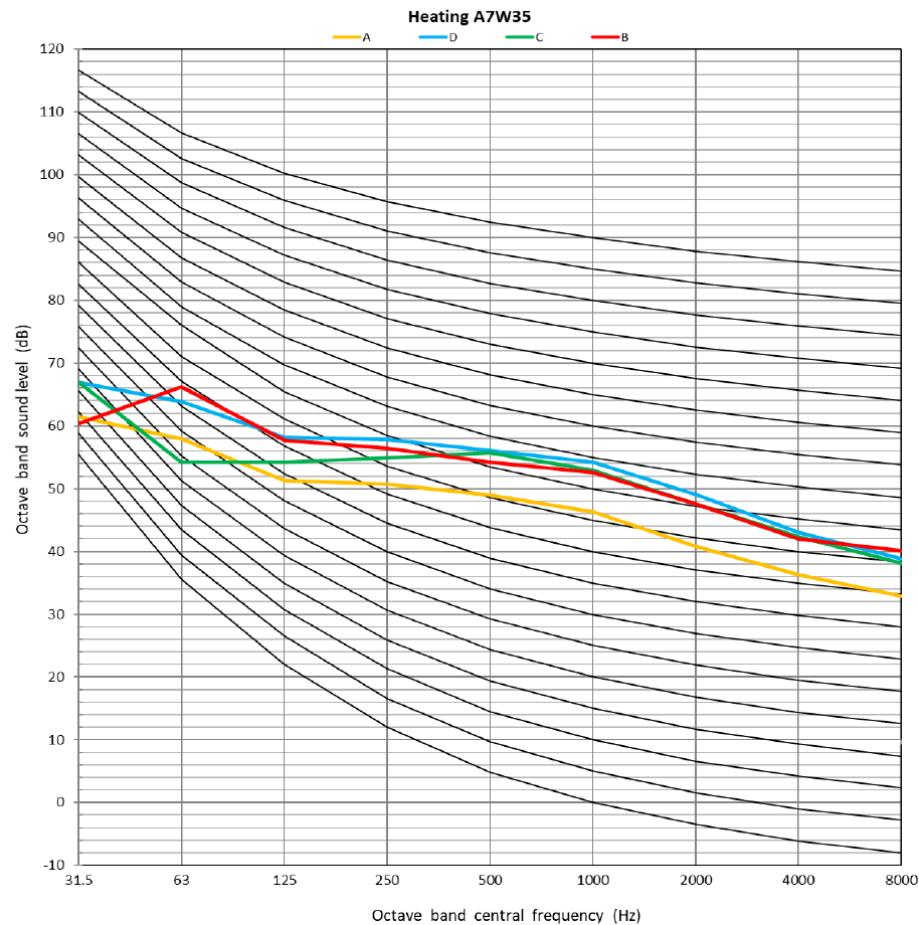


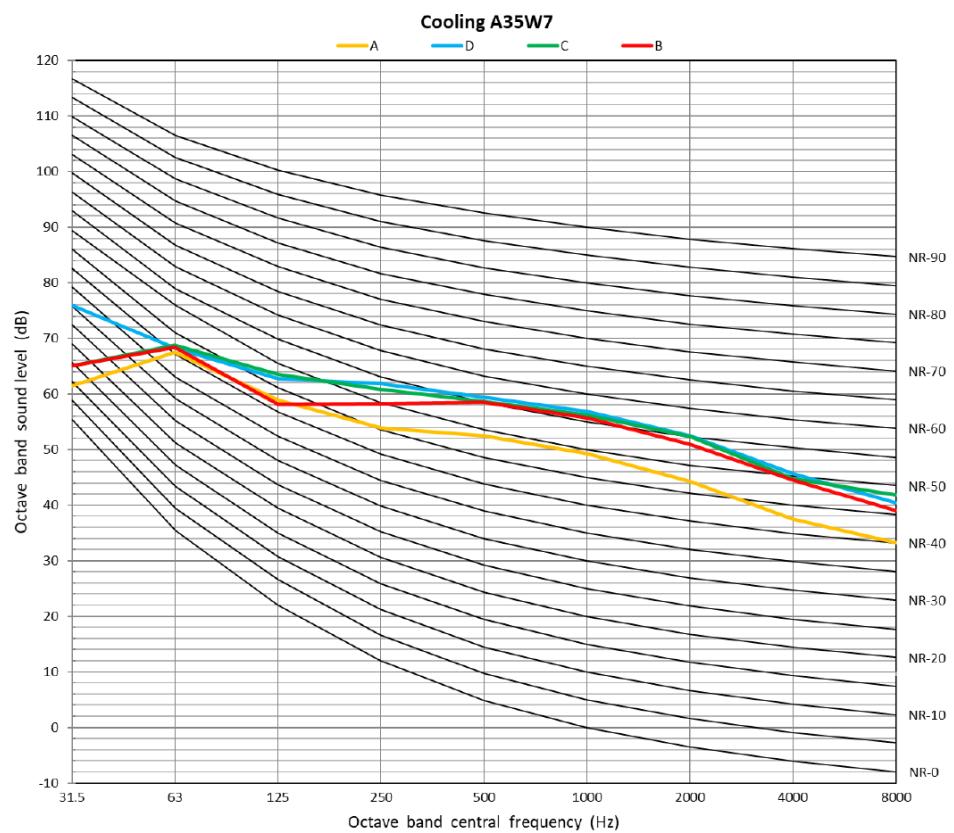
2.dB(A) is the maximum value tested under the conditions below:

Outdoor air temperature 7°C DB, 85% R.H.; EWT 30°C, LWT 35°C. Free compressor frequency.

