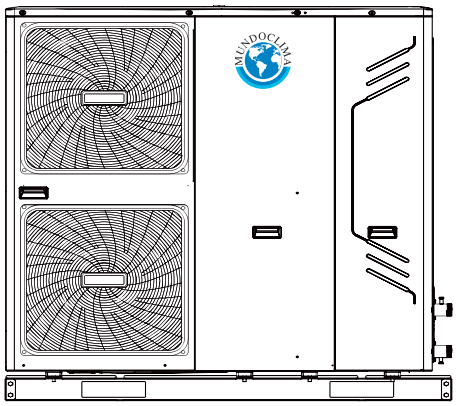
MUNDOCLIMA Aerotherm

MONOBLOC UNIT - AEROTHERM V17

Service Manual



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

SO30173 to SO30181
English

Content

1. General Information

1.1 Measurements

Model name	Dimension (mm)	Net/Gross weight (kg)	Power supply
MONOBLOC AEROTHERM V17 (5KW)	Width: 1210 Height: 940 Depth: 402	99/117	220～240-50Hz 1Ph
MONOBLOC AEROTHERM V17 (7KW)			
MONOBLOC AEROTHERM V17 (10KW)	Width: 1404 Height: 1414 Depth: 405	162/183	220～240-50Hz 1Ph
MONOBLOC AEROTHERM V17 (12KW)			
MONOBLOC AEROTHERM V17 (14KW)			
MONOBLOC AEROTHERM V17 (16KW)			
MONOBLOC AEROTHERM V17 (12KW) (TRIF.)	Width: 1404 Height: 1414 Depth: 405	177/198	380～415-50Hz 3Ph
MONOBLOC AEROTHERM V17 (14KW) (TRIF.)			
MONOBLOC AEROTHERM V17 (16KW) (TRIF.)			

1.2 External appearance

5/7kW **10-16kW**

2. Features

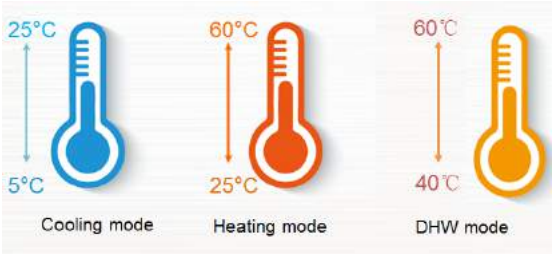
- All hydronic components are located within the outdoor unit. Water pipes run indoors from the outdoor unit, only need to connect water piping.
- Compact structure, easy for transportation and installation. Two doors design for easy access to inner parts for easy maintenance. (10-16kW)

- Heating, cooling & domestic hot water, total heat solution

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

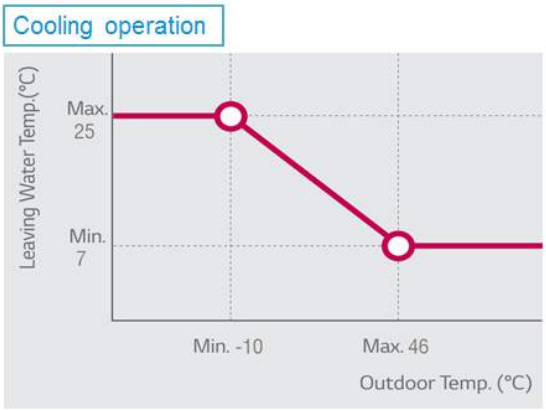
Ambient Temp. range

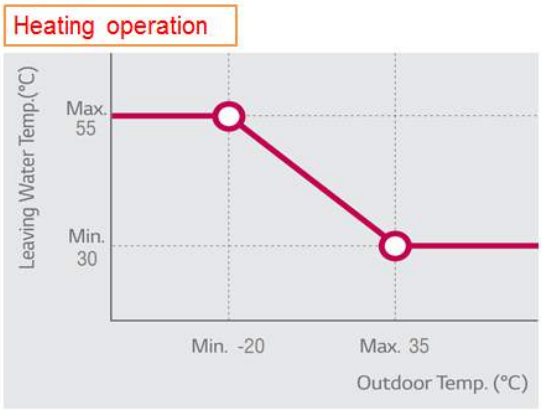
Water outlet Temp. range



- 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.
- Built-in back-up E-heater for additional heating during extremely cold outdoor temperatures. The capacity of E-heater is adjustable.
- 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

3. Specifications

3.1 220-240/1/50 products

Monobloc			**5KW**	**7KW**	**10KW**
Heating[1]	Capacity	kW	4.64	6.55	10.40
	rated Input	W	969	1449	2232
	COP	W/W	4.79	4.52	4.66
Heating[2]	Capacity	kW	4.72	6.72	10.20
	rated Input	W	1435	2006	3045
	COP	W/W	3.29	3.35	3.35
Cooling[3]	Capacity	kW	4.77	6.63	10.40
	rated Input	W	1011	1464	2080
	EER	W/W	4.72	4.53	5.00
Cooling[4]	Capacity	kW	4.65	6.69	9.90
	rated Input	W	1560	2478	3094
	EER	W/W	2.98	2.70	3.20
Energy eff. class	Water outlet @ 35℃		A++	A++	A++
	Water outlet @ 55℃		A+	A+	A+
Power supply		V/Ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50
MOP		A	22	24	35
MCA		A	20	22	30
Compressor	Brand		Mitsubishi		GMCC
	Model		TNB220FFEMC		ATQ420D1UMU
	Type		Twin rotary DC inverter		
	Poles		2	2	6
	Speed		3600	3600	12~120rps
	Max. frequency		6940	6940	13000
Outdoor fan	Brand		Panisonic/Nidec		
	Motor type		Brushless DC motor		
	Model		WZDK170-38G-1		ZKSP-100-8-1
	Number of fans		1	1	2
	Air flow	m^3/h	3050	3050	6150
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	1.4
	Fin type (code)		Hydrophilic aluminum		
	Coil length x height	mm	760*812.8	760*812.8	845*1270
	Number of circuits		8	8	9

Monobloc			**5KW**	**7KW**	**10KW**
Water side heat exchanger	Brand		Alfala	Alfala	Alfala
	Model		ACH-30EQ-50H-F(A)		ACH-30EQ-72H-F
	Type		Plate		Plate
Water pump	Brand		Wilo	Wilo	Wilo
	Model		RS15/6 RKC	RS15/6 RKC	RS25/7.5 RKC
	Pump head	m	6	6	7.5
Expansion tank volume		L	2	2	5
Refrigerant	Type		R410A	R410A	R410A
	Volume	kg	2.4	2.4	3.6
Throttle type			Electronic expansion valve		
Backup E-heater	Standard mounted	kW	/	/	3
	Optional	kW	3	3	4.5
	Capacity steps		1	1	2
	MOP	A	/	/	17(25)
	MCA	A	/	/	15(24)
	Power supply		220-240V/1Ph/50Hz		
Sound power level[5]	Heating	dB(A)	52	62	65
	Cooling	dB(A)	63	63	64
Unit dimension(W×H×D)		mm	1210×945×402		1404×1414×405
Packing dimension(W×H×D)		mm	1500×1140×450		1475×1580×440
Net/ Gross weight		kg	99/117	99/117	162/183
Piping connections Dia.		inch	1'' Femal BSP	1'' Femal BSP	1-1/4" Femal BSP
Safety valve		MPa	0.3	0.3	0.3
Total water volume		L	2	2	5.5
Ambient Temp. range	Cooling	℃	-5~46	-5~46	-5~46
	Heating	℃	-20-35	-20-35	-20-35
	DHW	℃	-20-43	-20-43	-20-43
Water outlet Temp. range	Cooling	℃	5~25	5~25	5~25
	Heating	℃	25~60	25~60	25~60
	DHW	℃	40~60	40~60	40~60

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

Monobloc			**12KW**	**14KW**	**16KW**
Heating[1]	Capacity	kW	12.13	14.75	16.38
	rated Input	W	2631	3422	4015
	COP	W/W	4.61	4.31	4.08
Heating[2]	Capacity	kW	12.57	14.06	16.13
	rated Input	W	3856	4449	5220
	COP	W/W	3.26	3.16	3.09
Cooling[3]	Capacity	kW	12.23	14.17	14.93
	rated Input	W	2602	3177	3641
	EER	W/W	4.70	4.46	4.10
Cooling[4]	Capacity	kW	12.21	12.99	13.75
	rated Input	W	4139	4495	5131
	EER	W/W	2.95	2.89	2.68
Energy eff. class	Water outlet @ 35℃		A++	A++	A++
	Water outlet @ 55℃		A+	A++	A+
Power supply		V/Ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50
MOP		A	35	35	35
MCA		A	30	32	32
Compressor	Brand		GMCC	GMCC	GMCC
	Model		ATQ420D1UMU		
	Type		Twin rotary DC inverter		
	Poles		6	6	6
	Speed		12~120rps	12~120rps	12~120rps
	Max. frequency		13000	13000	13000
Outdoor fan	Brand		Panisonic/Nidec		
	Motor type		Brushless DC motor		
	Model		ZKSP-100-8-1	ZKSP-100-8-1	ZKSP-100-8-1
	Number of fans		2	2	2
	Air flow	m^3/h	6150	6150	6150
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	1.4
	Fin type (code)		Hydrophilic aluminum		
	Coil length x height	mm	845*1270	845*1270	845*1270
	Number of circuits		9	9	9

Monobloc			**12KW**	**14KW**	**16KW**
Water side heat exchanger	Brand		Alfala	Alfala	Alfala
	Model		ACH-30EQ-72H-F		
	Type		Plate		
Water pump	Brand		Wilo	Wilo	Wilo
	Model		RS25/7.5 RKC	RS25/7.5 RKC	RS25/7.5 RKC
	Pump head	m	7.5	7.5	7.5
Expansion tank volume		L	5	5	5
Refrigerant	Type volume		R410A	R410A	R410A
	Charged volume	kg	3.6	3.6	3.6
Throttle type			Electronic expansion valve		
Backup E-heater	Standard mounted	kW	3	3	3
	Optional	kW	4.5	4.5	4.5
	Capacity steps		2	2	2
	MOP	A	17(25)	17(25)	17(25)
	MCA	A	15(24)	15(24)	15(24)
	Power supply		220-240V/1Ph/50Hz		
Sound power level[5]	Heating	dB(A)	67	71	72
	Cooling	dB(A)	66	70	71
Unit dimension(W×H×D)		mm	1404×1414×405	1404×1414×405	1404×1414×405
Packing dimension(W×H×D)		mm	1475×1580×440	1475×1580×440	1475×1580×440
Net/ Gross weight		kg	162/183	162/183	162/183
Piping connections Dia.		inch	1-1/4“ Femal BSP		
Safety valve		MPa	0.3	0.3	0.3
Total water volume		L	5.5	5.5	5.5
Ambient Temp. range	Cooling	℃	-5~46	-5~46	-5~46
	Heating	℃	-20-35	-20-35	-20-35
	DHW	℃	-20-43	-20-43	-20-43
Water outlet Temp. range	Cooling	℃	5~25	5~25	5~25
	Heating	℃	25~60	25~60	25~60
	DHW	℃	40~60	40~60	40~60

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

Monobloc			**12KW**	**14KW**	**16KW**
Heating[1]	Capacity	kW	12.33	14.08	16.30
	rated Input	W	2716	3237	3890
	COP	W/W	4.54	4.35	4.19
Heating[2]	Capacity	kW	11.97	14.09	16.08
	rated Input	W	3683	4431	5238
	COP	W/W	3.25	3.18	3.07
Cooling[3]	Capacity	kW	12.68	14.05	15.13
	rated Input	W	2715	3237	3754
	EER	W/W	4.67	4.34	4.03
Cooling[4]	Capacity	kW	12.27	13.83	15.27
	rated Input	W	4216	5122	6416
	EER	W/W	2.91	2.70	2.38
Energy efficiency class	Water outlet @ 35℃		A++	A++	A++
	Water outlet @ 55℃		A+	A++	A++
Power supply		V/Ph/Hz	380-415/3/50		
MOP		A	18	18	18
MCA		A	15	15	16
Compressor	Brand		GMCC	GMCC	GMCC
	Model		ATQ420D2UMU	ATQ420D2UMU	ATQ420D2UMU
	Type		Twin rotary DC inverter		
	Poles		6	6	6
	Speed		12~120rps	12~120rps	12~120rps
	Max. frequency		13000	13000	13000
Outdoor fan	Brand		Panasonic /Nidec		
	Motor type		Brushless DC motor		
	Model		ZKSP-100-8-1	ZKSP-100-8-1	ZKSP-100-8-1
	Number of fans		2	2	2
	Air flow	m^3/h	7000	7000	7000
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	1.4
	Fin type (code)		Hydrophilic aluminum		
	Coil length x height	mm	845*1270	845*1270	845*1270
	Number of circuits		9	9	9

Monobloc			**12KW**	**14KW**	**16KW**
Water pump	Brand		Wilo	Wilo	Wilo
	Model		RS25/7.5 RKC	RS25/7.5 RKC	RS25/7.5 RKC
	Pump head	m	7.5	7.5	7.5
Expansion tank volume		L	5	5	5
Refrigerant	Type		R410A	R410A	R410A
	Charged volume	kg	3.6	3.6	3.6
Throttle type			Electronic expansion valve		
Backup E-heater	Standard mounted	kW	4.5	4.5	4.5
	Optional	kW	/	/	/
	Capacity steps		1	1	1
	MOP	A	12	12	12
	MCA	A	9	9	9
	Power supply	V/Ph/Hz	380-415/3/50	380-415/3/50	380-415/3/50
Sound pressure level[5]	Heating	dB(A)	67	71	72
	Cooling	dB(A)	66	70	71
Unit net dimension(W×H×D)		mm	1397×1408×400	1397×1408×400	1397×1408×400
Unit net dimension(W×H×D)		mm	1475×1580×440	1475×1580×440	1475×1580×440
Net/ Gross weight		kg	174/192	174/192	174/192
Water piping connections Dia.		inch	1-1/4“ Female BSP	1-1/4“ Female BSP	1-1/4“ Female BSP
Safety valve		MPa	0.3	0.3	0.3
Total water volume		L	5.5	5.5	5.5
Ambient temperature range (Heat pump)	Cooling	℃	-5~46	-5~46	-5~46
	Heating	℃	-20-35	-20-35	-20-35
	Domestic hot water	℃	-20-43	-20-43	-20-43
Water outlet temperature range	Cooling	℃	5~25	5~25	5~25
	Heating	℃	25~60	25~60	25~60
	Domestic hot water	℃	40~60	40~60	40~60

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℃

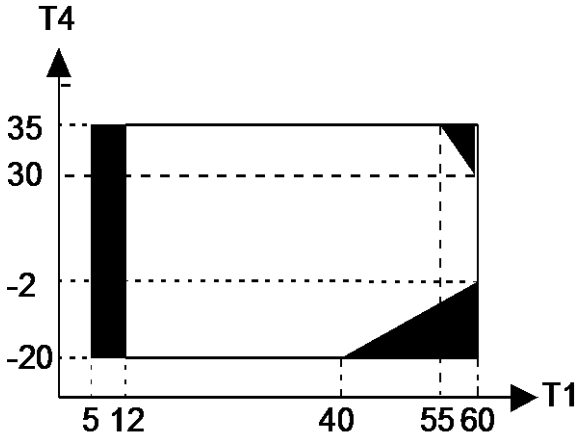
4.Condenser air in 35℃. Evaporator water in/out 12/7℃

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

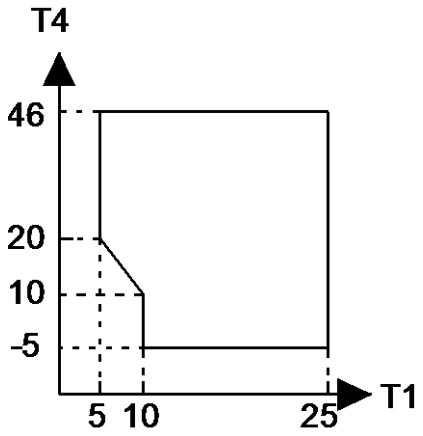
6. The above data test reference standard EN14511:2013; EN14825:2013; EN50564:2011; EN12102:2011; (EU) No:811:2013; (EU)No:813:2013; OJ 2014/C 207/02:2014

4. Operation range

Heating mode



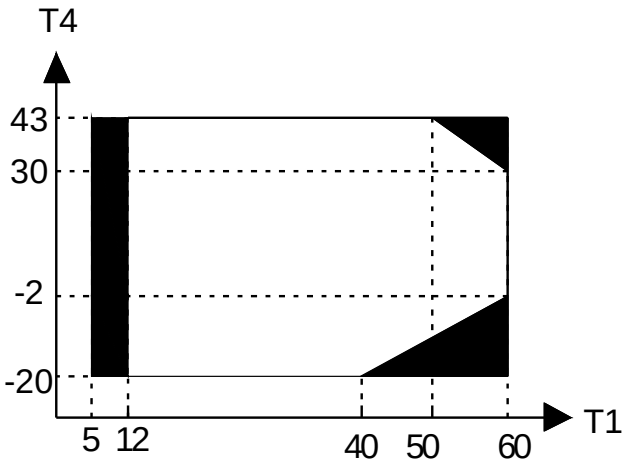
Cooling mode



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

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

Domestic hot water mode

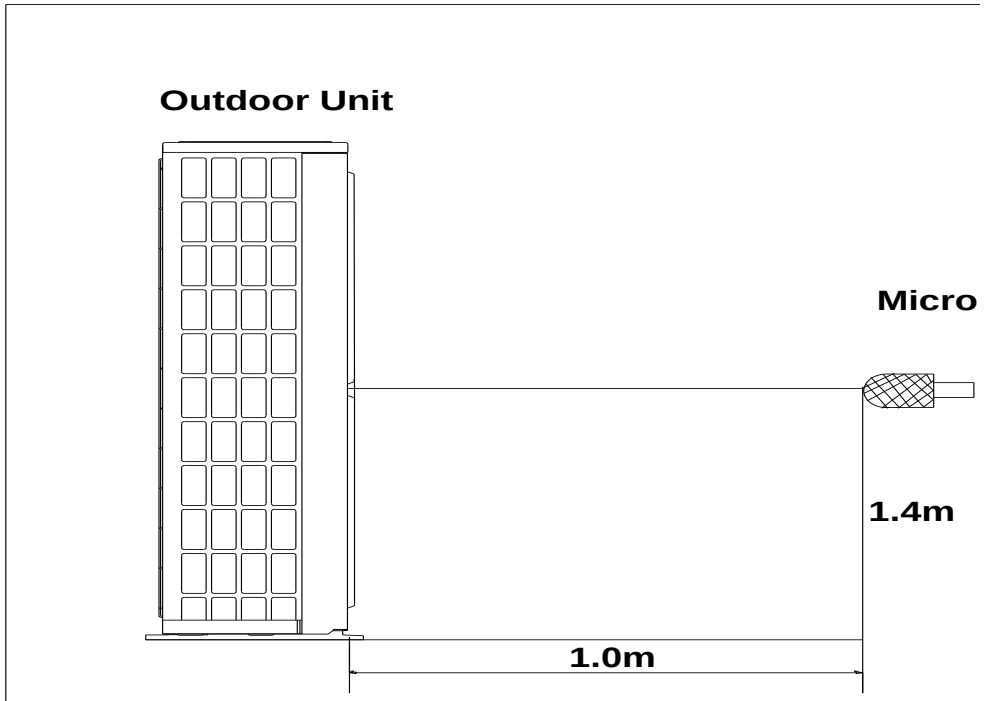


T1: Leaving water temperature (℃) T4 : Ambient temperature(℃)

