MUNDOCLIMA Aerotherm

BIBLOC UNIT - AEROTHERM V17

Service Manual

www.mundoclima.com

Thank you very much for purchasing our product.
Before using your unit, please read this manual carefully and keep it for future reference.

SO30160 to SO30172
English

Content

1. General Information

1.1 Measurements

1.1.1 Outdoor units

Model name	Dimension (mm)	Net/Gross weight (kg)	Power supply
UE BIBLOC AEROTHERM V17 (4KW)	Width: 960 Height: 860 Depth: 380	60/72	220～240-50Hz 1Ph
UE BIBLOC AEROTHERM V17 (6KW)			
UE BIBLOC AEROTHERM V17 (8KW)	Width: 1075 Height: 965 Depth: 395	76/88	220～240-50Hz 1Ph
UE BIBLOC AEROTHERM V17 (10KW)	Width: 900 Height: 1327 Depth: 400	99/112	220～240-50Hz 1Ph
UE BIBLOC AEROTHERM V17 (12KW)			
UE BIBLOC AEROTHERM V17 (14KW)			
UE BIBLOC AEROTHERM V17 (16KW)			
UE BIBLOC AEROTHERM V17 (12KW) (TRIF.)	Width: 900 Height: 1327 Depth: 400	115/128	380～415-50Hz 3Ph
UE BIBLOC AEROTHERM V17 (14KW) (TRIF.)			
UE BIBLOC AEROTHERM V17 (16KW) (TRIF.)			

1.1.2 Hydronic box

Model name	Dimension (mm)	Net/Gross weight (kg)	Power supply
UI BIBLOC AEROTHERM V17 (4 ~ 8KW)	Width: 400 Height: 865 Depth: 427	51/57	220～240-50Hz 1Ph
UI BIBLOC AEROTHERM V17 (10 ~ 16KW)	Width: 400 Height: 865 Depth: 427	54/60	220～240-50Hz 1Ph
UI BIBLOC AEROTHERM V17 (10 ~ 16KW) (TRIF.)	Width: 400 Height: 865 Depth: 427	54/60	380～415-50Hz 3Ph

1.2 External appearance

1.2.1 Outdoor units

4/6kW

8kW

1Ph 10-16kW & 3Ph 12-16kW

1.2.1 Hydronic box

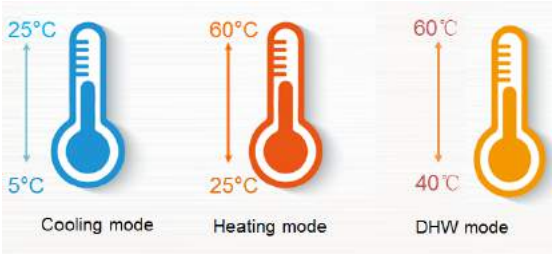
2. Features

Outdoor unit

- Compact structure, independent hydronic box, flexible installation.
- Refrigerant pipes run indoors from the outdoor unit, no need extra insulation of water piping to protect from freezing up.
- No need extra refrigerant within 10m refrigerant pipe length.
- Heating, cooling & domestic hot water, total heat solution

- Wide operation ambient temperature range & Wide water outlet temperature range

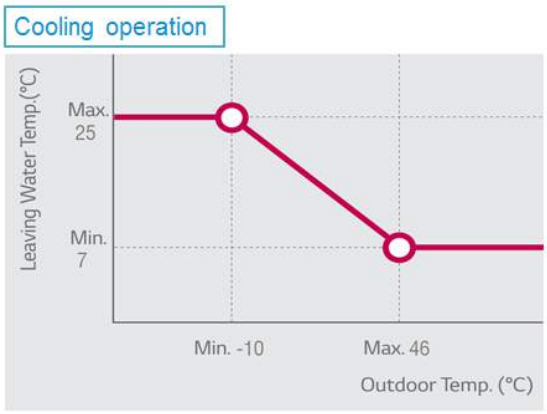
Ambient Temp. range **Water outlet Temp. range**

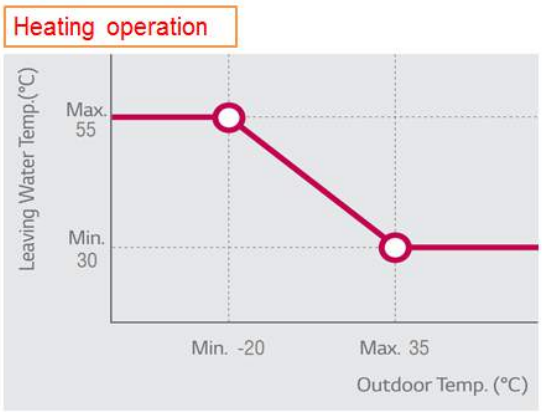


- DC inverter technology to guarantee optimal operational reliability and efficiency. Offers heating capacity of 80% at -7°C thanks to the large heat exchanger and large compressor.
- Compatible with additional heat sources (AHS), including solar energy, fuel boiler, gas boiler and so on. AHS can work together with heat pump or alternative for space heating and domestic hot water dependent on the system control.

- Weather dependent operation with climate correlation to ensure absolute comfort

  Climate correlation curve curves for choice. Once the curve is selected, the unit set the outlet water temperature automatically according to the outdoor ambient temperature.





- Two zones control for more flexibility

  Temperature of each zone is separately controlled. Two zones control reduces water pump cycle time and save energy.
- Priority setting function and multi modes choice
- Special functions such as air purge, preheating for floor and floor drying up for special use

Independent hydronic box

- All hydronic components are pre-assembled, easy for installation.
- All parts are easy to reach for maintenance thanks to the rotatory electric box design.
- Backup E-heater for additional heating during extremely cold outdoor temperatures. The capacity of E-heater is adjustable.
- Standard drain pan in the hydronic box, no worry about condensate water.

3. Specifications

3.1 220-240/1/50 products

Outdoor Split type (Bibloc)			**4KW**	**6KW**	**8KW**
Heating[1]	Capacity	kW	4.10	6.10	8.00
	Rated input	kW	0.82	1.29	1.73
	COP		5.00	4.73	4.62
Heating[2]	Capacity	kW	4.01	5.96	7.34
	Rated input	kW	1.13	1.68	2.13
	COP		3.55	3.55	3.45
Cooling[1]	Capacity	kW	4.10	6.10	8.00
	Rated input	kW	0.79	1.31	1.78
	EER		5.19	4.66	4.49
Cooling[2]	Capacity	kW	4.12	6.15	6.44
	Rated input	kW	1.30	2.08	2.24
	EER		3.17	2.96	2.88
Seasonal space heating energy eff. Class (average climate general)	Water outlet @ 35℃		A++	A++	A++
	Water outlet @ 55℃		A+	A+	A+
Power supply		V/Ph/Hz	220-240/1/50		
Maximum Overcurrent Protection (MOP)		A	20.0		22.0
Minimum Circuit Amps (MCA)		A	18.0		20.0
Dimension (W×H×D)		mm	960×860×380		1075×965×395
Packing (W×H×D)		mm	1040×1000×430		1120×1100×435
Net/gross weight		kg	60/72		76/88
Sound pressure level[3]	Heating	dB(A)	62		64
	Cooing	dB(A)	62		64
Compressor	Brand		Mitsubishi		GMCC
	Model		SNB172FJFMC		ATF250D22UMT
	Type		Twin rotary DC inverter		
	Poles		6	6	6
	Speed		10~130rps	10~130rps	12~120rps
	Max. frequency	Hz	5400	5400	7645
Outdoor fan	Brand		Panisonic/Nidec/WELLING		
	Motor type		Brushless DC motor		
	Model		ZKSP-72-8-1		ZKSP-170-8-1
	Number of fans		1	1	1
	Air flow	m^3/h	3180	3180	5120

Outdoor Split type (Bibloc)				**4KW**	**6KW**	**8KW**
Air side heat exchanger	Number of rows			2	2	2
	Tube pitch(a)x row pitch(b)		mm	25.4/22	25.4/22	25.4/22
	Tube dia. and type			Φ9.52 inner grooved copper		
	Fin space		mm	1.4	1.4	1.8
	Fin type (code)			Hydrophilic aluminum		
	Coil length x height		mm	760×813	760×813	880×914
	Number of circuits			5	5	8
Piping connections	Liquid	Type		Flaring		Flaring
		Dia.(OD)	mm	Φ9.5		Φ9.5
	Gas	Type		Flaring		Flaring
		Dia.(OD)	mm	Φ15.9		Φ15.9
	Piping length	Min.	m	2		2
		Max.	m	20		30
	Installation height difference	Outdoor unit upside	m	10		20
		Outdoor unit downside	m	8		15
Refrigerant	Type/Quantity		kg	R410A/2.5		R410A/2.8
	Throttle type			Electric expansion valve		
Ambient temperature range	Cooling		℃	-5~46		-5~46
	Heating		℃	-20~35		-20~35
	Sanitary hot water		℃	-20~43		-20~43

MOP: Maximum Overcurrent Protection MCA: Minimum Circuit Amps
Nominal capacity is based on the following conditions:

1.Evaporator air in 7℃ ℃85% R.H., Condenser water in/out 30/35℃

2.Evaporator air in 7℃ ℃85% R.H., Condenser water in/out 40/45℃

3.Condenser air in 35℃. Evaporator water in/out23/18℃

4.Condenser air in 35℃. Evaporator water in/out 12/7℃

5. At 1m in open field fan side (sound pressure)

6.The above data test reference standard EN14511:2013; EN14825:2013; EN50564:2011; EN12102:2011; (EU) No:811:2013; (EU)No:813:2013; OJ 2014/C 207/02:2014

Outdoor Split type (Bibloc)			**10KW**	**12KW**	**14KW**	**16KW**
Heating[1]	Capacity	kW	10.00	12.10	14.00	15.50
	Rated input	kW	2.17	2.74	3.39	3.82
	COP		4.61	4.42	4.13	4.06
Heating[2]	Capacity	kW	10.12	11.85	14.05	16.05
	Rated input	kW	2.93	3.48	4.41	5.03
	COP		3.45	3.41	3.19	3.19
Cooling[1]	Capacity	kW	10.00	11.80	13.00	14.00
	Rated input	kW	2.07	2.65	3.23	3.62
	EER		4.83	4.45	4.02	3.87
Cooling[2]	Capacity	kW	9.39	11.02	12.49	12.85
	Rated input	kW	3.26	4.17	5.07	5.39
	EER		2.88	2.64	2.46	2.38
Seasonal space heating energy eff. Class (average climate general)	Water outlet @ 35℃		A++	A++	A++	A++
	Water outlet @ 55℃		A+	A+	A+	A+
Power supply		V/Ph/Hz	220-240/1/50			
Maximum Overcurrent Protection (MOP)		A	35	35	35	35
Minimum Circuit Amps (MCA)		A	30	30	32	32
Dimension (W×H×D)		mm	900×1327×400			
Packing (W×H×D)		mm	1030×1457×435			
Net/gross weight		kg	99/112			
Sound pressure level[3]	Heating	dB(A)	65	66	69	71
	Cooing	dB(A)	65	66	69	71
Compressor	Brand		GMCC	GMCC	GMCC	GMCC
	Model		ATQ420D1UMU			
	Type		Twin rotary DC inverter			
	Poles		6	6	6	6
	Speed		12~120rps			
	Max. frequency	Hz	13000	13000	13000	13000
Outdoor fan	Brand		Panisonic/Nidec/WELLING			
	Motor type		Brushless DC motor			
	Model		ZKSP-100-8-1			
	Number of fans		2	2	2	2
	Air flow	m^3/h	6500	6500	6500	6500

Outdoor Split type (Bibloc)				**10KW**	**12KW**	**14KW**	**16KW**
Air side heat exchanger	Number of rows			2	2	2	2
	Tube pitch(a)x row pitch(b)		mm	25.4/22	25.4/22	25.4/22	25.4/22
	Tube dia. and type			Φ9.52 inner grooved copper			
	Fin space		mm	1.6	1.6	1.6	1.6
	Fin type (code)			Hydrophilic aluminum			
	Coil length x height		mm	845×1270	845×1270	845×1270	845×1270
	Number of circuits			9	9	9	9
Piping connections	Liquid	Type		Flaring			
		Dia.(OD)	mm	Φ9.5			
	Gas	Type		Flaring			
		Dia.(OD)	mm	Φ15.9			
	Piping length	Min.	m	2			
		Max.	m	50			
	Installation height difference	Outdoor unit upside	m	30			
		Outdoor unit downside	m	25			
Refrigerant	Type/Quantity		kg	R410A/3.9			
	Throttle type			Electric expansion valve			
Ambient temperature range	Cooling		℃	-5~46			
	Heating		℃	-20~35			
	Sanitary hot water		℃	-20~43			

MOP: Maximum Overcurrent Protection MCA: Minimum Circuit Amps
Nominal capacity is based on the following conditions:
1.Evaporator air in 7℃ ℃85% R.H., Condenser water in/out 30/35℃
2.Evaporator air in 7℃ ℃85% R.H., Condenser water in/out 40/45℃
3.Condenser air in 35℃. Evaporator water in/out23/18℃
4.Condenser air in 35℃. Evaporator water in/out 12/7℃
5. At 1m in open field fan side (sound pressure)
6. The above data test reference standard EN14511:2013; EN14825:2013; EN50564:2011; EN12102:2011; (EU) No:811:2013; (EU)No:813:2013; OJ 2014/C 207/02:2014

3.2 380-415/3/50 products

Outdoor Split type (Bibloc)			**12KW**	**14KW**	**16KW**
Heating[1]	Capacity	kW	12.10	14.00	15.50
	Rated input	kW	2.68	3.26	3.79
	COP		4.51	4.29	4.09
Heating[2]	Capacity	kW	11.97	13.93	15.48
	Rated input	kW	3.50	4.21	4.87
	COP		3.42	3.31	3.18
Cooling[1]	Capacity	kW	12.10	13.00	14.00
	Rated input	kW	2.82	3.21	3.68
	EER		4.29	4.05	3.80
Cooling[2]	Capacity	kW	11.70	12.53	12.91
	Rated input	kW	4.65	5.21	5.52
	EER		2.52	2.40	2.34
Seasonal space heating energy eff. Class (average climate general)	Water outlet @ 35℃		A++	A++	A++
	Water outlet @ 55℃		A+	A+	A+
Power supply		V/Ph/Hz	380-415/3/50		
Maximum Overcurrent Protection (MOP)		A	18	18	18
Minimum Circuit Amps (MCA)		A	15	15	16
Dimension (W×H×D)		mm	900×1327×400		
Packing (W×H×D)		mm	1030×1457×435		
Net/gross weight		kg	115/128		
Sound pressure level[3]	Heating	dB(A)	66	69	71
	Cooing	dB(A)	66	69	71
Compressor	Brand		GMCC	GMCC	GMCC
	Model		ATQ420D2UMU		
	Type		Twin rotary DC inverter		
	Poles		6	6	6
	Speed		12~120rps		
	Max. frequency	Hz	13000	13000	13000
Outdoor fan	Brand		Panisonic/Nidec/WELLING		
	Motor type		Brushless DC motor		
	Model		ZKSP-100-8-1		
	Number of fans		2	2	2
	Air flow	m^3/h	6500	6500	6500

Outdoor Split type (Bibloc)				**12KW**	**14KW**	**16KW**
Air side heat exchanger	Number of rows			2	2	2
	Tube pitch(a)x row pitch(b)		mm	25.4/22	25.4/22	25.4/22
	Tube dia. and type			Φ9.52 inner grooved copper		
	Fin space		mm	1.6	1.6	1.6
	Fin type (code)			Hydrophilic aluminum		
	Coil length x height		mm	845×1270	845×1270	845×1270
	Number of circuits			9	9	9
Piping connections	Liquid	Type		Flaring		
		Dia.(OD)	mm	Φ9.5		
	Gas	Type		Flaring		
		Dia.(OD)	mm	Φ15.9		
	Piping length	Min.	m	2		
		Max.	m	50		
	Installation height difference	Outdoor unit upside	m	30		
		Outdoor unit downside	m	25		
Refrigerant	Type/Quantity		kg	R410A/4.2		
	Throttle type			Electric expansion valve		
Ambient temperature range	Cooling		℃	-5~46		
	Heating		℃	-20~35		
	Sanitary hot water		℃	-20~43		

MOP: Maximum Overcurrent Protection MCA: Minimum Circuit Amps

Nominal capacity is based on the following conditions:

1.Evaporator air in 7℃ ℃85% R.H., Condenser water in/out 30/35℃

2.Evaporator air in 7℃ ℃85% R.H., Condenser water in/out 40/45℃

3.Condenser air in 35℃. Evaporator water in/out23/18℃

4.Condenser air in 35℃. Evaporator water in/out 12/7℃

5. At 1m in open field fan side (sound pressure)

6. The above data test reference standard EN14511:2013; EN14825:2013; EN50564:2011; EN12102:2011; (EU) No:811:2013; (EU)No:813:2013; OJ 2014/C 207/02:2014

3.3 Hydronic box

Indoor Split type (Bibloc)				**4 ~ 8KW**	**10 ~ 16KW**	**10 ~ 16KW (TRIF.)**
Type				Heating & Cooling		
Leaving water temperature range	Space heating	Low	°C	25~55, default 35		
		High	°C	35~60, default 45		
	Space cooling	Low	°C	7~25, default 7		
		High	°C	18~25, default 18		
	Sanitary hot water		°C	40~60, default 45		
Power supply			V/Ph/Hz	220-240/1/50	220-240/1/50	380-415/3/50
MOP			A	19	19	13.0
MCA			A	17	17	10.0
Dimension (W×H×D)			mm	400×865×427		
Packing (W×H×D)			mm	495×1040×495		
Net/gross weight			kg	43/51	54/62	54/62
Water circuit	Piping connections Dia.		mm	DN25	DN25	DN25
	Safety valve		kPa	300	300	300
	Total water volume		L	4.7	5	5
	Drainage pipe		mm	Φ16	Φ16	Φ16
	Expansion tank	Volume	L	3	3	3
		Max. water pressure	kPa	800	800	800
		Pre pressure	kPa	150	150	150
	Water side exchanger	Type		Plate type heat exchanger		
		Volume	L	0.7	1	1
	Water pump	Brand		Wilo	Wilo	Wilo
		Model		RS15/6 RKC	RS25/7.5 RKC	RS25/7.5 RKC
		Pump head	m	6	7.5	7.5
Refrigerant circuit	Liqiud side Dia.		mm	Φ9.5	Φ9.5	Φ9.5
	Gas side Dia.		mm	Φ15.9	Φ15.9	Φ15.9
Mounted Back-up E-heater	Size		kW	3.0	3	4.5
	Step			2	2	2
	MOP		A	17	17	12.0
	MCA		A	15	15	9.0
	Power supply			220-240/1/50	220-240/1/50	380-415/3/50

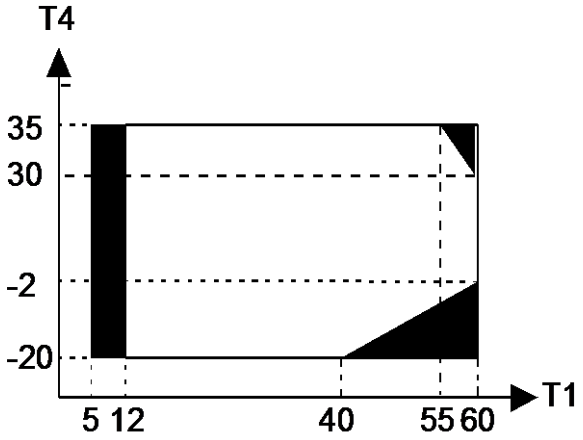
MOP: Maximum Overcurrent Protection MCA: Minimum Circuit Amps

Nominal capacity is based on the following conditions

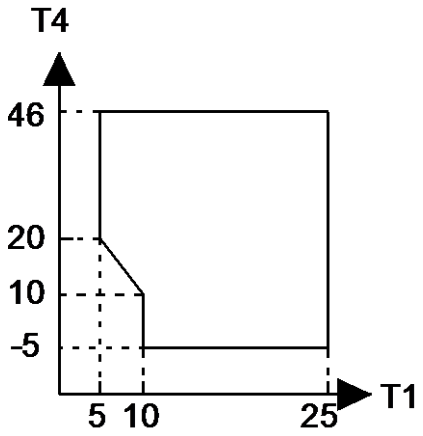
1. Condition 1: Heating mode air inlet at 7°C and water outlet at 35°C with ∆T at 5°C, Cooling mode air inlet at 35°C and water outlet at 18°C with ∆T at 5°C
2. Condition 2: Heating mode air inlet at 7°C and water outlet at 45°C with ∆T at 5°C, Cooling mode air inlet at 35°C and water outlet at 7°C with ∆T at 5°C
3. Noise level is test at 1m in open field fan side, in heating mode with air inlet at 7°C and water outlet at 35°C with ∆T at 5°C
4. The above data test reference standard EN14511

4. Operation range

Heating mode



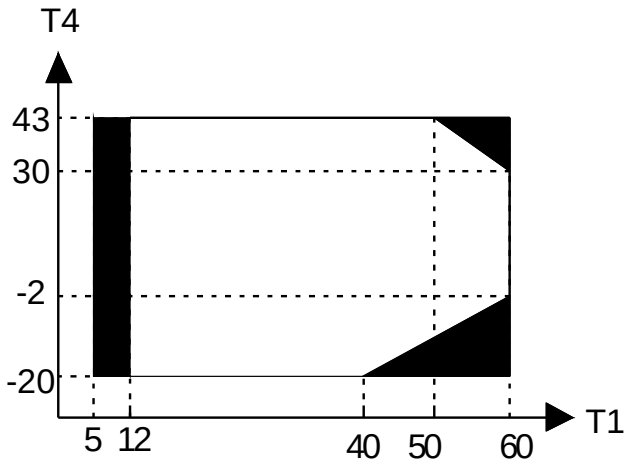
Cooling mode



T1: Leaving water temperature (℃) T4 : Ambient temperature(℃)

■ **No heat pump operation, backup E-heater or boiler only.**

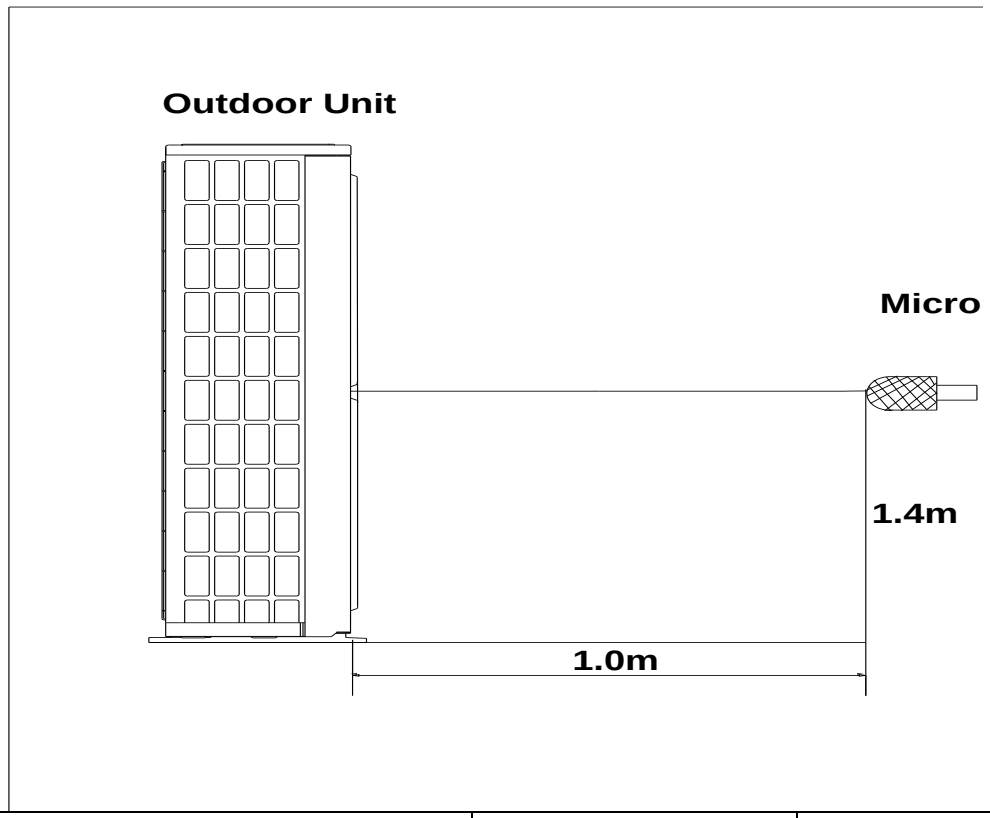
Domestic hot water mode



T1: Leaving water temperature (℃) T4 : Ambient temperature(℃)

■ **No heat pump operation, backup E-heater or boiler only.**

5. Sound pressure levels



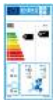
Model	Heating dB(A)	Cooling dB(A)
UE BIBLOC AEROTHERM V17 (4KW)	62	62
UE BIBLOC AEROTHERM V17 (6KW)	62	62
UE BIBLOC AEROTHERM V17 (8KW)	64	64
UE BIBLOC AEROTHERM V17 (10KW)	65	65
UE BIBLOC AEROTHERM V17 (12KW)	66	66
UE BIBLOC AEROTHERM V17 (14KW)	69	69
UE BIBLOC AEROTHERM V17 (16KW)	71	71
UE BIBLOC AEROTHERM V17 (12KW) (TRIF.)	66	66
UE BIBLOC AEROTHERM V17 (14KW) (TRIF.)	69	69
UE BIBLOC AEROTHERM V17 (16KW) (TRIF.)	71	71

Note:

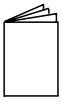
It is tested 1 meter away from the machine in a semi-anechoic room (sound pressure).

6. Accessories

6.1 Accessories for outdoor unit

Name	Shape	Quantity	Note
Outdoor unit installation &owner's manual		1	For outdoor unit installation
Product technical manual		1	For Erp description
Drainage pipe connector		1	For drainage
Magnet ring		1	Only for 1 Phase 10~16 kW, used on the signal wire between outdoor unit and hydronic box
Energy label		1	For hydronic box

6.2 Accessories for hydronic box

Name	Shape	Quantity	Note
Indoor unit installation & owner's manual		1	For hydronic box installation instruction
User interface installation & owner's manual		1	For operation instruction
Y-shape filter		1	
Mounting bracket		1	For mounting hydronic box
User interface		1	
M8 expansion screws		5	
T5 temperature sensor for domestic hot water tank		1	
Copper nut	-	1	