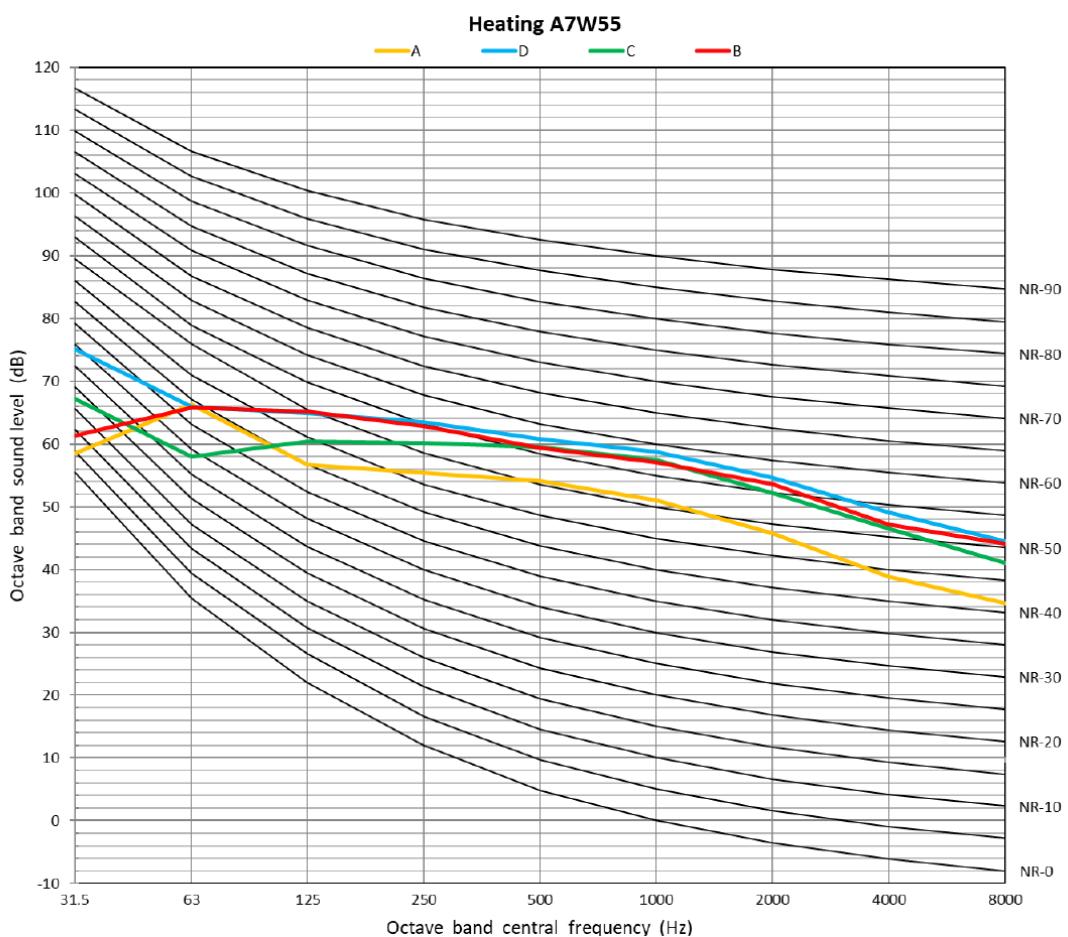
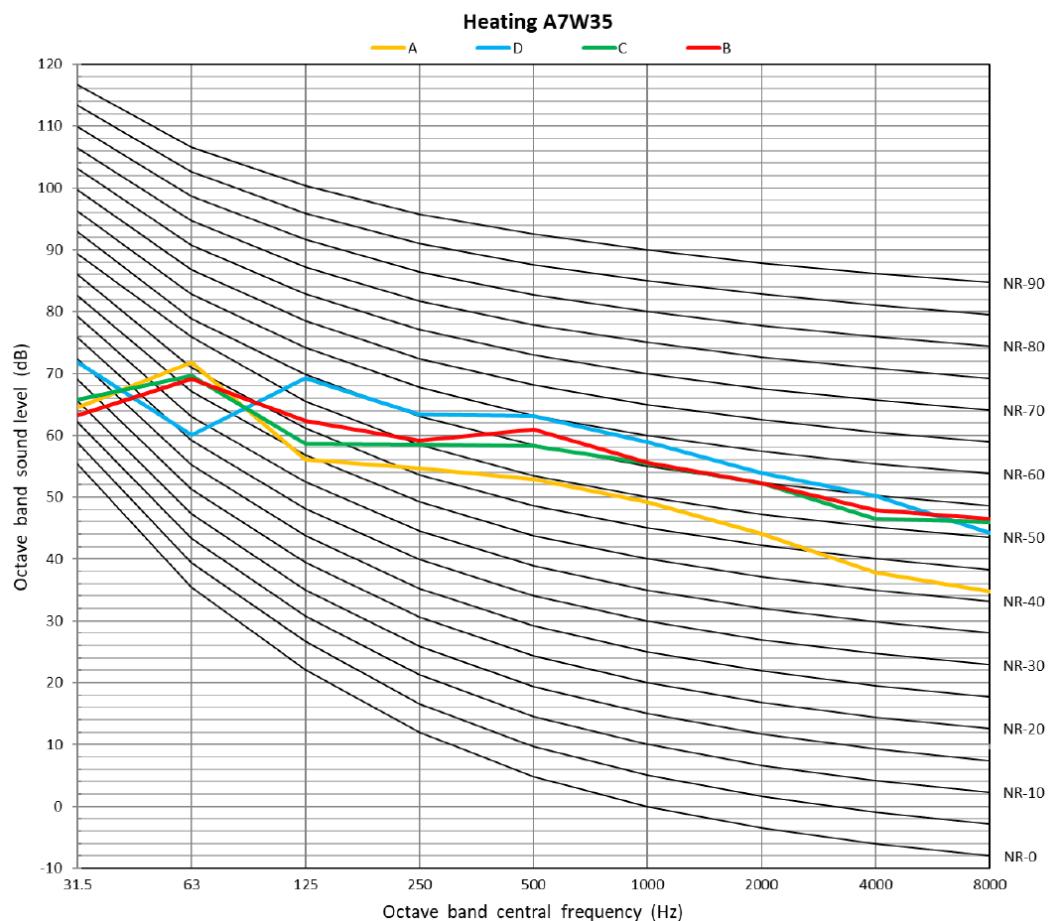
## 2.7.2.Octave Band Levels