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

5. Sound levels

5.1 Sound pressure level



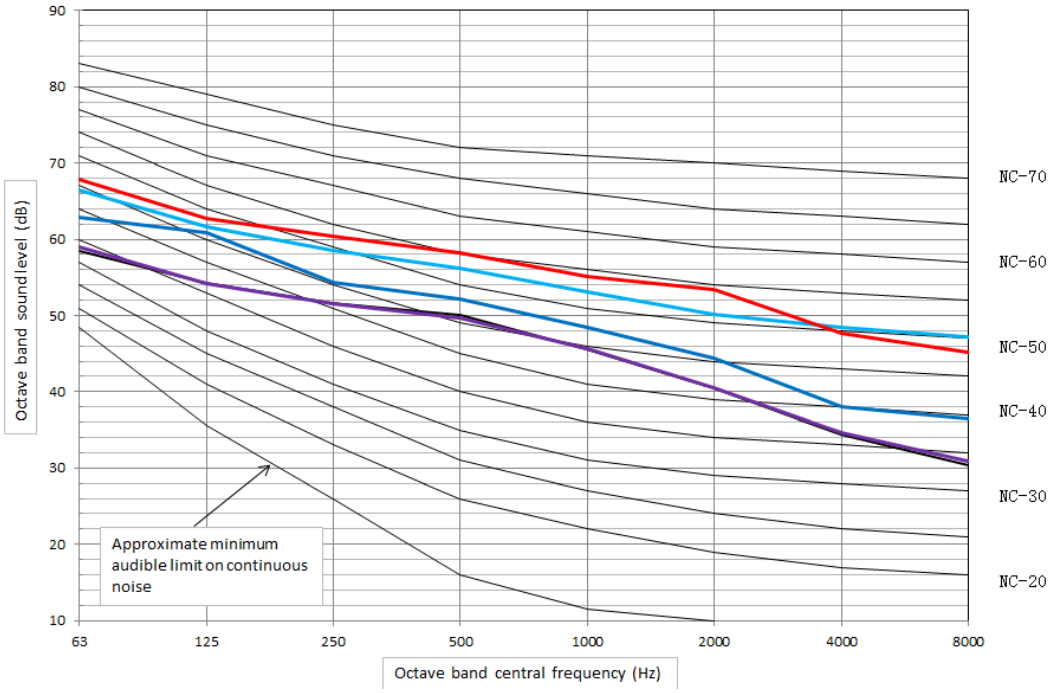
Model	Heating dB(A)	Cooling dB(A)
MONOBLOC AEROTHERM V17 (5KW)	52	63
MONOBLOC AEROTHERM V17 (7KW)	62	63
MONOBLOC AEROTHERM V17 (10KW)	65	64
MONOBLOC AEROTHERM V17 (12KW)	67	66
MONOBLOC AEROTHERM V17 (14KW)	71	70
MONOBLOC AEROTHERM V17 (16KW)	72	71
MONOBLOC AEROTHERM V17 (12KW) (TRIF.)	67	66
MONOBLOC AEROTHERM V17 (14KW) (TRIF.)	71	70
MONOBLOC AEROTHERM V17 (16KW) (TRIF.)	72	71

Note:

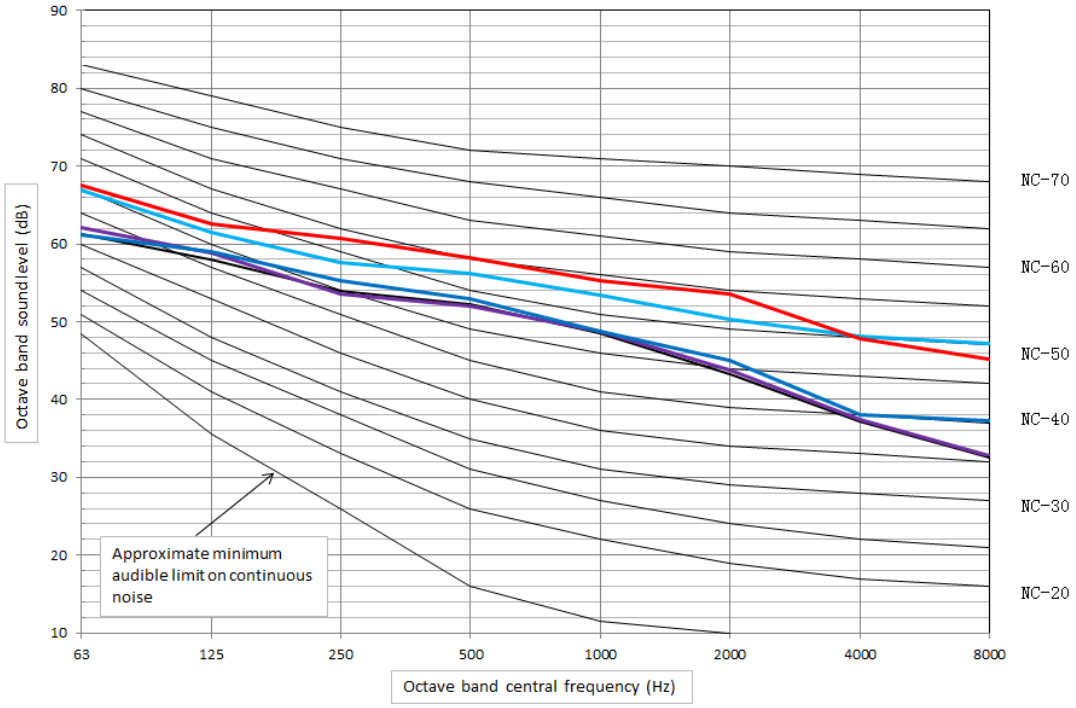
It is tested 1 meter away from the machine in a semi-anechoic room (sound pressure).

5.2 Octave band level

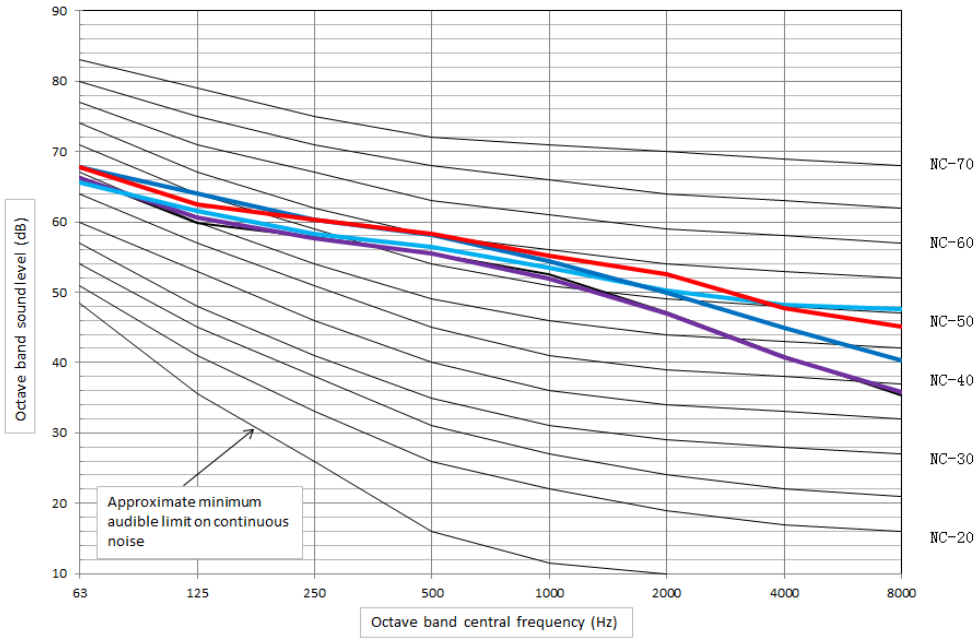
MONOBLOC AEROTHERM V17 (10KW)



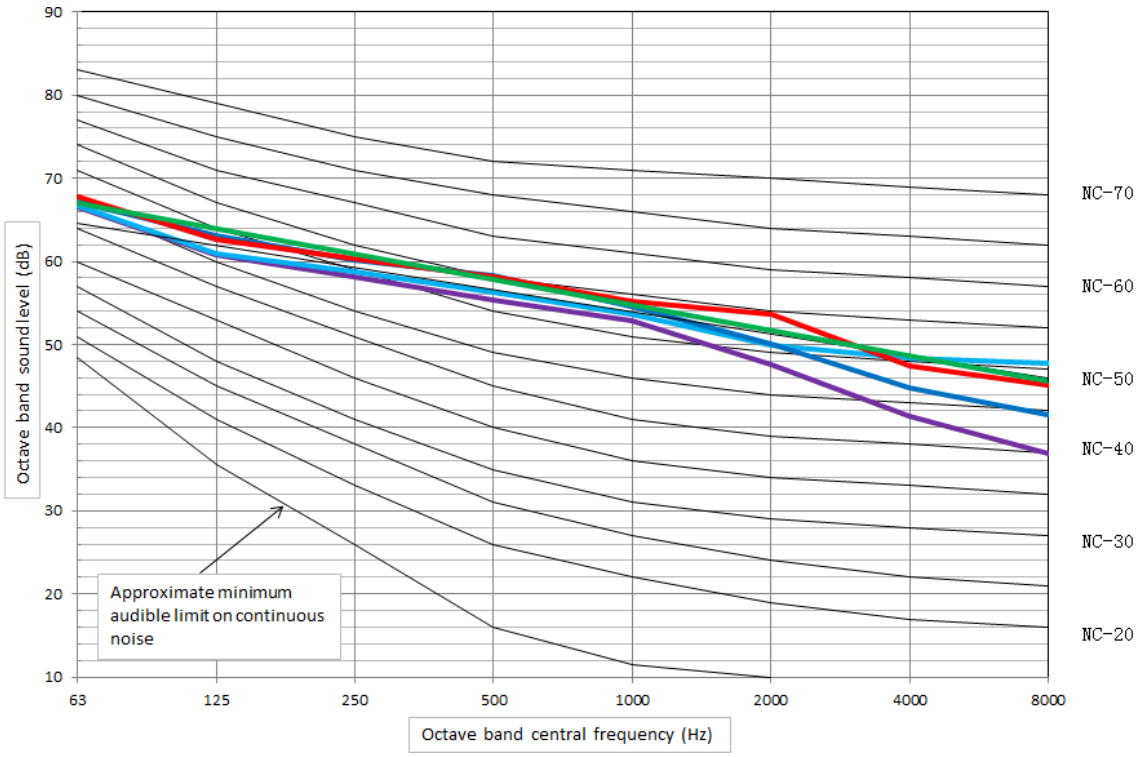
MONOBLOC AEROTHERM V17 (12KW)



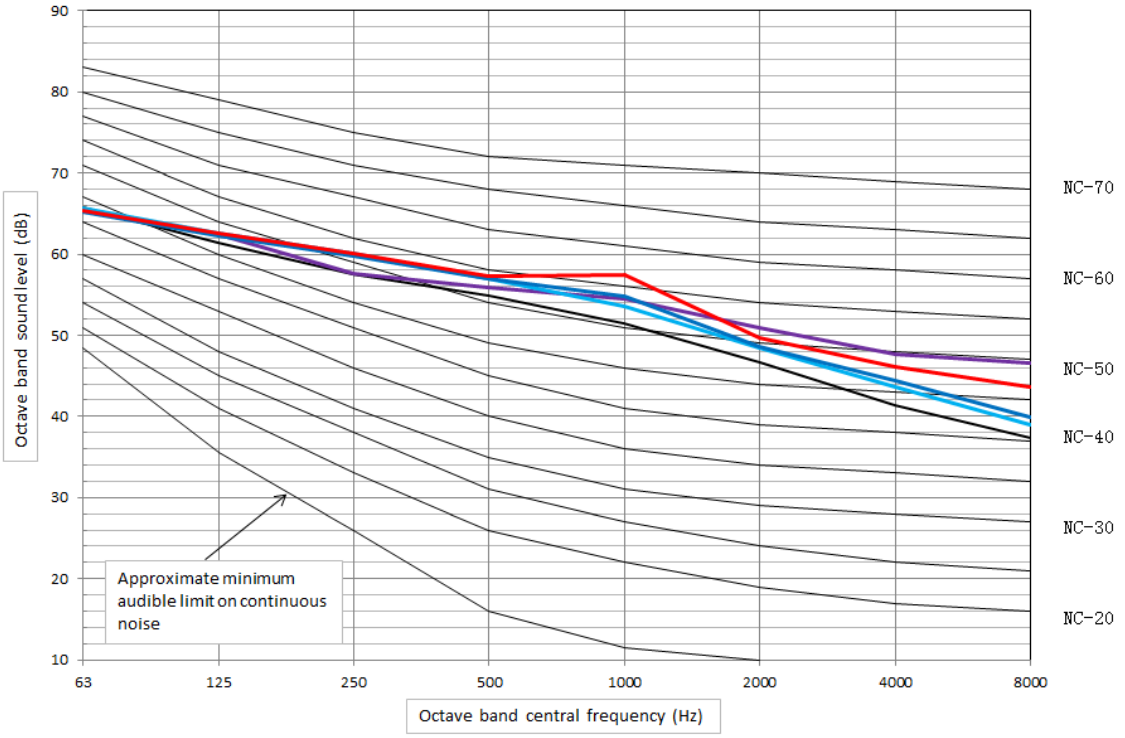
MONOBLOC AEROTHERM V17 (14KW)



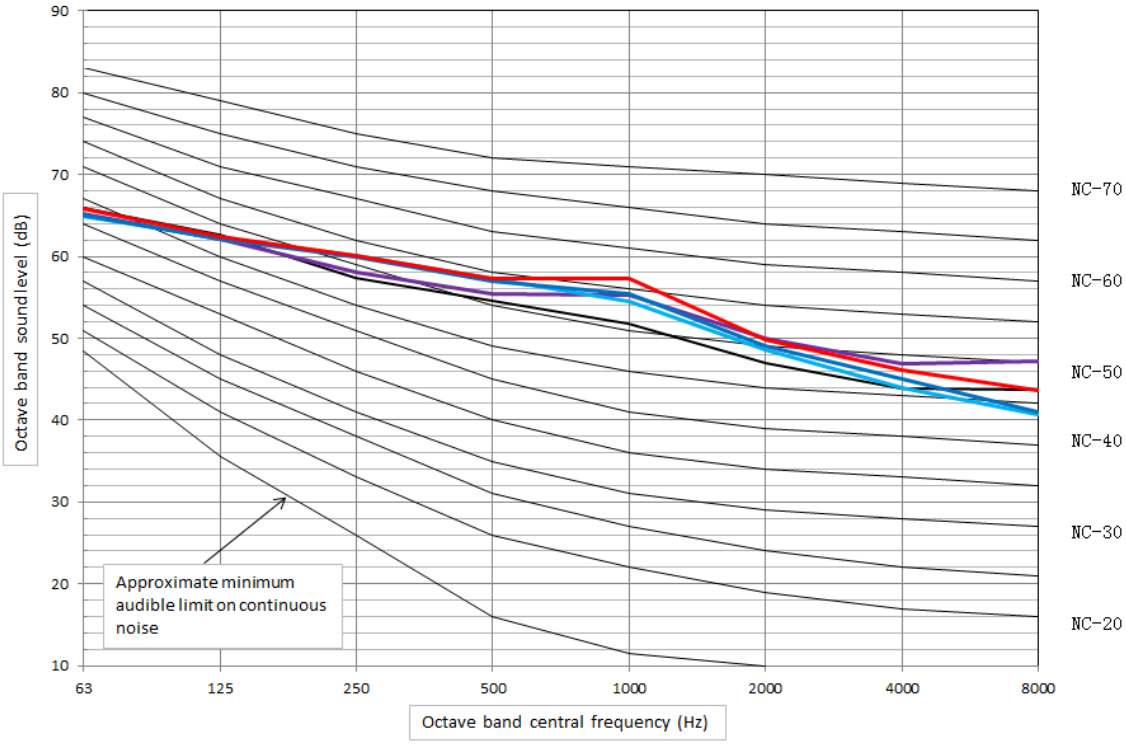
MONOBLOC AEROTHERM V17 (16KW)



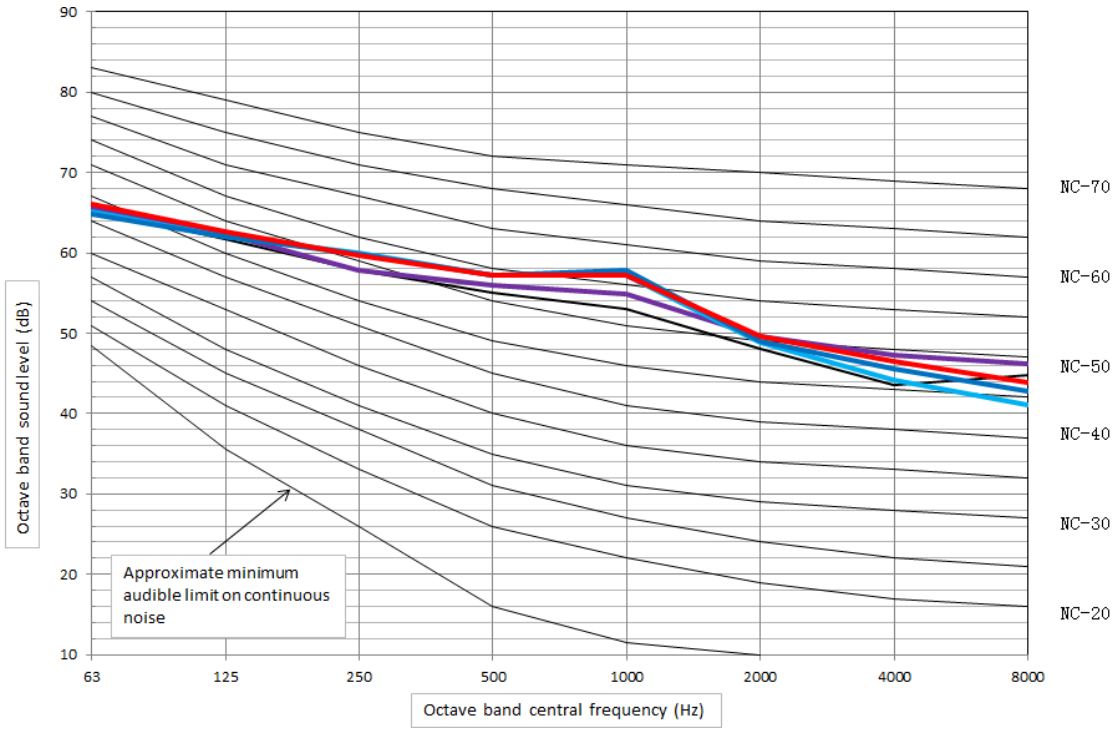
MONOBLOC AEROTHERM V17 (12KW) (TRIF.)