7. Performance data

7.1 Heating capacity for 220-240/1/50 products

Model: BIBLOC AEROTHERM V17 (4KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	1.85	0.88	2.10	1.65	0.88	1.88	1.51	0.88	1.72												
-15/-	2.10	0.82	2.57	2.08	0.89	2.35	2.08	0.94	2.22	2.12	1.05	2.01									
-7/-8	3.51	1.04	3.39	3.32	1.08	3.08	3.16	1.14	2.76	2.98	1.24	2.41	2.83	1.18	2.39	2.66	1.13	2.35			
2/1	4.38	1.04	4.21	4.08	1.07	3.81	3.82	1.11	3.45	3.50	1.16	3.02	2.82	0.96	2.95	2.20	0.78	2.83	1.60	0.60	2.66
7/6	5.87	1.09	5.38	5.28	1.09	4.86	4.71	1.08	4.37	4.12	1.07	3.85	3.32	1.00	3.33	2.43	0.89	2.73	1.59	0.74	2.16
15/12	4.86	0.83	5.87	4.12	0.76	5.42	3.52	0.77	4.56	2.71	0.73	3.71	2.19	0.67	3.26	1.95	0.72	2.72	1.43	0.61	2.35
20/15	4.72	0.79	5.99	4.22	0.78	5.39	3.78	0.75	5.03	3.22	0.71	4.55	2.64	0.67	3.94	2.05	0.63	3.28	1.42	0.55	2.58
25/18	4.81	0.79	6.08	4.38	0.82	5.31	4.03	0.74	5.42	3.55	0.65	5.50	2.91	0.61	4.79	2.19	0.54	4.02	1.45	0.44	3.30
35/24	4.71	0.76	6.21	4.45	0.83	5.37	4.26	0.72	5.95	4.02	0.62	6.48	3.24	0.59	5.52	2.45	0.55	4.49			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (6KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	2.61	1.31	1.99	2.32	1.31	1.77	2.15	1.34	1.61												
-15/-	3.08	1.27	2.43	3.06	1.36	2.25	3.05	1.46	2.09	3.02	1.59	1.90									
-7/-8	5.24	1.62	3.23	4.95	1.70	2.91	4.71	1.80	2.62	4.38	1.92	2.28	4.21	1.86	2.26	3.94	1.78	2.21			
2/1	6.55	1.64	4.00	6.10	1.69	3.62	5.71	1.74	3.28	5.20	1.81	2.87	4.28	1.53	2.79	3.26	1.21	2.69	2.25	0.89	2.52
7/6	8.81	1.72	5.11	7.93	1.71	4.63	7.05	1.69	4.17	6.17	1.68	3.67	4.95	1.57	3.16	3.59	1.38	2.60	2.28	1.11	2.05
15/12	7.27	1.30	5.60	6.19	1.20	5.15	5.25	1.20	4.36	4.03	1.15	3.51	3.25	1.05	3.10	2.28	0.88	2.60	1.45	0.67	2.16
20/15	7.08	1.24	5.70	6.32	1.23	5.12	5.65	1.18	4.77	4.80	1.10	4.35	3.96	1.06	3.75	2.98	0.96	3.11	2.01	0.82	2.45
25/18	7.20	1.24	5.80	6.57	1.30	5.07	6.02	1.17	5.15	5.31	1.02	5.21	4.35	0.96	4.55	3.27	0.86	3.82	2.12	0.68	3.11
35/24	7.09	1.20	5.91	6.72	1.31	5.12	6.42	1.13	5.68	5.99	0.97	6.20	4.88	0.92	5.28	3.62	0.85	4.26			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (8KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	3.12	1.73	1.80	3.00	2.07	1.45	2.25	1.73	1.30												
-15/-	3.25	1.62	2.01	3.07	1.97	1.56	3.45	2.25	1.53	3.81	2.53	1.51									
-7/-8	6.22	2.32	2.68	6.22	2.57	2.42	6.04	2.79	2.17	5.64	2.93	1.92	5.05	3.01	1.68	4.25	2.93	1.45			
2/1	9.00	2.20	4.09	8.40	2.41	3.48	7.68	2.57	2.99	6.81	2.76	2.47	5.82	2.79	2.09	4.68	2.82	1.66	3.43	2.47	1.39
7/6	12.66	2.58	4.90	10.75	2.59	4.15	9.05	2.51	3.60	7.55	2.40	3.14	6.25	2.36	2.65	5.15	2.23	2.31	4.26	2.24	1.90
15/12	11.30	1.97	5.75	9.72	1.92	5.07	8.23	1.97	4.19	6.79	1.81	3.74	5.44	1.98	2.75	4.14	1.70	2.44	2.95	1.47	2.00
20/15	12.98	2.00	6.48	10.81	1.89	5.73	8.92	1.80	4.95	7.41	1.71	4.33	6.12	1.72	3.55	4.87	1.62	3.01	3.99	1.66	2.41
25/18	14.69	2.05	7.17	11.94	1.87	6.39	9.72	1.72	5.64	7.98	1.62	4.92	6.76	1.60	4.23	6.03	1.69	3.56	5.44	1.86	2.92
35/24	15.21	1.76	8.65	13.10	1.70	7.72	10.66	1.53	6.98	9.12	1.46	6.26	7.68	1.50	5.12	6.53	1.54	4.23			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (10KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	3.96	2.11	1.88	3.73	2.25	1.66	3.09	1.99	1.55												
-15/-	5.24	2.17	2.41	4.99	2.34	2.13	4.44	2.30	1.93	4.24	2.47	1.72									
-7/-8	8.04	2.73	2.94	8.25	3.04	2.71	7.94	3.27	2.43	7.39	3.47	2.13	7.13	3.26	2.19	6.02	3.34	1.80			
2/1	9.31	2.73	3.41	8.98	2.93	3.07	9.12	3.19	2.86	9.09	3.51	2.59	8.17	3.40	2.40	7.67	3.49	2.20	3.87	2.24	1.73
7/6	11.60	2.74	4.24	11.31	2.79	4.05	12.46	3.24	3.84	12.13	3.51	3.46	10.57	3.25	3.25	8.06	2.87	2.81	5.09	2.15	2.37
15/12	12.12	2.04	5.95	10.75	1.91	5.64	9.87	2.04	4.85	9.26	2.25	4.12	8.75	2.48	3.53	7.98	2.71	2.94	4.62	2.04	2.26
20/15	11.79	1.54	7.68	10.32	1.57	6.58	8.54	1.49	5.73	8.09	1.68	4.81	7.57	1.88	4.03	7.04	2.09	3.37	6.13	2.08	2.95
25/18	11.93	1.42	8.43	10.55	1.46	7.25	8.99	1.39	6.47	8.54	1.58	5.42	8.34	1.79	4.67	7.84	1.98	3.96	7.21	2.10	3.44
35/24	12.28	1.31	9.39	10.77	1.40	7.72	9.36	1.33	7.02	8.88	1.49	5.95	8.49	1.70	4.98	7.94	1.93	4.11			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (12KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	4.68	2.59	1.81	4.40	2.73	1.61	3.66	2.44	1.50												
-15/-	6.19	2.67	2.32	5.90	2.86	2.06	5.25	2.82	1.86	5.01	3.02	1.66									
-7/-8	9.51	3.35	2.84	9.75	3.74	2.61	9.39	4.01	2.34	8.73	4.24	2.06	8.42	3.99	2.11	7.12	4.12	1.73			
2/1	11.00	3.34	3.29	10.61	3.57	2.97	10.78	3.91	2.76	10.74	4.31	2.49	9.65	4.18	2.31	9.07	4.28	2.12	4.57	2.74	1.67
7/6	13.71	3.35	4.09	13.37	3.42	3.91	14.72	3.98	3.70	14.33	4.29	3.34	12.49	3.98	3.14	9.53	3.52	2.71	6.01	2.62	2.29
15/12	14.32	2.49	5.74	12.70	2.33	5.44	11.66	2.49	4.68	10.95	2.76	3.97	10.34	3.04	3.40	9.43	3.32	2.84	5.46	2.50	2.18
20/15	13.94	1.88	7.41	12.20	1.92	6.35	10.09	1.83	5.52	9.56	2.06	4.64	8.95	2.30	3.89	8.32	2.55	3.26	7.24	2.54	2.85
25/18	14.10	1.73	8.14	12.47	1.78	6.99	10.62	1.70	6.24	10.09	1.93	5.23	9.86	2.19	4.51	9.27	2.43	3.82	8.52	2.57	3.32
35/24	14.51	1.60	9.06	12.73	1.71	7.45	11.06	1.63	6.78	10.50	1.83	5.74	10.03	2.09	4.81	9.38	2.37	3.96			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (14KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	5.22	3.05	1.71	4.91	3.23	1.52	4.08	2.87	1.42												
-15/-	6.91	3.14	2.20	6.58	3.39	1.94	5.86	3.33	1.76	5.59	3.56	1.57									
-7/-8	10.60	3.96	2.68	10.88	4.40	2.47	10.47	4.72	2.22	9.74	5.02	1.94	9.40	4.72	1.99	7.94	4.84	1.64			
2/1	12.27	3.95	3.11	11.84	4.23	2.80	12.02	4.61	2.61	11.98	5.08	2.36	10.77	4.92	2.19	10.12	5.06	2.00	5.10	3.23	1.58
7/6	15.29	3.95	3.87	14.91	4.04	3.69	16.42	4.69	3.50	15.98	5.06	3.16	13.94	4.69	2.97	10.63	4.15	2.56	6.71	3.09	2.17
15/12	15.98	2.94	5.43	14.17	2.76	5.14	13.01	2.94	4.42	12.21	3.25	3.76	11.53	3.58	3.22	10.51	3.92	2.68	6.09	2.96	2.06
20/15	15.54	2.22	7.00	13.60	2.27	6.00	11.26	2.16	5.22	10.66	2.43	4.38	9.98	2.72	3.67	9.28	3.01	3.08	8.07	3.00	2.69
25/18	15.73	2.05	7.69	13.91	2.10	6.61	11.85	2.01	5.90	11.26	2.28	4.94	11.00	2.58	4.26	10.34	2.86	3.61	9.50	3.03	3.14
35/24	16.19	1.89	8.56	14.20	2.02	7.04	12.33	1.92	6.41	11.71	2.16	5.43	11.19	2.46	4.54	10.47	2.79	3.75			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (16KW)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	5.75	3.40	1.69	5.42	3.61	1.50	4.50	3.21	1.40												
-15/-	7.62	3.52	2.17	7.26	3.78	1.92	6.46	3.70	1.74	6.17	3.97	1.55									
-7/-8	11.70	4.42	2.65	12.00	4.92	2.44	11.55	5.27	2.19	10.74	5.59	1.92	10.37	5.27	1.97	8.76	5.41	1.62			
2/1	13.53	4.41	3.07	13.06	4.72	2.77	13.27	5.15	2.58	13.22	5.67	2.33	11.88	5.51	2.16	11.16	5.63	1.98	5.63	3.61	1.56
7/6	16.87	4.42	3.82	16.45	4.50	3.65	18.12	5.23	3.46	17.64	5.65	3.12	15.38	5.24	2.93	11.73	4.63	2.53	7.40	3.45	2.14
15/12	17.63	3.29	5.36	15.63	3.08	5.08	14.36	3.29	4.37	13.47	3.63	3.71	12.72	4.00	3.18	11.60	4.37	2.65	6.72	3.29	2.04
20/15	17.15	2.48	6.92	15.01	2.53	5.93	12.42	2.41	5.16	11.76	2.72	4.33	11.01	3.04	3.63	10.24	3.37	3.04	8.91	3.35	2.66
25/18	17.35	2.28	7.60	15.35	2.35	6.53	13.07	2.24	5.83	12.42	2.55	4.88	12.14	2.88	4.21	11.41	3.20	3.57	10.48	3.38	3.10
35/24	17.86	2.11	8.46	15.67	2.25	6.96	13.61	2.15	6.33	12.92	2.41	5.36	12.35	2.75	4.49	11.55	3.12	3.70			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

7.2 Heating capacity for 380-415/3/50 products

Model: BIBLOC AEROTHERM V17 (12KW) (TRIF.)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	4.93	2.72	1.81	4.64	2.70	1.72	4.50	2.69	1.67												
-15/-	6.71	2.78	2.41	6.19	2.85	2.17	5.77	2.94	1.96	5.27	3.03	1.74									
-7/-8	10.29	3.41	3.02	9.87	3.64	2.71	9.53	3.87	2.46	9.14	4.25	2.15	7.92	4.30	1.84	6.57	4.35	1.51			
2/1	12.20	3.47	3.52	11.90	3.67	3.24	11.81	3.96	2.98	11.67	4.34	2.69	11.09	4.30	2.58	10.45	4.28	2.44	4.76	2.75	1.73
7/6	13.27	3.50	3.79	14.09	3.85	3.66	15.08	4.26	3.54	15.76	4.57	3.45	13.26	4.14	3.20	10.49	3.59	2.92	6.19	2.63	2.35
15/12	14.28	2.28	6.26	13.43	2.46	5.45	12.62	2.66	4.74	11.80	2.87	4.11	11.14	3.09	3.60	10.39	3.40	3.06	5.67	2.51	2.26
20/15	14.04	1.92	7.33	12.82	1.99	6.44	11.64	2.09	5.57	10.51	2.19	4.79	9.87	2.37	4.17	9.19	2.62	3.51	7.41	2.58	2.87
25/18	14.06	1.77	7.94	13.01	1.85	7.05	12.05	1.95	6.19	11.12	2.06	5.40	10.70	2.24	4.78	10.22	2.48	4.12	8.64	2.59	3.34
35/24	14.37	1.61	8.95	13.38	1.70	7.89	12.46	1.81	6.87	11.55	1.95	5.93	10.99	2.13	5.17	10.35	2.40	4.31			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (14KW) (TRIF.)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	5.68	3.25	1.75	5.34	3.24	1.65	5.17	3.21	1.61												
-15/-	7.72	3.31	2.33	7.13	3.41	2.09	6.64	3.51	1.89	6.06	3.63	1.67									
-7/-8	11.84	4.07	2.91	11.36	4.35	2.61	10.96	4.62	2.37	10.51	5.08	2.07	9.11	5.12	1.78	7.56	5.18	1.46			
2/1	14.04	4.14	3.39	13.70	4.39	3.12	13.59	4.74	2.87	13.43	5.19	2.59	12.76	5.12	2.49	12.03	5.12	2.35	5.47	3.30	1.66
7/6	15.27	4.17	3.66	16.21	4.59	3.53	17.35	5.09	3.41	18.14	5.45	3.33	15.26	4.95	3.08	12.08	4.28	2.82	7.13	3.14	2.27
15/12	16.44	2.72	6.04	15.45	2.94	5.26	14.52	3.17	4.58	13.58	3.43	3.96	12.82	3.69	3.47	11.96	4.05	2.95	6.53	3.00	2.18
20/15	16.16	2.29	7.07	14.75	2.38	6.21	13.40	2.50	5.37	12.10	2.62	4.62	11.36	2.83	4.02	10.57	3.13	3.38	8.52	3.08	2.77
25/18	16.18	2.11	7.66	14.97	2.20	6.80	13.86	2.32	5.97	12.80	2.46	5.21	12.31	2.67	4.61	11.76	2.96	3.97	9.94	3.09	3.22
35/24	16.54	1.92	8.63	15.40	2.02	7.61	14.34	2.16	6.63	13.29	2.32	5.72	12.65	2.54	4.98	11.91	2.86	4.16			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

Model: BIBLOC AEROTHERM V17 (16KW) (TRIF.)

Integrated value capacity table

LWE / Tamb	30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20/-	6.07	3.55	1.71	5.71	3.52	1.62	5.53	3.21	1.58												
-15/-	8.25	3.62	2.28	7.62	3.72	2.05	7.10	3.70	1.85	6.48	3.95	1.64									
-7/-8	12.66	4.44	2.85	12.15	4.75	2.56	11.72	5.05	2.32	11.24	5.55	2.03	9.74	5.60	1.74	8.09	5.67	1.43			
2/1	15.01	4.52	3.32	14.64	4.78	3.06	14.53	5.17	2.81	14.36	5.65	2.54	13.64	5.59	2.44	12.86	5.59	2.30	5.85	3.60	1.63
7/6	16.32	4.56	3.58	17.33	5.00	3.46	18.55	5.55	3.34	19.39	5.94	3.26	16.31	5.40	3.02	12.91	4.68	2.76	7.62	3.43	2.22
15/12	17.57	2.97	5.91	16.52	3.21	5.15	15.52	3.46	4.48	14.52	3.74	3.88	13.70	4.03	3.40	12.78	4.42	2.89	6.98	3.28	2.13
20/15	17.27	2.50	6.92	15.77	2.59	6.08	14.32	2.72	5.26	12.93	2.86	4.52	12.14	3.08	3.94	11.30	3.41	3.31	9.11	3.36	2.71
25/18	17.30	2.31	7.50	16.00	2.40	6.66	14.82	2.53	5.85	13.68	2.68	5.10	13.16	2.92	4.51	12.57	3.23	3.89	10.63	3.37	3.15
35/24	17.68	2.09	8.45	16.46	2.21	7.45	15.33	2.36	6.49	14.21	2.54	5.60	13.52	2.77	4.88	12.73	3.13	4.07			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods. The capacity is tested in free frequency situation.

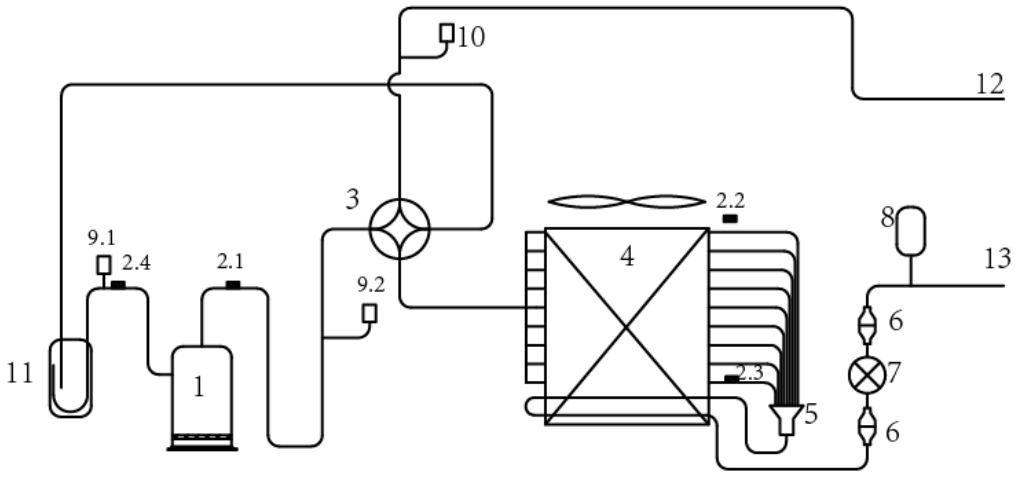
Remark:

LWE: Leaving water temperature (℃) Tamb : Ambient temperature(℃)

HC: Heating capacity (kW) PI : Power input (kW)

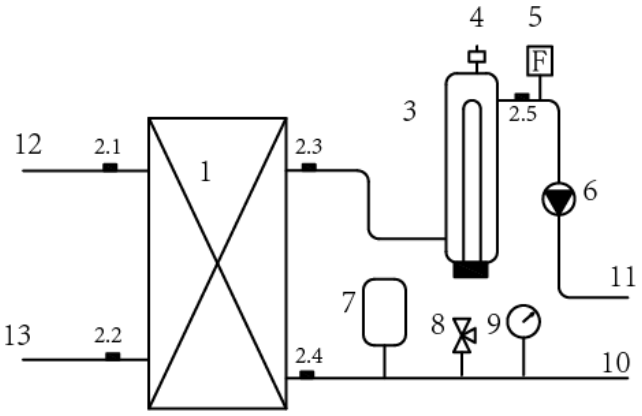
8. System diagram

8.1 System diagram for outdoor unit



1. Compressor
2.1-2.4 Temperature sensor
3. 4-way valve
4. Condenser
5. Distributor
6. Filter
7. EXV
8. Accumulator
9.1-9.2 Pressure switch
10. Pressure sensor
11. Accumulator
12. Refrigerant outlet
13. Refrigerant inlet

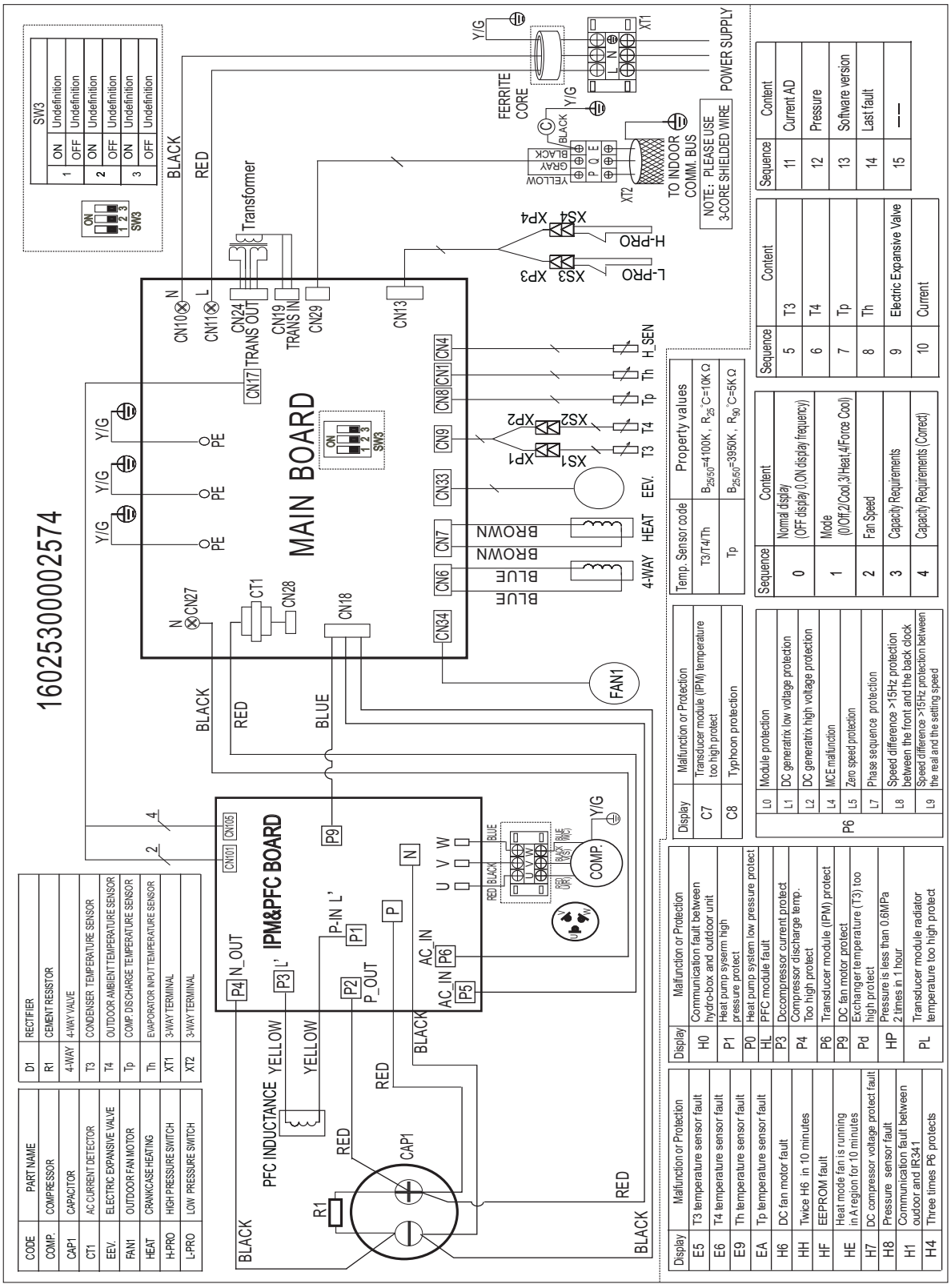
8.2 System diagram for hydronic box



1. Plate type heat exchanger
2.1-2.5 Temperature sensor
3. Backup E-heater
4. Air purge valve
5. Water flow switch
6. Water pump
7. Expansion vessel
8. Pressure relief valve
9. Manometer
10. Water inlet
11. Water outlet
12. Refrigerant inlet
13. Refrigerant outlet

9. Wiring diagrams

9.1 Wring diagram for outdoor unit
For 4/6/8kW 1Ph



CODE	PART NAME	CODE	PART NAME
COMP.	COMPRESSOR	R1	CEMENT RESISTOR
CAP1	CAPACITOR	4-WAY	4-WAY VALVE
CT1	AC CURRENT DETECTOR	T3	CONDENSER TEMPERATURE SENSOR
EEV.	ELECTRIC EXPANSIVE VALVE	T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
FAN1	OUTDOOR FAN MOTOR	Tp	COMP. DISCHARGE TEMPERATURE SENSOR
HEAT	CRANKCASE HEATING	Th	EVAPORATOR INPUT TEMPERATURE SENSOR
H-PRO	HIGH PRESSURE SWITCH	XT1	3-WAY TERMINAL
L-PRO	LOW PRESSURE SWITCH	XT2	3-WAY TERMINAL

Temp. Sensor code	Property values
T3/T4/Th	$B_{25/50}$=4100K ; R_{25}℃=10K Ω
Tp	$B_{25/60}$=3950K ; R_{90}℃=5K Ω

Sequence	Content
5	T3
6	T4
7	Tp
8	Th
9	Electric Expansive Valve
10	Current

Sequence	Content
11	Current AD
12	Pressure
13	Software version
14	Last fault
15	— —

Sequence	Content
0	Normal display (OFF display 0,ON display frequency)
1	Mode (0/Off,2/Cool,3/Heat,4/Force Cool)
2	Fan Speed
3	Capacity Requirements
4	Capacity Requirements (Correct)

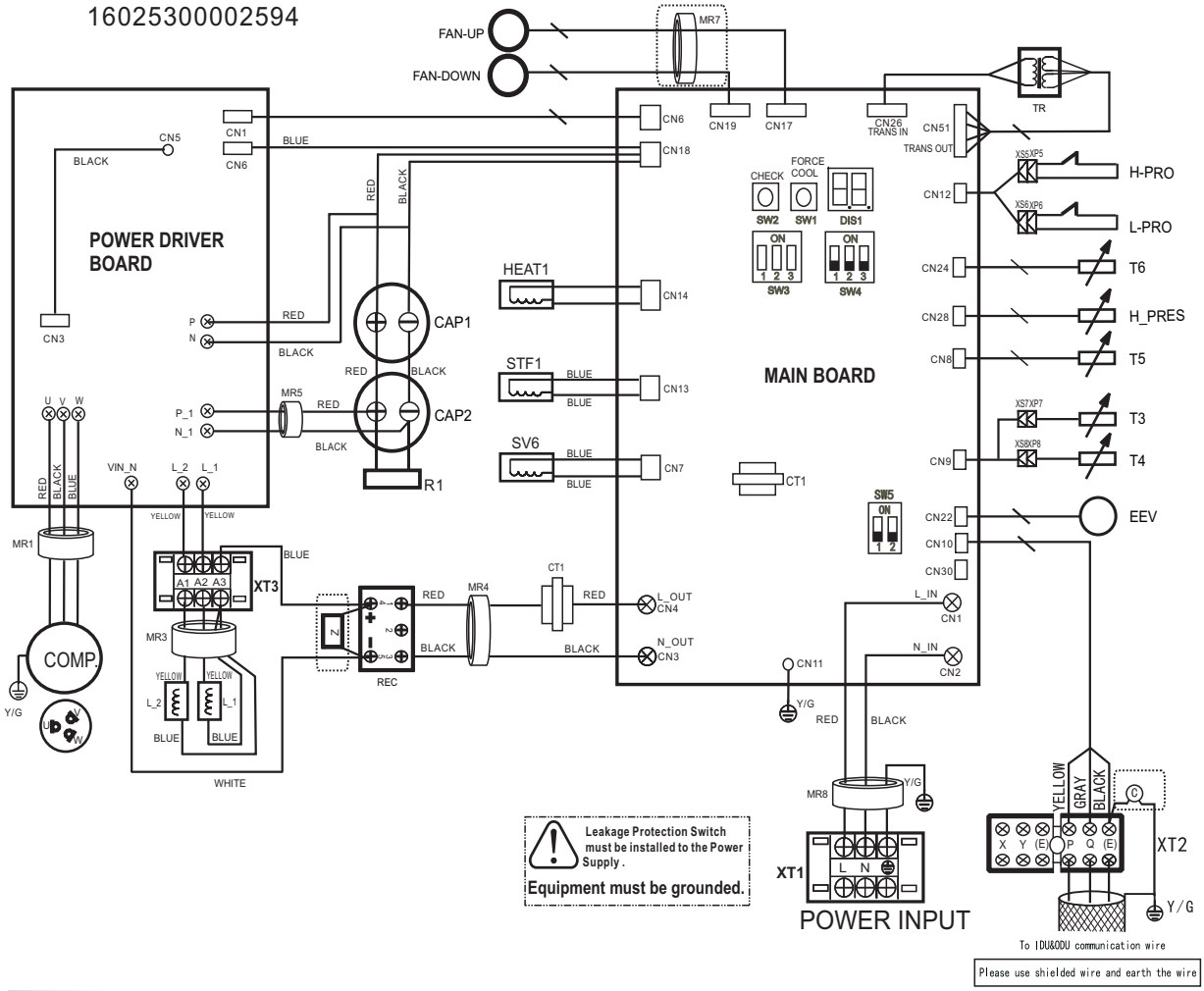
Display	Malfunction or Protection
C7	Transducer module (IPM) temperature too high protect
C8	Typhoon protection

P6		Malfunction or Protection
	L0	Module protection
	L1	DC generatrix low voltage protection
	L2	DC generatrix high voltage protection
	L4	MCE malfunction
	L5	Zero speed protection
	L7	Phase sequence protection
	L8	Speed difference >15Hz protection between the front and the back clock
	L9	Speed difference >15Hz protection between the real and the setting speed

Display	Malfunction or Protection
H0	Communication fault between hydro-box and outdoor unit
P1	Heat pump syserm high pressure protect
P0	Heat pump system low pressure protect
HL	PFC module fault
P3	Dccompressor current protect
P4	Compressor discharge temp. Too high protect
P6	Transducer module (IPM) protect
P9	DC fan motor protect
Pd	Exchanger temperature (T3) too high protect
HP	Pressure is less than 0.6MPa 2 times in 1 hour
PL	Transducer module radiator temperature too high protect

Display	Malfunction or Protection
E5	T3 temperature sensor fault
E6	T4 temperature sensor fault
E9	Th temperature sensor fault
EA	Tp temperature sensor fault
H6	DC fan motor fault
HH	Twice H6 in 10 minutes
HF	EEPROM fault
HE	Heat mode fan is running in A region for 10 minutes
H7	DC compressor voltage protect fault
H8	Pressure sensor fault
H1	Communication fault between outdoor and IR341
H4	Three times P6 protects

For 10-16kW, 1Ph



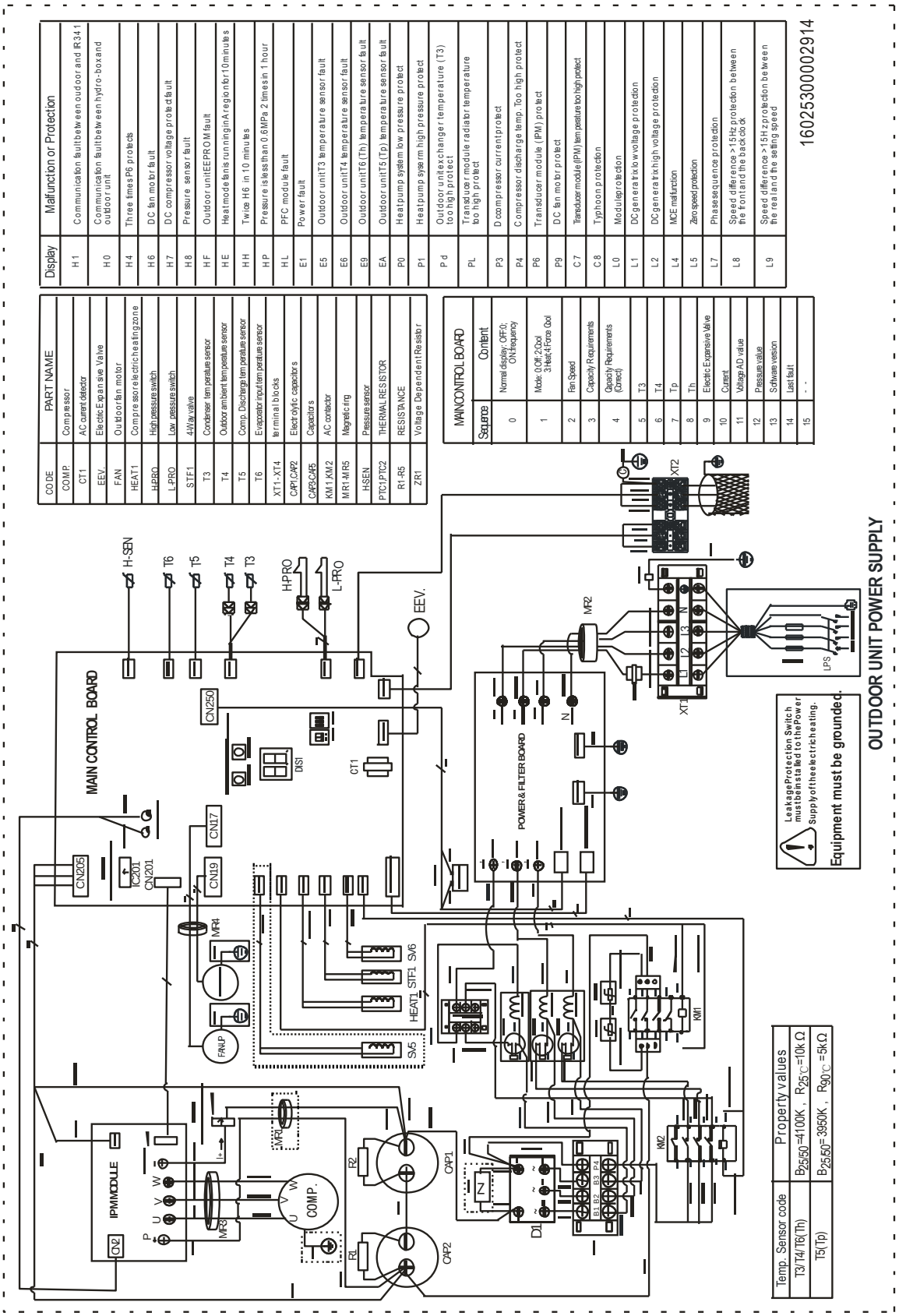
CODE	PART NAME
COMP.	Compressor
CT1	AC current detector
EEV.	Electric Expansive Valve
FAN	Outdoor fan motor
HEAT1	Compressor electric heating zone
H-PRO	High pressure switch
L-PRO	Low pressure switch
STF1	4-Way valve
T3	Condenser temperature sensor
T4	Outdoor ambient temperature sensor
T5	Comp. Discharge temperature sensor
T6	Evaporator input temperature sensor
XT1,XT2	terminal blocks
CAP1,CAP2	Electrolytic capacitors
Z	Varistor
SV6	Electric Valve
MR1-MR8	Magnetic ring
H-PRES	Pressure sensor
PTC1,PTC2	Thermal resistor
R1	Resistance
C	Y capactiors