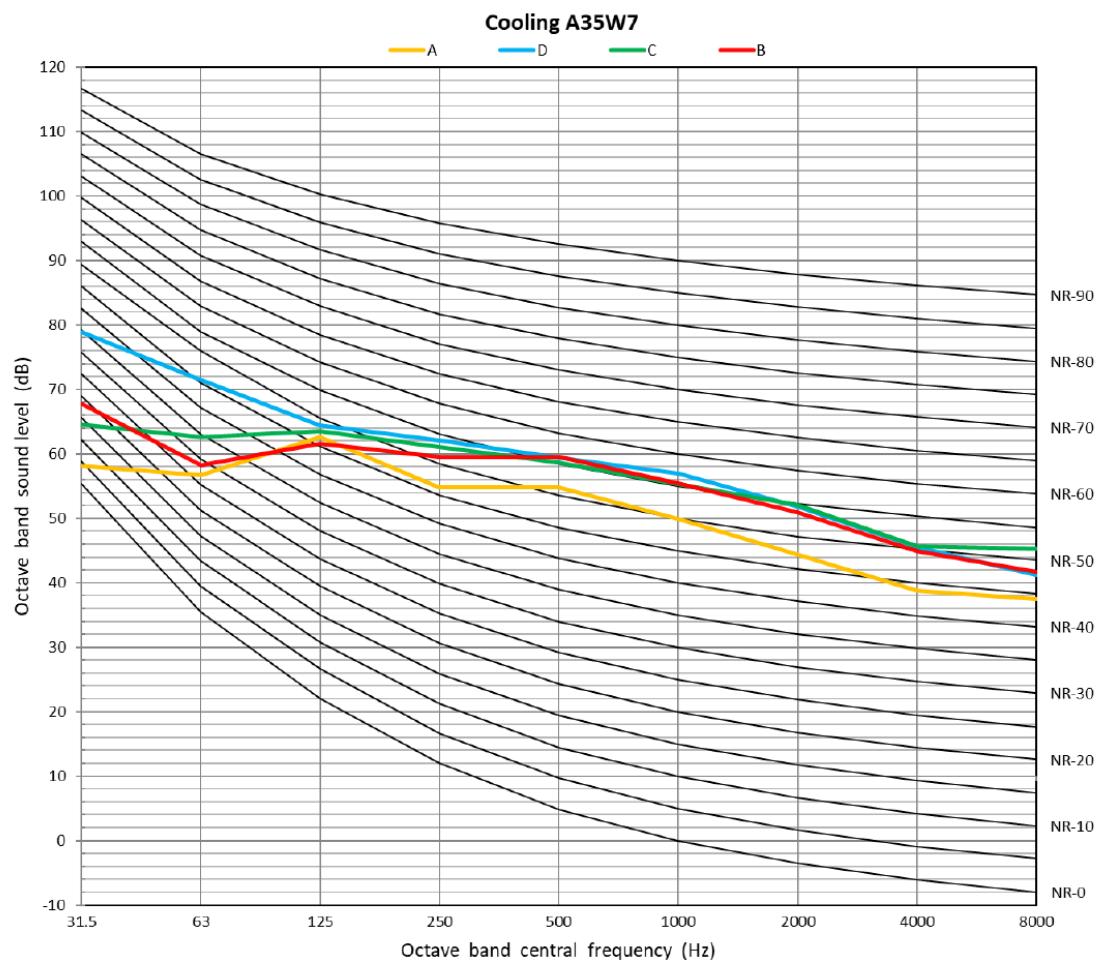
### 2.7.2.1. BDHX-260R-04T35