MONOBLOC AEROTHERM V17 (14KW) (TRIF.)



MONOBLOC AEROTHERM V17 (16KW) (TRIF.)



6. Accessories

Name	Shape	Quantity	
		5/7kW	10-16 kW
Outdoor unit installation &owner's manual		1	1
User interface owner's manual		1	1
Y-shape filter		1	1
Water outlet connection pipe assemble		2	1
User interface		1	1
Tighten belt for wiring		0	2
		3	3
T5:Thermistor for domestic hot water tank		1	1
T1:Thermistor for backup heater		1	0
Temperature sensor clamp		1	0
Transit line		1	1

7. Performance data

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

Model: MONOBLOC AEROTHERM V17 (5KW)

Peak 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	2.7	1.4	2.01	2.4	1.5	1.65	2.7	1.6	1.72												
-15	3.4	1.5	2.31	2.9	1.6	1.80	3.4	1.7	2.02	2.9	1.8	1.55									
-7	5.4	1.7	3.23	4.9	1.7	2.91	4.7	1.9	2.44	4.4	2.0	2.24	3.4	2.1	1.59	3.5	2.2	1.60			
-2	6.0	1.7	3.54	6.1	1.9	3.24	5.4	2.1	2.61	4.4	2.0	2.15	2.8	2.2	1.29	3.4	2.1	1.65	3.1	2.0	1.56
2	6.6	1.7	3.85	6.2	2.0	3.07	6.0	2.1	2.88	5.7	2.2	2.64	4.8	2.3	2.08	3.5	1.8	1.91	3.0	1.8	1.68
7	7.5	1.6	4.70	7.2	1.8	3.96	6.3	1.8	3.50	5.2	1.7	3.09	3.8	1.6	2.45	2.8	1.3	2.07	2.8	1.5	1.92
15	7.4	1.2	6.28	6.9	1.3	5.22	5.8	1.4	4.23	4.4	1.3	3.54	3.8	1.3	2.83	2.5	1.0	2.47	1.9	1.1	1.66
20	7.1	1.0	7.00	6.7	1.2	5.78	5.2	1.1	4.79	4.4	1.1	3.99	3.3	1.2	2.86	2.0	0.9	2.28	1.3	1.0	1.41
25	6.8	0.9	7.98	6.6	1.0	6.63	5.7	1.1	5.28	4.7	1.1	4.27	3.8	1.2	3.27	2.2	0.8	2.62	1.8	0.9	1.87
30	7.6	0.8	9.35	7.2	1.0	7.50	6.3	1.1	5.95	4.4	0.9	4.76	4.2	1.1	3.68	2.3	0.8	2.80	2.2	0.9	2.38
35	8.2	0.8	10.31	7.6	0.9	8.03	6.7	1.0	6.47	4.4	0.9	4.71	4.2	1.1	3.67	3.3	1.0	3.31			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	2.6	1.3	1.96	2.4	1.4	1.66	2.5	1.5	1.65												
-15	3.1	1.4	2.23	2.8	1.5	1.82	3.2	1.6	1.99	2.7	1.8	1.52									
-7	4.5	1.4	3.14	4.5	1.6	2.87	4.4	1.8	2.42	4.1	1.9	2.20	2.9	1.9	1.56	3.1	2.1	1.50			
-2	5.7	1.6	3.48	5.3	1.7	3.17	4.8	1.8	2.61	4.0	1.9	2.14	2.8	2.1	1.30	3.3	2.0	1.62	2.9	1.9	1.49
2	5.0	1.5	3.37	5.2	1.8	2.89	4.9	1.8	2.68	4.8	1.9	2.48	4.2	2.2	1.93	3.3	1.8	1.87	3.0	1.8	1.68
7	7.0	1.5	4.55	6.8	1.8	3.84	6.3	1.8	3.50	5.2	1.7	3.09	3.8	1.6	2.45	2.8	1.3	2.07	2.8	1.5	1.92
15	7.4	1.2	6.28	6.9	1.3	5.22	5.8	1.4	4.23	4.4	1.3	3.54	3.8	1.3	2.83	2.5	1.0	2.47	1.9	1.1	1.66
20	7.1	1.0	7.00	6.7	1.2	5.78	5.2	1.1	4.79	4.4	1.1	3.99	3.3	1.2	2.86	2.0	0.9	2.28	1.3	1.0	1.41
25	6.8	0.9	7.98	6.6	1.0	6.63	5.7	1.1	5.28	4.7	1.1	4.27	3.8	1.2	3.27	2.2	0.8	2.62	1.8	0.9	1.87
30	7.6	0.8	9.35	7.2	1.0	7.50	6.3	1.1	5.95	4.4	0.9	4.76	4.2	1.1	3.68	2.3	0.8	2.80	2.2	0.9	2.38
35	8.2	0.8	10.31	7.6	0.9	8.03	6.7	1.0	6.47	4.4	0.9	4.71	4.2	1.1	3.67	3.3	1.0	3.31			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

Model: MONOBLOC AEROTHERM V17 (7KW)

Peak 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	4.6	2.1	2.16	4.1	2.3	1.78	4.3	2.5	1.74												
-15	5.1	2.2	2.25	4.4	2.4	1.84	4.9	2.6	1.88	4.2	2.7	1.59									
-7	7.5	2.5	3.02	6.8	2.7	2.52	6.7	2.9	2.30	6.4	3.0	2.16	5.0	2.9	1.72	5.0	2.9	1.74			
-2	8.7	2.6	3.35	9.0	2.9	3.13	8.1	3.0	2.65	6.6	3.1	2.11	4.2	2.9	1.45	5.0	2.7	1.85	4.6	2.6	1.74
2	9.6	2.7	3.50	9.1	3.0	3.04	8.8	3.2	2.77	8.6	3.3	2.61	7.1	3.1	2.31	5.1	2.6	1.98	4.3	2.5	1.73
7	10.3	2.4	4.32	10.1	2.6	3.83	8.9	2.6	3.48	7.6	2.4	3.13	5.6	2.1	2.64	4.0	1.9	2.12	4.0	2.1	1.95
15	10.2	1.7	5.93	9.7	1.9	4.99	8.2	1.9	4.29	6.5	1.7	3.74	5.5	1.7	3.20	3.7	1.4	2.63	2.8	1.6	1.77
20	9.8	1.5	6.61	9.4	1.7	5.52	7.5	1.5	4.86	6.4	1.5	4.22	4.8	1.5	3.24	2.8	1.2	2.42	1.9	1.3	1.50
25	9.4	1.2	7.53	9.2	1.5	6.33	8.1	1.5	5.36	6.8	1.5	4.51	5.5	1.5	3.71	3.2	1.2	2.78	2.6	1.3	1.98
30	10.5	1.2	8.83	10.1	1.4	7.16	8.9	1.5	6.03	6.4	1.3	5.03	6.1	1.5	4.17	3.4	1.1	2.98	3.2	1.3	2.53
35	11.3	1.2	9.73	10.6	1.4	7.67	9.5	1.5	6.56	6.3	1.3	4.97	6.0	1.5	4.16	4.9	1.4	3.52			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	4.3	2.0	2.11	4.0	2.2	1.79	4.0	2.4	1.67												
-15	4.7	2.1	2.18	4.3	2.3	1.86	4.6	2.5	1.86	4.0	2.6	1.56									
-7	6.3	2.2	2.94	6.2	2.5	2.49	6.2	2.7	2.28	6.0	2.8	2.12	4.3	2.6	1.69	4.5	2.8	1.64			
-2	8.2	2.5	3.30	7.8	2.5	3.07	7.2	2.7	2.65	6.0	2.9	2.10	4.1	2.8	1.46	4.8	2.7	1.82	4.2	2.5	1.67
2	7.2	2.3	3.06	7.6	2.7	2.86	7.3	2.8	2.58	7.2	3.0	2.44	6.2	2.9	2.14	4.8	2.5	1.93	4.3	2.5	1.73
7	9.6	2.3	4.18	9.5	2.6	3.71	8.9	2.6	3.48	7.6	2.4	3.13	5.6	2.1	2.64	4.0	1.9	2.12	4.0	2.1	1.95
15	10.2	1.7	5.93	9.7	1.9	4.99	8.2	1.9	4.29	6.5	1.7	3.74	5.5	1.7	3.20	3.7	1.4	2.63	2.8	1.6	1.77
20	9.8	1.5	6.61	9.4	1.7	5.52	7.5	1.5	4.86	6.4	1.5	4.22	4.8	1.5	3.24	2.8	1.2	2.42	1.9	1.3	1.50
25	9.4	1.2	7.53	9.2	1.5	6.33	8.1	1.5	5.36	6.8	1.5	4.51	5.5	1.5	3.71	3.2	1.2	2.78	2.6	1.3	1.98
30	10.5	1.2	8.83	10.1	1.4	7.16	8.9	1.5	6.03	6.4	1.3	5.03	6.1	1.5	4.17	3.4	1.1	2.98	3.2	1.3	2.53
35	11.3	1.2	9.73	10.6	1.4	7.67	9.5	1.5	6.56	6.3	1.3	4.97	6.0	1.5	4.16	4.9	1.4	3.52			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

Model: MONOBLOC AEROTHERM V17 (10KW)

Peak 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	5.0	2.5	2.00	4.0	2.6	1.52	4.4	2.7	1.64												
-15	6.3	2.6	2.44	5.9	2.7	2.16	5.9	2.8	2.10	5.1	3.0	1.71									
-7	8.6	3.1	2.74	8.1	3.2	2.52	8.3	3.6	2.34	8.4	3.9	2.18	7.5	4.0	1.89	6.8	3.8	1.78			
-2	10.5	3.4	3.10	10.2	3.6	2.84	10.3	3.9	2.62	10.2	4.3	2.38	9.5	4.2	2.27	8.1	4.0	2.04	4.2	1.6	2.67
2	11.5	3.4	3.40	11.4	3.7	3.08	11.3	4.0	2.83	11.0	4.4	2.51	10.5	4.1	2.54	8.6	3.9	2.21	4.2	2.7	1.57
7	12.2	3.0	4.00	11.2	3.4	3.30	12.7	3.5	3.64	10.1	3.2	3.19	8.3	2.8	2.94	6.6	2.7	2.49	3.9	3.8	1.04
15	11.0	1.8	6.06	10.7	2.0	5.28	8.9	1.9	4.65	8.4	2.1	4.03	6.6	1.9	3.46	5.5	1.9	2.83	4.3	2.0	2.17
20	10.9	1.4	7.71	9.9	1.6	6.24	8.9	1.6	5.40	7.4	1.6	4.60	6.7	1.7	3.86	5.9	1.8	3.22	5.9	2.0	2.93
25	9.3	1.1	8.79	9.1	1.2	7.33	8.8	1.4	6.39	8.3	1.5	5.42	7.1	1.5	4.60	7.4	1.8	4.05	5.6	2.0	2.88
30	10.6	1.0	10.56	9.6	1.2	8.01	9.2	1.3	6.91	8.0	1.7	4.87	7.2	1.5	4.75	6.0	1.8	3.32	4.9	1.9	2.67
35	10.2	1.0	10.51	9.7	1.2	8.27	9.5	1.3	7.11	7.4	1.3	5.71	6.6	1.4	4.70	2.5	0.7	3.82			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	4.6	2.4	1.92	3.8	2.58	1.48	2.4	2.0	1.25												
-15	5.1	2.5	2.08	5.5	2.67	2.08	5.4	2.7	1.99	4.8	2.9	1.64									
-7	7.6	2.9	2.65	7.9	3.18	2.50	7.8	3.4	2.30	7.9	3.7	2.13	7.0	3.8	1.85	6.5	3.8	1.73			
-2	9.5	3.0	3.14	9.1	3.25	2.79	8.8	3.6	2.48	8.8	3.9	2.25	7.8	3.8	2.06	6.8	3.8	1.79	4.0	3.0	1.36
2	10.1	3.0	3.33	9.9	3.34	2.98	10.2	3.7	2.77	10.1	4.1	2.45	9.5	3.9	2.46	3.8	1.7	2.19	4.2	1.1	3.94
7	11.2	2.7	4.11	10.6	3.04	3.49	12.7	3.5	3.64	10.1	3.2	3.19	8.3	2.8	2.94	6.6	2.7	2.49	3.9	0.6	6.11
15	11.0	1.8	6.06	10.7	2.02	5.28	8.9	1.9	4.65	8.4	2.1	4.03	6.6	1.9	3.46	5.5	1.9	2.83	4.3	1.3	3.39
20	10.9	1.4	7.71	9.9	1.59	6.24	8.9	1.6	5.40	7.4	1.6	4.60	6.7	1.7	3.86	5.9	1.8	3.22	5.9	1.7	3.44
25	9.3	1.1	8.79	9.1	1.25	7.33	8.8	1.4	6.39	8.3	1.5	5.42	7.1	1.5	4.60	7.4	1.8	4.05	5.6	1.7	3.31
30	10.6	1.0	10.56	9.6	1.20	8.01	9.2	1.3	6.91	8.0	1.7	4.87	7.2	1.5	4.75	6.0	1.8	3.32	4.9	1.6	3.14
35	10.2	1.0	10.51	9.7	1.17	8.27	9.5	1.3	7.11	7.4	1.3	5.71	6.6	1.4	4.70	2.5	0.7	3.82			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

Model: MONOBLOC AEROTHERM V17 (12KW)

Peak 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	5.8	3.0	1.96	4.7	3.2	1.49	5.1	3.2	1.61												
-15	7.3	3.1	2.39	6.8	3.2	2.11	6.8	3.3	2.06	5.9	3.5	1.69									
-7	10.2	3.7	2.74	9.5	3.8	2.48	9.7	4.2	2.30	9.8	4.6	2.14	8.8	4.7	1.85	8.0	4.6	1.75			
-2	11.7	3.7	3.12	11.2	4.0	2.81	11.4	4.4	2.60	11.2	4.8	2.35	10.6	4.7	2.27	9.0	4.4	2.02	4.6	1.7	2.65
2	12.9	3.8	3.40	12.6	4.1	3.04	12.5	4.5	2.80	12.2	4.9	2.48	11.7	4.6	2.54	9.6	4.3	2.21	4.7	3.0	1.57
7	14.4	3.7	3.95	13.5	4.1	3.30	15.2	4.2	3.63	12.2	3.8	3.20	10.1	3.4	2.97	8.0	3.2	2.50	4.7	4.5	1.04
15	13.0	2.2	6.00	12.8	2.4	5.28	10.7	2.3	4.64	10.1	2.5	4.04	8.0	2.3	3.48	6.6	2.3	2.85	5.2	2.4	2.19
20	12.9	1.7	7.55	12.2	1.9	6.40	10.6	2.0	5.38	8.9	1.9	4.63	8.0	2.1	3.86	7.0	2.2	3.20	7.0	2.4	2.90
25	11.2	1.3	8.77	11.5	1.5	7.72	10.5	1.7	6.35	10.0	1.9	5.38	8.7	1.8	4.73	8.8	2.2	4.10	6.8	2.3	2.93
30	12.6	1.2	10.51	12.2	1.4	8.53	10.9	1.6	6.87	9.6	2.0	4.86	8.8	1.8	4.88	7.1	2.1	3.39	5.9	2.2	2.73
35	12.2	1.2	10.44	12.6	1.4	8.90	11.2	1.6	7.09	8.7	1.5	5.71	8.0	1.7	4.83	2.9	0.7	3.94			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	5.5	2.9	1.91	4.6	3.10	1.48	2.9	2.4	1.25												
-15	6.1	3.0	2.06	6.6	3.20	2.06	6.4	3.3	1.97	5.7	3.5	1.64									
-7	9.2	3.4	2.68	9.5	3.81	2.50	9.3	4.1	2.29	9.4	4.4	2.12	8.4	4.6	1.84	7.8	4.5	1.73			
-2	11.5	3.6	3.18	10.9	3.90	2.79	10.6	4.3	2.48	10.6	4.7	2.24	9.4	4.5	2.08	8.1	4.5	1.79	4.9	3.6	1.36
2	12.3	3.7	3.37	11.9	4.00	2.97	12.2	4.4	2.76	12.1	4.9	2.45	11.5	4.6	2.48	4.6	2.1	2.20	5.1	1.3	3.97
7	13.3	3.3	4.07	12.8	3.65	3.50	15.2	4.2	3.63	12.2	3.8	3.20	10.1	3.4	2.97	8.0	3.2	2.50	4.7	0.8	6.14
15	13.0	2.2	6.00	12.8	2.42	5.28	10.7	2.3	4.64	10.1	2.5	4.04	8.0	2.3	3.48	6.6	2.3	2.85	5.2	1.5	3.42
20	12.9	1.7	7.55	11.9	1.91	6.21	10.6	2.0	5.38	8.9	1.9	4.63	8.0	2.1	3.86	7.0	2.2	3.20	7.0	2.0	3.43
25	11.1	1.3	8.74	11.0	1.50	7.32	10.5	1.7	6.36	10.0	1.8	5.44	8.5	1.8	4.63	8.9	2.2	4.07	6.8	2.0	3.33
30	12.6	1.2	10.37	11.5	1.57	7.32	11.0	1.6	6.90	9.7	2.0	4.89	8.7	1.8	4.80	7.2	2.2	3.31	5.9	1.9	3.15
35	12.1	1.2	10.18	11.7	1.55	7.55	11.2	1.6	7.12	8.9	1.5	5.73	8.0	1.7	4.78	3.0	0.8	3.77			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