Display	Malfunction or Protection
H1	Communication malfunction between the main controlling chip and IPDU
H0	Communication malfunction between the out unit main board and hydro-box board
E5	T3 temperature sensor malfunction
E6	T4 temperature sensor malfunction
E9	T6 temperature sensor malfunction
EA	T5 temperature sensor malfunction
HF	EEPROM malfunction
H6	DC fan motor malfunction
H7	Voltage protection
H8	Pressure sensor malfunction
HE	5-minute error for heating mode fan in area A
HH	The H6 displayed 2 times in 10 minutes
HP	Pressure is less than 0.6MPa 2 times in 1 hour
P0	Low pressure protection
P1	High pressure protection
P3	Outdoor units current protection
P4	Compressor discharge temp. Protection

Display	Malfunction or Protection
Pd	The temperature of condenser outlet refrigerant is too high when in cooling model
PL	Radiator high temperature protection
C7	IPM high temperture protection
C8	Typhoon protection
L0	Module protection
L1	DC generatrix low voltage protection
L2	DC generatrix high voltage protection
L4	MCE malfunction
L5	Zero speed protection
L7	Phase sequence protection
L8	Speed difference >15Hz protection between the front and the back clock
L9	Speed difference >15Hz protection between the real and the setting speed
P6	IPM mode protection

Temp. Sensor code	Property values
T3/T4/T5/T6	$B_{25/50}$=4100K , R_{25}℃=10k Ω
Tp	$B_{25/50}$=3950K , R_{90}℃=5k Ω

For 10-16kW, 3Ph



CODE	PART NAME
COMP.	Compressor
CT1	AC current detector
EEV.	Electric Expansive Valve
FAN	Outdoor fan motor
HEAT1	Compressor electric heating zone
H-PRO	High pressure switch
L-PRO	Low pressure switch
STF1	4-Way valve
T3	Condenser temperature sensor
T4	Outdoor ambient temperature sensor
T5	Comp. Discharge temperature sensor
T6	Evaporator input temperature sensor
XT1-XT4	Terminal blocks
CAP1,CAP2	Electrolytic capacitors
CAP3-CAP5	Capacitors
KM1,KM2	AC contactor
MR1-MR5	Magnetic ring
H-SEN	Pressure sensor
PTC1,PTC2	THERMAL RESISTOR
R1-R5	RESISTANCE
ZR1	Voltage Dependent Resistor

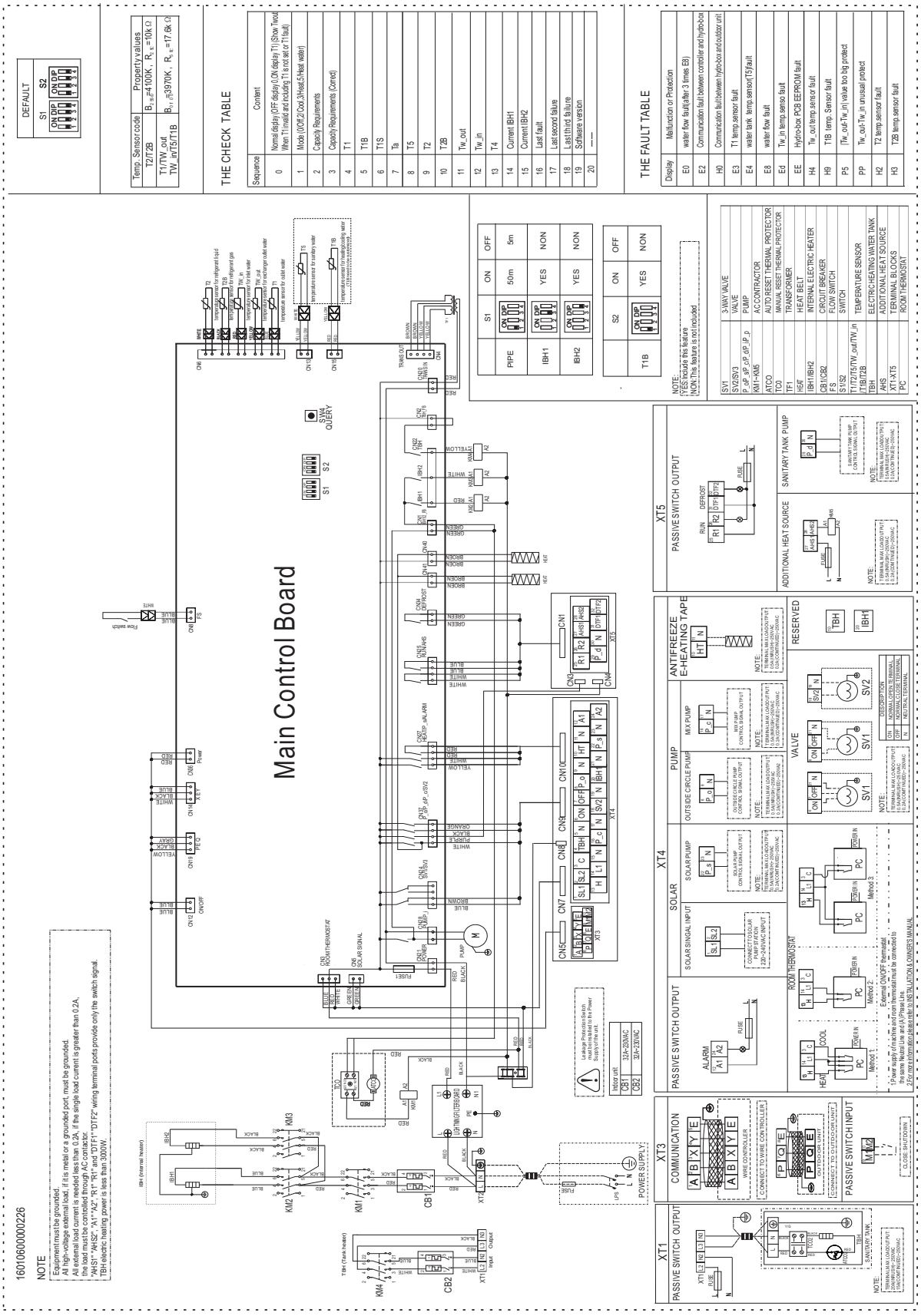
Display	Malfunction or Protection
H 1	Communication fault between outdoor and IR341
H 0	Communication fault between hydro-box and outdoor unit
H 4	Three times P6 protects
H 6	DC fan motor fault
H 7	DC compressor voltage protect fault
H 8	Pressure sensor fault
H F	Outdoor unit EEPROM fault
H E	Heat mode fan is running in A region for 10 minutes
H H	Twice H6 in 10 minutes
H P	Pressure is less than 0.6MPa 2 times in 1 hour
H L	PFC module fault
E1	Power fault
E5	Outdoor unit T3 temperature sensor fault
E6	Outdoor unit T4 temperature sensor fault
E9	Outdoor unit T6 (Th) temperature sensor fault
EA	Outdoor unit T5 (Tp) temperature sensor fault
P0	Heat pump system low pressure protect
P1	Heat pump system high pressure protect
P d	Outdoor unit exchanger temperature (T3) too high protect
PL	Transducer module radiator temperature too high protect
P3	DC compressor current protect
P4	Compressor discharge temp. Too high protect
P6	Transducer module (PM) protect
P9	DC fan motor protect
C 7	Transducer module (PM) temperature too high protect
C 8	Typhoon protection
L0	Module protection
L1	DC generatrix low voltage protection
L2	DC generatrix high voltage protection
L4	MCE malfunction
L5	Zero speed protection
L7	Phase sequence protection
L8	Speed difference >15Hz protection between the front and the back clock
L9	Speed difference >15Hz protection between the real and the setting speed

MAIN CONTROL BOARD	
Sequence	Content
0	Normal display: OFF:0; ON:frequency
1	Mode: 0:Off; 2:Cool 3:Heat; 4:Forced Cool
2	Fan Speed
3	Capacity Requirements
4	Capacity Requirements (Correct)
5	T3
6	T4
7	Tp
8	Th
9	Electric Expansive Valve
10	Current
11	Voltage AD value
12	Pressure value
13	Software version
14	Last fault
15	- -

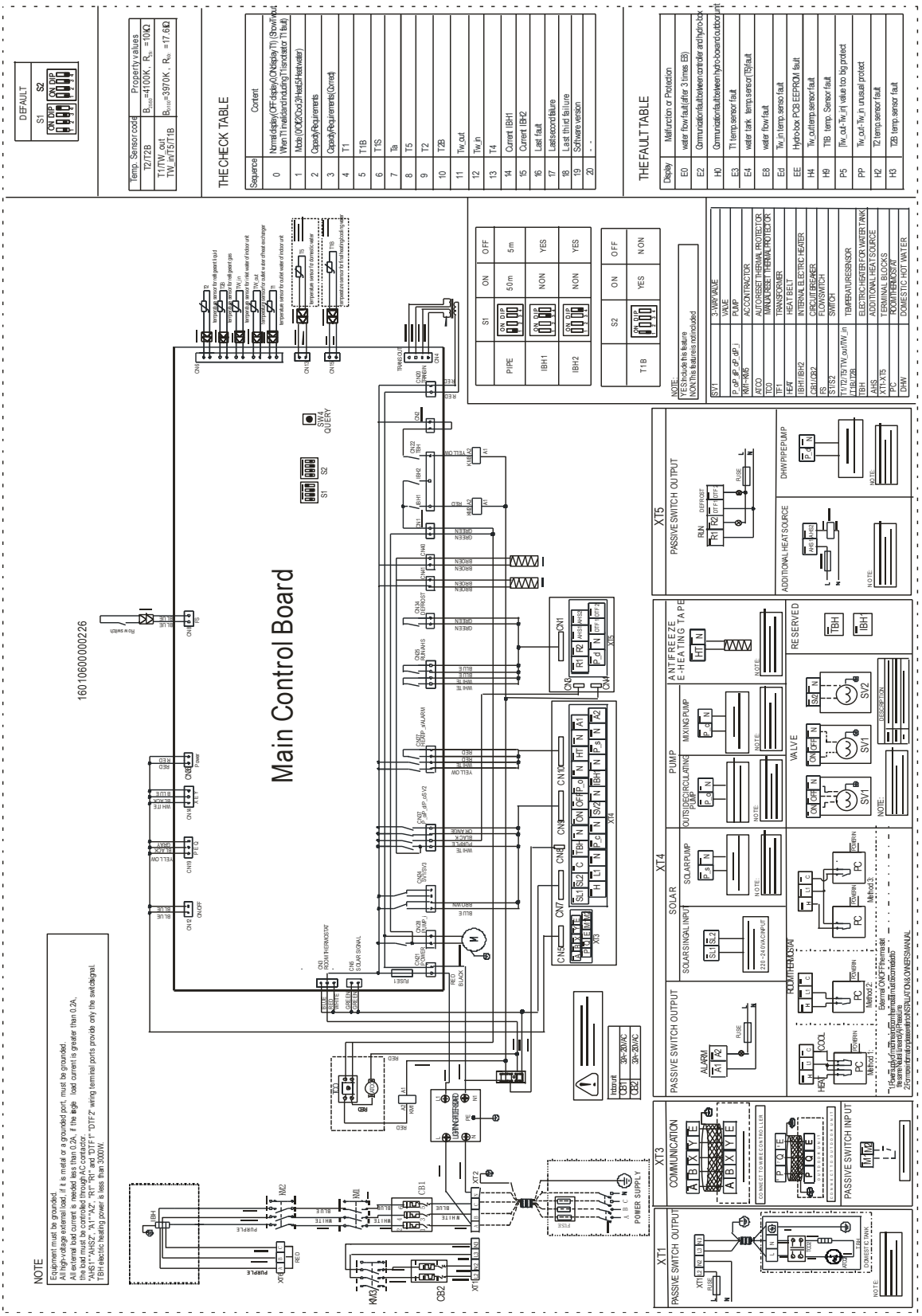
Temp. Sensor code	Property values
T3/T4/T6(Th)	$B_{25/50}$=4100K, $R_{25℃}$=10kΩ
T5(Tp)	$B_{25/50}$= 3950K, $R_{90℃}$ =5kΩ

9.2 Wring diagram for hydronic box

For 1Ph hydronic box



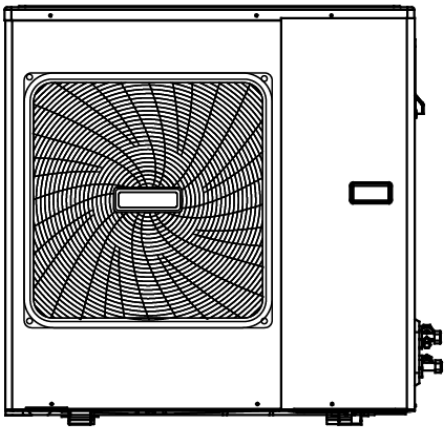
For 3Ph hydronic box



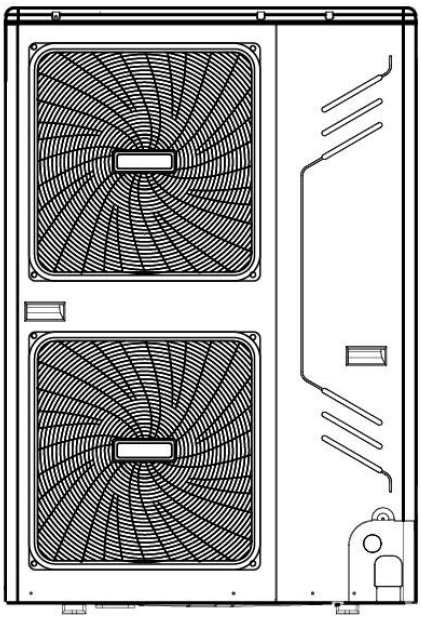
10. Overview of the unit

10.1 Overview of the outdoor unit

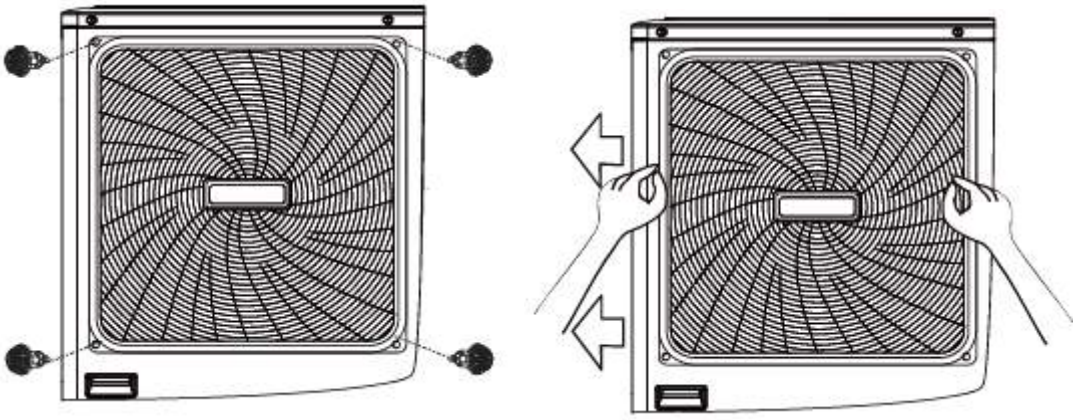
4-8kW



10-16kW



Push the grill to the left until it stops. Then pull its right edge, the grill can now be removed. You can also reverse the procedure. Exercise caution to avoid a possible hand injury.

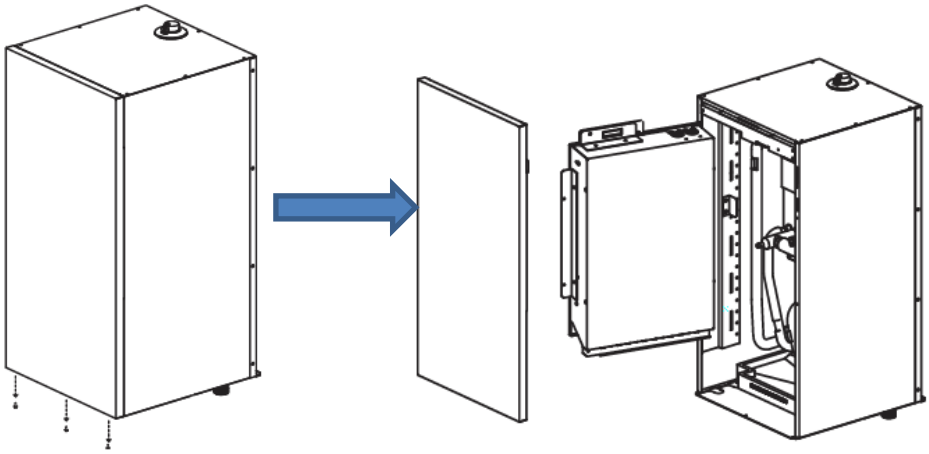


10.2 Overview of hydronic box

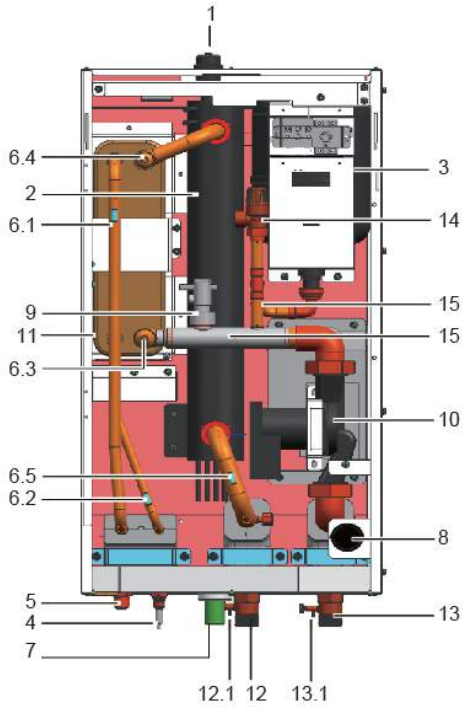
10.2.1 Hydronic box opening

The front flap on the indoor unit cover gives access to the manometer and user interface. The indoor unit cover can be removed by removing the 6 side screws and unhitching the cover.

To gain access to the control box components, the control box service panel can be removed. Thereto, loosen the front screws and unhitch the control box service panel.



10.2.2 Hydronic compartments & functional diagram



1. Air vent valve

Remaining air in the water circuit will be automatically removed via the air vent valve.

2. Backup heater

The backup heater consists of an electrical heating element that will provide additional heating capacity to the water circuit if the heating capacity of the unit is insufficient due to low outdoor temperatures; it also protects the external water piping from freezing during cold periods.

3. Expansion vessel (1.32 gallons (5 L))

4. Refrigerant liquid connection

5. Refrigerant gas connection

6. Temperature sensors

Four temperature sensors determine the water and refrigerant temperature at various points in the water circuit.

6.1-T2B; 6.2-T2; 6.3-TW_in; 6.4-TW_out; 6.5-T1

7. Drain port

8. Manometer

The manometer allows readout of the water pressure in the water circuit.

9. Flow switch

The flow switch checks the flow in the water circuit and protects the heat exchanger against freezing and the pump against damage.

10. Pump

The pump circulates the water in the water circuit.

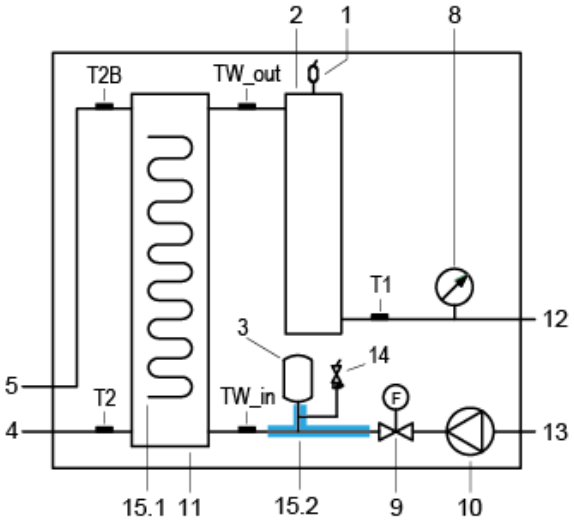
11. Heat exchanger

The manometer allows readout of the water pressure in the water circuit.

12. Water outlet connection

12.1 Air vent valve
13. Water inlet connection
13.1 Drain valve
14. Safety valve
The pressure relief valve prevents excessive water pressure in the water circuit by opening at 43.5psi (g)/3bar (g) and discharging some water.
15. Electrical heating tape (15.1-15.2)

Functional diagram of hydraulic compartment

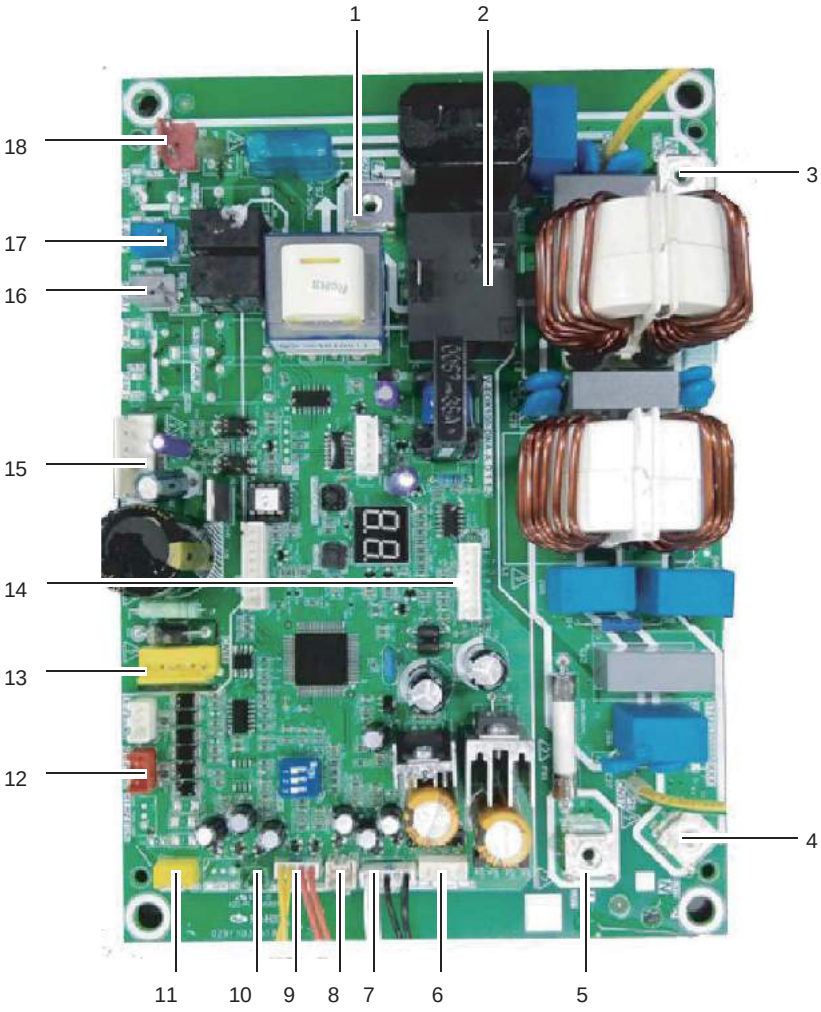


1 Air vent valve
2 Backup heater vessel with backup heater
3 Expansion vessel
4 Refrigerant liquid connection
5 Refrigerant gas connection
8 Manometer
9 Flow switch
10 Circulated pump
11 Heat exchanger
12 Water outlet connection
13 Water inlet connection
14 Safety valve
15.1 Electrical heating tape
15.2 Electrical heating tape
Temperature sensors: Tw_in, Tw_out, T1, T2, T2B

10.3 Electric box lay out for outdoor unit

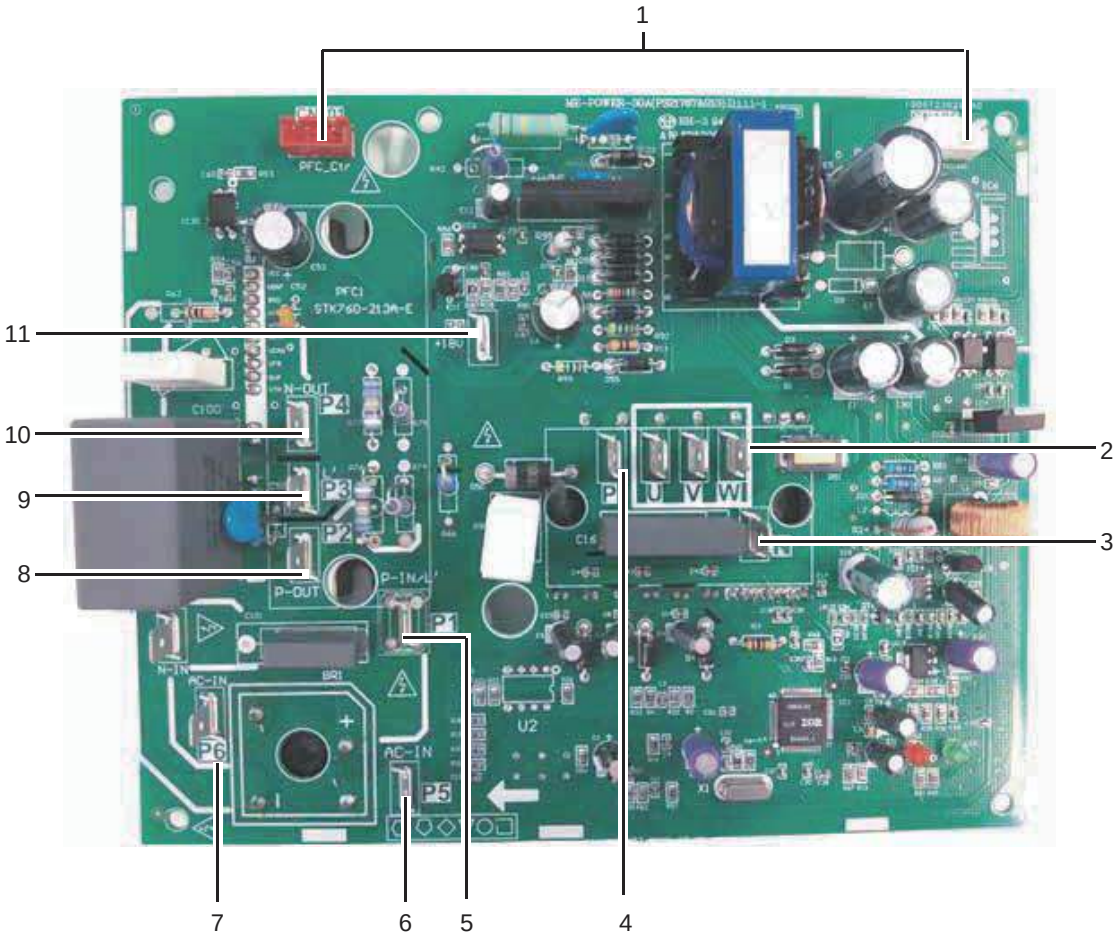
1Ph 4-8kW products

PCB A discription



1 Rectifier bridge input port L24
2 Hydraulic compartment input port2
3 Rectifier bridge input port N
4 Power supply N
5 Power supply L
6 Transformer output port
7 BLACK: T3 temperature sensor port
WHITE: T4 temperature sensor port
8 TP temperature sensor port
9 YELLOW: High pressure switch
RED: Low pressure switch
10 Th temperature sensor port
11 Pressure sensor port
12 Wire controller port
13 P/N/+18V port
14 To IPDU/PFC
15 DC fan port
16 Compression electromechanical heating belt
17 4-way valve port
18 Transformer input port

PCB B description



1 To main board (CN101,CN105)

2 Compressor connection port U V W (U,V,W)

3 Input port N for IPM module(N)

4 Input port P for IPM module(P)

5 Input port for PFC inductance(P1)

6 Input port for bridge Rectifiers(P5)

7 Input port for Bridge Rectifiers(P6)

8 Output port P of PFC(P2)

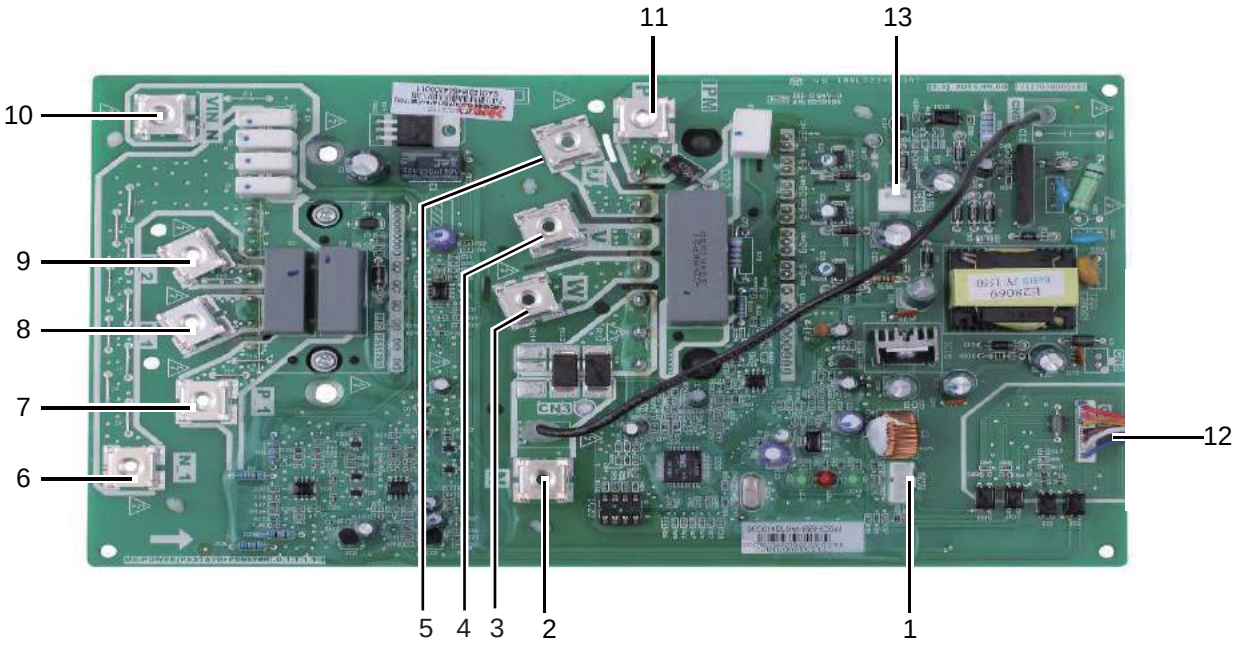
9 Input port for PFC(P3)

10 Output port N of PFC(P4)

11 +18V(P9)