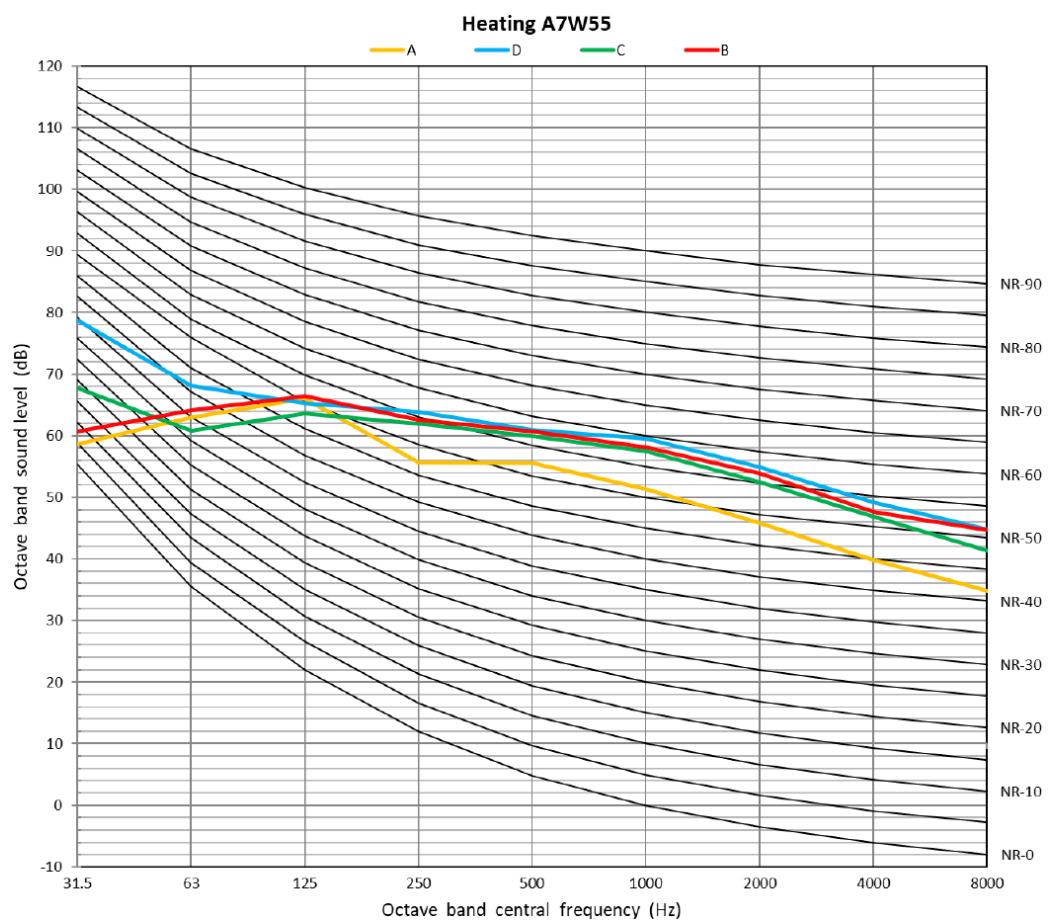
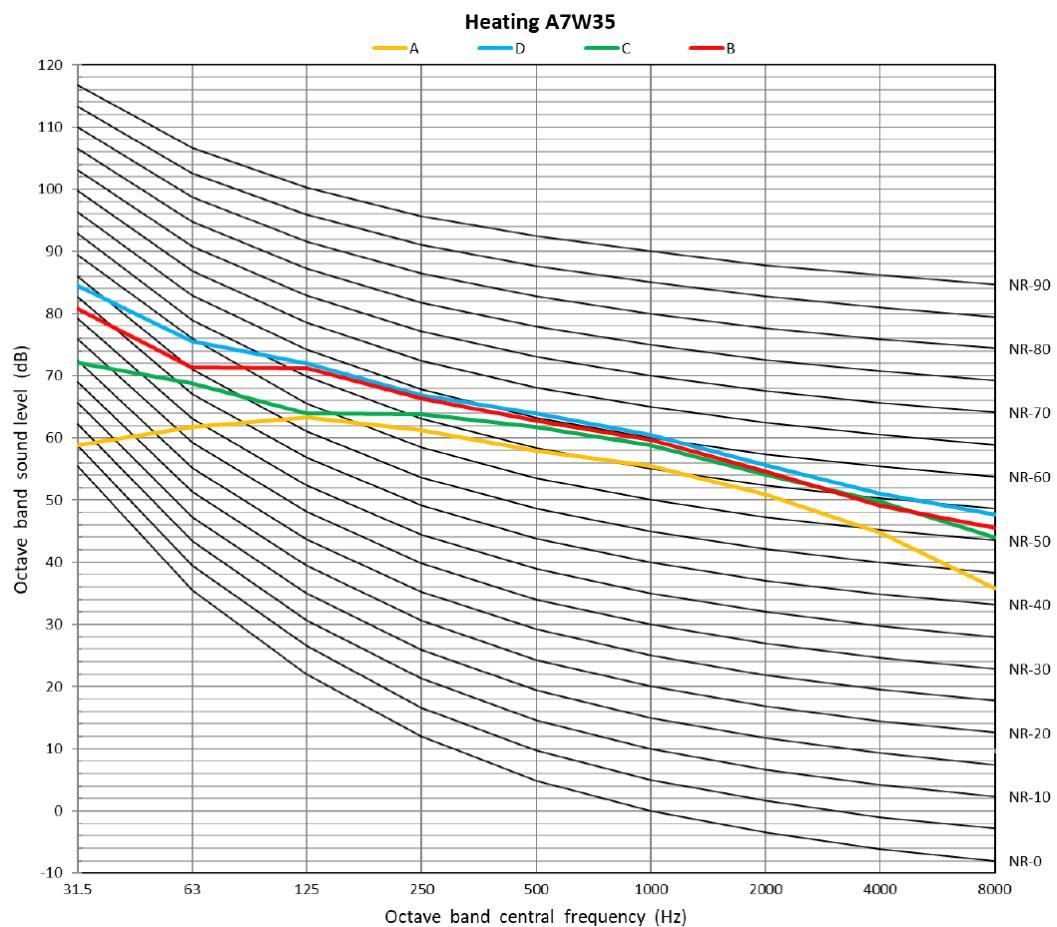