Model: MONOBLOC AEROTHERM V17 (14KW)

Peak 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	6.7	3.4	1.98	5.6	3.6	1.56	6.1	3.7	1.68												
-15	8.4	3.5	2.38	8.0	3.7	2.16	7.9	3.8	2.09	7.0	4.0	1.74									
-7	11.5	4.3	2.68	11.0	4.4	2.48	11.0	4.9	2.26	11.1	5.2	2.13	10.3	5.4	1.90	9.6	5.2	1.86			
-2	13.2	4.4	3.02	12.9	4.7	2.77	12.7	5.1	2.52	12.6	5.5	2.29	12.1	5.3	2.28	10.5	5.0	2.09	5.3	2.0	2.68
2	14.6	4.4	3.28	14.4	4.8	2.98	13.9	5.2	2.69	13.5	5.7	2.39	13.3	5.3	2.51	11.1	5.0	2.24	5.3	3.4	1.56
7	16.4	4.3	3.78	15.4	4.8	3.24	16.9	4.9	3.45	13.4	4.4	3.04	11.3	3.9	2.89	9.1	3.6	2.50	5.3	5.2	1.02
15	14.4	2.6	5.56	14.3	2.9	4.99	11.6	2.7	4.28	10.8	2.9	3.74	8.6	2.6	3.29	7.2	2.6	2.75	5.6	2.7	2.07
20	14.3	2.1	6.92	13.7	2.3	5.98	11.5	2.3	4.93	9.6	2.3	4.24	8.7	2.4	3.61	7.6	2.5	3.05	7.6	2.8	2.74
25	12.4	1.6	8.00	12.7	1.8	7.05	11.4	2.0	5.82	10.7	2.2	4.93	9.4	2.1	4.41	9.8	2.5	3.87	7.5	2.7	2.75
30	14.1	1.5	9.57	13.4	1.7	7.73	12.0	1.9	6.32	10.4	2.3	4.44	9.5	2.1	4.52	7.9	2.5	3.18	6.6	2.6	2.56
35	13.6	1.4	9.48	13.7	1.7	8.01	12.2	1.9	6.53	9.5	1.8	5.21	8.6	1.9	4.46	3.3	0.9	3.66			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	6.5	3.3	1.96	5.5	3.50	1.57	3.5	2.7	1.32												
-15	7.1	3.4	2.08	7.8	3.64	2.14	7.5	3.7	2.04	6.8	3.9	1.73									
-7	10.5	3.9	2.66	11.1	4.36	2.54	10.6	4.6	2.29	10.8	5.0	2.14	9.9	5.1	1.92	9.4	5.1	1.86			
-2	12.4	4.0	3.12	12.0	4.29	2.79	11.4	4.7	2.44	11.3	5.1	2.21	10.4	4.9	2.11	9.1	4.9	1.88	5.4	3.8	1.40
2	13.3	4.1	3.27	13.0	4.43	2.94	13.0	4.9	2.68	12.9	5.4	2.39	12.4	5.0	2.49	5.1	2.2	2.27	5.6	1.4	4.04
7	15.1	3.9	3.89	14.6	4.26	3.43	16.9	4.9	3.45	13.4	4.4	3.04	11.3	3.9	2.89	9.1	3.6	2.50	5.4	0.9	6.06
15	14.4	2.6	5.56	14.3	2.86	4.99	11.6	2.7	4.28	10.8	2.9	3.74	8.6	2.6	3.29	7.2	2.6	2.75	5.7	1.7	3.26
20	14.3	2.1	6.92	13.3	2.29	5.80	11.5	2.3	4.93	9.6	2.3	4.24	8.7	2.4	3.61	7.6	2.5	3.05	7.6	2.4	3.24
25	12.4	1.5	8.04	12.3	1.80	6.81	11.4	2.0	5.82	10.7	2.2	4.93	9.4	2.1	4.41	9.7	2.5	3.86	7.5	2.4	3.16
30	14.1	1.5	9.56	12.9	1.73	7.44	11.9	1.9	6.31	10.3	2.3	4.45	9.5	2.1	4.53	7.9	2.5	3.15	6.5	2.2	2.98
35	13.6	1.4	9.42	13.1	1.71	7.69	12.2	1.9	6.51	9.4	1.8	5.22	8.7	1.9	4.47	3.3	0.9	3.60			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

Model: MONOBLOC AEROTHERM V17 (16KW)

Peak 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	7.7	3.9	1.98	6.5	4.1	1.58	7.2	4.2													
-15	9.5	4.0	2.36	9.3	4.3	2.17	9.2	4.3	2.12	8.2	4.6										
-7	13.1	4.9	2.65	12.6	5.1	2.48	12.7	5.6	2.28	12.9	6.0	2.16	11.7	6.2	1.89	11.0	5.9	1.86			
-2	15.0	5.0	2.98	14.8	5.3	2.76	14.7	5.8	2.53	14.5	6.3	2.32	13.7	6.1	2.25	12.0	5.8	2.08	6.04	2.25	2.68
2	16.6	5.1	3.23	16.5	5.6	2.96	16.0	6.0	2.69	15.6	6.5	2.41	14.9	6.0	2.47	12.6	5.7	2.22	6.0	3.9	1.55
7	18.6	5.0	3.70	17.6	5.5	3.22	19.4	5.6	3.43	15.4	5.1	3.05	12.7	4.5	2.83	10.2	4.2	2.46	6.0	5.9	1.01
15	16.2	3.0	5.34	16.1	3.3	4.82	13.1	3.1	4.17	12.2	3.3	3.67	9.5	3.0	3.15	8.0	3.0	2.64	6.3	3.1	2.00
20	16.0	2.4	6.61	15.0	2.7	5.59	13.0	2.7	4.79	10.8	2.6	4.14	9.8	2.8	3.54	8.7	2.9	3.01	8.6	3.2	2.71
25	14.0	1.8	7.63	13.8	2.1	6.56	12.9	2.3	5.64	12.1	2.5	4.80	10.7	2.5	4.35	11.1	2.9	3.82	8.5	3.1	2.72
30	15.8	1.7	9.09	14.6	2.0	7.16	13.5	2.2	6.10	11.7	2.7	4.32	10.9	2.4	4.49	9.0	2.9	3.13	7.5	3.0	2.52
35	15.3	1.7	8.97	14.9	2.0	7.39	13.9	2.2	6.28	10.7	2.1	5.06	10.0	2.2	4.45	3.8	1.1	3.60			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	7.2	3.8	1.90	6.2	4.02	1.54	4.0	3.1	1.31												
-15	7.8	3.9	2.01	8.7	4.17	2.09	8.5	4.2	2.01	7.7	4.5	1.72									
-7	11.6	4.5	2.56	12.3	5.00	2.46	11.9	5.3	2.24	12.1	5.7	2.11	10.9	5.9	1.85	10.5	5.8	1.81			
-2	13.6	4.5	3.02	13.2	4.85	2.72	12.6	5.3	2.39	12.6	5.8	2.19	11.3	5.5	2.04	10.0	5.4	1.83	5.9	4.3	1.36
2	14.6	4.6	3.16	14.3	5.01	2.86	14.4	5.5	2.63	14.3	6.0	2.36	13.4	5.6	2.39	5.5	2.5	2.20	6.0	1.6	3.89
7	17.1	4.5	3.81	16.7	4.91	3.41	19.4	5.6	3.43	15.4	5.1	3.05	12.7	4.5	2.83	10.2	4.2	2.46	6.0	1.0	5.95
15	16.2	3.0	5.34	16.1	3.33	4.82	13.1	3.1	4.17	12.2	3.3	3.67	9.5	3.0	3.15	8.0	3.0	2.64	6.3	2.0	3.13
20	16.0	2.4	6.61	15.0	2.68	5.59	13.0	2.7	4.79	10.8	2.6	4.14	9.8	2.8	3.54	8.7	2.9	3.01	8.6	2.7	3.19
25	14.0	1.8	7.63	13.8	2.11	6.56	12.9	2.3	5.64	12.1	2.5	4.80	10.7	2.5	4.35	11.1	2.9	3.82	8.5	2.7	3.12
30	15.8	1.7	9.09	14.6	2.04	7.16	13.5	2.2	6.10	11.7	2.7	4.32	10.9	2.4	4.49	9.0	2.9	3.13	7.5	2.5	2.96
35	15.3	1.7	8.97	14.9	2.01	7.39	13.9	2.2	6.28	10.7	2.1	5.06	10.0	2.2	4.45	3.8	1.1	3.60			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

7.2 Cooling capacity 220-240/1/50 products

Model: MONOBLOC AEROTHERM V17 (5KW)

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	4.2	1.6	2.68	3.6	1.5	2.35	3.6	1.6	2.21	3.5	1.7	2.11	3.1	1.9	1.66	2.6	1.8	1.43
40	6.0	1.6	3.68	5.7	2.1	2.74	5.5	2.0	2.73	4.9	2.1	2.36	4.5	2.2	2.03	3.9	2.1	1.82
35	5.9	1.2	5.11	5.8	1.3	4.62	6.2	1.9	3.35	6.2	2.2	2.80	5.5	2.4	2.32	5.0	2.4	2.12
30	6.4	1.1	5.73	5.3	1.1	4.80	5.3	1.3	4.15	5.9	1.6	3.65	5.9	2.2	2.66	5.5	2.2	2.47
25	5.4	0.8	6.59	5.7	0.9	6.05	5.5	1.0	5.47	6.0	1.3	4.53	5.4	1.4	3.71	4.4	1.2	3.77
20	5.9	0.7	8.85	5.3	0.7	7.24	5.6	1.0	5.65	4.6	0.8	5.71	4.0	0.9	4.48	2.8	0.8	3.67
15	5.9	0.8	7.72	6.3	1.0	6.28	5.1	0.8	6.23	3.9	0.7	5.37	3.5	0.8	4.60	2.7	0.9	3.01
10	6.2	0.8	7.97	5.4	0.7	8.19	5.4	0.8	6.40	4.0	0.8	5.35	3.6	0.8	4.31			
5	6.4	0.8	8.10	5.6	0.7	8.39	5.5	0.8	6.58	4.1	0.8	5.44	3.6	0.8	4.54			
0	6.2	0.7	8.65	6.1	0.7	8.76	4.6	0.7	6.60	4.0	0.7	5.48	3.7	0.8	4.71			
-5	6.3	0.8	7.95	5.6	0.7	8.59	4.6	0.7	6.89	4.0	0.7	5.54	3.6	0.8	4.73			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

Model: MONOBLOC AEROTHERM V17 (7KW)

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	7.0	2.4	2.89	6.0	2.4	2.53	5.7	2.6	2.25	5.3	2.5	2.09	4.5	2.4	1.84	3.7	2.4	1.57
40	9.0	2.5	3.60	8.9	3.2	2.80	7.8	3.1	2.55	7.3	3.0	2.43	6.5	2.9	2.24	5.6	2.8	1.99
35	8.3	1.7	4.79	8.1	2.0	4.02	8.8	2.8	3.16	9.0	3.3	2.70	8.1	3.2	2.51	7.3	3.1	2.31
30	9.3	1.7	5.42	7.8	1.7	4.64	7.9	1.9	4.23	8.8	2.5	3.57	8.9	3.0	2.99	8.0	2.9	2.76
25	7.7	1.3	5.98	8.3	1.4	6.00	8.1	1.5	5.25	9.0	2.0	4.47	7.9	1.9	4.12	6.4	1.6	3.90
20	8.2	1.0	8.13	7.4	1.1	6.99	7.9	1.4	5.62	6.7	1.2	5.79	5.8	1.2	4.83	4.1	1.1	3.74
15	8.1	1.1	7.29	8.8	1.5	6.00	7.3	1.2	6.32	5.7	1.0	5.67	5.1	1.0	5.22	3.9	1.2	3.20
10	8.5	1.1	7.53	7.6	1.0	7.83	7.7	1.2	6.49	5.9	1.0	5.64	5.2	1.1	4.89			
5	8.8	1.1	7.65	7.9	1.0	8.01	7.8	1.2	6.67	6.0	1.0	5.75	5.2	1.0	5.14			
0	8.6	1.0	8.16	8.5	1.0	8.37	6.6	1.0	6.69	5.9	1.0	5.79	5.3	1.0	5.34			
-5	8.7	1.2	7.51	7.9	1.0	8.20	6.5	0.9	6.98	5.8	1.0	5.85	5.2	1.0	5.36			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

Model: MONOBLOC AEROTHERM V17 (10KW)

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	7.9	2.3	3.39	6.6	2.3	2.86	5.9	2.3	2.60	5.8	2.3	2.58	5.2	2.2	2.37	3.5	2.1	1.68
40	9.7	2.5	3.95	8.3	2.4	3.43	8.2	2.7	3.09	7.6	2.7	2.86	7.3	2.6	2.85	5.8	2.5	2.34
35	10.2	2.7	3.75	9.1	2.7	3.38	10.0	2.9	3.44	9.5	2.9	3.27	8.3	2.8	2.92	7.0	2.8	2.54
30	12.1	2.1	5.76	10.7	2.1	5.13	11.6	2.8	4.11	12.4	3.6	3.43	11.4	3.5	3.22	9.1	3.2	2.87
25	12.2	1.8	6.84	12.1	2.2	5.57	11.9	2.6	4.56	10.9	2.4	4.56	10.0	2.4	4.26	8.3	2.1	3.98
20	12.7	1.8	7.09	11.3	1.8	6.28	10.4	1.5	6.76	8.9	1.3	6.82	8.1	1.3	6.20	6.0	1.1	5.43
15	11.9	1.1	11.06	10.8	1.1	9.77	9.1	0.9	9.73	8.4	0.9	8.86	7.6	1.0	7.99	6.0	0.8	7.41
10	12.1	1.0	11.51	10.5	1.1	9.62	9.2	0.9	10.23	8.3	0.9	9.56	7.5	0.9	8.00			
5	12.1	1.0	12.00	10.6	1.1	9.53	9.0	1.0	9.37	8.4	0.9	9.52	7.2	0.9	7.80			
0	12.1	1.0	12.60	10.5	1.1	9.92	9.2	0.9	9.95	8.5	0.9	9.77	7.3	0.9	8.25			
-5	12.0	0.9	13.45	10.7	0.9	11.93	9.3	0.7	12.49	8.7	0.7	11.70	7.5	0.8	9.58			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

Model: MONOBLOC AEROTHERM V17 (12KW)

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	9.4	2.8	3.37	7.9	2.8	2.85	7.1	2.7	2.60	7.0	2.7	2.54	6.2	2.6	2.41	4.1	2.5	1.66
40	11.6	2.9	3.93	9.8	2.9	3.39	9.8	3.2	3.06	9.1	3.2	2.86	8.8	3.0	2.90	6.9	3.0	2.31
35	12.4	3.3	3.79	10.9	3.2	3.37	12.0	3.5	3.43	11.4	3.5	3.25	9.9	3.4	2.91	8.4	3.3	2.53
30	14.6	2.5	5.82	12.8	2.5	5.11	13.9	3.4	4.11	14.8	4.3	3.42	13.7	4.2	3.24	10.9	3.8	2.86
25	14.9	2.1	6.92	14.4	2.6	5.54	14.3	3.1	4.55	13.0	2.9	4.55	12.1	2.8	4.29	10.0	2.5	4.00
20	15.1	2.2	7.01	13.6	2.2	6.29	12.5	1.9	6.74	10.7	1.6	6.84	9.7	1.6	6.25	7.2	1.3	5.45
15	14.2	1.3	10.96	13.0	1.3	9.76	10.9	1.1	9.70	10.1	1.1	8.88	9.2	1.1	8.05	7.2	1.0	7.46
10	14.2	1.3	11.27	12.6	1.3	9.57	11.0	1.1	10.20	10.1	1.0	9.63	9.0	1.1	7.99			
5	14.5	1.2	11.93	12.6	1.3	9.51	10.8	1.2	9.32	10.1	1.1	9.56	8.7	1.1	7.86			
0	14.3	1.2	12.37	12.6	1.4	9.06	10.9	1.1	9.93	10.2	1.0	9.81	8.9	1.1	8.35			
-5	14.2	1.1	13.04	12.9	1.2	10.88	11.0	0.9	12.50	10.5	0.9	11.75	9.1	0.9	9.74			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

Model: MONOBLOC AEROTHERM V17 (14KW)