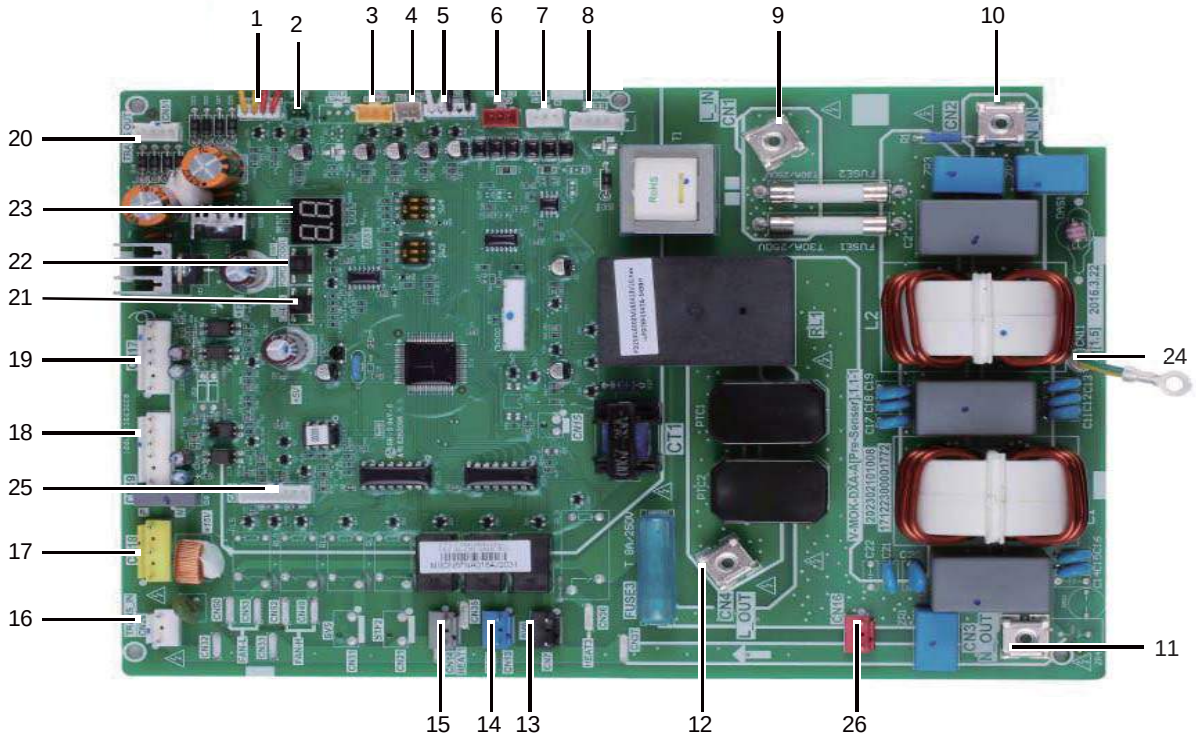
1Ph 10-16kW products

PCB A description



1	Reserved(CN2)	5	Power Supply Of U Phase For Compressor(U)	10	Input Port N For Pfc Module(VIN-N)
2	Input Port N For Ipm Module(N)	6	Output Port N Of Pfc Module(N_1)	11	Input Port P Foripm Modele(P)
3	Power Supply Of W Phase For Compressor(W)	7	Output Port P Of Pfc Module(P_1)	12	Communicate Port Between Pcb A And Pcb B(CN1)
4	Power Supply Of V Phase For Compressor(V)	8	Input Port For Pfc Inductance L_1(L_1)	13	+15V(CN6)
		9	Input Port For Pfc Inductance L_2(L_2)		

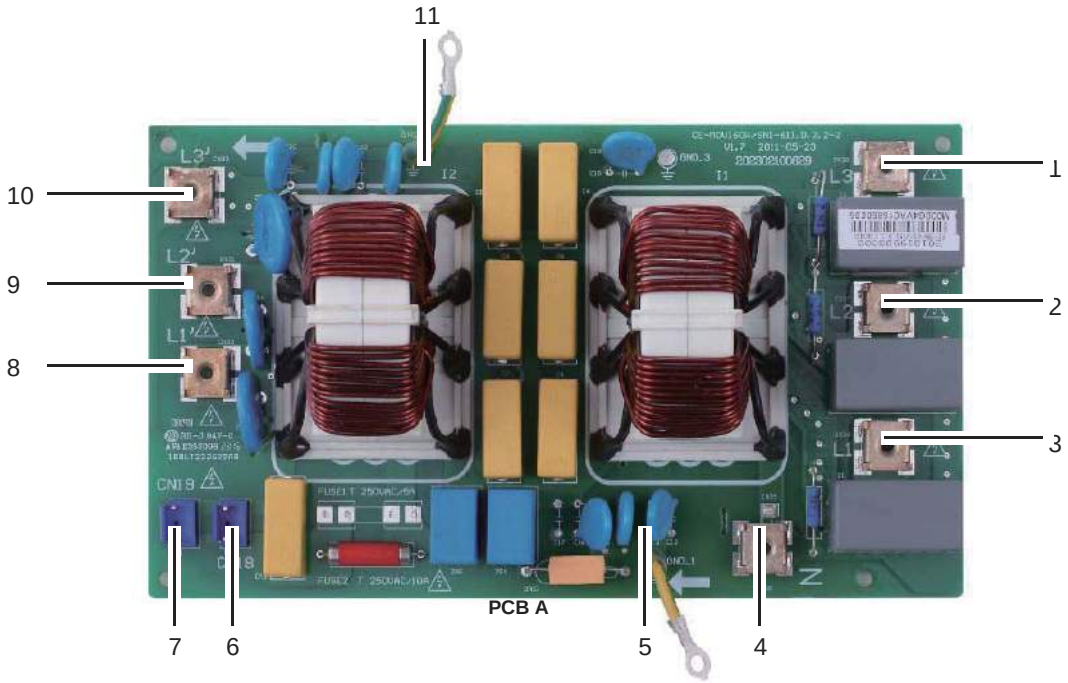
PCB B description



1 Port For Pressure Switch(CN12)
2 Port For Suction Temperature Sensor(CN24)
3 Port For Pressure Sensor(CN28)
4 Port For Discharge Temperature Sensor(CN8)
5 Port For Ambient Temperature And Condenser Outlet Temperature Sensor(CN9)
6 Port For Communication Between Outdoor Unit And Bydro-box(CN10)
7 Reserved(CN30)
8 Port For Electrical Expansion Value(CN22)
9 Input Port For Live Wire(CN1)
10 Input Port For Neutral Wire(CN2)
11 Output Port For Neutral Wire(CN3)
12 Ourput Port For Live Wire(CN4)
13 Reserved(CN7)
14 Port For 4-way Value(CN13)
15 Port For Eletric Heating Tape(CN14)
16 Input Port For Transformer(CN26)
17 Power Supply Port For Fan(CN18)
18 Port For Down Fan(CN19)
19 Port For Up Fan(CN17)
20 Output Port For Transformer(CN51)
21 Check Button(SW2)
22 Refrigerant Recovery Button
23 Digital Displays(DIS1)
24 Ground Wire(CN11)
25 Comunication Port For PCBA(CN6)
26 Power supply port for hydro-box control board(CN16)

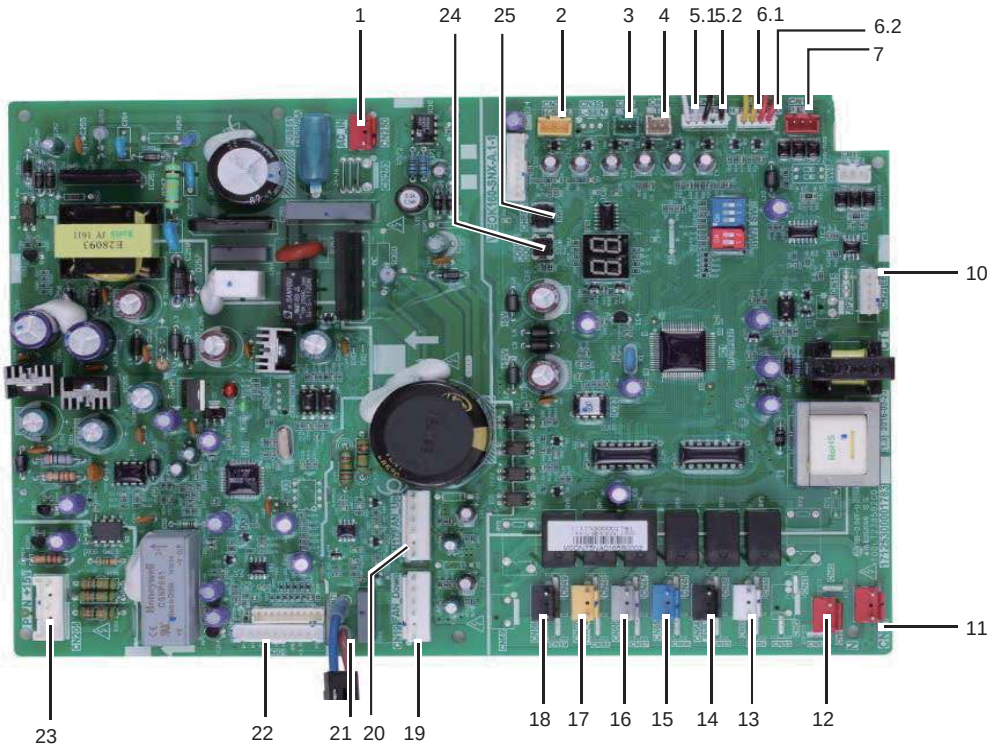
3Ph 12-16kW products

PCB A description



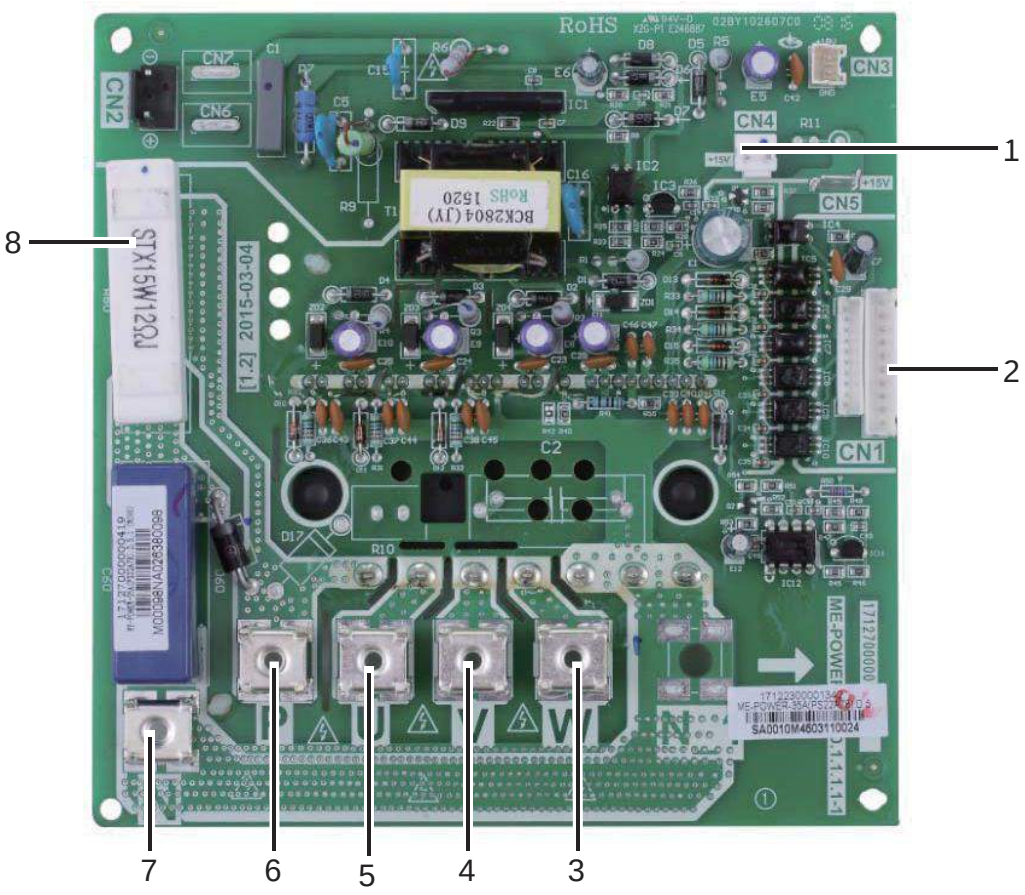
1 Power supply L3 2 Power supply L2 3 Power supply L1
4 Power supply N 5 Ground wire(GND_1) 6 Power supply for load(CN18))
7 Power supply for main control board(CN19) 8 Power filtering L1
9 Power filtering L2 10 Power filtering L3 11 Ground wire(GND_2)

PCB B description



1 Power supply for the main PCB(CN250) 2 Port for pressure sensor (CN36)
3 Port for suction Temp. sensor (CN4) 4 Port for discharge Temp. sensor(CN8)
5.1 Port for outdoor Temp. sensor (CN9) 5.2 Port for condenser outlet Temp. sensor (CN9)
6.1 Port for high pressure switch (CN6) 6.2 Port for low pressure switch (CN6)
7. Communicate port between door 1 PCB B and door 2 PCB(CN10）
10 Port for electrical expansion value (CN22) 11 Port for power supply (CN41)
12 Power supply for hydro-box 13 PFC control port (CN63)
14 Reserved (CN64) 15 Port for 4-way value (CN65)
16 Port for electric heating tape 17 PTC control (CN67) (CN66)
18 Reserved (CN68) 19 Port for down fan (CN19)
20 Port for up fan (CN17) 20 Port for up fan (CN17)
21 Power supply port for module (CN70\71) 22 Communication port for IPDU (CN201)
23 Port for voltage check (CN205) 24 Refrigerant recovery button (SW1)
25 Check button (SW2)

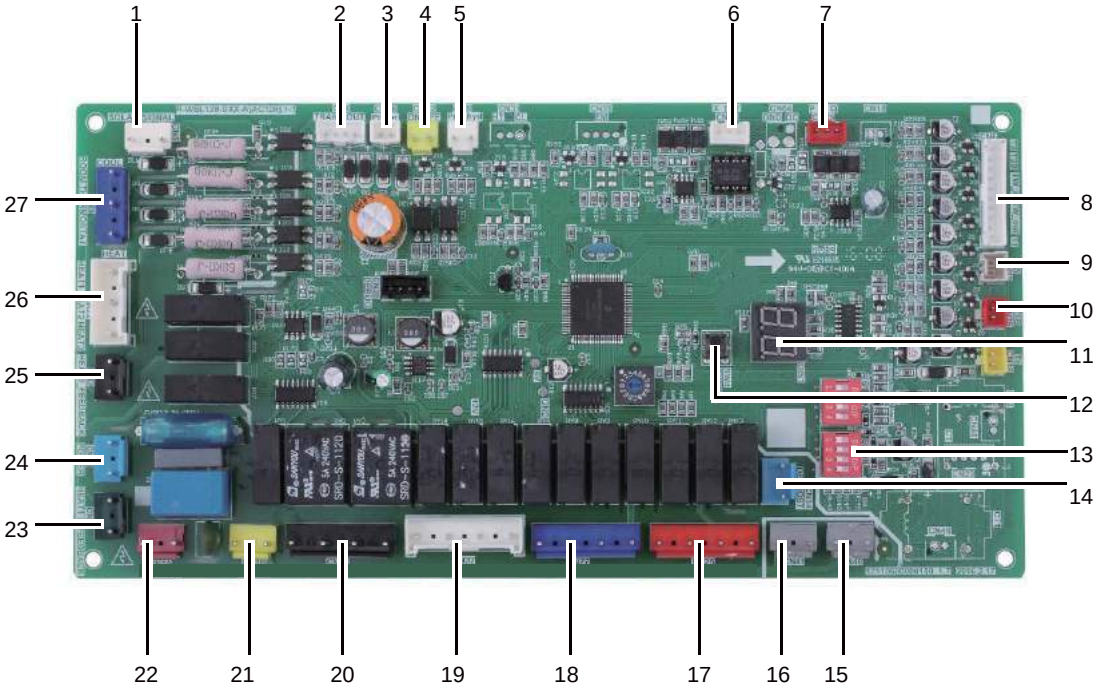
PCB C description



1. +15V port (CN4)
2. To MCU (CN1)
3. IPM input N
4. Compressor connection port W
5. Compressor connection port V
6. Compressor connection port U
7. IPM input P
8. Power for switching power supply (CN2)

10.4 Electric box lay out for hydronic box

Hydronic box PCB description



1 Input port for solar energy (CN5)

2 Output port for transformer (CN4)

3 Power supply port for user interface (CN36)

4 Port for remote switch (CN12)

5 Port for flow switch（CN8）

6 Communicate port between outdoor unit and hydronic box PCB(CN14)

7 Communicate port between hydronic box PCB and user interface (CN19)

8 Port for temperature sensors (TW_out, TW_in, T1, T2, T2B) (CN6)

9 Port for temperature sensor (CN13)

10 Port for temperature sensor (T1B, the final outlet temp.)(CN15)

11 Digital displays (DIS1)

12 Check button (SW4)

13 DIP switch (S1, S2)
14 output port for defrost (CN34)
15 Port for anti-freeze electric heating tape (internal)(CN40)
16 Port for anti-freeze electric heating tape (internal)(CN41)
17 Output port for external heating source / operation output port(CN25)
18 Port for anti-freeze eletric heating tape(external) /port for solar energy pump/output port for remote alarm(CN27)
19 Port for external circulated pump/pipe pump/mix pump/2-way valve SV2(CN37)
20 Port for SV1 (3-way valve) and SV3 (CN24)
21 Port for internal pump (CN28)
22 Input ports for transformer (CN20)
23 Feedback port for temperature switch (CN1)
25 Feedback port for external temp. switch(shorted in default)(CN2)
26 Control port backup heater/booster heaters (CN22)
27 Control port for room thermostat (CN3)

11. Installation

11.1 Installation for outdoor unit

11.1.1 Installation place for outdoor unit

Please keep the unit away from the following places, or malfunction of the machine may be caused.

1) There is combustible gas leakage.

2) There is much oil (including engine oil) ingredient.

3) There is salty air surrounding (near the coast)

4) There is caustic gas (the sulfide, for example) existing in the air (near a hot spring)

5) A place the heat air expelled out from the outdoor unit can reach your neighbor’s window.

7) A place where the drain water does not make any problem.

6) A place that the noise interfere your neighbor’s everyday life.

3) A place that is not exposed to a strong wind.

7) A place that is too weak to bear the weight of the unit.

4) A place that does not block a passage.

8) Uneven place.

9) Insufficient ventilation place.

10) Near private power station or high frequency equipment. Install indoor unit,

outdoor unit, power cord and connecting wire at least 1m away from TV set or radio to prevent noise or picture interference.

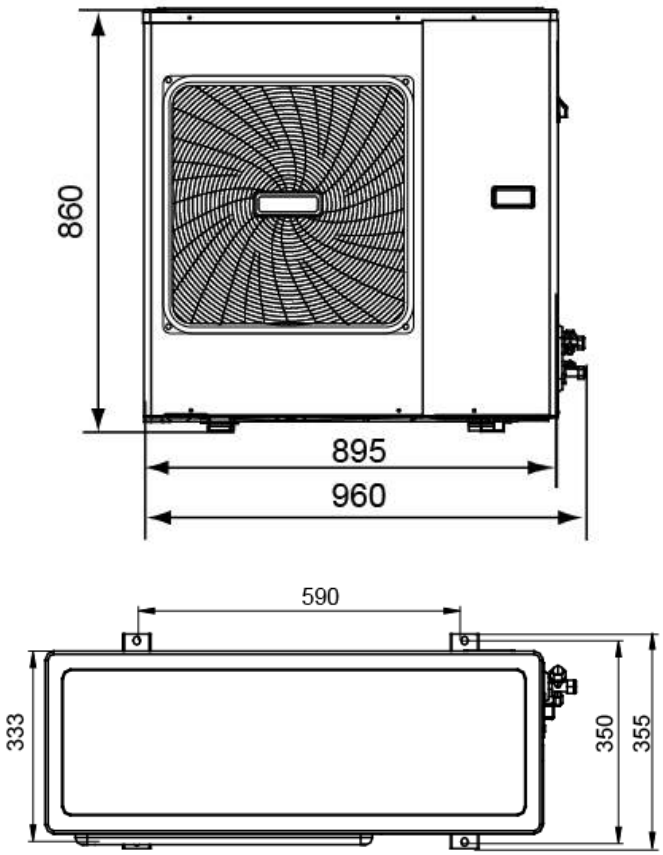
Caution:

- When the outdoor unit is installed in a place that is always exposed to a strong wind like a coast or on a high story of a building, secure a normal fan operation by using a duct or a wind shield.
- When the outdoor unit is installed in an elevated position, be sure to 4 secure its feet.
- Keep indoor unit, outdoor unit, power supply wiring and transmission wiring at least 1 meter away from televisions and radios. This is to prevent image interference and noise in those electrical appliances. (Noise may be generated depending on the conditions under which the electric wave is generated, even if 1 meter is kept.)
- The insulation of the metal parts of the building and the heater pump should comply with the regulation of National Electric Standard.

11.2.1 Unit dimensions and service for outdoor unit (unit: mm)

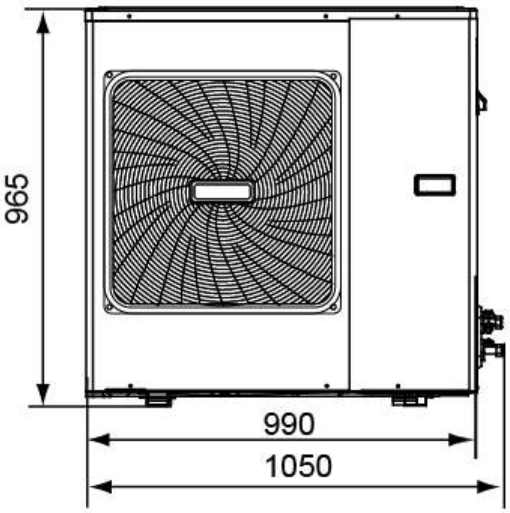
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts. (Prepare four sets each of Φ10 Expansion bolts, nuts and washers which are readily available on the market.)
- It is best to screw in the foundation bolts until their length is 20 mm from the foundation surface.

4/6kW

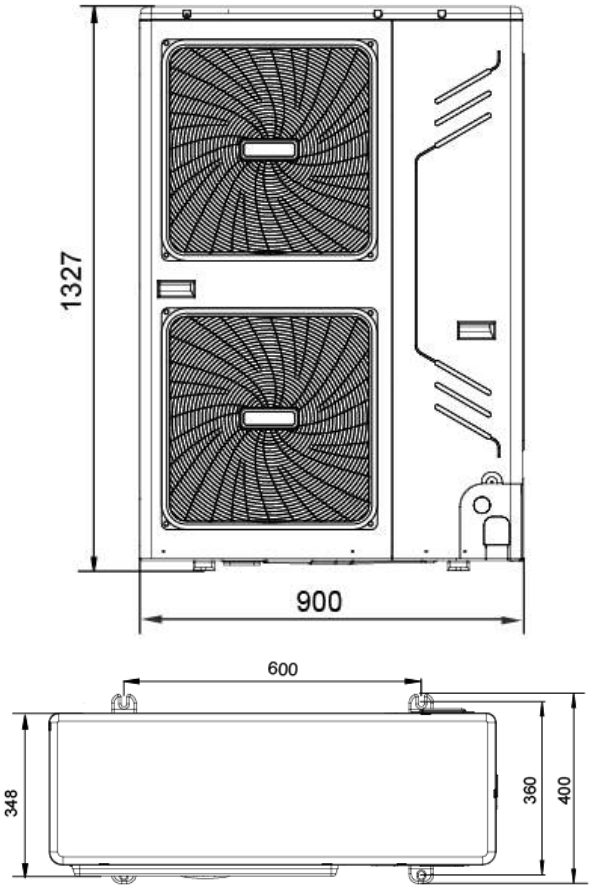


Note: The drain hole is covered by rubber plug; the bigger hole can be opened in field if necessary.

8kW

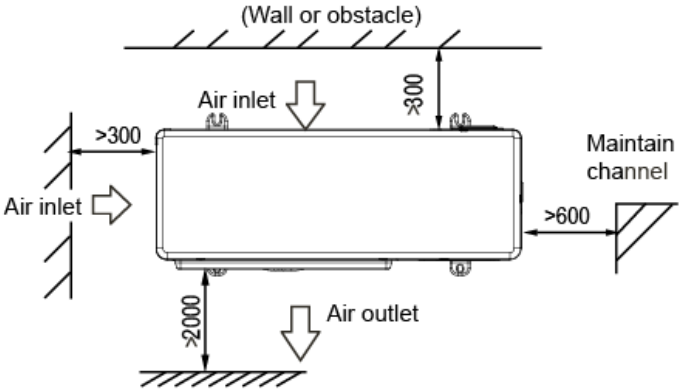


10-16kW

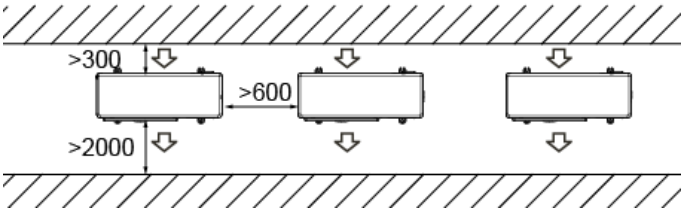


Unit installation dimensions

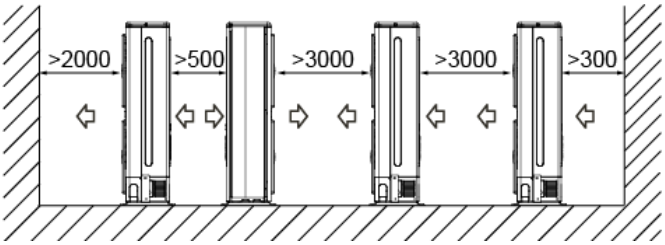
Single unit installation



Parallel connect the two units or above



Parallel connect the front with rear sides



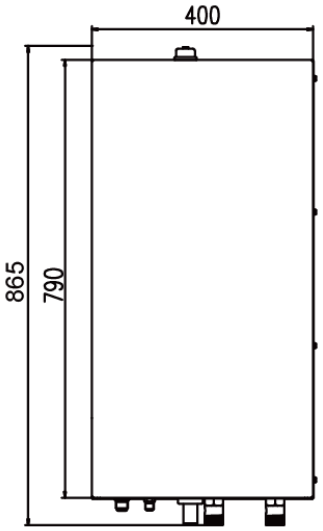
11.2 Installation for hydronic box

11.2.1 Installation place for hydronic box

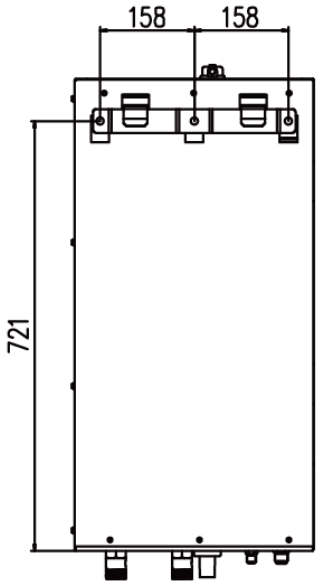
The hydronic box is to be wall mounted in an indoor location that meets the following requirements:

- The installation location is frost-free.
- The space around the unit is adequate for serving.
- The space around the unit allows for sufficient air circulation.
- There is a provision for condensate drain and pressure relief valve blow off.
- The installation surface is a flat and vertical non-combustible wall, capable of supporting the operation weight of the unit.
- There is no danger of fire due to leakage of inflammable gas.
- All piping lengths and distance have been taken into consideration.

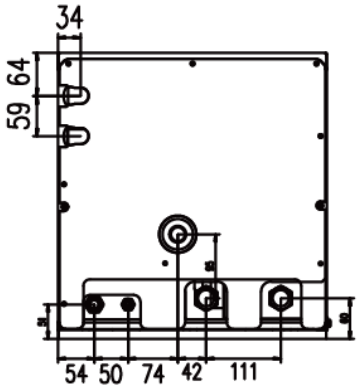
11.2 .2 Unit dimensions and service space (unit: mm)



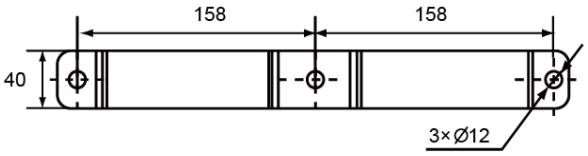
Front view



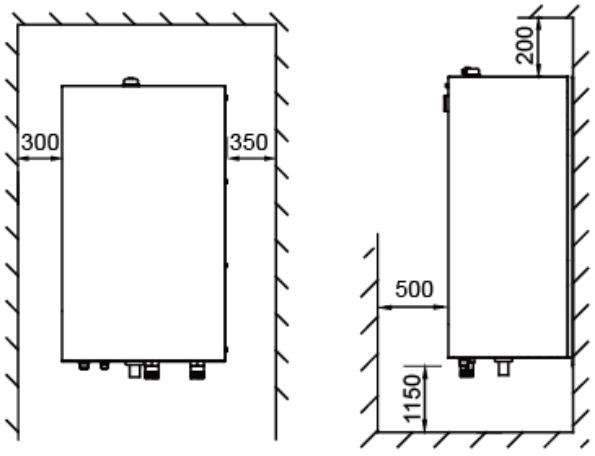
Back view



Upward view



Dimensions of the wall bracket



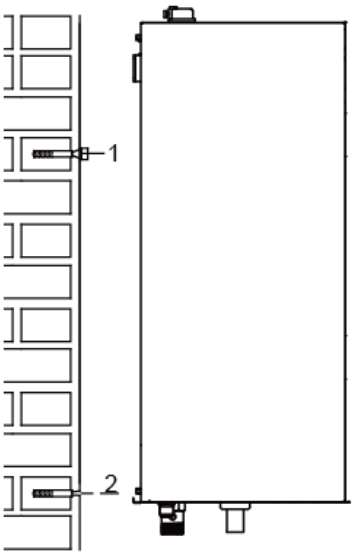
Required service space

11.2 .3 Inspecting, handling and unpacking

- The indoor unit is packed in a box.
- At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.
- Check if all indoor unit accessories are enclosed.
- Bring the unit as close as possible to the final installation position in its original package in order to prevent damage during transport.
- The hydronic box weights approximately 60kg and should be lifted by two persons using the two lifting bars provided.
- Do not grasp the control box or piping to lift the unit. Two lifting bars are provided to lift the unit.

11.2 .4 Mounting the indoor unit

- Fix the wall mounting bracket to the wall using appropriate plugs and screws.
- Make sure the wall mounting bracket is completely level. When the unit is not installed level, air might get trapped in the water circuit resulting in malfunctioning of the unit.
- Pay special attention to this when installing an indoor unit to prevent overflow of the drain pan.
- Hang the indoor unit on the wall mounting bracket.
- Fix the indoor unit at the bottom inside using appropriate plugs and screws. To do so, the unit is equipped with 2 hole sat the bottom outer edges of the frame.

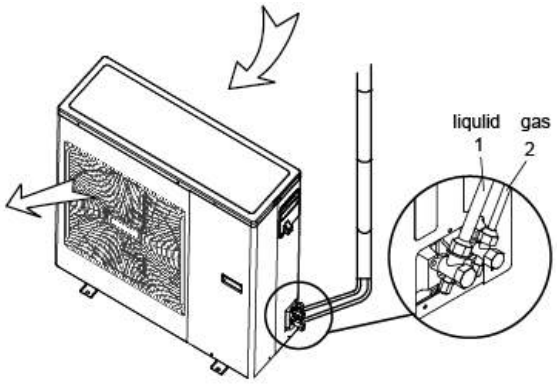


11.3 Refrigerant pipework

11.3.1 Refrigerant piping connection

Check whether the difference in height between the indoor unit and outdoor unit, the length of refrigerant pipe, and the number of the bends meet the following requirements.