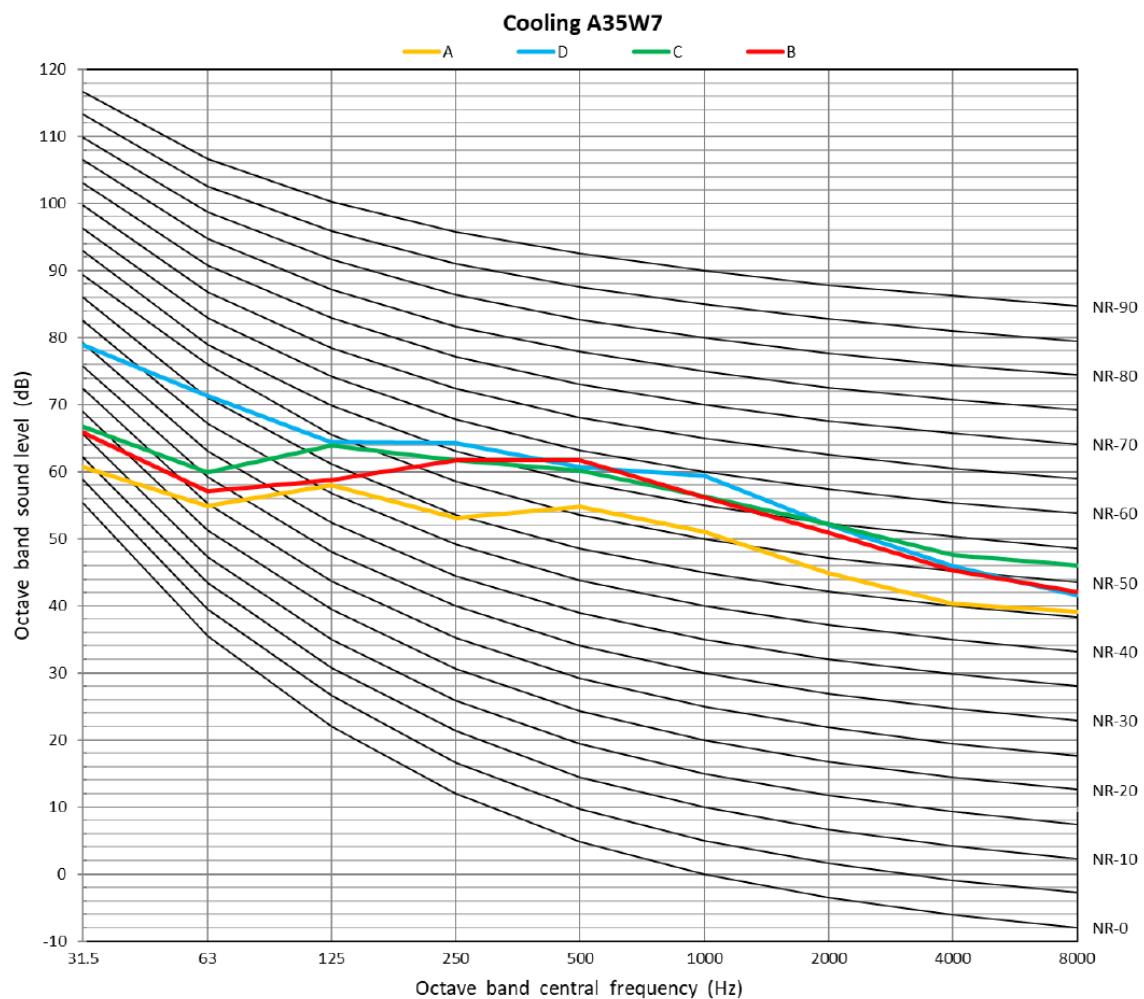
### 2.7.2.2. BDHX-300R-04T35



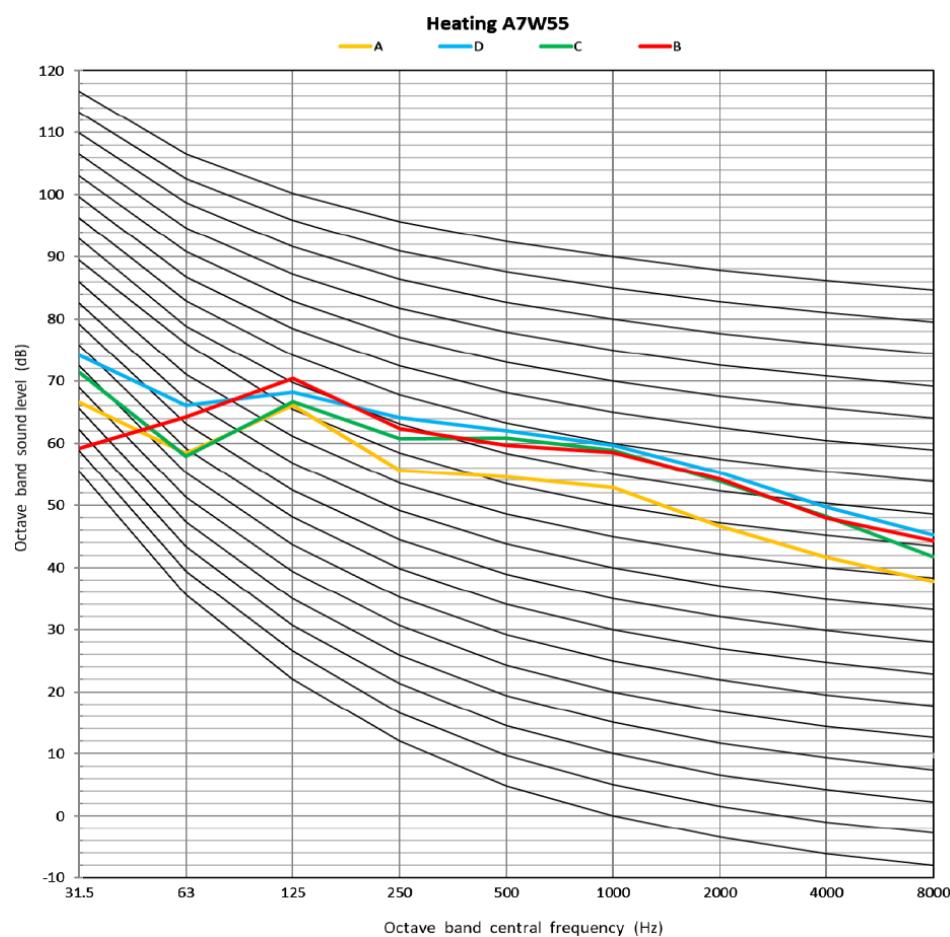
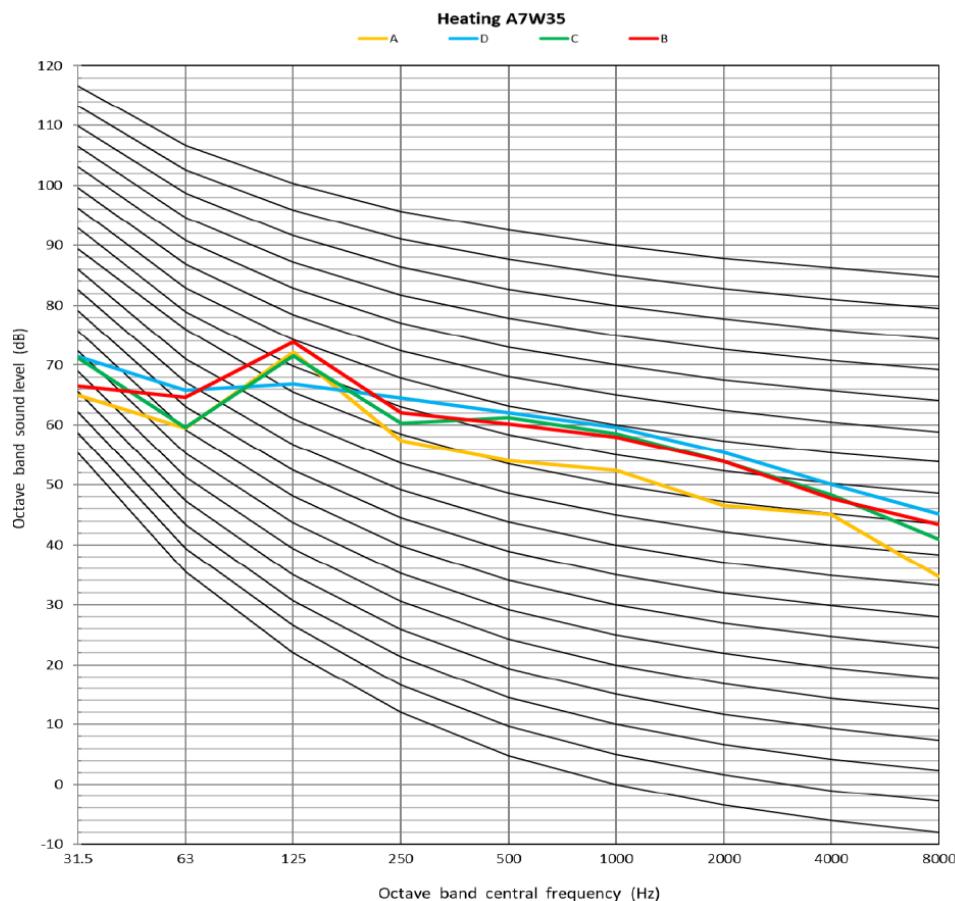