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	11.0	3.2	3.46	9.5	3.1	3.04	8.5	3.1	2.75	8.0	3.0	2.64	7.1	3.0	2.36	5.0	2.9	1.72
40	13.3	3.4	3.97	11.6	3.3	3.53	11.4	3.6	3.16	10.8	3.6	3.01	10.0	3.5	2.84	8.2	3.4	2.40
35	14.2	3.8	3.77	12.6	3.7	3.43	13.6	4.0	3.42	13.0	3.9	3.29	11.6	3.8	3.03	10.2	3.7	2.73
30	15.9	2.8	5.72	14.1	2.7	5.12	15.0	3.7	4.04	15.9	4.7	3.38	15.1	4.6	3.29	12.3	4.1	3.00
25	16.1	2.4	6.73	15.8	2.9	5.50	15.2	3.4	4.42	13.9	3.1	4.45	13.2	3.1	4.31	11.1	2.7	4.13
20	17.1	2.6	6.71	15.6	2.5	6.17	13.9	2.2	6.40	11.8	1.8	6.50	11.0	1.8	6.10	8.2	1.5	5.44
15	15.7	1.5	10.15	14.5	1.6	9.22	11.8	1.3	8.95	10.8	1.3	8.23	10.0	1.3	7.61	7.9	1.1	7.18
10	15.8	1.5	10.34	14.1	1.6	8.94	11.9	1.3	9.34	10.8	1.2	8.82	9.7	1.3	7.47			
5	16.1	1.5	10.97	14.2	1.6	8.85	11.7	1.4	8.52	10.8	1.2	8.67	9.7	1.3	7.49			
0	16.0	1.4	11.41	14.1	1.5	9.22	11.9	1.3	9.08	10.9	1.2	8.91	9.7	1.2	7.88			
-5	15.9	1.3	12.06	14.5	1.3	11.09	11.9	1.0	11.42	11.2	1.0	10.69	9.9	1.1	9.11			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

Model: MONOBLOC AEROTHERM V17 (16KW)

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	12.2	3.6	3.35	10.6	3.6	2.97	9.6	3.5	2.73	9.1	3.5	2.61	7.9	3.4	2.31	5.6	3.3	1.70
40	14.7	3.8	3.83	13.0	3.8	3.45	12.9	4.2	3.11	12.3	4.1	3.00	11.1	4.0	2.77	9.2	3.9	2.38
35	15.6	4.3	3.62	14.1	4.2	3.32	15.3	4.6	3.35	14.6	4.5	3.24	12.8	4.4	2.92	11.3	4.3	2.66
30	17.3	3.1	5.53	15.5	3.1	4.99	16.6	4.2	3.97	17.7	5.3	3.35	16.4	5.1	3.18	13.4	4.6	2.92
25	17.6	2.7	6.49	17.4	3.3	5.34	16.9	3.9	4.34	15.4	3.5	4.39	14.2	3.4	4.14	12.1	3.0	4.00
20	19.5	3.0	6.57	17.8	2.9	6.13	16.0	2.5	6.37	13.6	2.1	6.51	12.3	2.1	5.97	9.3	1.7	5.36
15	17.6	1.8	9.76	16.3	1.8	8.91	13.3	1.5	8.72	12.2	1.5	8.07	11.0	1.5	7.28	8.7	1.3	6.91
10	17.7	1.8	9.87	15.9	1.8	8.62	13.5	1.5	9.08	12.2	1.4	8.61	11.0	1.5	7.33			
5	18.1	1.7	10.42	16.0	1.9	8.53	13.2	1.6	8.27	12.2	1.4	8.44	11.0	1.5	7.38			
0	18.1	1.7	10.85	16.0	1.8	8.87	13.5	1.5	8.78	12.3	1.4	8.66	11.1	1.4	7.80			
-5	17.9	1.6	11.48	16.4	1.5	10.66	13.6	1.2	11.02	12.7	1.2	10.37	11.4	1.3	9.06			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

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

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

Peak 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	5.9	2.8	2.07	5.4	3.0	1.77	4.4	3.0	1.46												
-15	7.2	2.9	2.47	6.8	3.1	2.19	6.1	3.1	1.94	5.6	3.4	1.66									
-7	10.4	3.5	2.93	9.8	3.8	2.57	9.8	4.1	2.38	9.1	4.4	2.06	8.6	4.2	2.06	7.7	4.5	1.72			
-2	11.8	3.6	3.29	11.2	3.9	2.87	11.2	4.3	2.63	10.9	4.6	2.36	10.0	4.7	2.11	8.3	4.6	1.79	6.9	3.9	1.77
2	13.7	3.9	3.51	13.3	4.0	3.30	13.0	4.4	2.99	12.0	4.5	2.67	11.8	4.6	2.58	10.3	4.5	2.30	4.6	2.6	1.73
7	13.6	3.4	3.95	15.0	3.8	3.91	12.8	3.5	3.64	11.9	3.7	3.26	9.7	3.3	2.97	7.0	2.9	2.39	4.4	2.3	1.94
15	13.4	2.1	6.34	12.7	2.4	5.36	10.4	2.2	4.70	9.9	2.4	4.12	7.9	2.2	3.59	7.1	2.2	3.16	4.9	2.3	2.13
20	12.3	1.6	7.84	12.1	1.8	6.63	10.5	1.9	5.57	9.2	1.9	4.98	7.3	2.0	3.71	6.6	2.1	3.17	5.2	2.3	2.29
25	11.2	1.2	9.50	11.4	1.4	8.09	10.4	1.6	6.61	9.6	1.7	5.57	8.3	1.7	4.72	7.9	2.1	3.84	2.4	1.4	1.74
30	12.4	1.1	11.04	12.7	1.4	9.34	10.7	1.5	7.01	9.9	1.7	5.91	8.9	1.7	5.14	8.2	1.9	4.36	6.7	2.2	3.10
35	11.9	1.1	10.78	12.4	1.4	9.17	11.0	1.5	7.41	8.6	1.5	5.94	8.2	1.7	4.81	6.5	1.8	3.60			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	5.5	2.8	2.01	5.1	3.0	1.71	4.2	3.0	1.41												
-15	6.9	2.9	2.39	6.5	3.1	2.13	5.8	3.1	1.88	5.3	3.3	1.61									
-7	10.6	3.6	2.97	10.1	3.9	2.61	10.0	4.2	2.41	9.4	4.5	2.09	8.9	4.6	1.94	7.8	4.5	1.76			
-2	12.1	3.8	3.22	11.5	4.1	2.81	11.4	4.4	2.57	11.1	4.8	2.30	10.2	4.9	2.07	8.6	4.9	1.76	7.2	4.1	1.74
2	11.9	3.5	3.39	11.6	3.8	3.03	11.8	4.3	2.78	11.2	4.5	2.49	11.2	4.7	2.39	9.7	4.6	2.13	5.0	2.8	1.75
7	13.1	3.1	4.17	13.7	3.7	3.72	12.8	3.5	3.64	11.9	3.7	3.26	9.7	3.3	2.97	7.0	2.9	2.39	4.4	2.3	1.95
15	13.4	2.1	6.34	12.7	2.4	5.36	10.4	2.2	4.70	9.9	2.4	4.12	7.9	2.2	3.59	7.1	2.2	3.16	4.9	2.3	2.13
20	12.3	1.6	7.84	11.7	1.8	6.42	10.5	1.9	5.57	9.2	1.9	4.98	7.3	2.0	3.71	6.6	2.1	3.17	5.2	2.3	2.30
25	11.2	1.2	9.47	10.9	1.4	7.67	10.4	1.6	6.62	9.7	1.7	5.62	8.1	1.8	4.62	7.9	2.1	3.81	2.3	1.4	1.72
30	12.3	1.1	10.89	11.9	1.5	8.02	10.7	1.5	7.03	10.0	1.7	5.95	8.8	1.7	5.06	8.3	2.0	4.25	6.7	2.2	3.05
35	11.8	1.1	10.51	11.5	1.5	7.77	11.1	1.5	7.44	8.8	1.5	5.96	8.1	1.7	4.76	6.7	1.9	3.45			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

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

Peak 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	6.8	3.3	2.09	6.4	3.5	1.86	5.3	3.4	1.53												
-15	8.3	3.4	2.46	8.0	3.6	2.24	7.1	3.6	1.97	6.6	3.8	1.72									
-7	11.8	4.1	2.87	11.4	4.4	2.57	11.1	4.7	2.34	10.4	5.1	2.05	10.1	4.8	2.11	9.2	5.1	1.82			
-2	13.4	4.2	3.18	12.9	4.6	2.84	12.5	4.9	2.54	12.2	5.3	2.30	11.4	5.4	2.12	9.7	5.3	1.85	7.9	4.4	1.79
2	15.5	4.6	3.38	15.3	4.7	3.23	14.6	5.1	2.87	13.3	5.2	2.57	13.4	5.2	2.56	11.9	5.1	2.33	5.2	3.0	1.73
7	15.4	4.1	3.78	17.1	4.5	3.84	14.3	4.1	3.46	13.2	4.3	3.10	10.9	3.8	2.90	8.0	3.4	2.38	4.9	2.6	1.91
15	14.9	2.5	5.87	14.2	2.8	5.07	11.2	2.6	4.33	10.6	2.8	3.81	8.6	2.5	3.40	7.8	2.5	3.04	5.3	2.6	2.01
20	13.7	1.9	7.20	13.5	2.2	6.19	11.4	2.2	5.10	9.9	2.2	4.56	7.9	2.3	3.47	7.2	2.4	3.02	5.7	2.6	2.16
25	12.5	1.4	8.66	12.6	1.7	7.39	11.3	1.9	6.06	10.3	2.0	5.09	8.9	2.0	4.40	8.7	2.4	3.63	2.6	1.6	1.64
30	13.8	1.4	10.06	13.9	1.6	8.46	11.6	1.8	6.44	10.7	2.0	5.40	9.6	2.0	4.77	9.2	2.3	4.09	7.4	2.6	2.91
35	13.3	1.4	9.79	13.4	1.6	8.25	12.1	1.8	6.82	9.4	1.7	5.41	8.8	2.0	4.44	7.4	2.2	3.34			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	6.5	3.1	2.06	6.1	3.3	1.82	5.0	3.4	1.49												
-15	7.9	3.3	2.42	7.7	3.5	2.21	6.8	3.5	1.94	6.3	3.7	1.69									
-7	12.2	4.1	2.95	11.7	4.4	2.65	11.4	4.7	2.41	10.7	5.1	2.11	10.4	5.1	2.02	9.5	5.0	1.90			
-2	13.1	4.1	3.16	12.6	4.5	2.82	12.3	4.8	2.53	11.9	5.2	2.28	11.2	5.3	2.11	9.6	5.2	1.85	8.0	4.4	1.80
2	12.9	3.9	3.29	12.8	4.2	3.01	12.6	4.7	2.70	11.9	4.9	2.43	12.2	5.1	2.40	10.8	4.9	2.20	5.4	3.1	1.78
7	14.8	3.7	3.99	15.7	4.3	3.65	14.3	4.1	3.46	13.2	4.3	3.10	10.9	3.8	2.90	8.0	3.4	2.38	5.0	2.6	1.92
15	14.9	2.5	5.87	14.2	2.8	5.07	11.2	2.6	4.33	10.6	2.8	3.81	8.6	2.5	3.40	7.8	2.5	3.04	5.3	2.6	2.03
20	13.7	1.9	7.20	13.1	2.2	6.00	11.4	2.2	5.10	9.9	2.2	4.56	7.9	2.3	3.47	7.2	2.4	3.02	5.7	2.6	2.17
25	12.5	1.4	8.71	12.2	1.7	7.14	11.3	1.9	6.06	10.3	2.0	5.10	8.9	2.0	4.40	8.7	2.4	3.61	2.6	1.6	1.63
30	13.8	1.4	10.04	13.4	1.6	8.15	11.6	1.8	6.43	10.6	2.0	5.40	9.6	2.0	4.78	9.2	2.3	4.05	7.4	2.6	2.89
35	13.3	1.4	9.73	12.8	1.6	7.92	12.0	1.8	6.80	9.3	1.7	5.42	8.9	2.0	4.45	7.3	2.2	3.29			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

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

Peak 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	7.8	3.7	2.09	7.4	3.9	1.88	6.2	3.9	1.57												
-15	9.5	3.9	2.44	9.3	4.1	2.26	8.2	4.1	2.00	7.7	4.4	1.76									
-7	13.4	4.7	2.83	13.0	5.1	2.57	12.8	5.4	2.36	12.1	5.8	2.08	11.5	5.5	2.10	10.6	5.8	1.83			
-2	15.2	4.9	3.14	14.8	5.2	2.83	14.4	5.7	2.55	14.1	6.1	2.32	12.9	6.1	2.09	11.0	6.0	1.84	9.0	5.0	1.79
2	17.6	5.3	3.33	17.5	5.5	3.21	16.7	5.8	2.87	15.4	5.9	2.59	15.0	6.0	2.52	13.4	5.8	2.31	5.9	3.4	1.71
7	17.5	4.7	3.70	19.6	5.1	3.81	16.4	4.8	3.44	15.2	4.9	3.10	12.2	4.3	2.83	9.0	3.8	2.35	5.6	3.0	1.89
15	16.7	3.0	5.65	15.9	3.3	4.90	12.7	3.0	4.22	11.9	3.2	3.74	9.4	2.9	3.25	8.6	2.9	2.93	5.8	3.0	1.95
20	15.4	2.2	6.87	14.8	2.6	5.79	12.9	2.6	4.96	11.1	2.5	4.45	9.0	2.6	3.41	8.2	2.7	2.98	6.4	3.0	2.14
25	14.1	1.7	8.27	13.7	2.0	6.88	12.8	2.2	5.88	11.7	2.4	4.96	10.2	2.3	4.34	9.9	2.8	3.58	2.9	1.8	1.62
30	15.5	1.6	9.55	15.1	1.9	7.84	13.2	2.1	6.22	12.0	2.3	5.25	11.0	2.3	4.73	10.5	2.6	4.03	8.5	3.0	2.83
35	15.0	1.6	9.26	14.6	1.9	7.61	13.7	2.1	6.56	10.6	2.0	5.26	10.2	2.3	4.43	8.4	2.6	3.29			

Peak value does not include capacity drop during frosting and defrosting periods.

Remark:

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

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

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	7.2	3.6	1.99	6.8	3.8	1.79	5.7	3.8	1.48												
-15	8.8	3.8	2.33	8.6	4.0	2.16	7.7	4.0	1.91	7.2	4.3	1.68									
-7	13.4	4.7	2.83	13.0	5.1	2.57	12.8	5.4	2.36	12.1	5.8	2.08	11.5	5.9	1.95	10.6	5.7	1.85			
-2	14.4	4.7	3.06	13.9	5.1	2.75	13.6	5.5	2.48	13.2	5.9	2.25	12.2	6.0	2.04	10.5	5.9	1.80	8.7	5.0	1.74
2	14.1	4.4	3.18	14.0	4.8	2.92	14.0	5.3	2.65	13.2	5.5	2.40	13.2	5.7	2.30	11.7	5.5	2.12	5.9	3.4	1.71
7	16.8	4.3	3.91	17.9	5.0	3.62	16.4	4.8	3.44	15.2	4.9	3.10	12.2	4.3	2.83	9.0	3.8	2.35	5.6	3.0	1.89
15	16.7	3.0	5.65	15.9	3.3	4.90	12.7	3.0	4.22	11.9	3.2	3.74	9.4	2.9	3.25	8.6	2.9	2.93	5.8	3.0	1.95
20	15.4	2.2	6.87	14.8	2.6	5.79	12.9	2.6	4.96	11.1	2.5	4.45	9.0	2.6	3.41	8.2	2.7	2.98	6.4	3.0	2.14
25	14.1	1.7	8.27	13.7	2.0	6.88	12.8	2.2	5.88	11.7	2.4	4.96	10.2	2.3	4.34	9.9	2.8	3.58	2.9	1.8	1.62
30	15.5	1.6	9.55	15.1	1.9	7.84	13.2	2.1	6.22	12.0	2.3	5.25	11.0	2.3	4.73	10.5	2.6	4.03	8.5	3.0	2.87
35	15.0	1.6	9.26	14.6	1.9	7.61	13.7	2.1	6.56	10.6	2.0	5.26	10.2	2.3	4.43	8.4	2.6	3.29			

Integrated value takes into consideration the capacity drop during frosting and defrosting periods.