Models	**4/6kW**	**8kW**	**10-16kW**
Max. piping length	20m	30m	50m
Max. height difference when outdoor unit is upside	10m	20m	30m
Max. height difference when outdoor unit is downside	8m	15m	25m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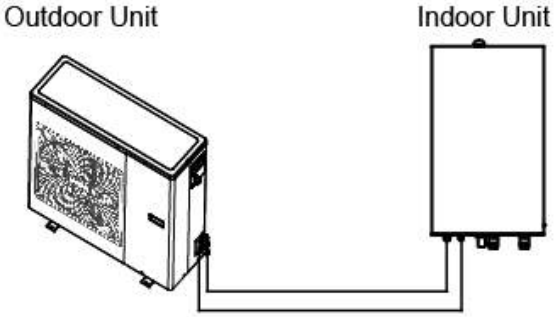
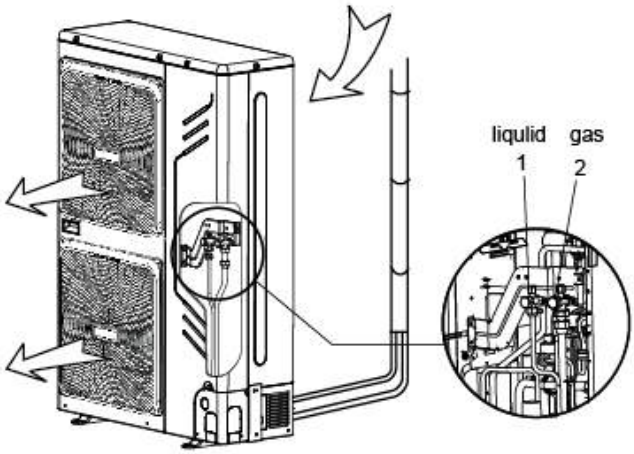
gas
1
2


Outdoor Unit
Indoor Unit

4~8kW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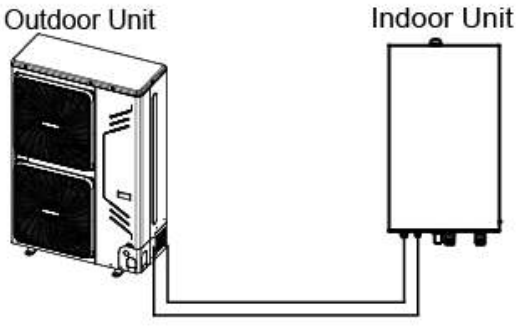

Outdoor Unit
Indoor Unit

10~16kW

Size of pipes of Gas side and Liquid side

Models	Refrigerant	Gas side	Liquid side
4-16kW	R410A	Φ15.9	Φ9.52

Connection method

Models	Gas side	Liquid side
4-16kW outdoor unit	Flare	Flare
Indoor unit	Flare	Flare

11.3.2 Clean pipes and airtight test

After refrigerant piping connection, it is necessary to remove dirt or water in the pipes.

- Make sure there is no dirt and water before connecting the piping to the outdoor units.
- Wash the pipes with high pressure nitrogen, never use refrigerant of outdoor unit.

Then airtight test: Charge pressured nitrogen after connecting indoor/outdoor unit pipes to do airtight test.

- Pressured nitrogen [4.3MPa (44kg/cm2) for R410A] should be used in the airtight test.
- Tighten high pressure/low pressure valves before applying pressured nitrogen.
- Apply pressure from air vent mouth on the high pressure/low pressure valves.
- The high pressure/low pressure valves are closed when applying pressured nitrogen.
- The airtight test should never use any oxygen, flammable gas or poisonous gas.

11.3.3 Air Purge with vacuum pump

- Use vacuum pump to do the vacuum, never use refrigerant to expel the air.
- Vacuuming should be done from both liquid side and gas side simultaneously.

11.3.4 Refrigerant amount to be added

Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit connection. If the length of the liquid side pipe is less than 10 meters it is no need to add more refrigerant, so calculating the added refrigerant the length of the liquid side pipe must subtract 10 meters.

Liquid side piping diameter	**Refrigerant**	**Refrigerant to be added per-meter piping**
Φ9.5	R410A	0.054kg

11.4 Electrical wiring

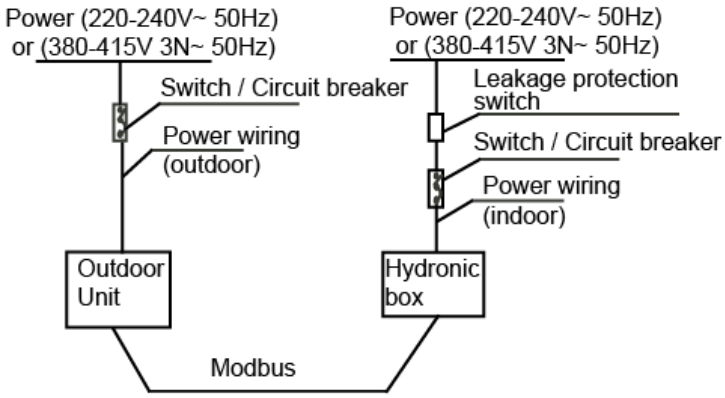
Please select power source for indoor unit and outdoor unit respectively.

- The power supply has specified branch circuit with leakage protector and manual switch.
- Outdoor unit and indoor unit connect with required power supply which is 220-240V~ 50Hz or 380-415V 3N~ 50Hz.
- Use 3-core screened wire as indoor and outdoor control wire.
- The installation should comply with relevant national electric standard.
- Power wiring should be engaged by specialized electrician.

11.4.1 Outdoor unit wiring

The specification of power

Capacity(kW)		**4-8kW**	**10-16kW**	**12-16kW**
Outdoor unit power	Phase	1		3
	Voltage	220-240V		380-415V
	Frequency	50Hz		
	Power wiring(mm^2)	3*2.5	3*4.0	5*2.5
Circuit breaker(A)		30	40	32
Outdoor / hydronic box signal wire		3-core shield wire(3*0.75)		
Flexible cord must meet 60245IEC (H05RN-F) standards.				



Wrong signal wire connection between outdoor unit and hydronic box may cause malfunction. Seal the wiring connection with the insulation material, or the condensing dew will be caused.

11.4.2 Hydronic box wiring

Capacity(kW)		**4-16kW**	**12-16kW**
Outdoor unit power	Phase	1	3
	Voltage	220-240V	380-415V
	Frequency	50Hz	
	Power wiring(mm^2)	3*2.5	5*2.5
Circuit breaker(A)		32	
Outdoor / hydronic box signal wire		3-core shield wire(3*0.75)	

When power cord is parallel with signal wire, please put them into separate wire distribution pipes, and leave a proper distance. (Reference distance: It is 300mm when current capacity of power cord is less than 10A, or 500mm when 50A).

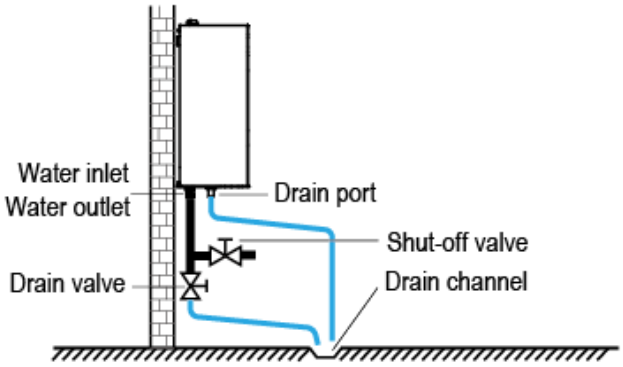
11.4 Water pipework

All piping lengths and distances have been taken into consideration. The maximum allowed thermistor cable length is 20m. This is the maximum allowable distance between the domestic hot water tank and the unit (only for installations with a domestic hot water tank).The thermistor cable supplied with the domestic hot water tank is 10m in length.

In order to optimize efficiency we recommend installing the 3-way valve and the domestic hot water tank as close as possible to the unit.

Requirement	**Volume**
Maximum allowable piping length between the 3-way valve SV1 and the hydronic box (only for installations with domestic hot water tank)	3m
Maximum allowable piping length between the domestic hot water tank and the hydronic box (only for installations with domestic hot water tank).	8m
Maximum allowable piping length between the T1B and the hydronic box.	8m

When water is at standstill inside the system, freezing is very likely to happen and damaging the system in the process.



Before installation of the unit, check the following:

- The maximum water pressure = 3 bar.
- The maximum water temperature is 70℃ according to safety device setting.
- Always use materials that are compatible with the water used in the system and with the materials used in the unit.
- Ensure that components installed in the field piping can withstand the water pressure and temperature.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance.
- Air vents must be provided at all high points of the system. The vents should be located at points that are easily accessible for servicing. An automatic air purge is provided inside the unit. Check that this air purge valve is not tightened too much so that automatic release of air in the water circuit remains possible.

Checking the water circuit

- The units are equipped with a water inlet and outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with local laws and regulations.
- The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.

Checking the water volume and expansion vessel pre-pressure

The unit is equipped with a 5 L expansion vessel that has a default pre-pressure of 1.5 bar. To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted and the minimum and maximum water volume must be checked.

1. Check that the total water volume in the installation, excluding the internal water volume of the unit, is at least 20L.

2. Determine if the expansion vessel pre- pressure requires adjustment.

Calculating pre-pressure of the expansion vesse**l**

The pre-pressure (Pg) to be set depends on the maximum installation height difference (H) and is calculated as follows:

Pg(bar)=(H(m)/10+0.3) bar

3. Using the table and instructions below, determine if the total water volume in the installation is below the maximum allowed water volume.

Installation height difference*	Water volume ≤160L	Water volume >160L
≤7 m	No pre-pressure adjustment required.	Actions required: • pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel" • check if the water volume is lower than maximum allowed water volume (use graph below)
>7 m	Actions required: • Pre-pressure must be increased, calculate according to "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume (use graph below)	Expansion vessel of the unit too small for the installation.

Installation height difference: height difference (m) between the highest point of the water circuit and the unit. If the unit is located at the highest point of the installation, the installation height is considered to be 0 m.

Notes：

- In most applications this minimum water volume will be satisfactory.
- In critical processes or in rooms with a high heat load though, extra water might be required.
- When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume is kept even if all the valves are closed.

When it is required to change the default pre-pressure of the expansion vessel

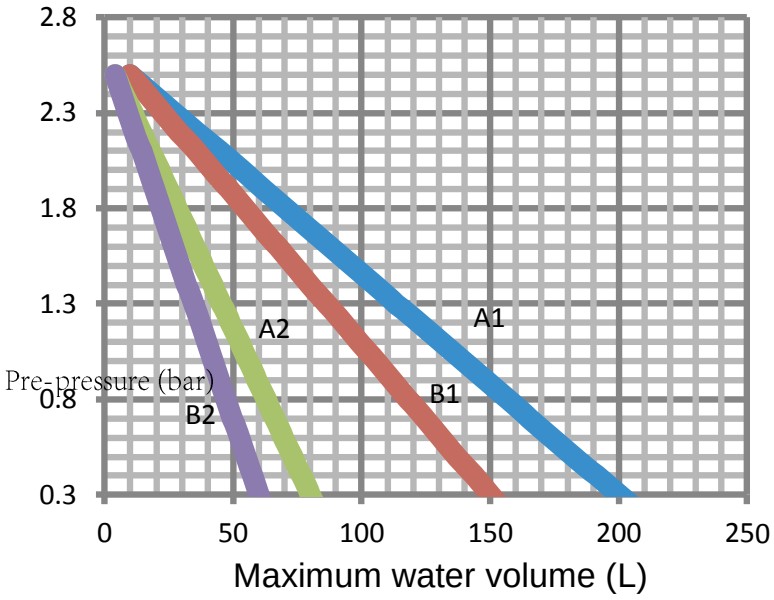
[1 bar], keep in mind the following guidelines:

- Use only dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system. Therefore, the pre-pressure should only be adjusted by a licensed installer.

Checking the maximum allowed water volume

To determine the maximum allowed water volume in the entire circuit, proceed as follows:

1. Determine the calculated pre-pressure (Pg) for the corresponding maximum water volume using the graph below.
2. Check that the total water volume in the entire water circuit is lower than this value.



A1 System without glycol for (10 ~ 16KW)

A2 System without glycol for (4 ~ 8KW)

B1 System with 25% propylene glycol for (10 ~ 16KW)

B2 System with 25% propylene glycol for (4 ~ 8KW)

If this is not the case, the expansion vessel inside the unit is too small for the installation.

Example 1

The unit is installed 5 m below the highest point in the water circuit. The total water volume in the water circuit is 100 L. In this example, no action or adjustment is required.

Example 2

The unit is installed at the highest point in the water circuit. The total water volume in the water circuit is 180 L.

Result:

- Since 180 L is more than 160 L, the pre-pressure must be decreased (see table above).
- The required pre-pressure is:

  Pg(bar) = (H(m)/10+0.3) bar = (0/10+0.3) bar = 0.3 bar
- The corresponding maximum water volume can be read from the graphic is approximately 210 L.
- Since the total water volume (180 L) is below the maximum water volume (210 L), the expansion vessel suffices for the installation.

When it is required to change the default pre-pressure of the expansion vessel (1 bar), keep in mind the following guidelines:

- Use only dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunctioning of the system. Pre-pressure should only be adjusted by a licensed installer.

Connecting the water circuit

Water connections must be made in accordance with the outlook diagram delivered with the unit, with respect to the water intake and water outlet.

If air, moisture or dust gets in the water circuit, problems may occur.

Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.

- Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- Use a good thread sealant for sealing the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-brass metallic piping, make sure to insulate both materials from each other to prevent galvanic corrosion.
- Because brass is a soft material, use appropriate tools for connecting the water circuit. Inappropriate tools will cause damage to the pipes.

Notes:

The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping:

- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between the domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit.
- The recommended maximum changeover time of the valve should be less than 60 seconds.

Protecting the water circuit against freezing

Frost can cause damage to the hydronic system. As this unit is installed outdoors and thus the hydraulic system is exposed to freezing temperatures, care must be taken to prevent freezing of the system.

All hydronic parts are insulated to reduce heat loss. Insulation must be present on the field piping.

The unit is already equipped with several features to prevent freezing.

The software contains special functions using the heat pump to protect the entire system against freezing. When the temperature of the water flow in the system drops to a certain value, the software will heat the water, either using

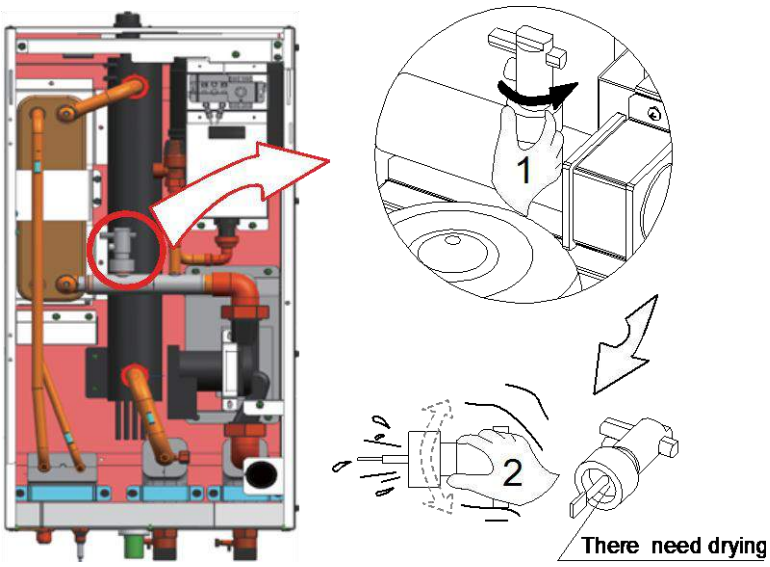
the heat pump, the electric heating tap, or the backup heater. The freeze protection function will turn off only when the temperature increases to a certain value.

In case of a power failure, the features mentioned above cannot protect the unit from freezing. Since a power failure could happen when the unit is unattended, the supplier recommends adding glycol to the water system. If no glycol is added, the water must be drained out when there is a power failure. Depending on the expected lowest outdoor temperature, make sure the water system is filled with a concentration of glycol as mentioned in the table below. When glycol is added to the system, the performance of the unit is affected. The correction factor of the unit capacity, flow rate and pressure drop of the system is listed in the table below:

Freezing point(℃)						
	0	-5	-10	-15	-20	-25
Percentage of ethylene glycol in weight						
	0	12%	20%	28%	35%	40%
cPf	1	0.98	0.97	0.965	0.96	0.955
cQ	1	1.02	1.04	1.075	1.11	1.14
cdp	1	1.07	1.11	1.18	1.22	1.24

cPf: correction factor for unit heating capacity
cQ: correction factor for flow rate
cdp: correction factor for system pressure drop

Water may enter into the flow switch and cannot be drained out and may freeze when the temperature is low enough. The flow switch should be removed and dried, then can be reinstalled in the unit.



Corrosion in the system due to glycol

Uninhibited glycol will turn acidic under the influence of oxygen. This process is accelerated by presence of copper and at higher temperatures. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.

It is of extreme importance:

- That the water treatment is correctly executed by a qualified water specialist.
- That a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols.
- That in case of an installation with a domestic hot water tank, only the use of propylene glycol is allowed. In other installations the use of ethylene glycol is fine.
- That no automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates that can foul or plug the system;
- That galvanized piping is not used in glycol systems since it may lead to the precipitation of certain elements in the glycol’s corrosion inhibitor;
- To ensure that the glycol is compatible with the materials used in the system.

11.5 Fill the water

1. Connect the water supply to the fill valve and open the valve.
2. Make sure the automatic air purge valve is open (at least 2 turns).
3. Fill with water until the manometer indicates a pressure of approximately 2.0 bars. Remove air in the circuit as much as possible using the air purge valve. Air present in the water circuit might cause malfunctioning of the backup heater.

11.6 Piping insulation

The complete water circuit including all piping, must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter. The thickness of the sealing materials must be at least 13 mm with λ= 0.039 W/mK in order to prevent freezing on the outside water piping.
If the temperature is higher than 30°C and the humidity is higher than RH 80%, then the thickness of the sealing materials should be at least 20 mm in order to avoid condensation on the surface of the seal.

11.7 Field wiring

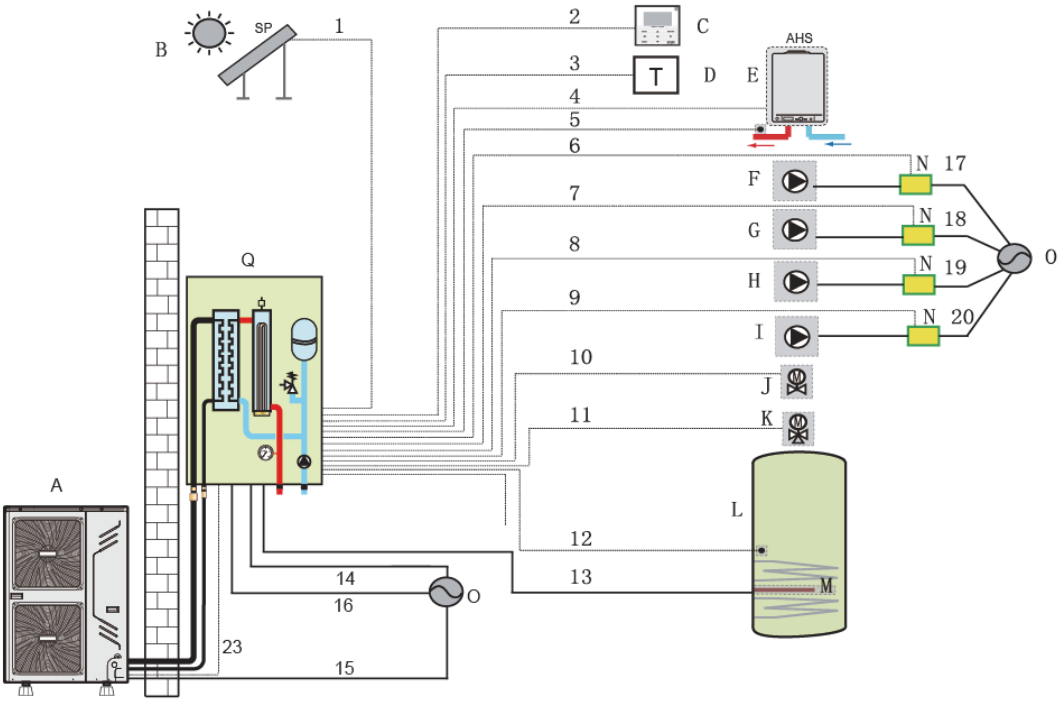
- A main switch or other means of disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations.
- Switch off the power supply before making any connections.
- Use only copper wires.
- Never squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections.
- All field wiring and components must be installed by a licensed electrician and must comply with relevant local laws and regulations.

- The field wiring must be carried out in accordance with the wiring diagram supplied with the unit.
- Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.
- Be sure to establish a ground. Do not ground the unit to a utility pipe, surge protector, or telephone ground. Incomplete grounding may cause electrical shock.
- Be sure to install a ground fault circuit interrupter (30 mA). Failure to do so may cause electrical shock.
- Be sure to install the required fuses or circuit breakers

11.7.1 Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on the high pressure side).
- Secure the electrical wiring with cable ties as shown in figure so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the ground fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the ground fault circuit interrupter
- This unit is equipped with an inverter. Installing a phase advancing capacitor not only reduce the power factor improvement effect, but also may cause abnormal heating of the capacitor due to high frequency waves. Never install a phase advancing capacitor as it could lead to an accident.

11.7.2 Wiring overview



A: Outdoor unit B: Solar energy kit (field supply) C: User interface

D: Room thermostat (field supply) E:Boiler (field supply)

F: P_s: Solar pump (field supply) G: P_c: Mixing pump (field supply)

H: P_o: Outside circulation pump (field supply)

I P_d: DHW pump (field supply) J: SV2: 2-way valve (field supply)

K: SV1: 3-way valve for domestic hot water tank (field supply)

L: Domestic hot water tank M: Booster heater N: Contactor

O: Power supply Q: Hydronic box

Item	Description	Current	Required number of conductors	Maximum running current
1	Solar energy kit signal cable	AC	2	200mA
2	User interface cable	AC	5	200mA
3	Room thermostat cable	AC	2 or 3	200mA(a)
4	Boiler control cable	/	2	200mA
5	Thermistor cable	DC	2	(b)
6	Solar pump control cable	/	2	200mA
7	Mix pump control cable	/	2	200mA
8	Outside circulation pump cable	AC	2	200mA(a)
9	DHW pump control cable	AC	2	200mA(a)
10	2-way valve control cable	AC	2	200mA(a)
11	3-way valve control cable	AC	2 or 3	200mA(a)
12	Thermistor cable	DC	2	(b)
13	Booster heater control cable	AC	2	200mA(a)
14	Power supply cable for booster heater	AC	2	200mA(a)
15	Power supply cable for unit	AC	2+GND(1 Ph) 3+GND(3Ph)	31A (1Ph) 15A(3-Ph)
16	Power supply cable for backup heater	AC	2+GND(1 Ph) 3+GND(3Ph)	14A (1Ph) 6A(3-Ph)
17	Power supply cable for solar pump	AC	2	200mA(a)
18	Power supply cable for mixing pump	AC	2	200mA(a)
19	Power supply cable for outside circulation pump	AC	2	200mA(a)
20	Power supply cable for DHW pump	AC	2	200mA(a)
21	Thermistor cable	AC	2	200mA(a)
22	Backup heater control cable	AC	2	200mA(a)

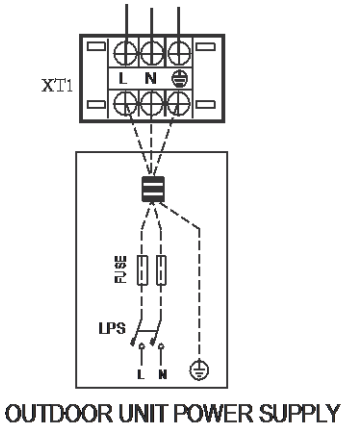
(a) Minimum cable section AWG18 (0.75 mm^2)

(b) The thermistor cable are delivered with the unit

Equipment must be grounded. All high-voltage external loads, if it is metal or a grounded port must be grounded. All external loads current are needed less than 1.5A, if the loads current is greater than 1.5A, Single external load current is needed less than 0.2A, if the single load current is greater than 0.2A, and the load must be controlled through AC contactor."AHS1" "AHS2", "A1" "A2", "R1" "R1" and "DTF1" "DTF2" wiring terminal ports provide only the switch signal.

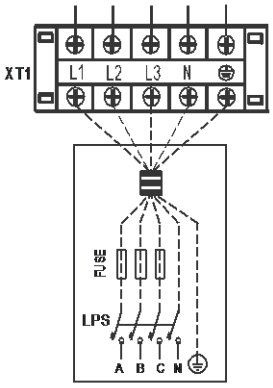
Specifications of standard wiring components

Stated values above are maximum values



OUTDOOR UNIT POWER SUPPLY

1-phase



OUTDOOR UNIT POWER SUPPLY

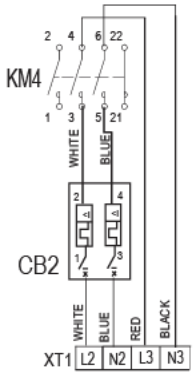
3-phase

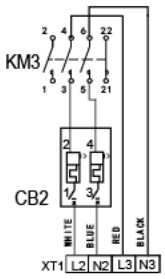
Model	**4-16kW 1Ph**	**12-16kW 3Ph**
Maximum overcurrent protector (MOP)	32A	25A
Wiring size	Wiring size must comply with the applicable local laws and regulations	

Connection of the backup heater power supply

This power circuit must be protected with the required safety devices according to local laws and regulations. Select the power cable in accordance with relevant local laws and regulations. For the maximum running current of the backup heater, refer to the table below.

	Backup heater capacity	
	3kW(1Ph)	4.5kW(3Ph)
Backup heater nominal voltage	220-240VAC	380-415VAC
Minimum circuit amps(MCA)	14.3A	14.3A
Maximum overcurrent protector (MOP)	32A	32A





Electrical parts of the hydraulic compartment: The XT4/XT5 contains terminals for solar energy, remote alarm, 2-way valve, 3-way valve, pump, booster heater and external heating source.

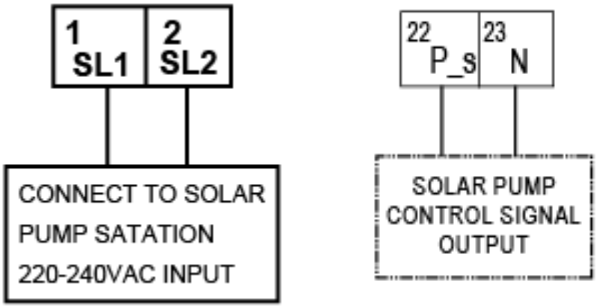
All high-voltage external loads, if it is metal or a grounded port must be grounded.

All external loads current is needed less than 0.2A, if the single load current is greater than 0.2A, the load must be controlled through AC contactor.

"STV1" "STV2", "A1" "A2", "R1" "R1" and "DTF1" "DTF2" wiring terminal ports provide only the switch signal. TBH electric heating power is less than 3000W.

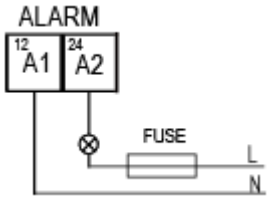
The parts wiring is illustrated below:

For solar energy kit



Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

For remote alarm



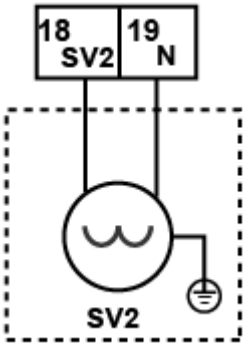
Voltage	Passive signal port
Maximum running current	0.5A
Wiring size	0.75mm^2

Procedure:

1. Connect the cable to the appropriate terminals as shown on the diagram.

2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

For 2-way valve SV2



Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

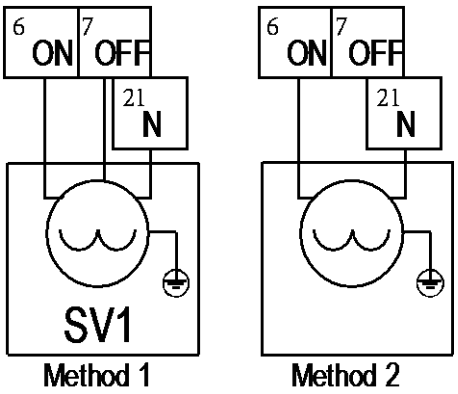
NOTE: Only a normal closing valve is available for this unit

Procedure:

1. Connect the valve cable to the appropriate terminals as shown in the picture

2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For 3-way value SV1



Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

NOTE: Wiring of the 3-way valve is different for NC (normal close) and NO (normal open). Before wiring, read the Installation & Owner's manual for the 3-way valve carefully and

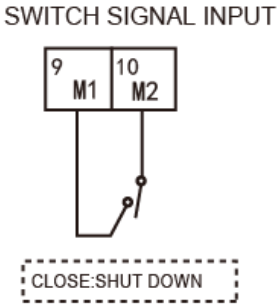
install the valve as should in the picture. Make sure to connect it to the correct terminal numbers.

Procedure:

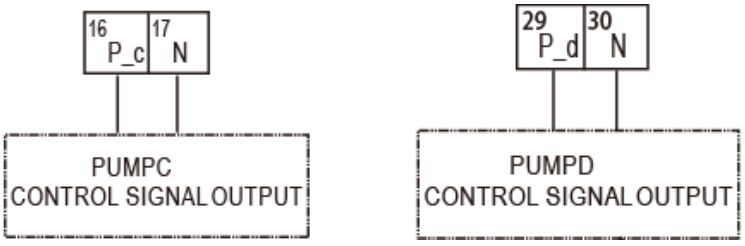
1. Connect the cable to the appropriate terminals as shown in the picture

2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

For remote shutdown



For tank loop pump P_d and mix pump P_c



Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

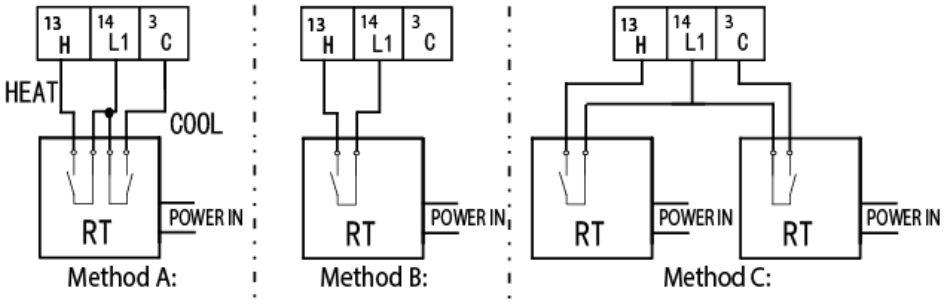
Procedure:

1. Connect the cable to the appropriate terminals as shown in the picture.

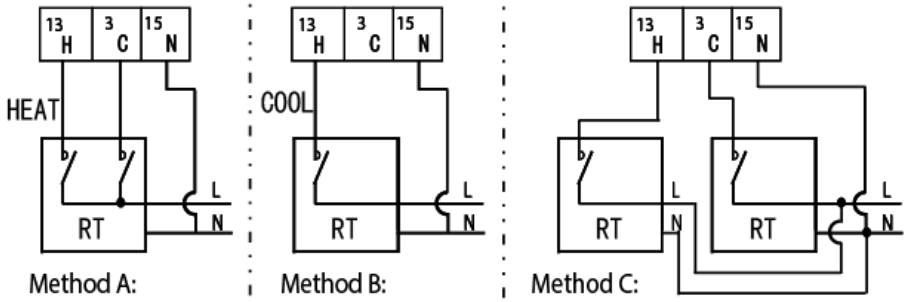
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For room thermostat

External ON/OFF thermostat



External thermostat



There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

If method “A” is selected, the space operation mode can be selected on the room thermostat.