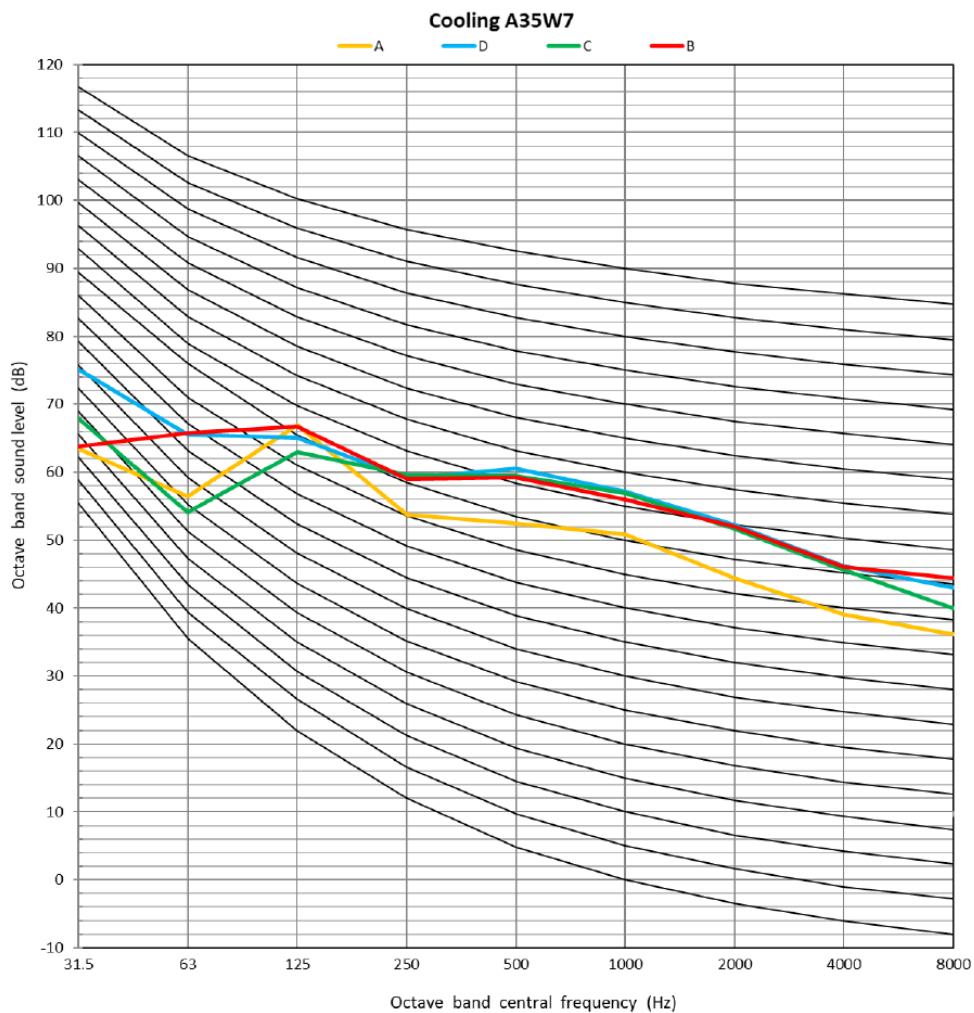
### 2.7.2.3. BDHX-350R-04T35





#### 2.7.2.4. BDHX-400R-04T35





## 2.8.Configuration

Title	Code	State	Default	Min	Max	Interval	Unit
DHW heating setting	DHW mode	Enable or disable DHW mode: 0=NON, 1=YES	1	2	1	1	/
	Disinfect	Enable or disable the disinfect mode: 0=NON, 1=YES	1	2	1	1	/
	DHW priority	Enable or disable DHW priority mode: 0=NON, 1=YES	1	2	1	1	/
	Pump_D	Enable or disable DHW pump mode: 0=NON, 1=YES	0	0	1	1	/
	DHW priority time set	Enable or disable DHW priority time setting: 0=NON, 1=YES	0	0	1	1	/
	dT5_ON	The temperature difference for starting DHW mode	10	1	30	1	°C
	dT1S5	The difference value between Twout and T5 in DHW mode	10	5	40	1	°C
	T4DHWMAX	The maximum ambient temperature at which the heat pump can operate for domestic water heating	43	35	43	1	°C
	T4DHWMIN	The minimum ambient temperature at which the heat pump can operate for domestic water heating	-10	-25	30	1	°C
	t_INTERVAL_DHW	The start time interval of the compressor in DHW mode	5	5	5	/	Minutes
	T5S_DISINFECT	The target temperature of water in the domestic hot water tank in DISINFECT mode	65	60	70	1	°C
	t_DI_HIGHEMP.	The time for which the highest temperature of water in the domestic hot water tank in DISINFECT mode lasts	15	5	60	5	Minutes
	t_DI_MAX	The maximum time for which disinfection lasts	210	90	300	5	Minutes
	t_DHWHP_RESTRICT	The operating time for heating/cooling	30	10	600	5	Minutes
Cooling setting	t_DHWHP_MAX	The maximum continuous operating time of the heat pump in DHW PRIORITY mode	90	10	600	5	Minutes
	PUMP_D TIMER	Enable or disable the DHW pump to run as scheduled and to keep running for PUMP RUNNING TIME: 0=NON, 1=YES	1	0	1	1	/
	PUMP_D RUNNING TIME	The certain time for which the DHW pump keeps running	5	5	120	1	Minutes
	PUMP_D DISINFECT	Enable or disable the DHW pump to operate when the unit is in DISINFECT mode and T5 is larger than or equal to T5S_DI-2: 0=NON, 1=YES	1	0	1	1	/
	ACS function	Enable or disable the double DHW tanks: 0=NON, 1=YES	0	0	1	1	/
	Cooling mode	Enable or disable the cooling mode: 0=NON, 1=YES	1	0	1	1	/
	t_T4_FRESH_C	The refresh time of climate-related curves in cooling mode	0.5	0.5	6	0.5	Hours
	T4CMAX	The highest ambient operating temperature in cooling mode	52	35	52	1	°C
	T4CMIN	The lowest ambient operating temperature in cooling mode	10	-5	25	1	°C
	dT1SC	The temperature difference for starting the heat pump (T1)	5	2	10	1	°C
	dTSC	The temperature difference for starting the heat pump (Ta)	2	1	10	1	°C
	t_INTERVAL_C	Compressor operation delay in cooling mode	5	5	5	/	Minutes
	Zone 1 C-emission	The type of Zone 1 terminal for cooling mode: 0=FCU (fan coil unit), 1=RAD. (radiator), 2=FLH (floor heating)	0	0	2	1	/
	Zone 2 C-emission	The type of Zone 2 terminal for cooling mode: 0=FCU (fan coil unit), 1=RAD. (radiator), 2=FLH (floor heating)	0	0	2	1	/