Remark:

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

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

7.4 Cooling capacity for 380-415/3/50 products

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

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	9.4	2.8	3.37	7.9	2.8	2.8	7.1	2.7	2.6	7.0	2.7	2.5	6.2	2.6	2.4	4.1	2.5	1.7
40	11.6	2.9	3.93	9.8	2.9	3.4	9.8	3.2	3.1	9.1	3.2	2.9	8.8	3.0	2.9	6.9	3.0	2.3
35	12.4	3.3	3.79	10.9	3.2	3.4	12.0	3.5	3.4	11.4	3.5	3.3	9.9	3.4	2.9	8.4	3.3	2.5
30	14.6	2.5	5.82	12.8	2.5	5.1	13.9	3.4	4.1	14.8	4.3	3.4	13.7	4.2	3.2	10.9	3.8	2.9
25	14.9	2.1	6.92	14.4	2.6	5.5	14.3	3.1	4.5	13.0	2.9	4.6	12.1	2.8	4.3	10.0	2.5	4.0
20	15.1	2.2	7.01	13.6	2.2	6.3	12.5	1.9	6.7	10.7	1.6	6.8	9.7	1.6	6.3	7.2	1.3	5.5
15	14.2	1.3	10.96	13.0	1.3	9.8	10.9	1.1	9.7	10.1	1.1	8.9	9.2	1.1	8.0	7.2	1.0	7.5
10	14.2	1.3	11.27	12.6	1.3	9.6	11.0	1.1	10.2	10.1	1.0	9.6	9.0	1.1	8.0			
5	14.5	1.2	11.93	12.6	1.3	9.5	10.8	1.2	9.3	10.1	1.1	9.6	8.7	1.1	7.9			
0	14.3	1.2	12.37	12.6	1.4	9.1	10.9	1.1	9.9	10.2	1.0	9.8	8.9	1.1	8.3			
-5	14.2	1.1	13.04	12.9	1.2	10.9	11.0	0.9	12.5	10.5	0.9	11.8	9.1	0.9	9.7			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

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

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	11.0	3.2	3.46	9.5	3.1	3.0	8.5	3.1	2.7	8.0	3.0	2.6	7.1	3.0	2.4	5.0	2.9	1.7
40	13.3	3.4	3.97	11.6	3.3	3.5	11.4	3.6	3.2	10.8	3.6	3.0	10.0	3.5	2.8	8.2	3.4	2.4
35	14.2	3.8	3.77	12.6	3.7	3.4	13.6	4.0	3.4	13.0	3.9	3.3	11.6	3.8	3.0	10.2	3.7	2.7
30	15.9	2.8	5.72	14.1	2.7	5.1	15.0	3.7	4.0	15.9	4.7	3.4	15.1	4.6	3.3	12.3	4.1	3.0
25	16.1	2.4	6.73	15.8	2.9	5.5	15.2	3.4	4.4	13.9	3.1	4.5	13.2	3.1	4.3	11.1	2.7	4.1
20	17.1	2.6	6.71	15.6	2.5	6.2	13.9	2.2	6.4	11.8	1.8	6.5	11.0	1.8	6.1	8.2	1.5	5.4
15	15.7	1.5	10.15	14.5	1.6	9.2	11.8	1.3	8.9	10.8	1.3	8.2	10.0	1.3	7.6	7.9	1.1	7.2
10	15.8	1.5	10.34	14.1	1.6	8.9	11.9	1.3	9.3	10.8	1.2	8.8	9.7	1.3	7.5			
5	16.1	1.5	10.97	14.2	1.6	8.9	11.7	1.4	8.5	10.8	1.2	8.7	9.7	1.3	7.5			
0	16.0	1.4	11.41	14.1	1.5	9.2	11.9	1.3	9.1	10.9	1.2	8.9	9.7	1.2	7.9			
-5	15.9	1.3	12.06	14.5	1.3	11.1	11.9	1.0	11.4	11.2	1.0	10.7	9.9	1.1	9.1			

Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

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

LWE / Tamb	22			18			15			13			10			7		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
45	12.2	3.6	3.35	10.6	3.6	2.97	9.6	3.5	2.73	9.1	3.5	2.61	7.9	3.4	2.31	5.6	3.3	1.70
40	14.7	3.8	3.83	13.0	3.8	3.45	12.9	4.2	3.11	12.3	4.1	3.00	11.1	4.0	2.77	9.2	3.9	2.38
35	15.6	4.3	3.62	14.1	4.2	3.32	15.3	4.6	3.35	14.6	4.5	3.24	12.8	4.4	2.92	11.3	4.3	2.66
30	17.3	3.1	5.53	15.5	3.1	4.99	16.6	4.2	3.97	17.7	5.3	3.35	16.4	5.1	3.18	13.4	4.6	2.92
25	17.6	2.7	6.49	17.4	3.3	5.34	16.9	3.9	4.34	15.4	3.5	4.39	14.2	3.4	4.14	12.1	3.0	4.00
20	19.5	3.0	6.57	17.8	2.9	6.13	16.0	2.5	6.37	13.6	2.1	6.51	12.3	2.1	5.97	9.3	1.7	5.36
15	17.6	1.8	9.76	16.3	1.8	8.91	13.3	1.5	8.72	12.2	1.5	8.07	11.0	1.5	7.28	8.7	1.3	6.91
10	17.7	1.8	9.87	15.9	1.8	8.62	13.5	1.5	9.08	12.2	1.4	8.61	11.0	1.5	7.33			
5	18.1	1.7	10.42	16.0	1.9	8.53	13.2	1.6	8.27	12.2	1.4	8.44	11.0	1.5	7.38			
0	18.1	1.7	10.85	16.0	1.8	8.87	13.5	1.5	8.78	12.3	1.4	8.66	11.1	1.4	7.80			
-5	17.9	1.6	11.48	16.4	1.5	10.66	13.6	1.2	11.02	12.7	1.2	10.37	11.4	1.3	9.06			

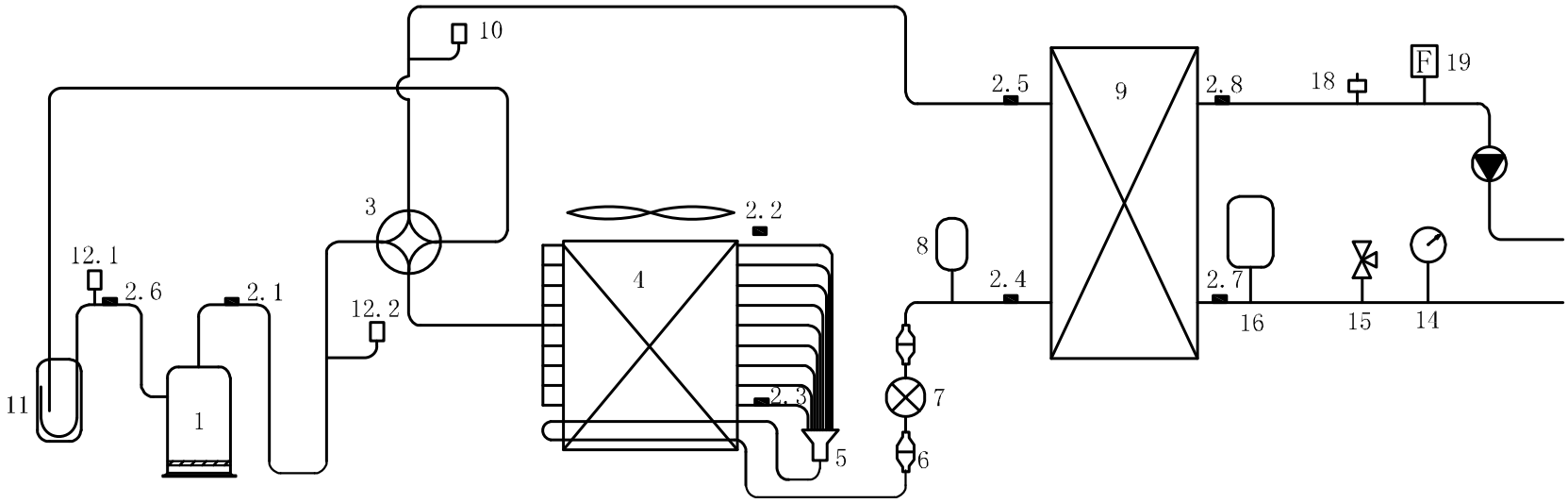
Remark:

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

CC: Cooling capacity (kW) PI : Power input (kW)

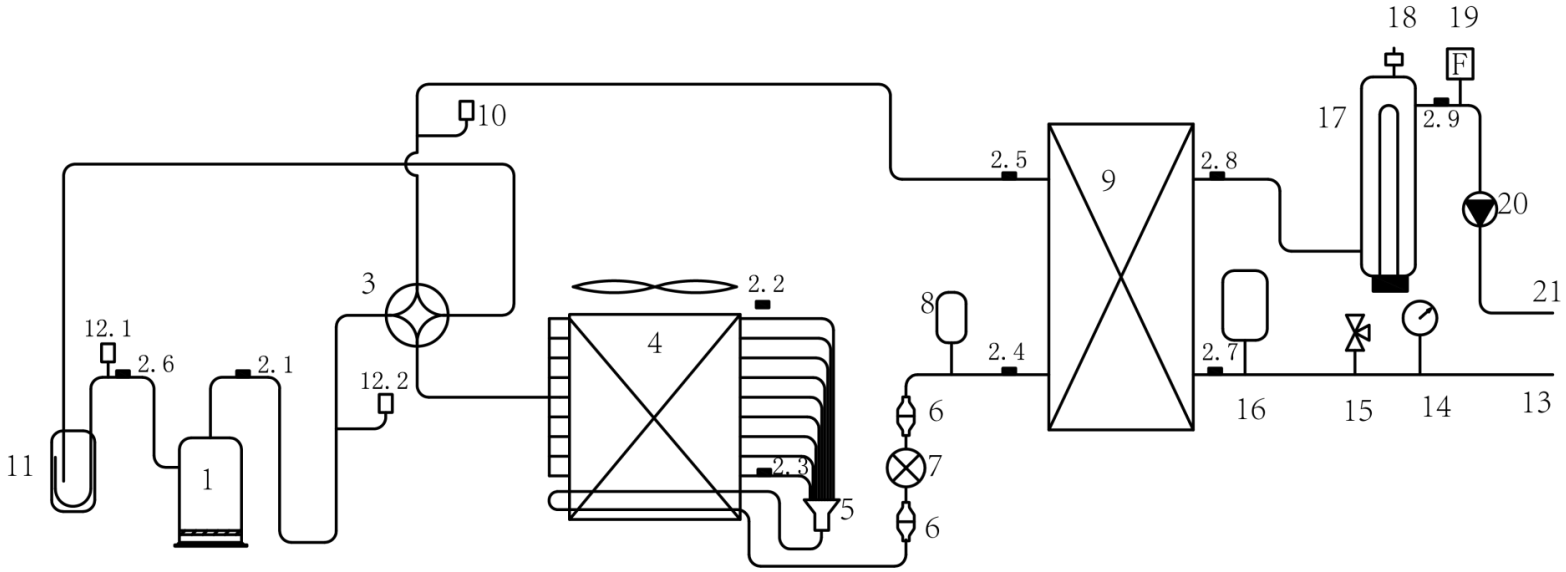
8. System diagram

8.1 System diagram for 5/7kW



1. Compressor
2.1-2.8 Temperature sensor
3. 4-way valve
4. Condenser
5. Distributor
6. Filter
7. EXV
8. Accumulator
9. Plate type heat exchanger
10. Pressure sensor
11. Accumulator
12.1-12.2 Pressure switch
13. Water inlet
14. Manometer
15. Pressure relief valve
16. Expansion vessel
18. Air purge valve
19. Water flow switch
20. Water pump
21. Water outlet

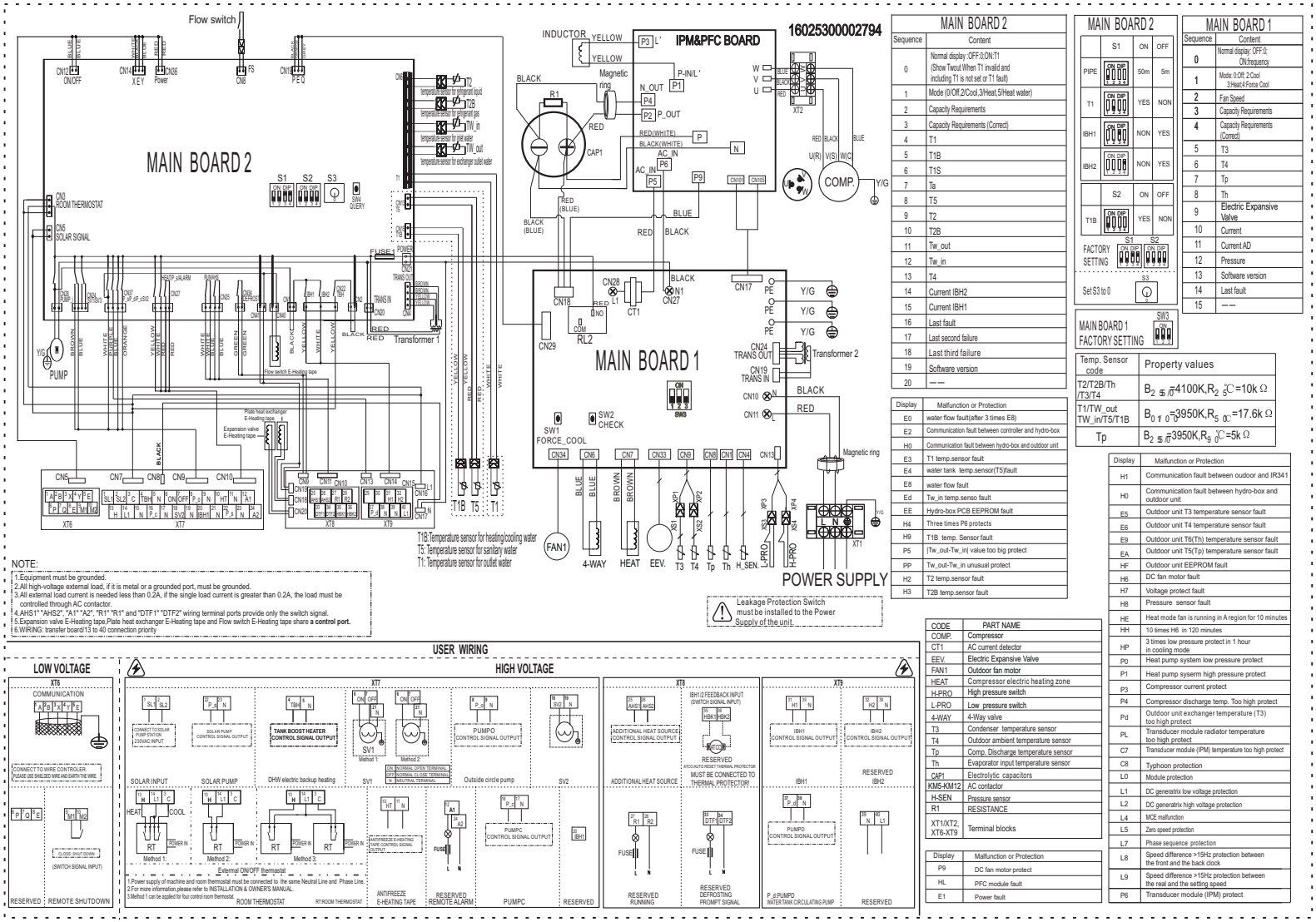
8.2 System diagram for 10-16kW



1. Compressor
2.1-2.9 Temperature sensor
3. 4-way valve
4. Condenser
5. Distributor
6. Filter
7. EXV
8. Accumulator
9. Plate type heat exchanger
10. Pressure sensor
11. Accumulator
12.1-12.2 Pressure switch
13. Water inlet
14. Manometer
15. Pressure relief valve
16. Expansion vessel
17. Back-up E-heater
18. Air purge valve
19. Water flow switch
20. Water pump
21. Water outlet

9. Wiring diagrams

For 5/7kW 1Ph



MAIN BOARD 2	
Sequence	Content
0	Normal display: OFF:0;ON:T1 (Show Twout When T1 invalid and including T1 is not set or T1 fault)
1	Mode (0/Off,2/Cool,3/Heat,5/Heat water)
2	Capacity Requirements
3	Capacity Requirements (Correct)
4	T1
5	T1B
6	T1S
7	Ta
8	T5
9	T2
10	T2B
11	Tw_out
12	Tw_in
13	T4
14	Current IBH2
15	Current IBH1
16	Last fault
17	Last second failure
18	Last third failure
19	Software version
20	——

MAIN BOARD 2			
	S1	ON	OFF
PIPE		50m	5m
T1		YES	NON
IBH1		NON	YES
IBH2		NON	YES
	S2	ON	OFF
T1B		YES	NON

FACTORY SETTING S1 S2 S3

Set S3 to 0

MAIN BOARD 1 FACTORY SETTING SW3

MAIN BOARD 1	
Sequence	Content
0	Normal display: OFF:0; ON:frequency
1	Mode: 0:Off, 2:Cool 3:Heat,4:Force 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	Current AD
12	Pressure
13	Software version
14	Last fault
15	——

Temp. Sensor code	Property values
T2/T2B/Th /T3/T4	B25/50=4100K,R25℃=10kΩ
T1/TW_out TW_in/T5/T1B	B0/70=3950K,R50℃=17.6kΩ
Tp	B25/50=3950K,R90℃=5kΩ

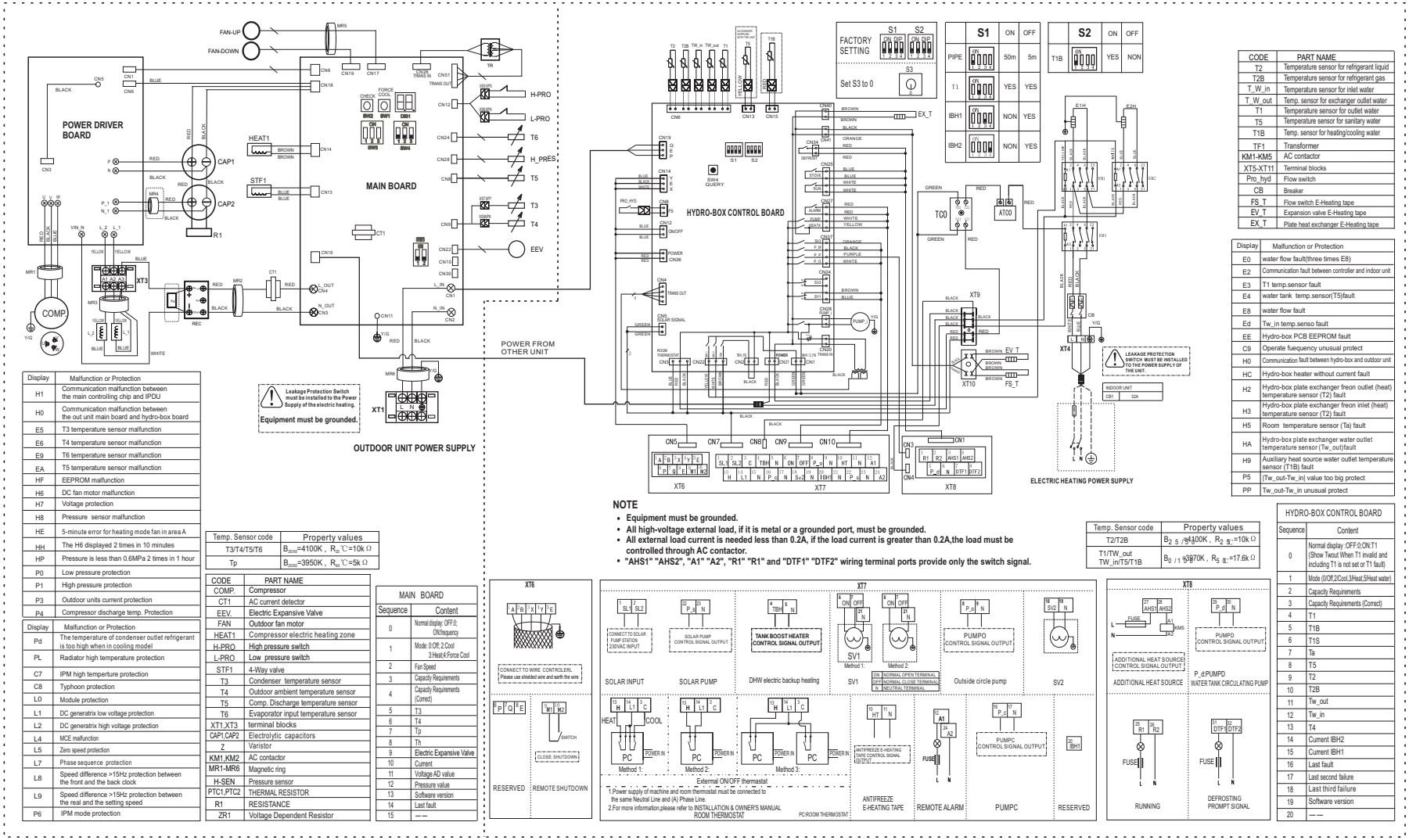
Display	Malfunction or Protection
E0	water flow fault(after 3 times E8)
E2	Communication fault between controller and hydro-box
H0	Communication fault between hydro-box and outdoor unit
E3	T1 temp.sensor fault
E4	water tank temp.sensor(T5)fault
E8	water flow fault
Ed	Tw_in temp.senso fault
EE	Hydro-box PCB EEPROM fault
H4	Three times P6 protects
H9	T1B temp. Sensor fault
P5	|Tw_out-Tw_in| value too big protect
PP	Tw_out-Tw_in unusual protect
H2	T2 temp.sensor fault
H3	T2B temp.sensor fault