If method “B” is selected, the room thermostat is used as a switch. When the room temperature reaches the target temperature, the units will turn off, while the space operation mode can only be selected on the user interface.

If method “C” is selected, any of the room thermostats sent ON signal to the unit turns on the unit. Both room thermostats sent OFF signals to the unit will the unit turn off. The operation mode can be set in the user interface. When the room thermostat is installed the ON/OFF of the unit is decided by the temperature detected by the thermostat, the user interface can only set the target temperature.

NOTE:

1. The wiring of the thermostat should correspond to the settings of the user interface.

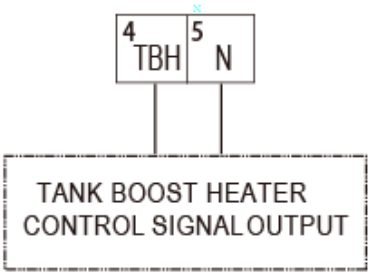
2. Power supply of machine and room thermostat must be connected to the same Neutral Line and (A) Phase Line.

Procedure:

1. Connect the cable to the appropriate terminals as shown in the picture.

2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For booster heater in water tank



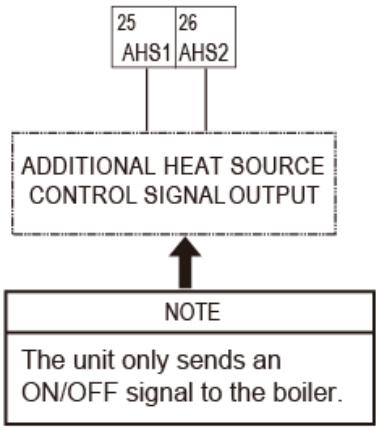
Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

Connection of the booster heater cable depends on the application. Only when the domestic hot water tank is installed will this wiring be needed. The unit only sends a turn on/off signal to the booster heater. An additional circuit breaker is needed and a dedicated terminal is needed to supply power to the booster heater.

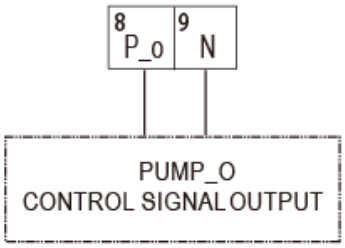
Procedure:

1. Connect the cable to the appropriate terminals as shown in the picture.
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For boiler and pipe pump P_o:



Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2



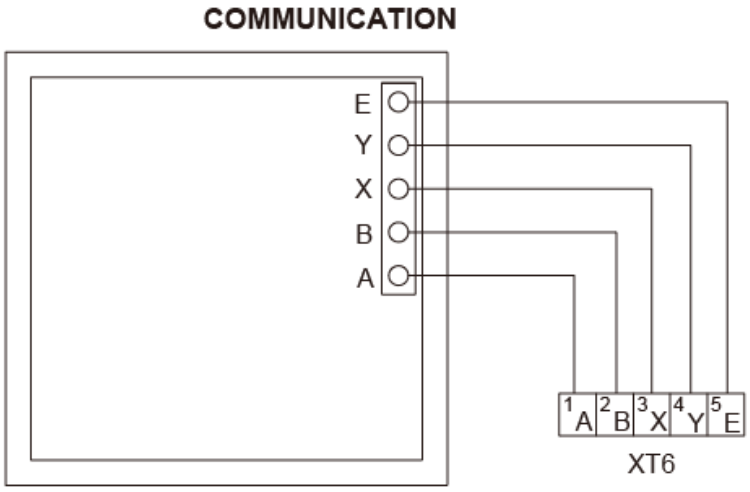
Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

Procedure:

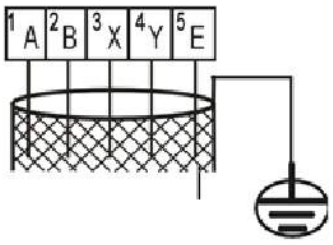
1. Connect the cable to the appropriate terminals as shown in the picture.

2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For user interface



Please use shield wire and earth the wire



Wire type	5 core shield cable
Wire section	AWG18-AWG16(0.75~1.25mm^2)
Maximum wire length	50m

As described above, during wiring, port A in the unit terminal XT6 corresponds

to port A in the user interface. Port B corresponds to port B. Port X corresponds to port X. Port Y corresponds to port Y, and port E corresponds to port E.

Procedure:

1. Remove the rear part of the user interface.
2. Connect the cable to the appropriate terminals as shown in the picture
3. Reattach the rear part of the user interface

12. Start-up and configuration

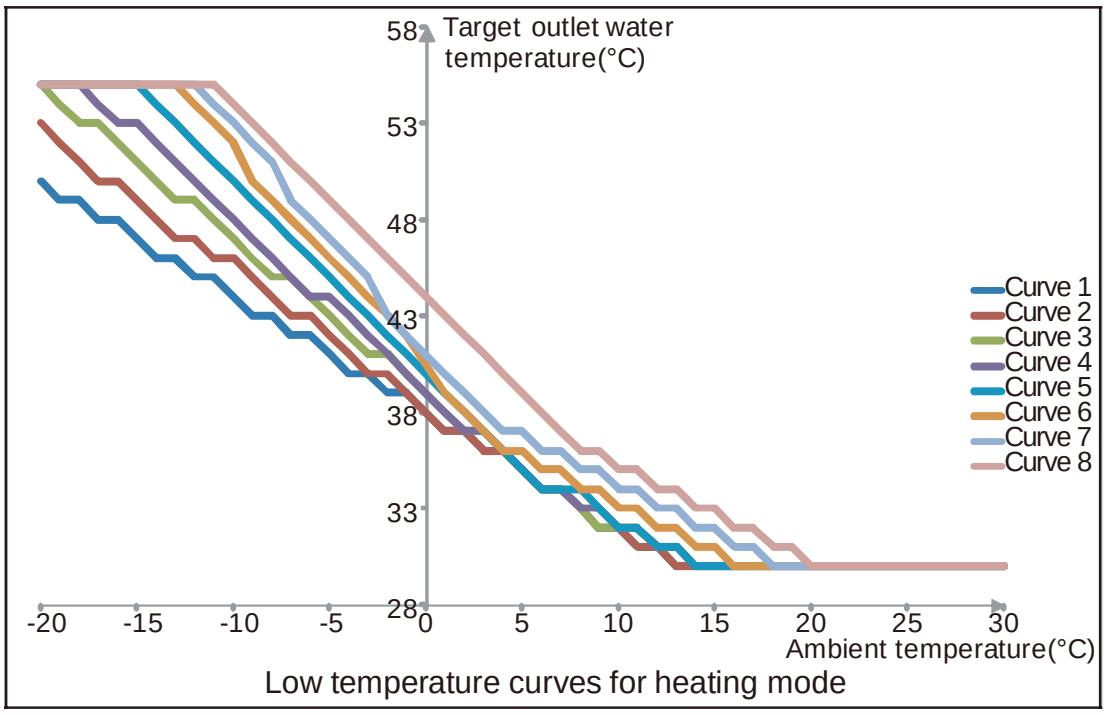
The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

12.1 Climate related curves

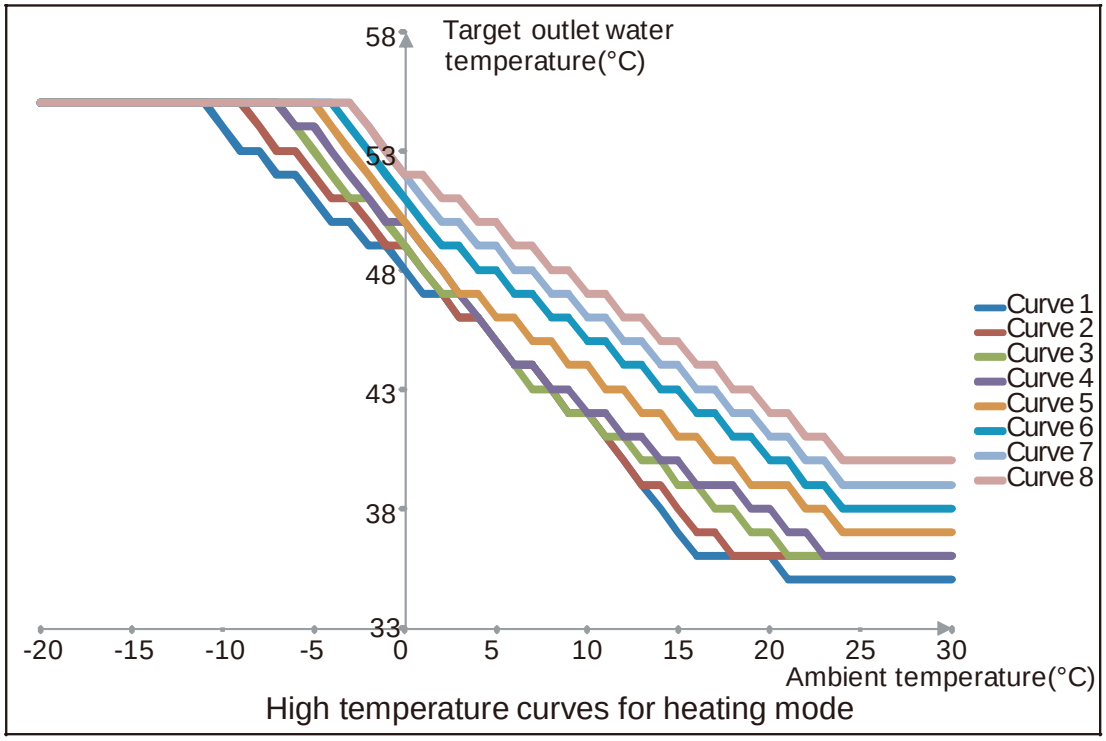
The climate related curves can be selected in the user interface. Once the curve is selected, the target outlet water temperature is determined by the outdoor temperature. In each mode, you can select one curve from 8 curves in the user interface. The target outlet water temperature decreases in the turn from curve 8 to curve 1 at the same outdoor temperature.

The selection of the low/high temperature curve can be done in the user interface. The relationship between outdoor temperature and target water temperature is described in the picture below:

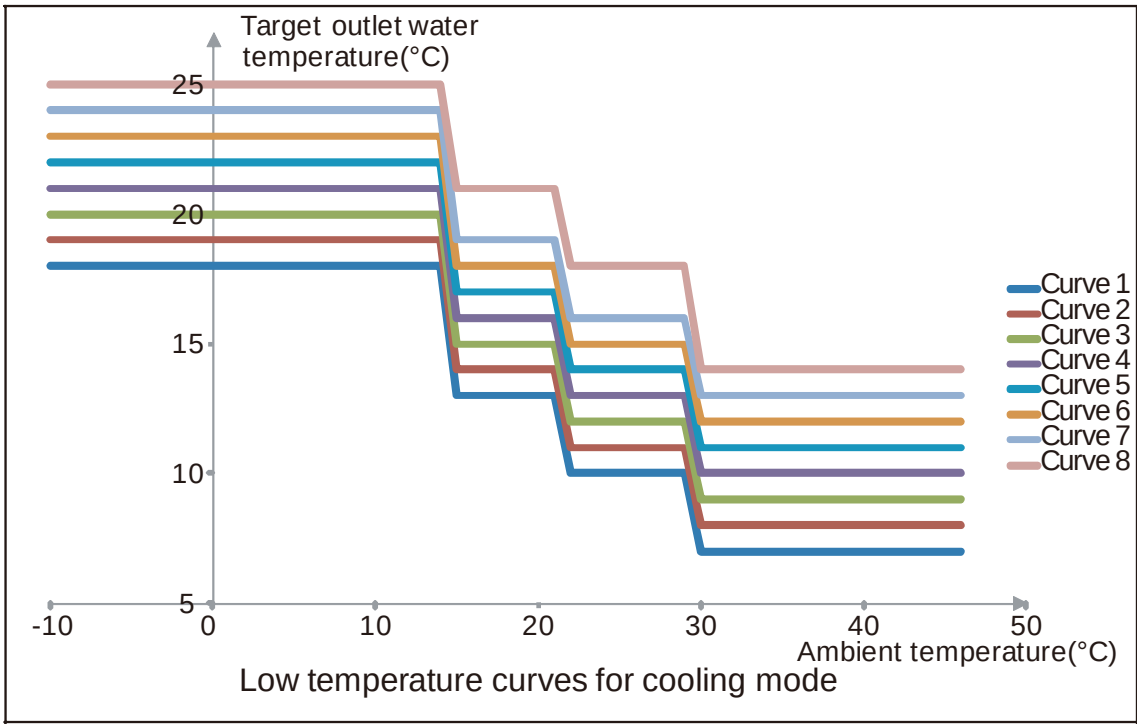
Low temperature curves for heating mode



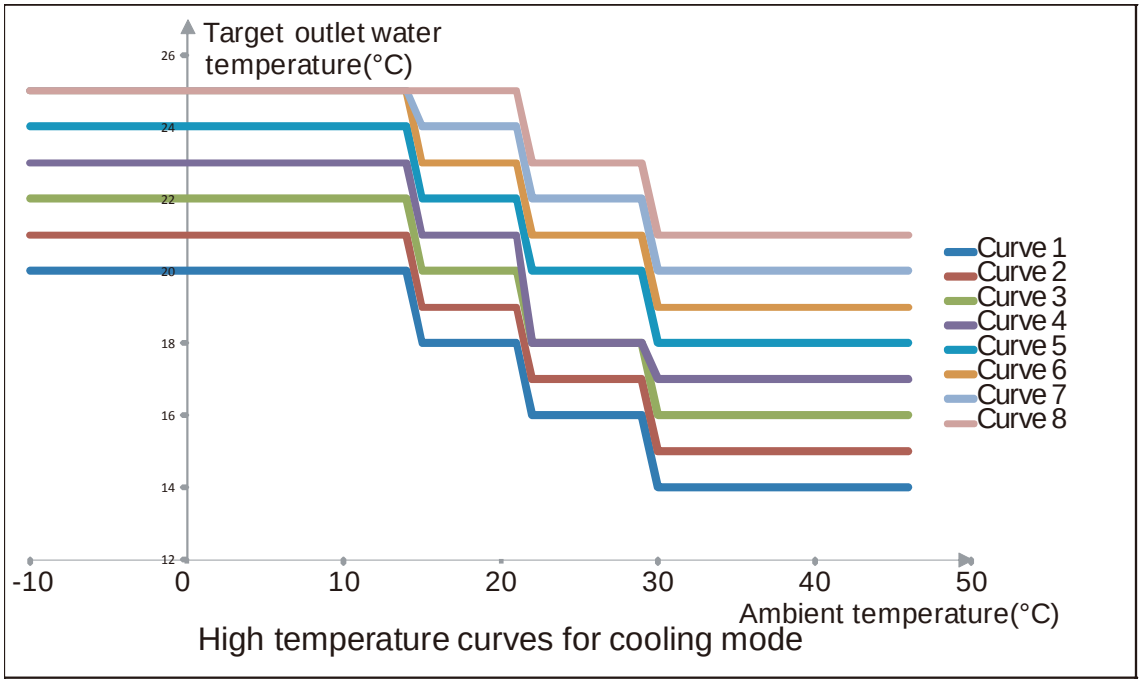
High temperature curves for heating mode



Low temperature curves for cooling mode

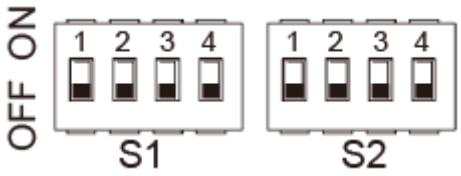


High temperature curves for cooling mode



12.2 DIP switch settings

DIP switch 26 is located on the switch box PCB and allows configuration of additional heating source thermistor installation, the second inner backup heater installation, etc.



DIP switch	Description	ON	OFF
S1-1	Selection of refrigerant pipe length	⩾60% of Max. Piping Length(*)	＜60% of Max. Piping Length(*)
S1-2	Backup heater outlet temperature T1 temperature sensor installation	Not installed	Installed
S1-3	The first inner backup heater IBH1 installation	Not installed	Installed
S1-4	The second inner backup heater IBH2 installation	Not installed	Installed
S2-1	Additional heating source outlet temperature T1B sensor installation	Installed	Not installed
S2-2	/	/	/
S2-3	/	/	/
S2-4	/	/	/

(*) Max. piping length: refer to the manual of outdoor unit.

12.3 Initial start-up at low outdoor ambient temperatures

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in concrete floors cracking due to rapid temperature change. Please contact the responsible building contractor for further details. The lowest water flow set temperature can be decreased to a value between 25°C and 35°C by adjust.

12.4 Pre-operation checks

After the installation of the unit, check the following before switching on the circuit breaker:

- Field wiring: Make sure that the field wiring between the local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), unit and domestic hot water tank, and unit and backup heater box have been connected according to the instructions, according to the wiring diagrams and to local laws and regulations.
- Fuses, circuit breakers, or protection devices: Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter 3 specifications. Make sure that no fuses or protection devices have been bypassed.
- Backup heater circuit breaker: Do not forget to turn on the backup heater circuit breaker in the switch box (it depends on the backup heater type). Refer to the wiring diagram.
- Booster heater circuit breaker: Do not forget to turn on the booster heater circuit breaker (applies only to units with optional domestic hot water tank installed).
- Ground wiring: Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
- Internal wiring: Visually check the switch box for loose connections or damaged electrical components.
- Mounting: Check that the unit is properly mounted, to avoid abnormal noises and vibrations when starting up the unit.
- Damaged equipment: Check the inside of the unit for damaged components or squeezed pipes.
- Refrigerant leak: Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Power supply voltage: Check the power supply voltage on the local supply

panel. The voltage must correspond to the voltage on the identification label of the unit.

- Air purge valve: Make sure the air purge valve is open (at least 2 turns).
- Shut-off valves: Make sure that the shut-off valves are fully open

12.5 Powering up the unit

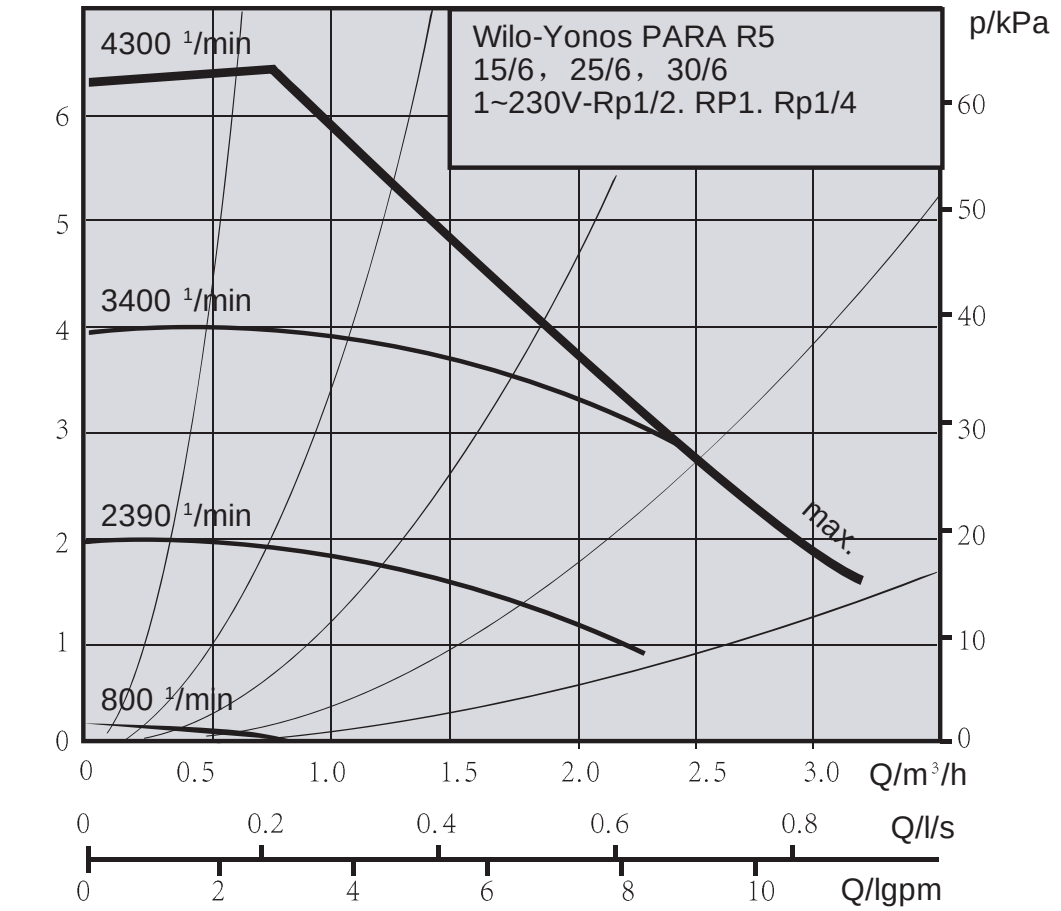
When power to the unit is turned on, "1%~99%" is displayed on the user interface during initialization. During this process the user interface cannot be operated.

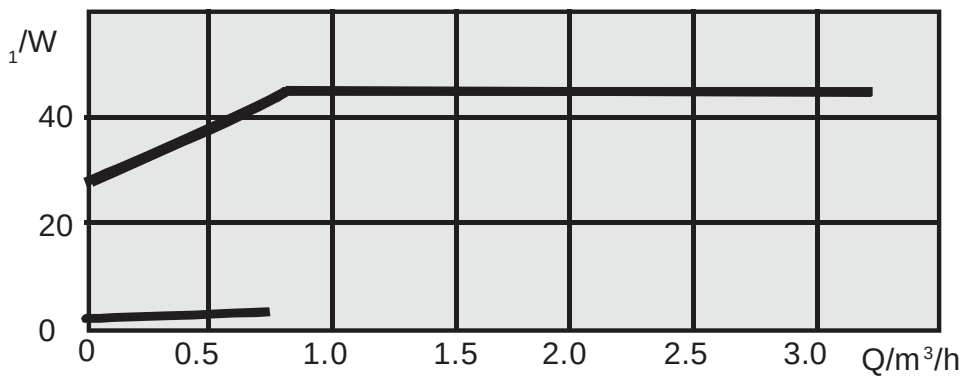
12.6 Setting the pump speed

The pump speed can be selected by adjusting the red knob on the pump. The notch point indicates pump speed. The default setting is the highest speed (III). If the water flow in the system is too high the speed can be set to low (I). The available external static pressure function for water flow is shown in the graph below.

Models 4 to 8kW

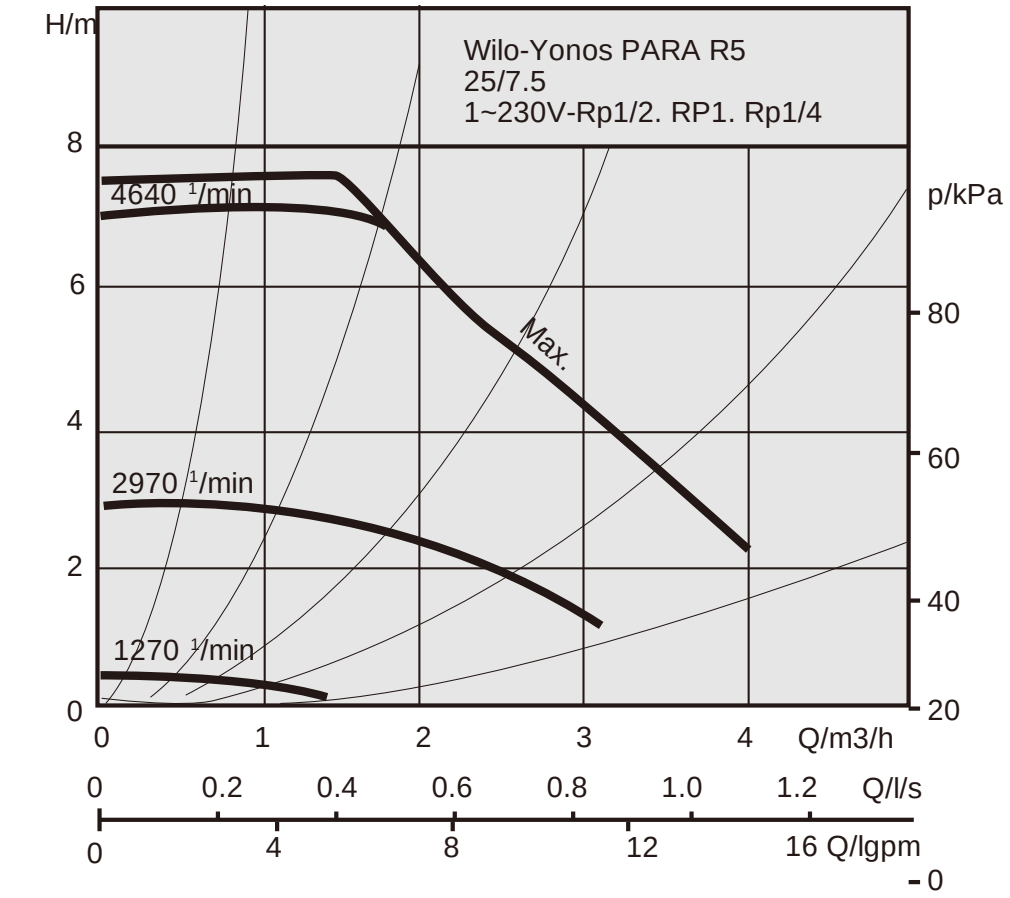
Constant speed ⅠⅡⅢ

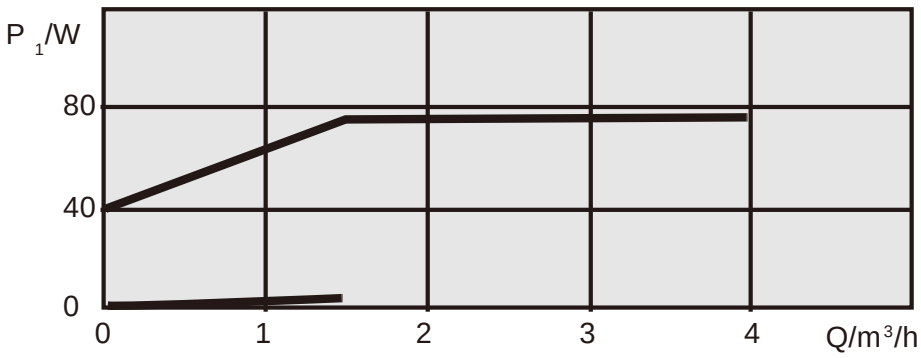




Models 10 to 16kW

Constant speed ⅠⅡⅢ





Pump LED diagnosis and solutions

The pump has an LED operating status display. This makes it easy for the technician to search for the cause of a fault in the heating system.

- If the LED display lights up continuously green, it means the pump is running normally.

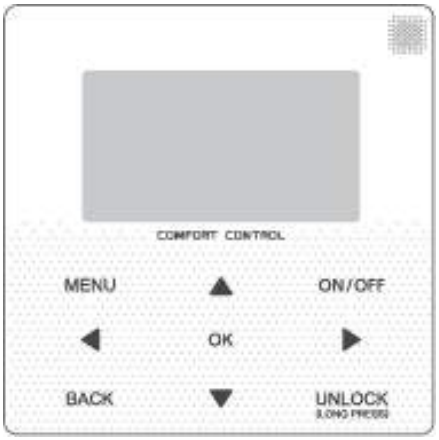
- If the LED display is flashing green, it means the pump is running the venting function. The pump runs during the 10 minute venting function. After its cycle, the installer needs to adjust the targeted performance.
- If the LED is flashing green/red, it means that the pump has stopped operating due to an external reason. The pump will restart by itself after the abnormal situation disappears. The probable reason causing the problem is pump low voltage or over voltage (U<160V or U>280V), and you should check the voltage supply. Another reason is module overheating, and you should check the water and ambient temperatures.
- If the LED is flashing red, it means the pump has stopped operating, and a serious fault has happened (e.g. pump blocked). The pump cannot restart itself due to a permanent failure and the pump should be changed.
- If the LED does not light up, it means no power supply to the pump, possibly the pump is not connected to power supply. Check the cable connection. If the pump is still running, it means the LED is damaged. Or the electronics are damaged and the pump should be changed.

12.7 Failure diagnosis at the moment of first installation

- If nothing is displayed on the user interface, it is necessary to check for any of the following abnormalities before diagnosing possible error codes.
  a. Disconnection or wiring error (between power supply and unit or between unit and user interface).
  b. The fuse on the PCB may have blown.
- If the user interface shows "E8" or "E0" as an error code, there is a possibility that there is air in the system, or the water level in the system is less than the required minimum.
- If the error code E2 is displayed on the user interface, check the wiring between the user interface and unit.

12.8 Field setting

The unit shall be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user demand. A number of field settings are available. These settings are accessible and programmable through “FOR SERVICEMAN” in user interface.



To change one or more field settings, proceed as follows.

Keys	Function
MENU	• Go to the menu structure (on the home page)
◄► ▼ ▲	• Navigate the cursor on the display • Navigate in the menu structure • Adjust settings
ON/OFF	• Turn on/off the space heating/cooling operation mode or DHW mode • Turn on/or off functions in the menu structure
BACK	• Come back to the up level
UNLOCK	• Long press for unlock /lock the controller • Unlock /lock some functions such as “DHW temperature adjusting “
OK	• Go to the next step when programming a schedule in the menu structure; and confirm a selection to enter in the submenu of the menu structure.

12.8.1 About FOR SERVICEMAN

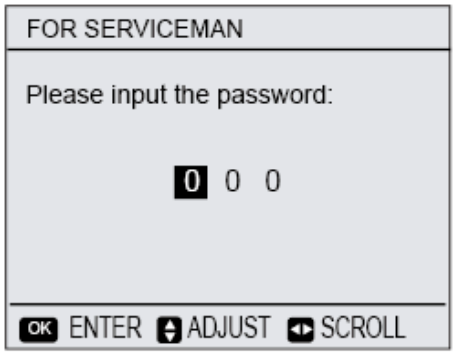
“FOR SERVICEMAN” is designed for the installer to set the parameter.