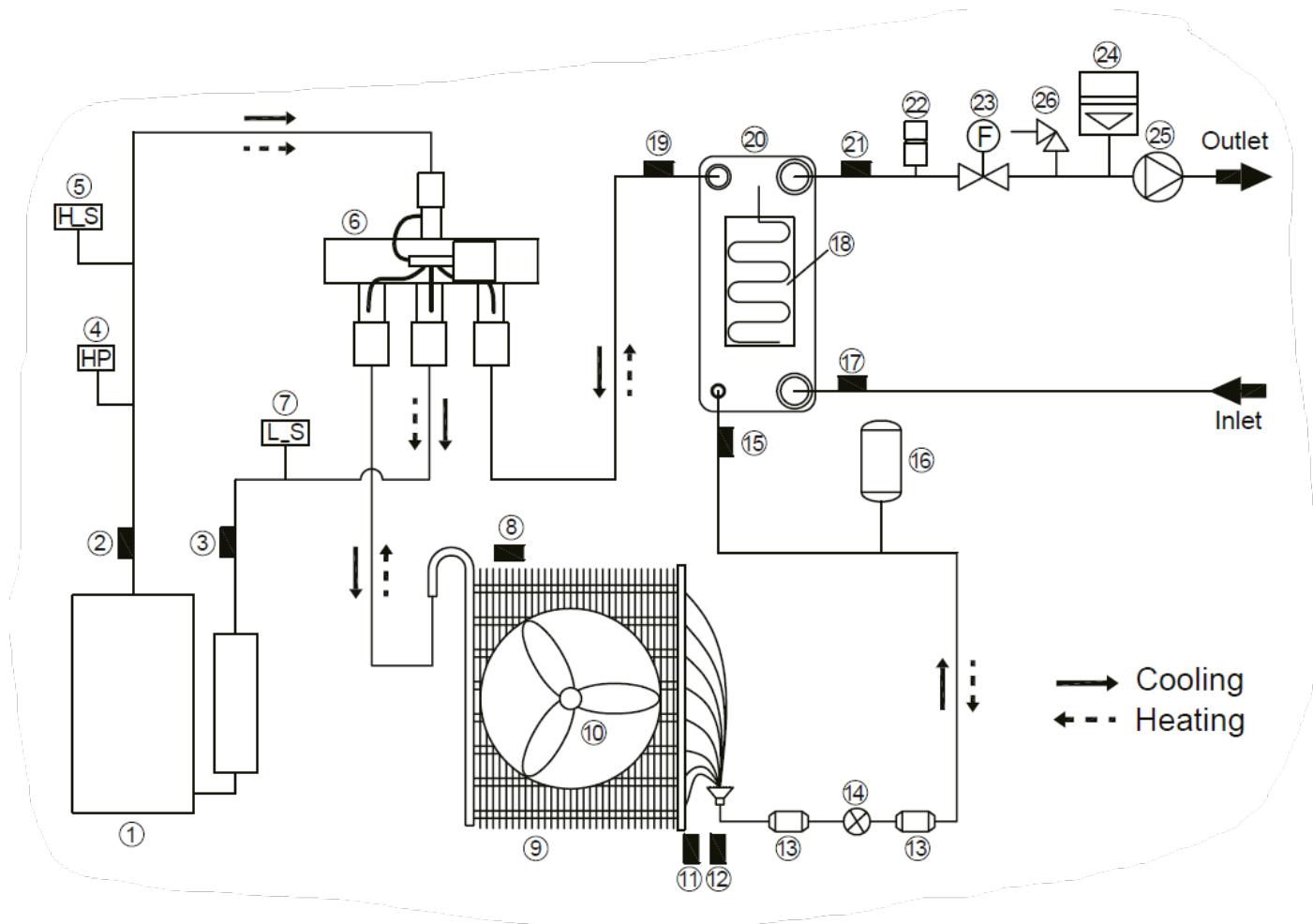
Title	Code	State	Default	Min	Max	Interval	Unit
Heating setting	Heating mode	Enable or disable the heating mode: 0=NON, 1=YES	1	0	1	1	/
	t_T4_FRESH_H	The refresh time of climate-related curves in heating mode	0.5	0.5	6	0.5	Hour
	T4HMAX	The maximum ambient operating temperature in heating mode	25	20	35	1	°C
	T4HMIN	The minimum ambient operating temperature in heating mode	-15	-25	30	1	°C
	dT1SH	The temperature difference for starting the unit (T1)	5	2	20	1	°C
	dTS	The temperature difference for starting the unit (Ta)	2	1	10	1	°C
	t_INTERVAL_H	Compressor operation delay in heating mode	5	5	5	/	Minute
	Zone 1 H-emission	The type of Zone 1 terminal for heating mode: 0=FCU (fan coil unit), 1=RAD. (radiator), 2=FLH (floor heating)	1	0	2	1	/
	Zone 2 H-emission	The type of Zone 2 terminal for heating mode: 0=FCU (fan coil unit), 1=RAD. (radiator), 2=FLH (floor heating)	2	0	2	1	/
	Force defrost	Enable or disable the force defrost: 0=NON, 1=YES	0	0	1	1	/
AUTO mode setting	T4AUTOCMIN	The minimum operating ambient temperature for cooling in auto mode	25	20	29	1	°C
	T4AUTOHMAX	The maximum operating ambient temperature for heating in auto mode	17	10	17	1	°C
Temp. type setting	Water flow temp.	Enable or disable the WATER FLOW TEMP.: 0=NON, 1=YES	1	0	1	1	/
	Room temp.	Enable or disable the ROOM TEMP.: 0=NON, 1=YES	0	0	1	1	/
	Double zone	Enable or disable the DOUBLE ZONE: 0=NON, 1=YES	0	0	1	1	/
Room thermostat setting	Room thermostat	The style of room thermostat: 0=NON, 1=MODE SET, 2=ONE ZONE, 3=DOUBLE ZONE	0	0	3	1	/
	Mode set priority	Select the priority mode in ROOM THERMOSTAT: 0=HEAT, 1=COOL	0	0	1	1	/
Other heat source	IBH FUNCTION	Select the mode of IBH (BACKUP HEATER): 0=HEAT+DHW, 1=HEAT	0	0	1	1	/
	IBH locate	IBH/AHS installation location: 0=pipe loop	0	0	0	/	/
	dT1_IBH_ON	The temperature difference between T1S and T1 for starting the backup heater	5	2	10	1	°C
	t_IBH_DELAY	The time for which the compressor has run before startup of the first step backup heater	30	15	120	5	Minute
	T4_IBH_ON	The ambient temperature for starting the backup heater	-5	-15	30	1	°C
	P_IBH1	Power input of IBH1	0	0	20	0.5	kW
	P_IBH2	Power input of IBH2	0	0	20	0.5	kW
	AHS FUNCTION	Enable or disable the AHS (AUXILIARY HEATING SOURCE) function: 0=NON, 1=HEAT, 2=HEAT+DHW	0	0	2	1	/
	AHS_PUMPI CONTROL	Select the pump operating status when only AHS runs: 0=RUN, 1=NOT RUN	0	0	1	1	/
	dT1_AHS_ON	The temperature difference between T1S and T1 for starting the auxiliary heating source	5	2	20	1	°C
	t_AHS_DELAY	The time for which the compressor has run before startup of the additional heating source	30	5	120	5	Minute
	T4_AHS_ON	The ambient temperature for starting the additional heating source	-5	-15	30	1	°C
	EnSwitchPDC	Enable or disable automatic switch of heat pump and auxiliary heating source based on running cost: 0=NON, 1=YES	0	0	1	1	/
	GAS-COST	Price of gas	0.85	0	5	0.01	Price/m³
	ELE-COST	Price of electricity	0.20	0	5	0.01	Price/kWh
	MAX-SETHEATER	Maximum set temperature of additional heating source	80	0	80	1	°C