Display	Malfunction or Protection
H1	Communication fault between oudoor and IR341
H0	Communication fault between hydro-box and outdoor unit
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
HF	Outdoor unit EEPROM fault
H6	DC fan motor fault
H7	Voltage protect fault
H8	Pressure sensor fault
HE	Heat mode fan is running in A region for 10 minutes
HH	10 times H6 in 120 minutes
HP	3 times low pressure protect in 1 hour in cooling mode
P0	Heat pump system low pressure protect
P1	Heat pump syserm high pressure protect
P3	Compressor current protect
P4	Compressor discharge temp. Too high protect
Pd	Outdoor unit exchanger temperature (T3) too high protect
PL	Transducer module radiator temperature too high protect
C7	Transducer module (IPM) temperature too high protect
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	Transducer module (IPM) protect

CODE	PART NAME
COMP.	Compressor
CT1	AC current detector
EEV.	Electric Expansive Valve
FAN1	Outdoor fan motor
HEAT	Compressor electric heating zone
H-PRO	High pressure switch
L-PRO	Low pressure switch
4-WAY	4-Way valve
T3	Condenser temperature sensor
T4	Outdoor ambient temperature sensor
Tp	Comp. Discharge temperature sensor
Th	Evaporator input temperature sensor
CAPI	Electrolytic capacitors
KM5-KM12	AC contactor
H-SEN	Pressure sensor
R1	RESISTANCE
XT1/XT2, XT6-XT9	Terminal blocks

Display	Malfunction or Protection
P9	DC fan motor protect
HL	PFC module fault
E1	Power fault

For 10 16kW, 1Ph



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_{25}℃=5k Ω

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,XT3	terminal blocks
CAP1,CAP2	Electrolytic capacitors
Z	Varistor
KM1,KM2	AC contactor
MR1-MR6	Magnetic ring
H-SEN	Pressure sensor
PTC1,PTC2	THERMAL RESISTOR
R1	RESISTANCE
ZR1	Voltage Dependent Resistor

MAIN BOARD	
Sequence	Content
0	Normal display :OFF:0; ON:frequency
1	Mode: 0:Off, 2:Cool 3:Heat,4: Force 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	——

CODE	PART NAME
T2	Temperature sensor for refrigerant liquid
T2B	Temperature sensor for refrigerant gas
T_W_in	Temperature sensor for inlet water
T_W_out	Temp. sensor for exchanger outlet water
T1	Temperature sensor for outlet water
T5	Temperature sensor for sanitary water
T1B	Temp. sensor for heating/cooling water
TF1	Transformer
KM1-KM5	AC contactor
XT5-XT11	Terminal blocks
Pro_hyd	Flow switch
CB	Breaker
FS_T	Flow switch E-Heating tape
EV_T	Expansion valve E-Heating tape
EX_T	Plate heat exchanger E-Heating tape

Display	Malfunction or Protection
E0	water flow fault(three times E8)
E2	Communication fault between controller and indoor unit
E3	T1 temp.sensor fault
E4	water tank temp.sensor(T5)fault
E8	water flow fault
Ed	Tw_in temp.senso fault
EE	Hydro-box PCB EEPROM fault
C9	Operate fuequency unusual protect
H0	Communication fault between hydro-box and outdoor unit
HC	Hydro-box heater without current fault
H2	Hydro-box plate exchanger freon outlet (heat) temperature sensor (T2) fault
H3	Hydro-box plate exchanger freon inlet (heat) temperature sensor (T2) fault
H5	Room temperature sensor (Ta) fault
HA	Hydro-box plate exchanger water outlet temperature sensor (Tw_out)fault
H9	Auxiliary heat source water outlet temperature sensor (T1B) fault
P5	|Tw_out-Tw_in| value too big protect
PP	Tw_out-Tw_in unusual protect

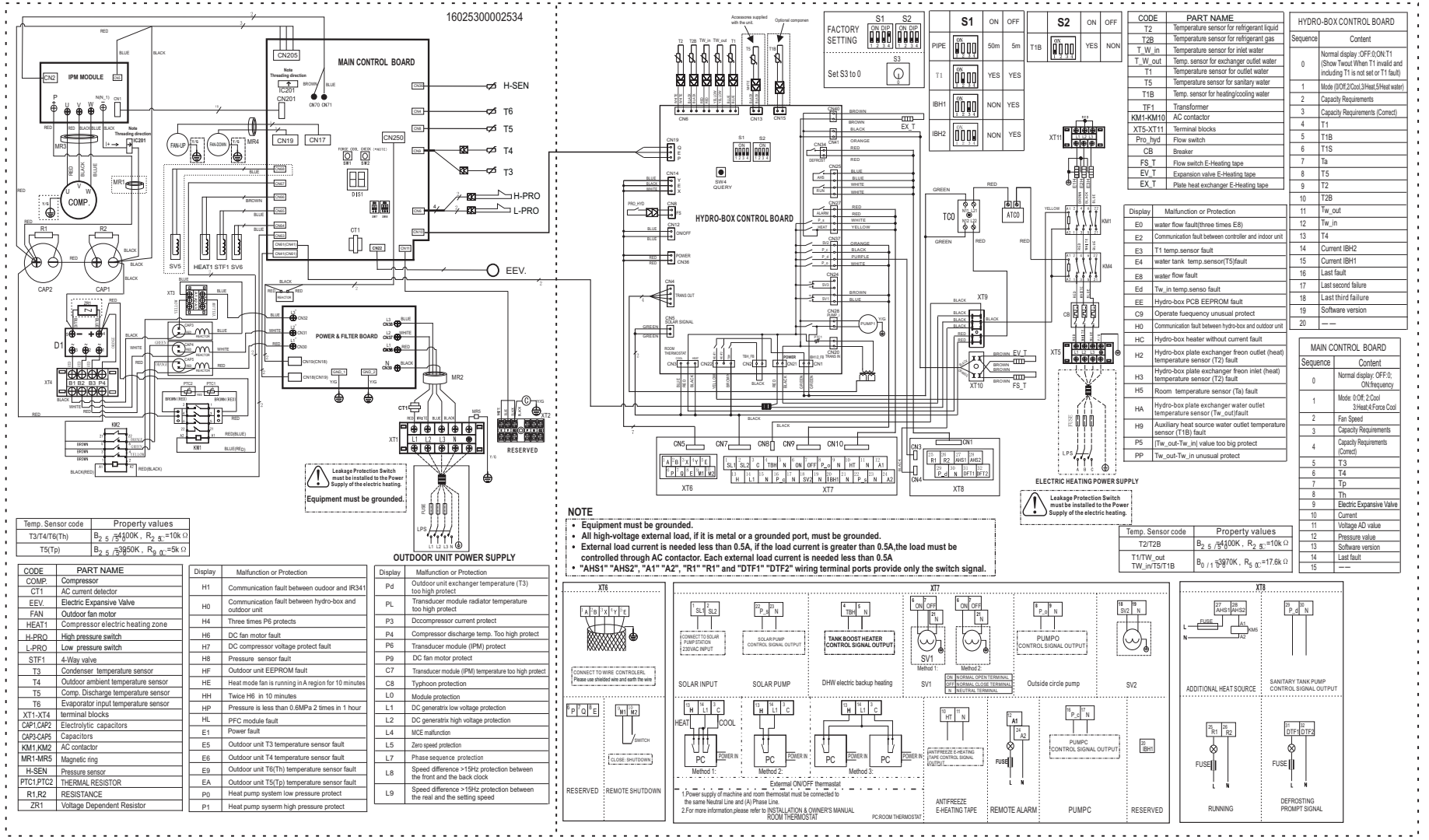
NOTE

- **Equipment must be grounded.**
- **All high-voltage external load, if it is metal or a grounded port, must be grounded.**
- **All external load current is needed less than 0.2A, if the load current is greater than 0.2A,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.**

Temp. Sensor code	Property values
T2/T2B	$B_{25/50}$=4400K , R_{25}=10k Ω
T1/TW_out TW_in/T5/T1B	$B_{0/50}$=3970K , R_{25}=17.6k Ω

HYDRO-BOX CONTROL BOARD	
Sequence	Content
0	Normal display :OFF:0;ON:T1 (Show Twout.When T1 invalid and including T1 is not set or T1 fault)
1	Mode (0:Off,2:Cool,3:Heat,5:Heat water)
2	Capacity Requirements
3	Capacity Requirements (Correct)
4	T1
5	T1B
6	T1S
7	Ta
8	T5
9	T2
10	T2B
11	Tw_out
12	Tw_in
13	T4
14	Current IBH2
15	Current IBH1
16	Last fault
17	Last second failure
18	Last third failure
19	Software version
20	——

For 12-16kW, 3Ph



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

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,R2	RESISTANCE
ZR1	Voltage Dependent Resistor

Display	Malfunction or Protection
H1	Communication fault between oudoor and IR341
H0	Communication fault between hydro-box and outdoor unit
H4	Three times P6 protects
H6	DC fan motor fault
H7	DC compressor voltage protect fault
H8	Pressure sensor fault
HF	Outdoor unit EEPROM fault
HE	Heat mode fan is running in A region for 10 minutes
HH	Twice H6 in 10 minutes
HP	Pressure is less than 0.6MPa 2 times in 1 hour
HL	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 syserm high pressure protect

Display	Malfunction or Protection
P4	Compressor discharge temp. Too high protect
P6	Transducer module (IPM) protect
P9	DC fan motor protect
C7	Transducer module (IPM) temperature too high protect
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

S1	ON	OFF
PIPE	50m	5m
T1	YES	YES
IBH1	NON	YES
IBH2	NON	YES

S2	ON	OFF
T1B	YES	NON

CODE	PART NAME
T2	Temperature sensor for refrigerant liquid
T2B	Temperature sensor for refrigerant gas
T_W_in	Temperature sensor for inlet water
T_W_out	Temp. sensor for exchanger outlet water
T1	Temperature sensor for outlet water
T5	Temperature sensor for sanitary water
T1B	Temp. sensor for heating/cooling water
TF1	Transformer
KM1-KM10	AC contactor
XT5-XT11	Terminal blocks
Pro_hyd	Flow switch
CB	Breaker
FS_T	Flow switch E-Heating tape
EV_T	Expansion valve E-Heating tape
EX_T	Plate heat exchanger E-Heating tape

Display	Malfunction or Protection
E0	water flow fault(three times E8)
E2	Communication fault between controller and indoor unit
E3	T1 temp.sensor fault
E4	water tank temp.sensor(T5)fault
E8	water flow fault
Ed	Tw_in temp.senso fault
EE	Hydro-box PCB EEPROM fault
C9	Operate fuequency unusual protect
H0	Communication fault between hydro-box and outdoor unit
HC	Hydro-box heater without current fault
H2	Hydro-box plate exchanger freon outlet (heat) temperature sensor (T2) fault
H3	Hydro-box plate exchanger freon inlet (heat) temperature sensor (T2) fault
H5	Room temperature sensor (Ta) fault
HA	Hydro-box plate exchanger water outlet temperature sensor (Tw_out)fault
H9	Auxiliary heat source water outlet temperature sensor (T1B) fault
P5	|Tw_out-Tw_in| value too big protect
PP	Tw_out-Tw_in unusual protect

HYDRO-BOX CONTROL BOARD	
Sequence	Content
0	Normal display :OFF:0;ON:T1 (Show Twout When T1 invalid and including T1 is not set or T1 fault)
1	Mode (0:Off,2:Cool,3:Heat,5:Heat water)
2	Capacity Requirements
3	Capacity Requirements (Correct)
4	T1
5	T1B
6	T1S
7	Ta
8	T5
9	T2
10	T2B
11	Tw_out
12	Tw_in
13	T4
14	Current IBH2
15	Current IBH1
16	Last fault
17	Last second failure
18	Last third failure
19	Software version
20	— —

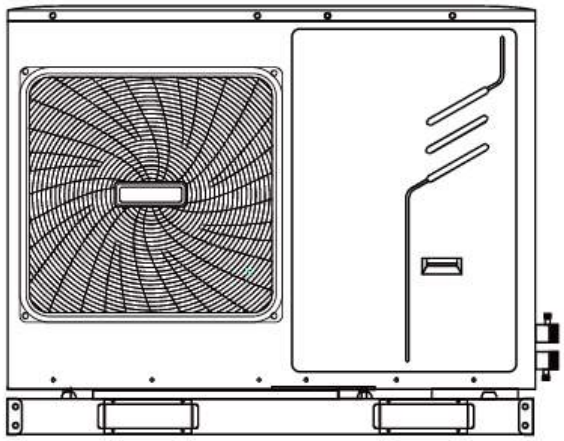
MAIN CONTROL BOARD	
Sequence	Content
0	Normal display: OFF:0; ON:frequency
1	Mode: 0:Off; 2:Cool 3:Heat;4:Force Cool
2	Fan Speed
3	Capacity Requirements
4	Capacity Requirements (Correct)
5	T3
6	T4
7	Tp
8	Th
9	Electric Expansive Valve
10	Current
11	Voltage AD value
12	Pressure value
13	Software version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

Temp. Sensor code	Property values
T2/T2B	$B_{25/50}$=4100K, R_{25}=10kΩ
T1/TW_out TW_in/T5/T1B	$B_{0/100}$=3970K, R_{50}=17.6kΩ

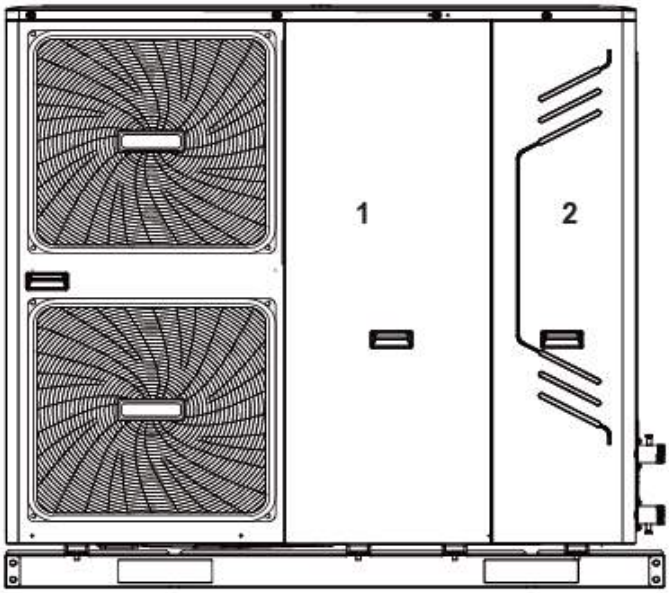
10. Overview of the unit

10.1 Opening the unit

5/7kW

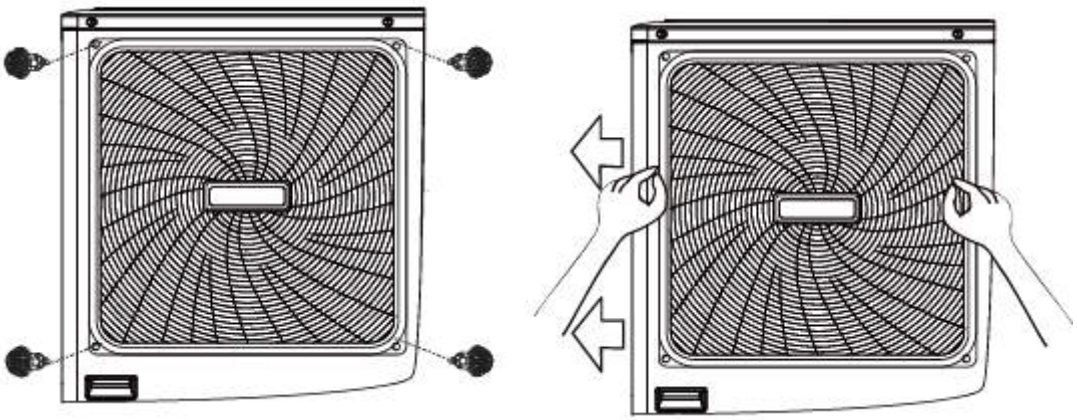


10-16kW



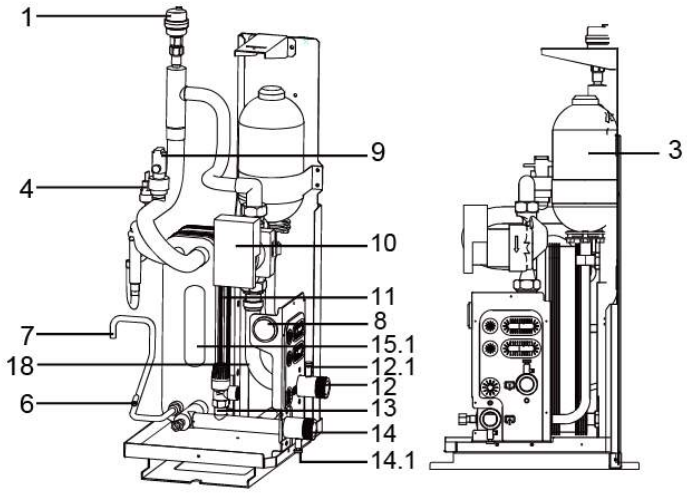
Door 1: Access to the compressor compartments and electrical parts
Door 2: Access to the hydronic compartments and electrical parts

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 Main components

10.2.1 Hydraulic compartments & functional diagram for 5/7kW



1. Air purge valve

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

3. Expansion vessel (0.88gallons (2 L)

4. Pressure Sensor

6. Temperature sensors

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

7. Refrigerant liquid connection

8. Manometer

The manometer provide water pressure readout of 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. Plate type heat exchanger

Plate type heat exchanger is for heat exchanger between water and refrigerant.