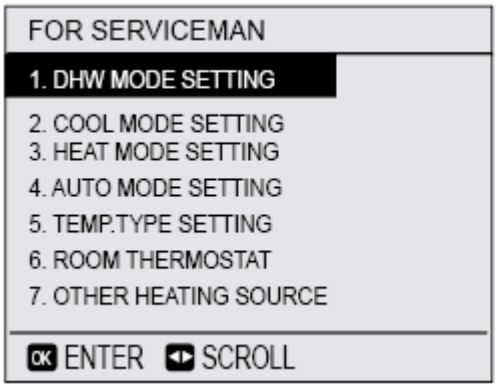
1. Setting the composition of equipment.

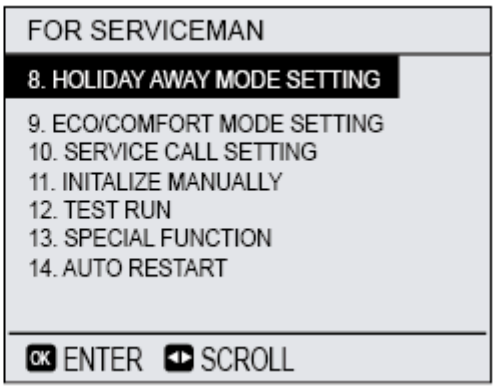
2. Setting the parameter.

Go to MENU> FOR SERVICEMAN. Press OK, to enter FOR SERVICEMAN.

The password is 666. Use ◄ ► to navigate and use ▼ ▲ to adjust the numerical value. Press OK. The following page is displayed:







Use ▼ ▲ to scroll and use “OK” to enter submenu for setting the parameters.

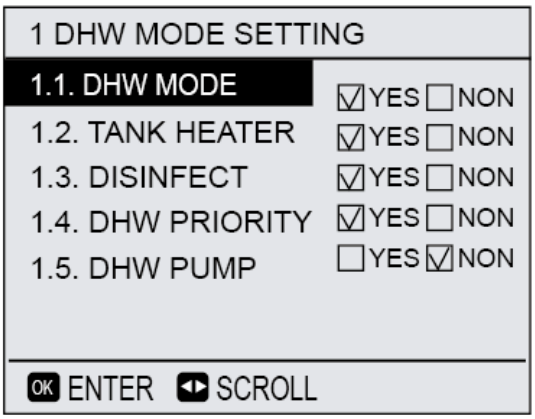
12.8.2 DHW control

DHW MODE SETTING typically consists of the following:

- DHW MODE: Enable or disable the DHW mode
- TANK HEATER: Set whether the booster heater is available or not
- DISINFECT：Set the parameters for disinfection
- DHW PRIORITY：Set the priority between domestic hot water heating and space operation
- DHW PUMP: Set the parameters for DHW pump operation. The functions above apply only to installations with a domestic hot water tank.

Detect whether the DHW mode is effective.

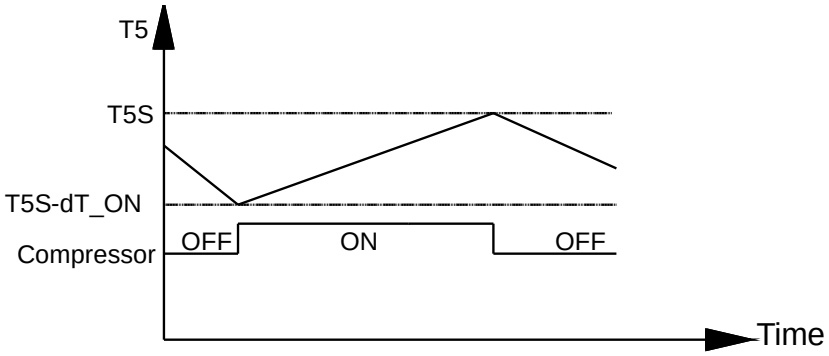
Go to MENU> FOR SERVICEMAN> DHW MODE SETTING. Press OK. The following page is displayed:



Use ◄ ► to scroll and OK for enter. When the cursor is in ☐YES, Press OK to set the DHW MODE as effective. When the cursor is in ☐ NON, press OK to set the DHW MODE as ineffective.

- Go to MENU> FOR SERVICEMAN>DHW MODE SETTING>1.1 DHW MODE

dT5_ON is the temperature difference for starting the heat pump, the picture below illustrates the dT5_ON function.

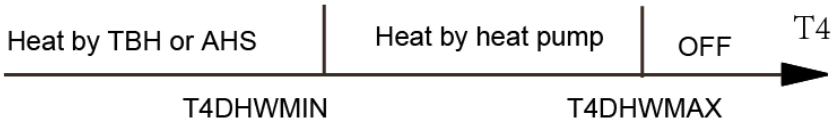


T5S is the target temperature for domestic hot water. T5 is the actual temperature of domestic hot water. When T5 drops to a certain temperature (T5≤T5S-dT5_ON) the heat pump will be available. dT1S5 is the correct value for the target outlet water temperature (T1S=T5+dT1S5).

T4DHWMAX is the maximum ambient temperature that the heat pump operates at for domestic water heating. The unit will not operate if the ambient temperature goes above it in DHW mode.

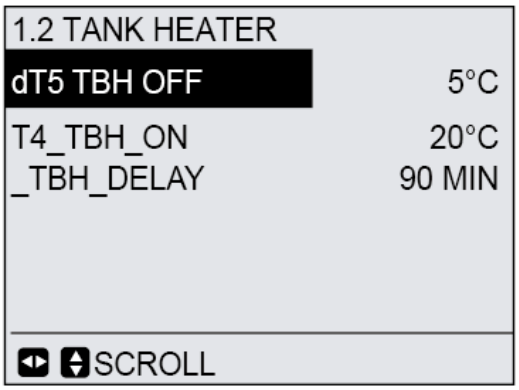
T4DHWMIN is the minimum ambient temperature that the heat pump can operate for domestic water heating. The heat pump will turn off if the ambient

temperature drops below it in water heating mode. The relationship between operation of the unit and ambient temperature can be illustrated in the picture below:



T_INTERVAL_DHW is the start time interval of the compressor in DHW mode. When the compressor stops running, the next time the compressor turns on it should be T_INTERVAL_DHW plus one minute later at least.

- If tank heater (booster heater) is available, go to FOR SERVICEMAN > DHW MODE SETTING>1.2 TANK HEATER and select “Yes”, when “OK” pressed, the following page will appear:



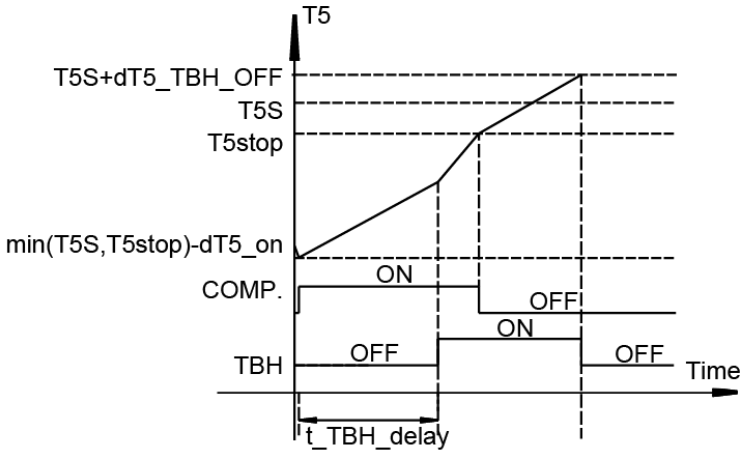
Use ◄ ► and ▼▲ to scroll and adjust parameters. Use BACK to exit.

dT5_TBH_OFF is the temperature difference between T5 and T5S that turns the booster heater off. The booster heater will turn off (T5≥5S+dT_TBH_OFF) when the heat pump malfunctions.

T4_TBH_ON is the temperature only when the ambient temperature is lower than its parameter and the booster heater will be available.

t_TBH_DELAY is the time that the compressor has run before starting the booster heater (if T5＜min (T5S,T5stop)).

The operation of the unit during DHW mode described in the picture below:

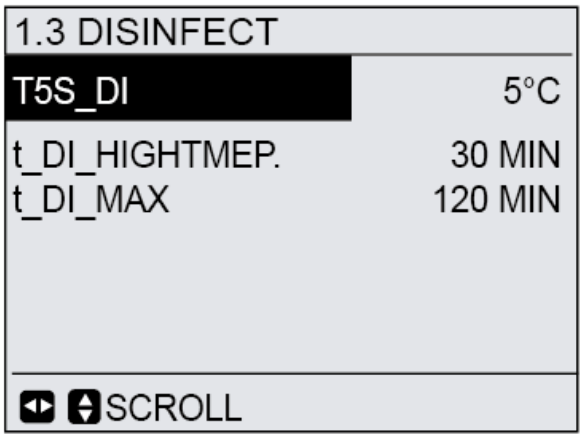


In the picture, T5stop is a parameter related to ambient temperature, which cannot be changed in the user interface. When T5≥T5stop,the heat pump will turn off.

Note: the booster heater and backup heater can't operate simultaneously, if the booster heater has been on, the backup heater will be off.

If the booster heater is unavailable, the dT5_ON cannot be adjusted and is fixed at 2.

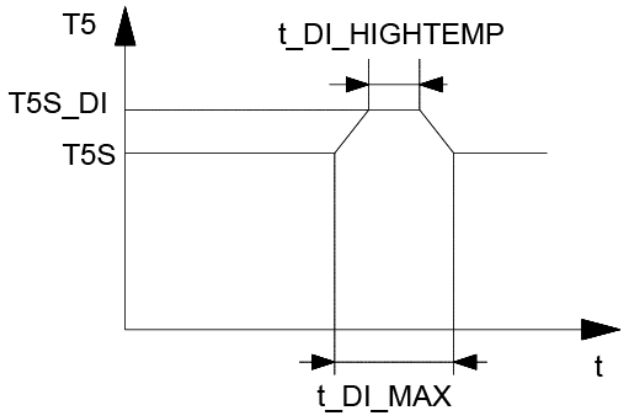
- To enable disinfect function, Go to MENU> FOR SERVICEMAN>DHW MODE SETTING> 1.3 DISINFECT and select "YES", when "OK" pressed, the following page will appear.



T5S_DI is the target temperature of water in the domestic hot water tank in the DISINFECT function.

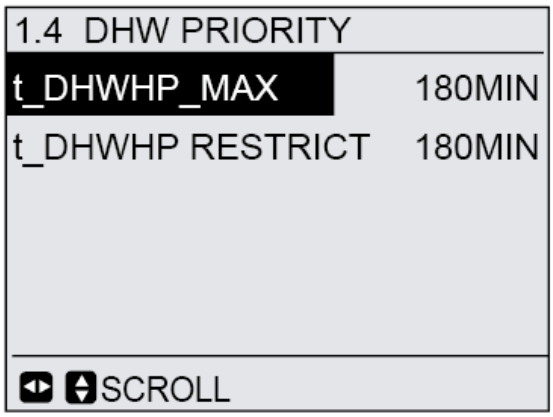
t_DI_HIGHTEMP is the time that the hot water will last.

t_DI_MAX is the time that disinfection will last. The change of domestic water temperature is described in the picture below:



Be aware that the domestic hot water temperature at the hot water tap will be equal to the value selected in FOR SERVICEMAN “T5S_DI” after a disinfection operation.

- To set the priority between domestic water heating and space operation Go to SERVICEMAN>DHW MODE SETTING>1.4DHW PRIORITY:

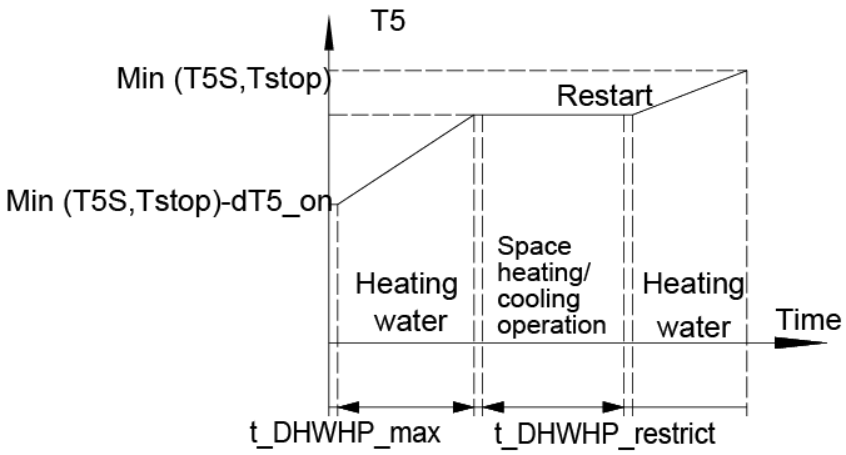


The function of the DHW PRIORITY is used to set the operation priority between domestic water heating and space (heating/cooling) operation. You can use ◄ ► and ▼▲ to scroll and adjust parameters. Use BACK to exit.

T_DHWHP_MAX is the maximum continuous working period of the heat pump in DHW PRIORITY mode.

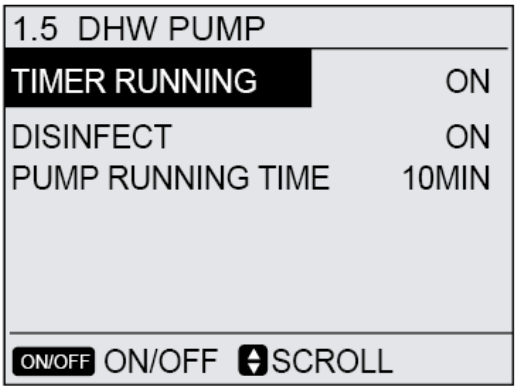
T_DHWHP_RESTRICT is the operation time for the space heating/cooling operation.

If DHW PRIORITY is enabled, the operation of the unit is described in the picture below:



If NON is selected in the DHW PRIORITY mode, when it is available and the space heating/cooling is OFF, the heat pump will heat the water as required. If space heating/cooling is ON, the water will be heated as required when the booster heater is unavailable. Only when the space heating/cooling is OFF will the heat pump operate to heat domestic water.

If the DHW pump (P_d) is available, Go to FOR SERVICEMAN>DHW MODE SETTING>1.5DHW PUMP and select “YES”, when“ OK” pressed, the following page will appear, You can use ◄► and ▼▲ to scroll and adjust parameters. Use BACK to exit.



When the TIMER RUNNING is ON, the DHW pump will run as timed and keeps running for an certain time (as defined in PUMP RUNNING TIME), this can ensure the temperature of water in the system are uniform.

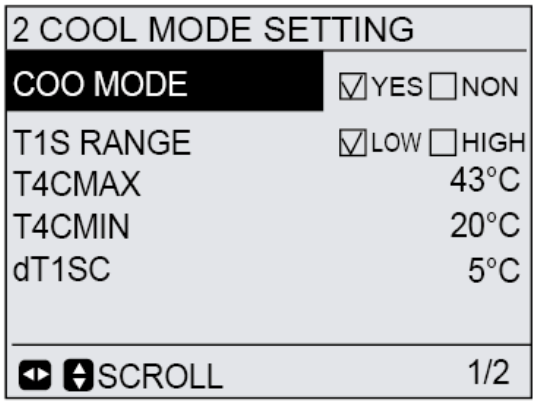
When DISINFECT is ON, the DHW pump will operate when the unit is in disinfect mode and T5≥T5S_DI-2. Pump run time is t+5min.

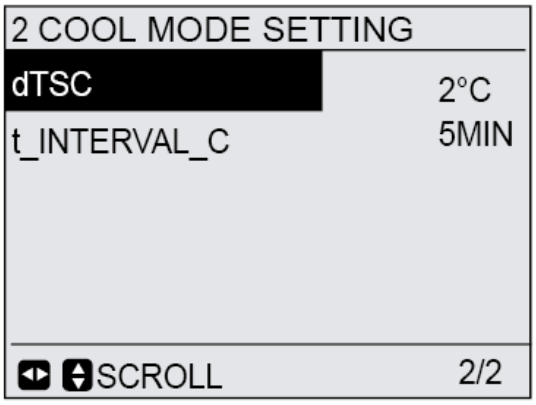
12.8.3 COOL MODE SETTING

COOL MODE SETTING typically consists of the following：

- COOL MODE: Set the COOL mode effective or non-effective
- T1S RANGE: Select the range of target outlet water temperature
- T4CMAX: Sett the maximum ambient operation temperature
- T4CMIN: Set the minimum ambient operating temperature
- dT1SC: Set the temperature difference for starting the heat pump

To determine whether the COOL mode is effective, go to MENU> FOR SERVICEMAN > COOL MODE SETTING. Press OK. The following page will be displayed:

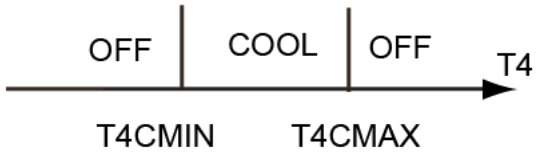




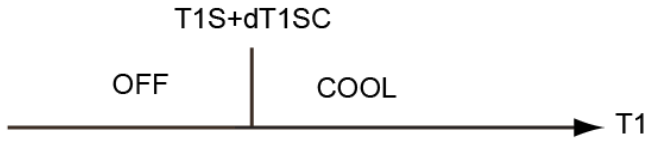
When the cursor is on COOL MODE, use ◄► to select YES or NON. Then press OK to enable or disable the cool mode. When the cursor is on T1S RANGE, use ◄►to select the range of outlet water temperature. When LOW is selected, the minimum target temperature is 5°C. If the climate-related curve function is select, the curve selected is the low temperature curve. When HIGH is selected, the minimum target temperature is 18°C. If the climate-related curve function is select, the curve selected is the high temperature curve. When the cursor is on T4CMAX、T4CMIN、dT1SC、dTSC or t_INTERVAL_C, Use ◄► and ▼▲ to scroll and adjust the parameter. T4CMAX is the maximum ambient temperature in COOL mode. The unit cannot work if the ambient temperature is higher.

T4CMIN is the minimum ambient operating temperature in COOL mode. The unit will turn off if the ambient temperature drops below it. The relationship

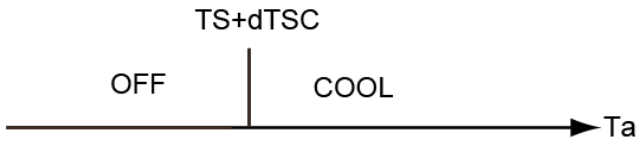
between the operation of the unit and ambient temperature is shown in the picture below:



dT1SC is the temperature difference between T1 (actual outlet water temperature) and T1S (target outlet water temperature) for starting the unit in cool mode. When T1 is high enough unit turns on, and the unit turns off if T1 drops to a certain value. See the diagram below:



dTSC is the temperature difference between Ta (actual room temperature) and TS (target room temperature) To start the unit when ROOM TEMP is enabled in TEMP.TYPE SETTING. Only when the Ta is high enough will the unit turn on, and the unit will turn off if the Ta drops to a certain value. Only when the ROOM TEMP is enabled will this function be available. See picture below:



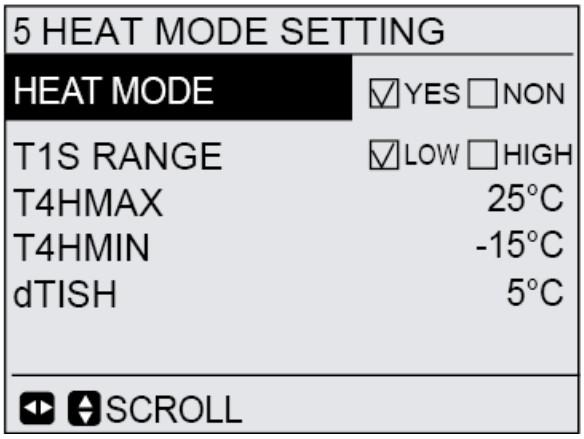
12.8.4 HEAT MODE SETTING

HEAT MODE SETTING typically consists of the following：

- HEAT MODE: Enable or disable the HEAT mode
- T1S RANGE: Selecting the range of target outlet water temperature
- T4HMAX: Setting the maximum ambient operating temperature
- T4HMIN: Setting the minimum operating ambient operating temperature
- dTISH: Setting the temperature difference for starting the unit
- t_INTERVAL_H: Setting the compressor start time interval

To determine whether the HEAT mode is effective, go to MENU> FOR

SERVICEMAN> HEAT MODE SETTING. Press OK. The following page be displayed:



When the cursor is on HEAT MODE, use◄► to scroll to YES or NON and press OK to enable or disable the heat mode. When the cursor is on the T1S RANGE, use ◄► to scroll to YES or NON and press OK to select the range of outlet water temperature. When LOW is selected, the maximum target temperature is 55°C. If the climate-related curve function is select, the curve selected is the low temperature curve. When HIGH is selected, the maximum target temperature is 60°C. If the climate-related curve function is select, the curve selected is the high temperature curve.

When the cursor is on T4HMAX、T4HMIN、dT1SH、dTSH or t_INTERVAL_H, Use ◄► and ▼▲ to scroll and adjust the parameter.

T4HMAX is the maximum ambient operating temperature for heat mode. The unit will not work if the ambient temperature is higher.

T4HMIN is the minimum ambient operating temperature for heat mode. The unit will turn off if the ambient temperature is lower.

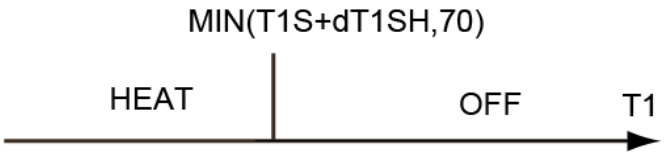
The relationship between the operation of the unit and ambient temperature can be seen in the picture below:

dT1SH is the temperature difference between T1 and T1S for starting the unit

in heat mode.

When the target outlet water temperature T1S<47, the unit will turn on or off as described below:

When the target outlet water temperature T1S≥47, the unit will on or off as described below：



dTSH is the temperature difference between Ta (Ta is the room temperature) and TS for starting the unit when ROOM TEMP is enabled in TEMP.TYPE SETTING. Only when Ta drops to a certain value will the unit turn on, and the unit will turn off if the Ta high enough. See diagram below. (Only when ROOM TEMP is enabled will this function be available).

t_INTERVAL_H is the compressor start time interval in heat mode. When the compressor stops running, the next time that the compressor turns on should be “ t_INTERVAL_H” and one minute later at least.

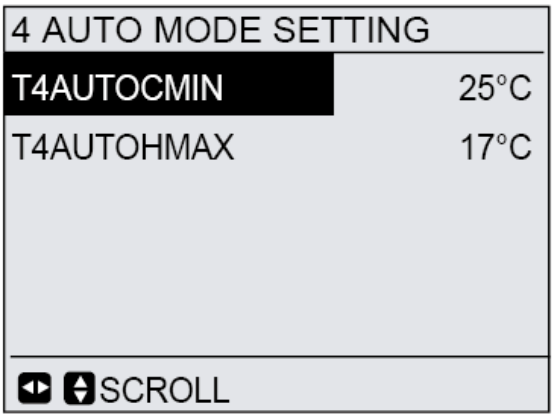
12.8.5 AUTO MODE SETTING

Controlling AUTO mode typically consists of the following：

- T4AUTOCMIN：set the minimum operating ambient temperature for cooling
- T4AUTOHMAX: set the maximum operating ambient temperature for heating

To determine whether the AUTO mode is effective, go to MENU> FOR

SERVICEMAN> AUTO MODE SETTING. Press OK. The following page is displayed.

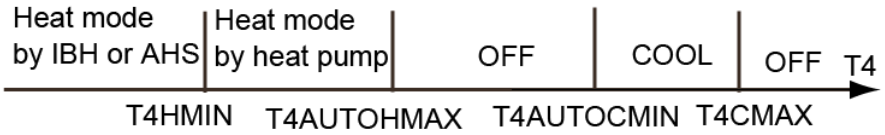


Use ◄ ► and ▼ ▲ to scroll and adjust the parameter.

T4AUTOCMIN is the minimum operating ambient temperature for cooling in auto mode. The unit will turn off if the ambient temperature is lower when in space cooling operation.

T4AUTOHMAX is the maximum operating ambient temperature for heating in auto mode. The unit will turn off if the ambient temperature is higher when in space heating operation.

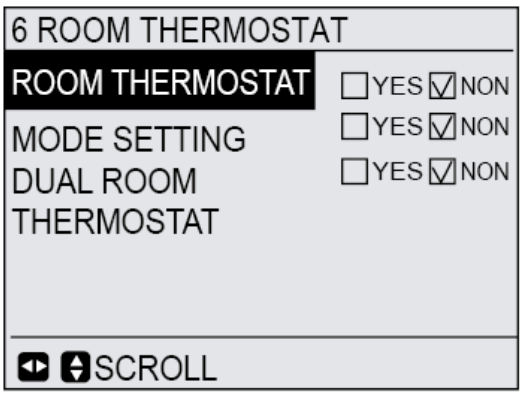
The relationship between heat pump operation and ambient temperature is described in the picture below (AHS is an additional heating source. IBH is a backup heater in the unit.):



12.8.6 ROOM THERMOSTAT

The ROOM THERMOSTAT is used to set whether the room thermostat is available.

To set the ROOM THERMOSTAT, go to MENU> FOR SERVICEMAN> ROOM THERMOSTAT. Press OK. The following page is displayed:



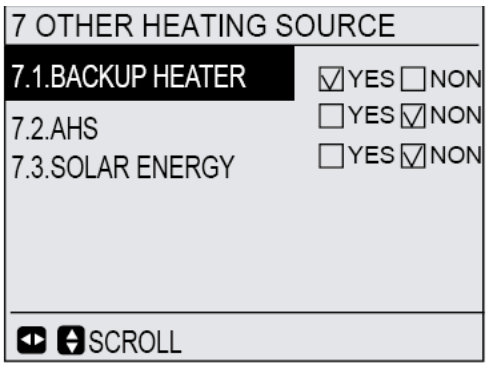
If the room thermostat is available, select YES and press OK. In MODE SETTING, if YES is selected, the mode setting and the on/off function cannot be performed from the user interface. The timer function is unavailable; the operation mode and the on/off function are decided by the room thermostat. The temperature setting can be done by the user interface.

If NON is selected, the user interface can be used to set operation mode and target temperature, while the on/off function is determined by room thermostat; the timer function is unavailable. In DUAL ROOM THERMOSTAT, if YES is selected, the ROOM THERMOSTAT, MODE SETTING will turn to NON automatically, and the WATER FLOW TEMP. and ROOM TEMP. is forcibly set to YES. The timer function in the user interface is unavailable. The setting of operation mode and target temperature can be done on the user interface.

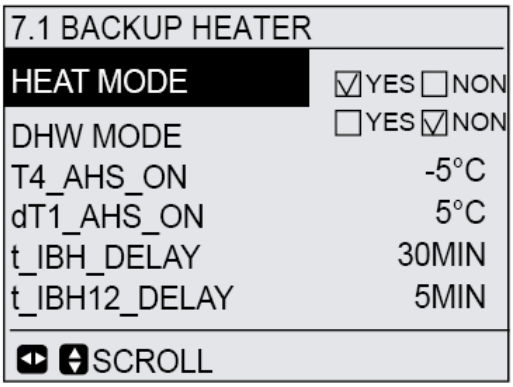
12.8.7 Other HEATING SOURCE

The OTHER HEATING SOURCE is used to set whether the backup heater, and additional heating sources like a boiler or solar energy kit is available.

To set the OTHER HEATING SOURCE, go to MENU> FOR SERVICEMAN> OTHER HEATING SOURCE, Press OK. The following page will appear:



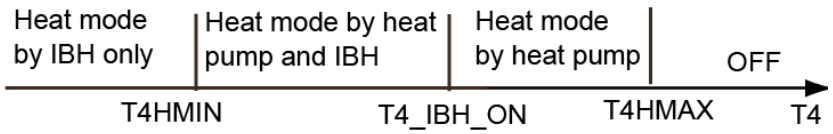
If backup heater is available, please select YES at BACKUP HEATER. Press OK and the following page is displayed:



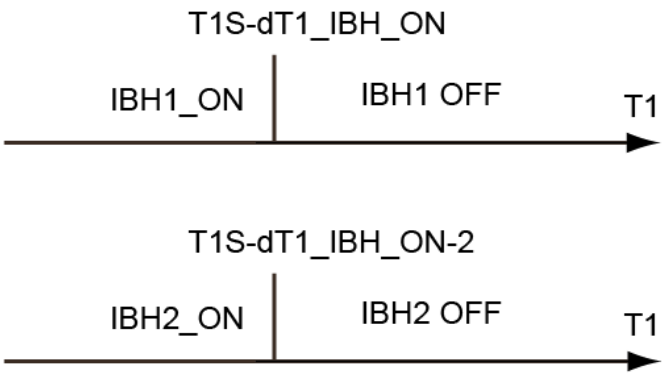
When the cursor is on HEAT MODE or DHW MODE, Use ◄ ► to select YES or NON. If YES is selected, the backup heater will be available in the corresponding mode, otherwise it will be unavailable.

When the cursor is on T4_IBH_ON、dT1_IBH_ON、t_IBH_DELAY、or t_IBH12_DELAY, Use ◄ ► and ▼ ▲ to scroll and adjust the parameter.

T4_IBH_ON is the ambient temperature for starting the backup heater. If the ambient temperature rises above T4_IBH_ON, the backup heater will be unavailable. The relationship between operation of the backup heater and the ambient is shown in the picture below.

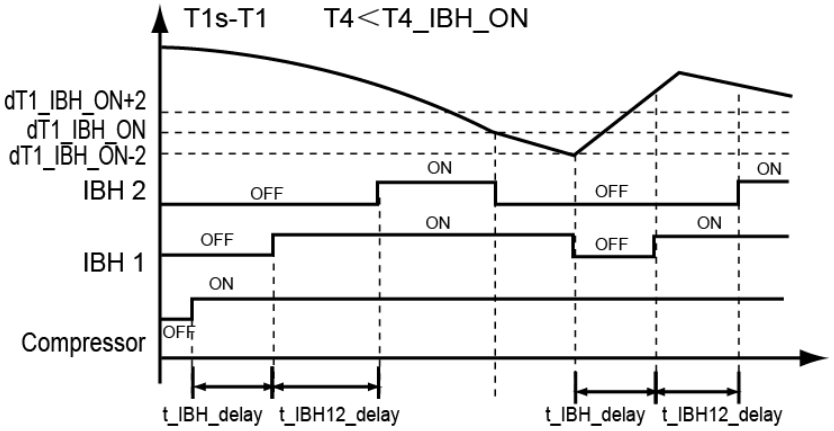


dT1_IBH_ON is the temperature difference between T1S and T1 for starting the backup heater. Only when at the T1<T1S-dT1_IBH_ON can the backup heater turn on. When a second backup heater is installed, if the temperature difference between T1S and T1 is larger than dT1_IBH_ON+2, the second backup heater will turn on. The relationship between operation of the backup heater and the temperature difference is shown in the diagram below.