Other heat source	MIN-SETHEATER	Minimum set temperature of additional heating source	30	0	80	1	°C
	MAX-SIGHEATER	The voltage corresponding to the maximum set temperature of additional heating source	10	0	10	1	V
	MIN-SIGHEATER	The voltage corresponding to the minimum set temperature of additional heating source	3	0	10	1	V
	TBH FUNCTION	Enable or disable the TBH (TANK BOOSTER HEATER) function: 0=NON, 1=YES	1	0	1	1	/
	dT5_TBH_OFF	The temperature difference between T5 and T5S (the set water tank temperature) for turning the booster heater off	5	0	10	1	°C
	t_TBH_DELAY	The time for which the compressor has run before startup of the booster heater	30	0	240	5	Minute
	T4_TBH_ON	The ambient temperature for starting the tank booster heater	5	-5	50	1	°C
	P_TBH	Power input of TBH	2	0	20	0.5	kW
	Solar function	Enable or disable the SOLAR function: 0=NON, 1=ONLY SOLAR, 2=SOLAR+HP (HEAT PUMP)	0	0	2	1	/
	Solar control	Solar pump (pump_s) control: 0=Tsolar, 1=SL1SL2	0	0	1	1	/
	Deltatsol	The temperature deviation for enabling SOLAR	10	5	20	1	°C
Holiday away setting	T1S_H.A_H	The target outlet water temperature for space heating in HOLIDAY AWAY mode	25	20	25	1	°C
	T5S_H.A_DHW	The target temperature for heating domestic hot water in HOLIDAY AWAY mode	25	20	25	1	°C
Special function	Preheating for floor T1S	The set outlet water temperature during first floor preheating	25	25	35	1	°C
	t_ARSTH	Running time for first floor preheating	72	48	96	12	Hour
	t_Dryup	Temp-up days for floor drying	8	4	15	1	Day
	t_Highpeak	Days for floor drying	5	3	7	1	Day
	t_Drydown	Temp-down days for floor drying	5	4	15	1	Day
	t_Drypeak	Outlet water temperature for floor drying	45	30	55	1	°C
	Start time	The start time of floor drying	00:00	0:00	23:30	1/30	h/min
	Start date	The start date of floor drying	Current date+1	Current date+1	31/12/2099	1/1/1	Dd/mm/yyyy
	Preheating for floor	Enable or disable floor preheating: 0=NON, 1=YES	0	0	1	1	/
	Floor drying up	Enable or disable floor drying: 0=NON, 1=YES	0	0	1	1	/
Auto restart	Auto restart cooling/heating mode	Enable or disable the auto restart of cooling/heating mode: 0=NON, 1=YES	1	0	1	1	/
	Auto restart DHW mode	Enable or disable the auto restart of DHW mode: 0=NON, 1=YES	1	0	1	1	/
Power input limitation	Power input limitation	The type of power input limitation	1	1	8	1	/
Input definition	M1 M2	Define the function of the M1M2 switch: 0=REMOTE ON/OFF, 1=TBH ON/OFF, 2=AHS ON/OFF	0	0	2	1	/
	Smart grid	Enable or disable the SMART GRID: 0=NON, 1=YES	0	0	1	1	/
	T1T2	Control options of Port T1T2: 0=NON, 1=RT/Ta_PCB	0	0	1	1	/
	Tbt	Enable or disable the TBT: 0=NON, 1=YES	0	0	1	1	/
	P_X PORT	Select the function of P_X PORT: 0=DEFORST, 1=ALARM	0	0	1	1	/
Cascade setting	PER_START	Percentage of operating units among all units	10	10	100	10	%
	TIME_ADJUST	Time interval for determining the necessity of unit loading/unloading	5	1	60	1	Minute
HMI address setting	HMI setting	Choose the HMI: 0=MASTER	0	0	0	/	/
	HMI address for BMS	Set the HMI address code for BMS	1	1	255	1	/
	Stop BIT	Upper computer stop bit:	1	1	2	1	/

		1=STOP BIT1, 2=STOP BIT2					
Common setting	t_DELAY PUMP	The time for which the compressor has run before startup of the pump	2	0.2	20	0.5	Minute
	t1_ANTILOCK PUMP	The pump anti-lock interval	24	5	48	1	Hour
	t2_ANTILOCK PUMP RUN	The pump anti-lock running time	60	0	300	30	Second
	t1-ANTILOCK SV	The valve anti-lock interval	24	5	48	1	Hour
	t2-ANTILOCK SV RUN	The valve anti-lock running time	60	0	300	30	Second
	Ta-adj.	The corrected value of Ta inside the wired controller	-2	-10	10	1	°C
	F-PIPE LENGTH	Select the total length of the liquid pipe (F-PIPE LENGTH): 0=F-PIPE LENGTH<10m, 1=F-PIPE LENGTH>=10m	0	0	1	1	/
	PUMP_I SILENT OUTPUT	The Pump_I max output limitation	100	50	100	5	%
	Energy metering	Enable or disable the energy analysis: 0=NON, 1=YES	1	0	1	1	/
	Pump_O	Additional circulation pump P_o operation: 0=ON (keep running) 1=Auto (controlled by the unit)	0	0	1	1	/

## 2.9.Piping Diagram

4-6 kW units (without electric heater)



Item	Description	Item	Description
1	Compressor	14	Electronic expansion valve
2	Temperature sensor (compressor discharge)	15	Temperature sensor (plate heat exchanger inlet refrigerant: cooling)
3	Temperature sensor (compressor suction)	16	Liquid reservoir
4	High pressure switch	17	Temperature sensor (water inlet)
5	High pressure sensor	18	Heat tape (plate heat exchanger)
6	4-way valve	19	Temperature sensor (plate heat exchanger outlet refrigerant: cooling)
7	Low pressure sensor	20	Plate heat exchanger
8	Temperature sensor (outdoor air)	21	Temperature sensor (water outlet)
9	Heat exchanger	22	Automatic air vent valve
10	Fan	23	Water flow switch
11	Temperature sensor (heat exchanger)	24	Expansion vessel
12	Temperature sensor (heat exchanger outlet refrigerant: cooling)	25	Water pump
13	Filter	26	Pressure relief valve



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