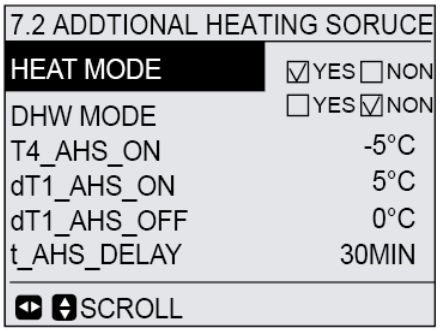


t_IBH_DELAY is the time that the compressor has run before the first backup heater turns on (if T1<T1S).

t_IBH12_DELAY is the time that the first backup heater has run before the second backup heater turns on.

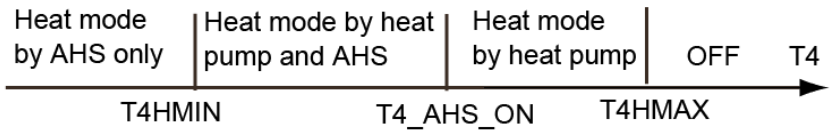


If an additional heating source is available, please select YES at the corresponding position. Press OK and the following page is displayed:

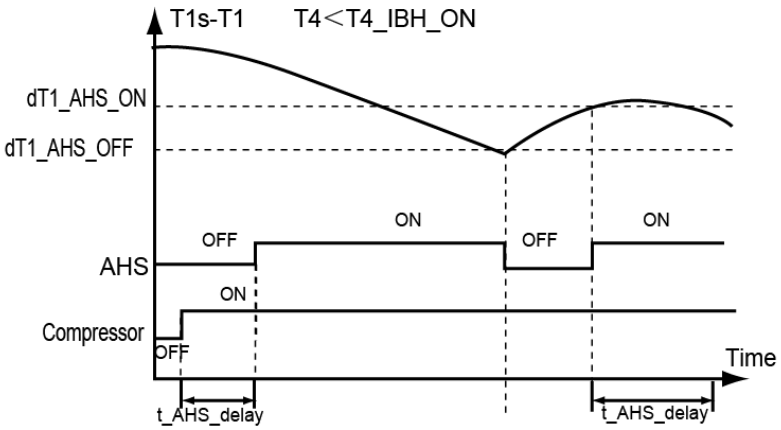


When the cursor is on HEAT MODE or DHW MODE, Use ◄► to select YES or NON. If YES is selected, the additional heating source will be available in the corresponding mode, otherwise it will be unavailable.

When the cursor is on T4_AHS_ON、dT1_AHS_ON、dT1_AHS_OFF or t_AHS_DELAY, Use ◄ ► and ▼ ▲ to scroll and adjust the parameter. T4_AHS_ON is the ambient temperature for starting the additional heating source. When the ambient temperature rises above T4_AHS_ON, the additional heating source will be unavailable. The relationship between the operation of additional heating source and ambient temperature is shown in the picture below:



dT1_AHS_ON is the temperature difference between T1S and T1 for turning the additional heating source on(only when T1<T1S-dT1_AHS_ON), dT1_AHS_OFF is the temperature difference between T1S and T1 for turning the additional heating source off (when T1≥T1S+dT1_AHS_OFF the additional heating source will turn off), t_AHS_DELAY is the time that the compressor has run before starting the additional heating source. It should be shorter than the additional heating source start time interval. The operation of the heat pump and the additional heating source is shown below:



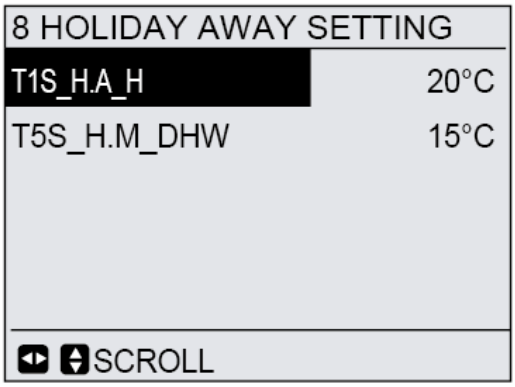
If solar energy kit is installed, please select YES at “SOLAR ENERGY”, and then the solar pump will operate when the solar energy kit operating for water heat, and the heat pump will stop operating for domestic hot water heating.

12.8.8 HOLIDAY AWAY SETTING

The HOLIDAY AWAY SETTING is used to set the outlet water temperature to

prevent freezing when away for holiday.

To enter the HOLIDAY AWAY SETTING, go to MENU> FOR SERVICEMAN> HOLIDAY AWAY SETTING. Press OK. The following picture is displayed:



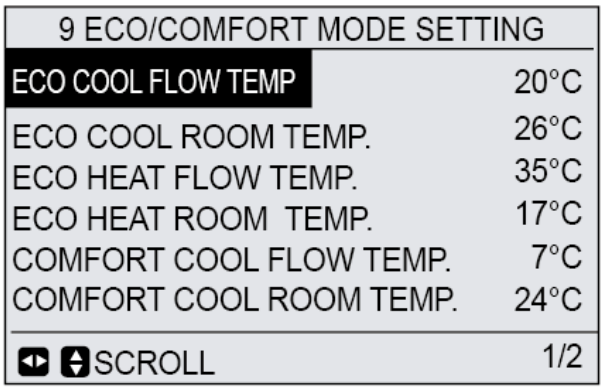
When the cursor is on T1S_H.A._H or T5S_H.M_DHW, Use◄ ► and ▼ ▲ to scroll and adjust the parameter, T1S_H.A._H is the target outlet water temperature for space heating when in holiday away mode.

T1S_H.M_DHW is the target outlet water temperature for water heating when in holiday away mode.

12.8.9 ECO/COMFORT MODE SETTING

The ECO/COMFORT MODE SETTING is used to set the target room temperature or outlet water temperature when in ECO/COMFORT MODE.

To enter the ECO/COMFORT MODE SETTING, go to MENU> FOR SERVICEMAN> COMFORT MODE SETTING. Press OK. The following picture is displayed:



When the cursor is on ECO COOL FLOW TEMP. - ECO COOL ROOM TEMP.- ECO HEAT FLOW TEMP. - ECO HEAT ROOM TEMP. - COMFORT COOL

FLOW TEMP. - COMFORT COOL ROOM TEMP. - COMFORT HEAT FLOW TEMP. or COMFORT HEAT ROOM TEMP, Use ◄ ► and ▼ ▲ to scroll and adjust the parameter.

ECO COOL FLOW TEMP. is the target outlet water temperature when in ECO COOL mode.

ECO COOL ROOM TEMP. is the target room temperature when in ECO COOL mode. This value will be useful only when “YES” is selected in TEMP. TYPE SETTING/ROOM TEMP.

ECO HEAT FLOW TEMP. is the target outlet water temperature when in ECO HEAT mode.

ECO HEAT ROOM TEMP. is the target room temperature when in ECO HEAT mode. This value will be useful only when the “YES” is selected in TEMP. TYPE SETTING/ROOM TEMP.

COMFORT COOL FLOW TEMP. is the target outlet water temperature when in COMFORT COOL mode.

COMFORT COOL ROOM TEMP. is the target room temperature when in COMFORT COOL mode. This value will be useful only when “YES” is selected in TEMP. TYPE SETTING/ROOM TEMP.

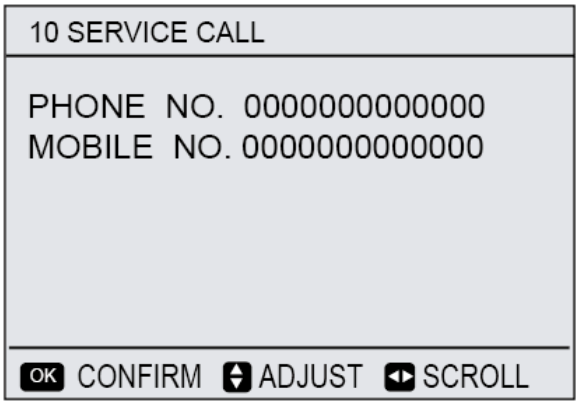
COMFORT HEAT FLOW TEMP. is the target outlet water temperature when in COMFORT HEAT mode.

COMFORT HEAT ROOM TEMP. is the target room temperature when in COMFORT HEAT mode. This value will be useful only when the “YES” is selected in TEMP. TYPE SETTING/ROOM TEMP.

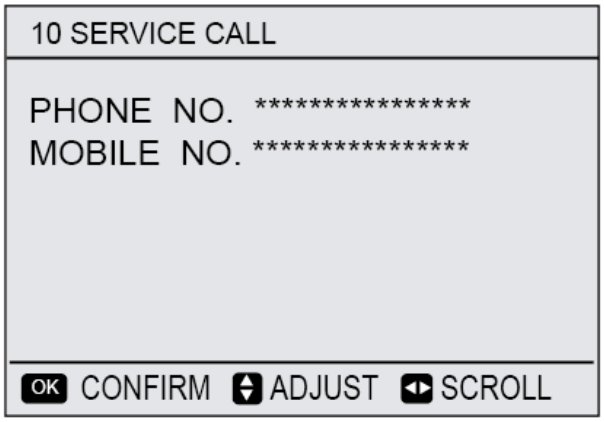
11.8.7 SERVICE CALL

The installers can set the phone number of the local dealer in SERVICE CALL. If the unit doesn’t work properly, call this number for help.

To set the SERVICE CALL, go to MENU> FOR SERVICEMAN> SERVICE CALL. Press OK. The following is displayed:



Use ▼ ▲ to scroll and set the phone number. The maximum length of the phone number is 13 digits, if the length of phone number is short than 12, please input ■, as shown below:

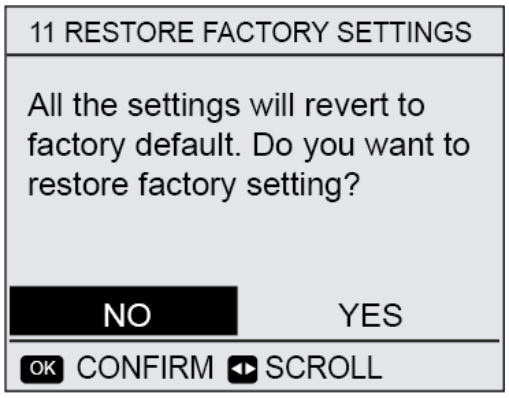


The number displayed on the user interface is the phone number of your local dealer.

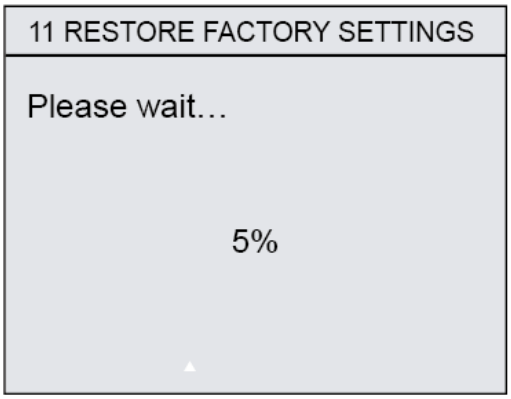
12.8.10 RESTORE FACTORY SETTINGS

The RESTORE FACTORY SETTING is used to restore all the parameters set in the user interface to the factory setting.

To restore factory settings, go to MENU> FOR SERVICEMAN> RESTORE FACTORY SETTINGS. Press OK. The following page is displayed:



Use ◄ ► to scroll the cursor to YES and press OK, the following page will display:



After a few seconds, all the parameters set in the user interface will be restored to factory settings.

12.9 Test run and final check

Before switching on the unit, read following recommendations:

- When the complete installation and all necessary settings have been carried out, close all front panels of the unit and refit the unit cover.
- The service panel of the switch box may only be opened by a licensed electrician for maintenance purposes.

If required, the installer can perform a manual test run operation at any time to check correct operation of air purge, heating, cooling and domestic water heating.

13. Maintenance and service

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals. This maintenance needs to be carried out by your local Mundoclima technician.

The described checks must be executed at least once a year by qualified personnel.

- Water pressure: Check if the water pressure is above 1 bar. If necessary add water.
- Water filter: Clean the water filter.
- Water pressure relief valve: Check for correct operation of the pressure relief valve by turning the black knob on the valve counter-clock. Wise:
  If you do not hear a clacking sound, contact your local dealer.
  In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.
- Pressure relief valve hose: Check that the pressure relief valve hose is positioned appropriately to drain the water.
- Backup heater vessel insulation cover: Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.
- Domestic hot water tank pressure relief valve (field supply) : Applies only to installations with a domestic hot water tank. Check for correct operation of the pressure relief valve on the domestic hot water tank.
- Domestic hot water tank booster heater: Applies only to installations with a domestic hot water tank. It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.
- Unit switch box: Carry out a thorough visual inspection of the switch box

and look for obvious defects such as loose connections or defective wiring. Check for correct operation of contactors with an ohm meter. All contacts of these contactors must be in open position.

- Use of glycol: Document the glycol concentration and the pH-value in the system at least once a year.

  PH-value below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added.

  When the PH-value is below 7.0 then oxidation of the glycol occurred, the system should be drained and flushed thoroughly before severe damage occurs.

  Make sure that the disposal of the glycol solution is done in accordance with relevant local laws and regulations.

14. Troubleshooting

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances can safety devices be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local dealer.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve to avoid water dripping out of the unit.

14.1 General symptoms description

Symptom 1: The unit is turned on but the unit is not heating or cooling as expected.

Possible causes	Corrective action
The temperature setting is not correct.	Check the controller set point.T4HMAX, T4HMIN in heat mode. T4CMAX, T4CMIN in cool mode. T4DHWMAX, T4DHWMIN in DHW mode.
The water flow is too low.	Check that all shut off valves of the water circuit are completely open. • Check if the water filter needs cleaning. • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be>1bar (water is cold). • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value

Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)

Possible causes	Corrective action
The unit must start up out of its operation range (the water temperature is too low).	In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (12°C). • Check that the backup heater power supply is correct. • Check that the backup heater thermal fuse is closed. • Check that the backup heater thermal protector is not activated. • Check that the backup heater contactors are not broken

Symptom 3: Pump is making noise

Possible causes	Corrective action
There is air in the system	Purge air
Water pressure at pump inlet is too low.	• Check on the manometer that there is sufficient water pressure. The water pressure must be > 1 bar (water is cold). • Check that the manometer is not broken. • Check that the expansion vessel is not broken. • Check that the setting of the pre- pressure of the expansion vessel is correct

Symptom 4: The water pressure relief valve opens

Possible causes	Corrective action
The expansion vessel is broken.	Replace the expansion vessel.
The filling water pressure in the installation is higher than 0.3MPa.	Make sure that the filling water pressure in the installation is in 0.15~0.20MPa

Symptom 5: The water pressure relief valve leaks

Possible causes	Corrective action
Dirty is blocking the water pressure relief valve outlet.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clock. Wise: • If you do not hear a clacking sound, contact your local dealer. • In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.

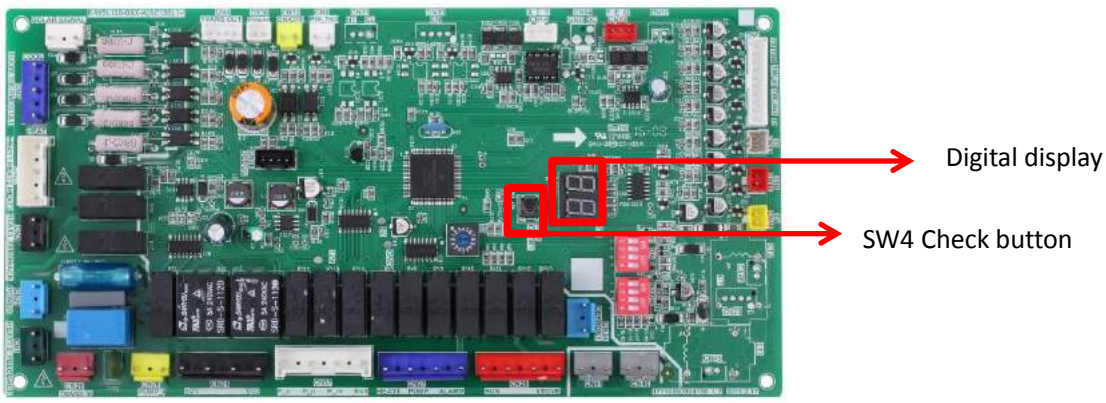
Symptom 6: Space heating capacity shortage at low outdoor temperatures

Possible causes	Corrective action
Backup heater operation is not activated.	Check that the "OTHER HEATING SOURCE/ BACKUP HEATER" is enabled. Check whether or not the thermal protector of the backup heater has been activated. Check if booster heater is running, the backup heater and booster heater can't operate simultaneously.
Too much heat pump capacity is used for heating domestic hot water (applies only to installations with a domestic hot water tank).	Check that the 't_DHWHP_MAX' and "t_DHWHP _RESTRICT" are configured appropriately: • Make sure that the 'DHW PRIORITY' in the user interface is disabled. Enable the"T4_TBH_ON" in the user interface "FOR SERVICEMAN" to activate the booster heater for domestic water heating.

14.2 Parameters check

14.2.1 Check the parameters of hydronic box

To check the parameters of hydronic box, open the door of hydronic box and you'll see the PCB like following, the digital display will show the temperature of outlet water in normal condition ('0' will display if the unit is off or error code will display if error occurs). Long press the check button "SW4" and the digital display will show the operating mode. Then press the check button "SW4" in sequence. The digital display will show the value, the implication of the value illustrated in the diagram below:



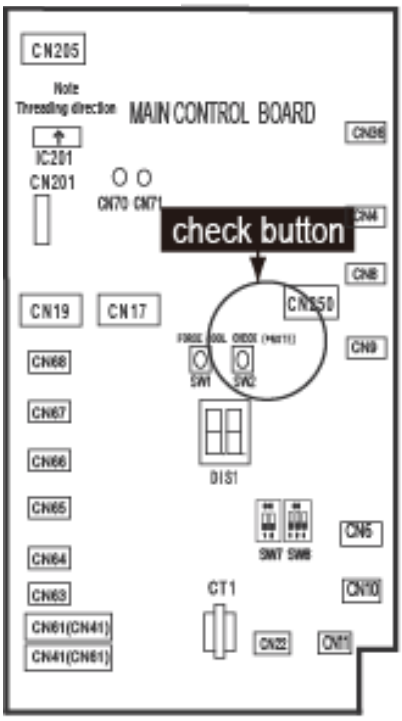
Check sequence table

Number	Implication
0	Temperature of outlet water when unit is on, when the unit is off, display ‘0’
1	Operation mode(0—OFF，2—COOL，3—HEAT，5—Water heating)
2	Capacity requirement before correction
3	Capacity requirement after correction
4	Outlet water temperature of backup heater
5	Outlet water temperature of additional heating source
6	Target outlet water temperature calculated from climate-related curves
7	Room temperature
8	Temperature of domestic hot water
9	Temperature of refrigerant at outlet /inlet of plate heat exchanger when in heat mode/cool mode
10	Temperature of refrigerant at inlet /outlet of plate heat exchanger when in heat mode/cool mode
11	Temperature of water at outlet of plate heat exchanger
12	Temperature of water at inlet of plate heat exchanger
13	Ambient temperature
14	Current of backup heater 1
15	Current of backup heater 2
16	Error/protection code for the last time,”—” will display if no error/protection occur
17	Error/protection code for the second last time, ”—” will display if no error/protection occur
18	Error/protection code for the third last time, ”—” will display if no error/protection occur
19	Version of software (hydraulic module)

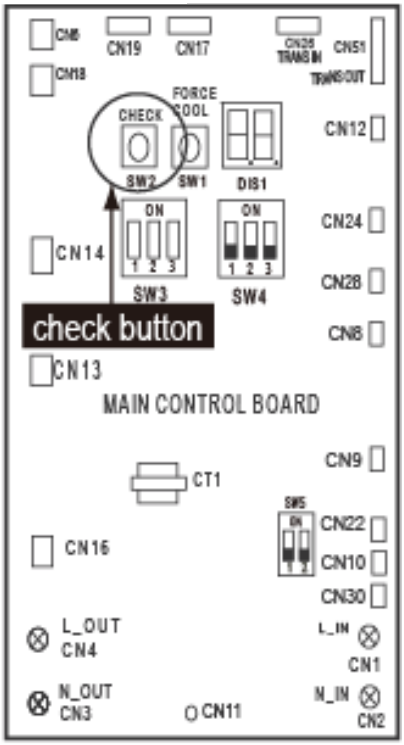
14.2.2 Check the parameters of outdoor unit

To check the parameters on the refrigerant side, open the door and you'll see the PCB like the following (different for 1-phase and 3-phase unit): the digital display will show the present compressor frequency ('0' will display if the unit is off or error code will display if error occurs). Long press the check button and the digital display will show the operating mode, and then press the check button in sequence. The digital display will show the value, the implication of the value is shown in the diagram below:

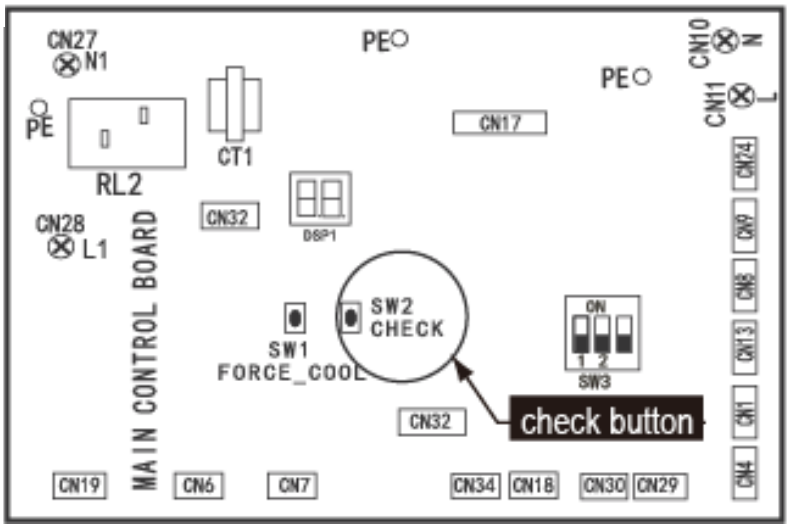
1Ph 10-16kW SW2



3Ph 12-16kW SW2



1Ph 4-8kW SW2



Check sequence table

Number	Implication
0	Frequency of compressor at present
1	Operation mode (0—Standby，2—COOL，3—HEAT，5—refrigerant recovery)
2	Fan speed
3	Frequency from hydraulic module
4	Frequency after restriction by the outdoor unit
5	Temperature of tube at outlet/inlet of condenser when in cool/heat mode
6	Ambient temperature
7	Discharge temperature
8	Suction temperature (when the temperature lower than -0℃， “.” stands for negative sign)
9	The opening of EEV (the value display multiply 8 will be the actual opening)
10	Actual current
11	Actual voltage
12	Pressure of refrigerant (evaporate/condense pressure when in cool /heat mode)
13	Ambient temperature
14	Version of software (Outdoor unit)
15	—

14.3 Error codes and troubleshooting

Code	Malfunction or protection	Failure cause and corrective action
E0	Flow switch error (E8 displayed 3 times)	1. The wire circuit is short connected or open. Reconnect the wire to assure effective connection. 2. Water flow rate is too low 3. Water flow switch failed, switch is opened or closed continuously. Change water the flow switch.
E1	Phase sequence fault (only for 3 Ph unit)	1. Check the power supply cables to avoid phase loss 2. Check the power supply cables sequence; change any two cables sequence of the three power supply.
E2	Communication failure between user interface and unit	1. Wire doesn't connect between user interface and unit. Connect the wire. 2. Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc. To add a barrier to protect the unit or to move the unit to the other place.
E3	The backup heater exchanger outlet water temperature sensor（T1） error.	1. The T1 sensor connector is loosening. Reconnect it. 2. The T1 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive. 3. The T1 sensor failure, change a new sensor.
E4	The domestic hot water Temp. sensor (T5）error.	1. The T5 sensor connector is loosening. Reconnect it. 2. The T5 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T5 sensor failure, change a new sensor.
E5	The condenser outlet refrigerant temperature sensor (T3) error.	1. The T3 sensor connector is loosening. Reconnect it. 2. The T3 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive. 3. The T3 sensor failure, change a new sensor.
E6	The ambient Temp. sensor (T4) error.	1. The T4 sensor connector is loosening. Reconnect it. 2. The T4 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T4 sensor failure, change a new sensor.
E8	Water flow failure	Check that all shut off valves of the water circuit are completely open. • Check if the water filters needs cleaning.

		• Charging water • Make sure there is no air in the system (purge air). • Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar. • Check that the pump speed setting is on the highest speed. • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump • If this error occurs at defrost operation (during space heating or domestic water heating), make sure that the backup heater power supply is wired correctly and that fuses are not blown. • Check that the pump fuse and PCB fuse are not blown.
E9	Suction pipe sensor （Th）error	1. The Th sensor connector is loosening. Reconnect it. 2. The Th sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive. 3. The Th sensor failure, change a new sensor.
H0	Communication error between outdoor Unit and indoor unit	1. Wire doesn't connect between indoor unit and outdoor unit. Connect the wire. 2. Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc. To add a barrier to protect the unit or to move the unit to the other place.
H1	The plate heat exchanger refrigerant inlet (liquid pipe) Temp. sensor (T2) error.	1. The T2 sensor connector is loosening. Reconnect it. 2. The T2 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T2 sensor failure, change a new sensor.
H2	The plate heat exchanger refrigerant outlet (gas pipe) Temp. sensor (T2B) error.	1. The T2B sensor connector is loosening. Reconnect it. 2. The T2B sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T2B sensor failure, change a new sensor.
H3	The plate heat exchanger refrigerant inlet (liquid pipe) Temp. sensor (T2) error.	1. The T2 sensor connector is loosening. Reconnect it. 2. The T2 sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T2 sensor failure, change a new sensor.
H4	3 times P6 protect	Same to P6
H5	The indoor Temp.	1. The Ta senor is in the interface;

	sensor (Ta) error	2. The Ta sensor failure，change a new sensor or change a new interface.
H6	The DC fan failure	1. Strong wind or typhoon below toward to the fan, to make the fan running in the opposite direction. Change the unit direction or make shelter to avoid typhoon below to the fan. 2. Fan motor is broken, change a new fan motor.
H7	Main circuit voltage failure	1. Whether the power supply input is in the available range. 2. Power off and power on for several times rapidly in short time. Remain the unit power off for more than 3 minutes than power on. 3. The circuit defect part of Main control board is defective. Replace a new Main PCB.
H8	Pressure sensor failure	1. Pressure sensor connector is loosening, reconnect it. 2. Pressure sensor failure. Change a new sensor.
H9	The system outlet water Temp. sensor T1B failure.	1. The T1B sensor connector is loosening. Reconnect it. 2. The T1B sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The T1B sensor failure, change a new sensor.
HA	The plate heat exchanger water outlet Temp. sensor (Twout) error.	1. The Twout sensor connector is loosening. Reconnect it. 2. The Twout sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 3. The Twout sensor failure, change a new sensor.
HE	The condenser refrigerant outlet Temp. is too high in heating mode for more than 10 minutes.	The outside ambient Temp. is too high(higher than 30℃, the unit still operate heat mode. Close the heat mode when the ambient Temp. is higher than 30℃
HF	The outdoor unit EEprom failure	1. The EEprom parameter is error, rewrite the EEprom data. 2. EEprom chip part is broken. Change a new EEprom chip part. 3. Main PCB is broken, change a new PCB.
HH	H6 displayed 10 times in 2 hours	Refer to H6
HL	PFC module failure	The PFC module is broken, change a new PFC module.
P0	Low pressure protection	1. System is lack of refrigerant. Charge refrigerant in right volume. 2. When at heating mode or heat water mode, heat

		exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction. 3. The water flow is low in cooling mode. 4. Electrical expansion valve locked or winding connector loosens. Tap-tap the valve body and plug in/ plug off the connector for several times to make sure the valve is working correctly. And install the winding in the right location
P1	High pressure protection	**Heating mode, DHW mode:** 1. The water flow is low; water temp is high, whether there is air in the water system. Release the air. 2. Water pressure is lower than 0.1Mpa, charge the water to let the pressure in the range of 0.15~0.2Mpa. 3. Over charge the refrigerant volume. Recharge the refrigerant in right volume. 4. Electrical expansion valve locked or winding connector is loosening. Tap-tap the valve body and plug in/ plug off the connector for several times to make sure the valve is working correctly. And install the winding in the right location **DHW mode:** Water tank heat exchanger is smaller than the required 1.7m^2(10-16kW unit)or 1.4m^2(5-7kW unit) **Cooling mode:** 1. Heat exchanger cover is not removed. Remove it. 2. Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction.
P3	Compressor overcurrent protection.	1. The same reason to P1. 2. Power supply voltage of the unit is low, increase the power voltage to the required range.
P4	High discharge Temp. protection.	1. The same reason to P1. 2. System is lack of refrigerant. Charge the refrigerant in right volume. 3. Twout temp sensor connector loosens. Reconnect it. 4. T1 temp sensor connector loosens. Reconnect it. 5. T5 temp sensor connector loosens. Reconnect it.
P5	High Temp. difference protection between water inlet and water outlet of the plate heat	1. Check that all shut off valves of the water circuit are completely open. • Check if the water filters need cleaning. • Charging water • Make sure there is no air in the system (Purge air).

	exchanger.	• Check on the manometer that there is sufficient water pressure. The water pressure must be >1 bar (water is cold). • Check that the pump speed setting is on the highest speed. • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump
P6	Module protection	1. Power supply voltage of the unit is low, increase the power voltage to the required range. 2. The space between the units is too narrow for heat exchange. Increase the space between the units. 3. Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction. 4. Fan is not running. Fan motor or fan is broken, Change a new fan or fan motor. 5. Over charge the refrigerant volume. Recharge the refrigerant in right volume. 6. Water flow rate is low, there is air in system, or pump head is not enough. Release the air and reselect the pump. 7. Water outlet temp sensor is loosening or broken, reconnect it or change a new one. 8. Water tank heat exchanger is smaller than the required 1.7m^2 (10-16kW unit)or 1.4m^2 (5-7kW unit) 9. Module wires or screws are loosening. Reconnect wires and screws. The Thermal Conductive Adhesive is dry or drop. Add some thermal conductive adhesive. 10. The wire connection is loosening or drop. Reconnect the wire. 11. Drive board is defective, replace a new one. 12. If already confirm the control system has no problem, then compressor is defective, replace a new compressor.
Pb	Anti-freeze mode protection.	Unit will return to the normal operation automatically.
Pd	High Temp. protection of refrigerant outlet temp of condenser.	1. Heat exchanger cover is not removed. Remove it. 2. Heat exchanger is dirty or something is block on the surface. Clean the heat exchanger or remove the obstruction. 3. There is no enough space around the unit for heat exchange.

		4. Fan motor is broken, replace a new one.
PP	Water inlet Temp. is higher than water outlet in heating mode	1. The water inlet/outlet sensor wire connector is loosening. Reconnect it. 2.The water inlet/outlet（Twin /Twout）sensor is broken, Change a new sensor. 3. Four-way valve is blocked. Restart the unit again to let the valve change the direction. Four-way valve is broken, change a new valve.

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