12. Water outlet connection

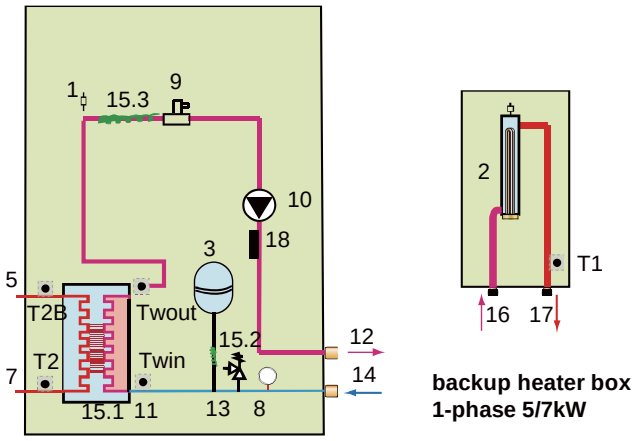
12.1 Air purge valve

13. The pressure relief valve

14. Water inlet connection

14.1 Drain valve

Functional diagram of hydraulic compartment



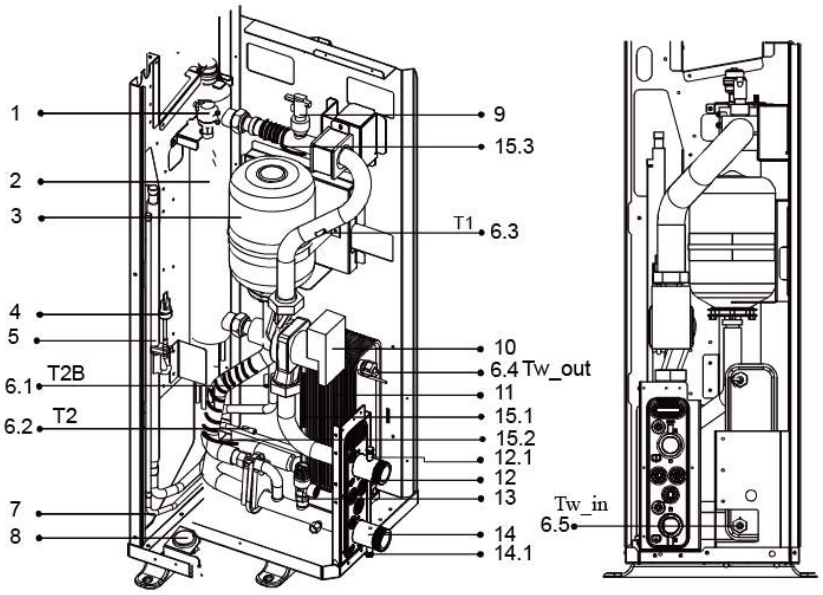
1-phase 5/7kW

backup heater box
1-phase 5/7kW

1. Air purge valve
2. Backup heater vessel with backup heater
3. Expansion vessel
4. Refrigerant gas connection
5. Refrigerant liquid connection
6. Manometer
7. Flow switch
8. Plate type heat exchanger
9. Pump
10. Water outlet connection
11. Water inlet connection
12. Pressure relief valve

13.1-13.3 Electrical heating tape

10.2.2 Hydraulic compartments & functional diagram for 10-16kW



1. Air purge valve

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

2. Backup E-heater

The backup heater consists of electrical heating element that provides 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.

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

4. Pressure Sensor

5. Refrigerant gas connection

6. Temperature sensors

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

7. Refrigerant liquid connection

8. Manometer

The manometer provide water pressure readout of 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. Plate type heat exchanger

Plate type heat exchanger is for heat exchanger between water and refrigerant.

12. Water outlet connection

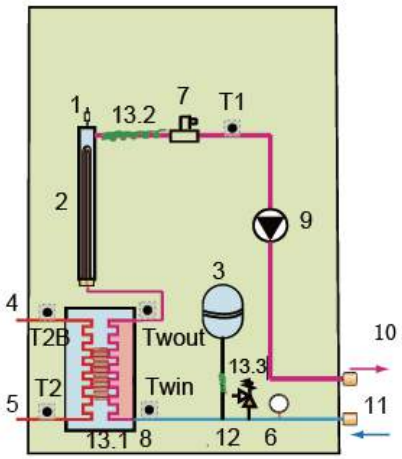
12.1 Air purge valve

13. The pressure relief valve

The pressure relief valve prevents excessive water pressure in the water circuit by opening at 43.5 psi (3 bars) and discharging water.

14. Water inlet connection
14.1 Drain valve
15. Electrical heating tape (15.1-15.3)

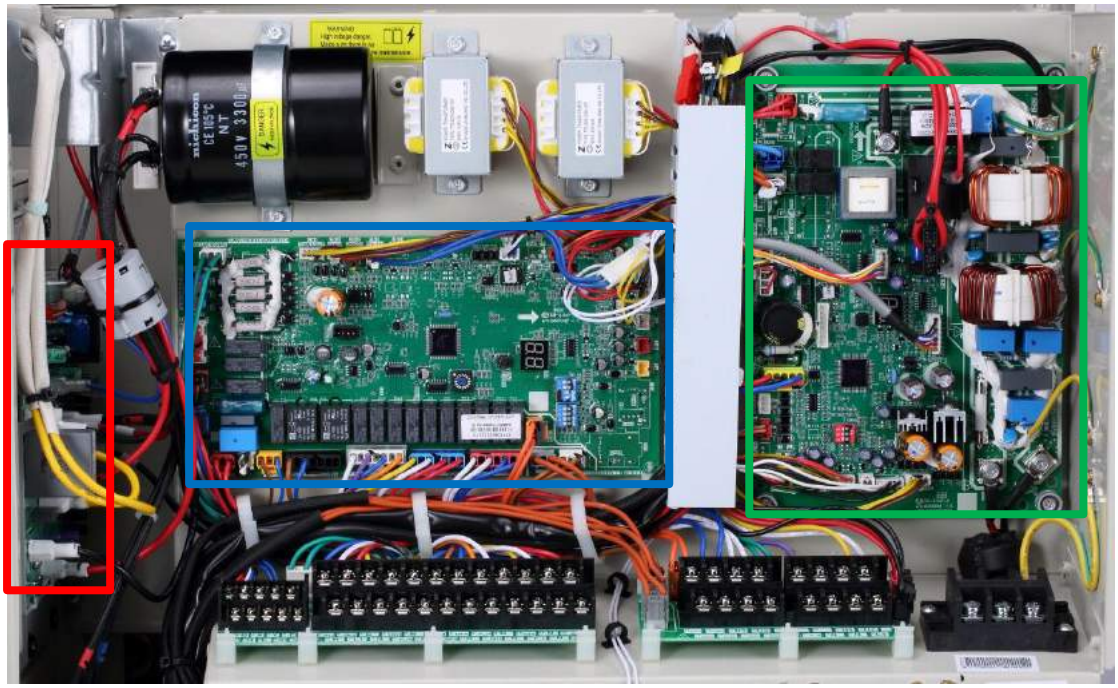
Functional diagram of hydraulic compartment



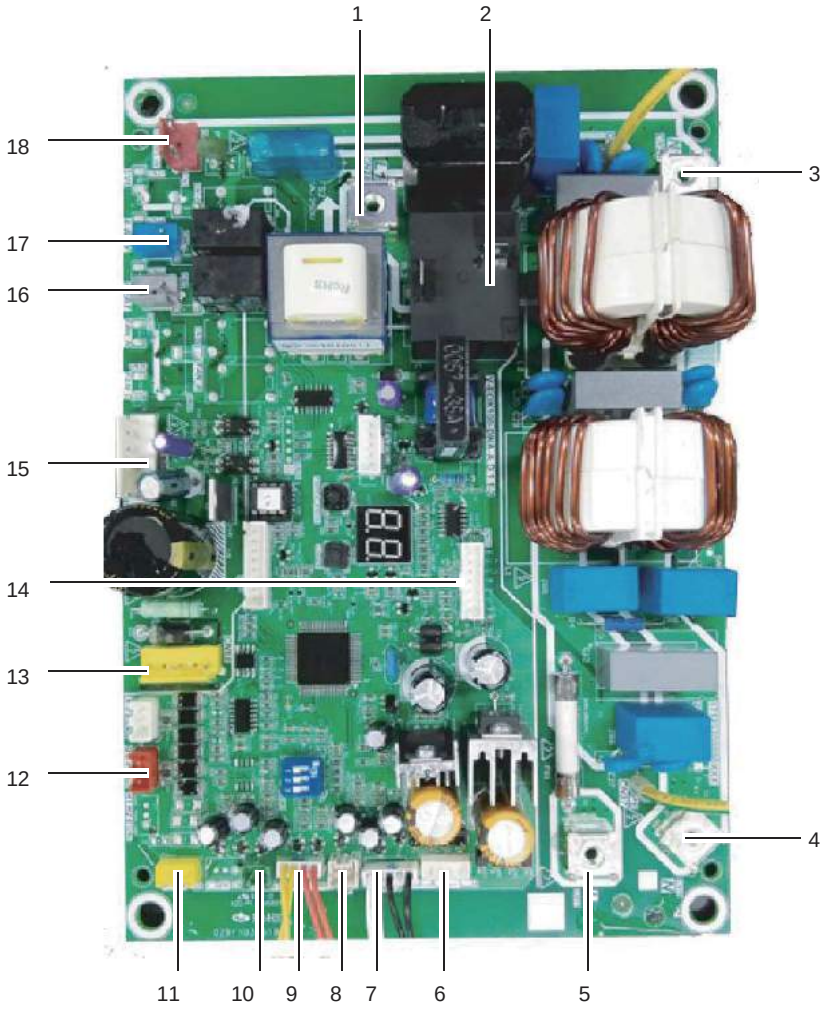
1. Air purge valve
2. Backup heater vessel with backup heater
3. Expansion vessel
4. Refrigerant gas connection
5. Refrigerant liquid connection
6. Manometer
7. Flow switch
8. Plate type heat exchanger
9. Pump
10. Water outlet connection
11. Water inlet connection
12. Pressure relief valve
13.1-13.3 Electrical heating tape

10.3 Electric box lay out for 1Ph 5/7kW products

- PCB A for refrigerant parts
- PCB C for refrigerant parts
- PCB for hydronic parts

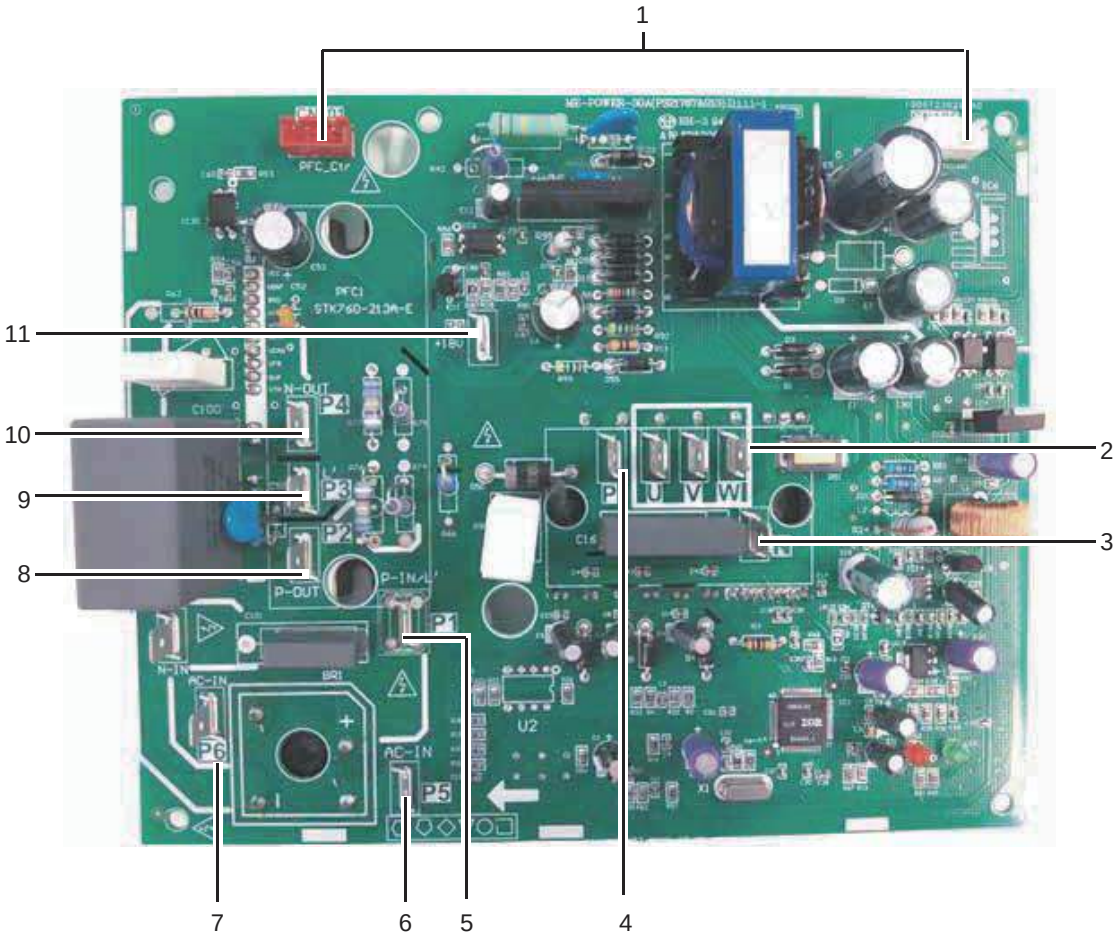


PCB A description for refrigerant parts



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 for refrigerant parts



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)

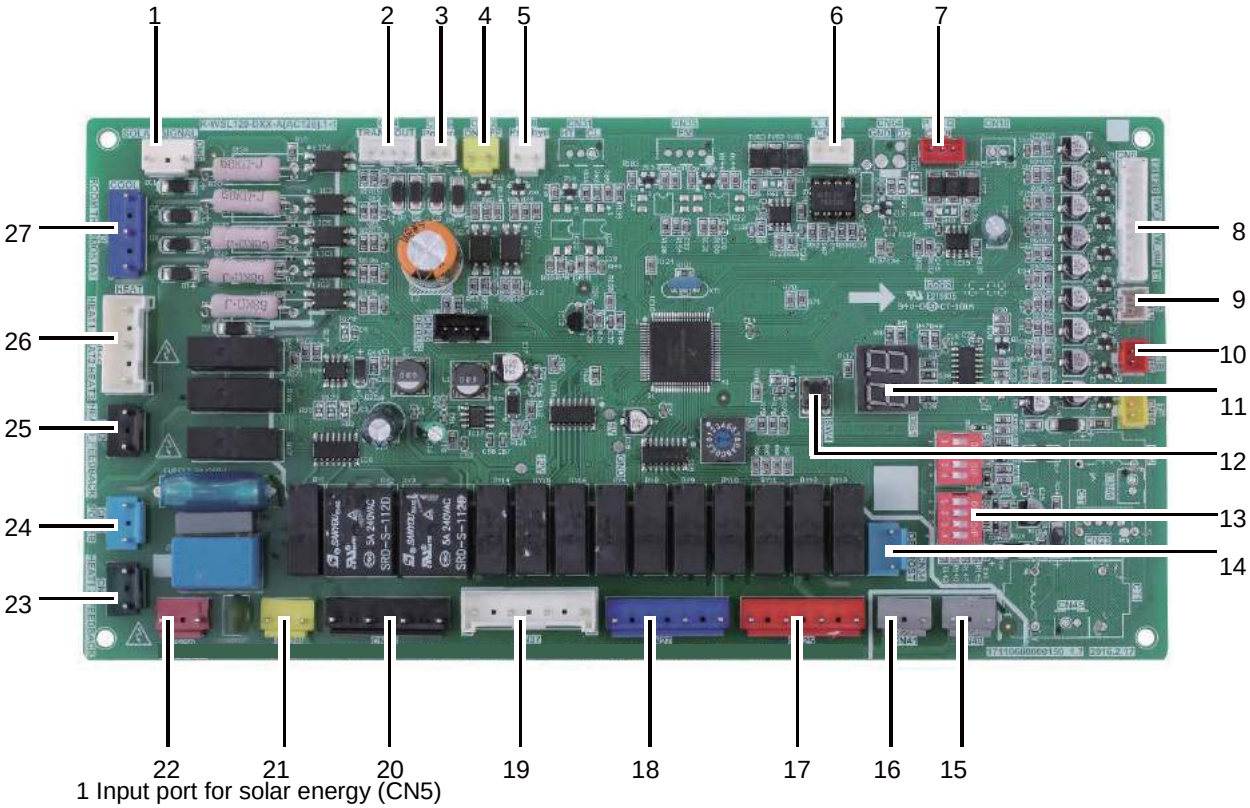
8 Output port P of PFC(P2)

9 Input port for PFC(P3)

10 Output port N of PFC(P4)

11 +18V(P9)

PCB description for hydronic parts



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 PCB B and hydronic PCB(CN14）

7 Communicate port between hydronic 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(CN

27) 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)

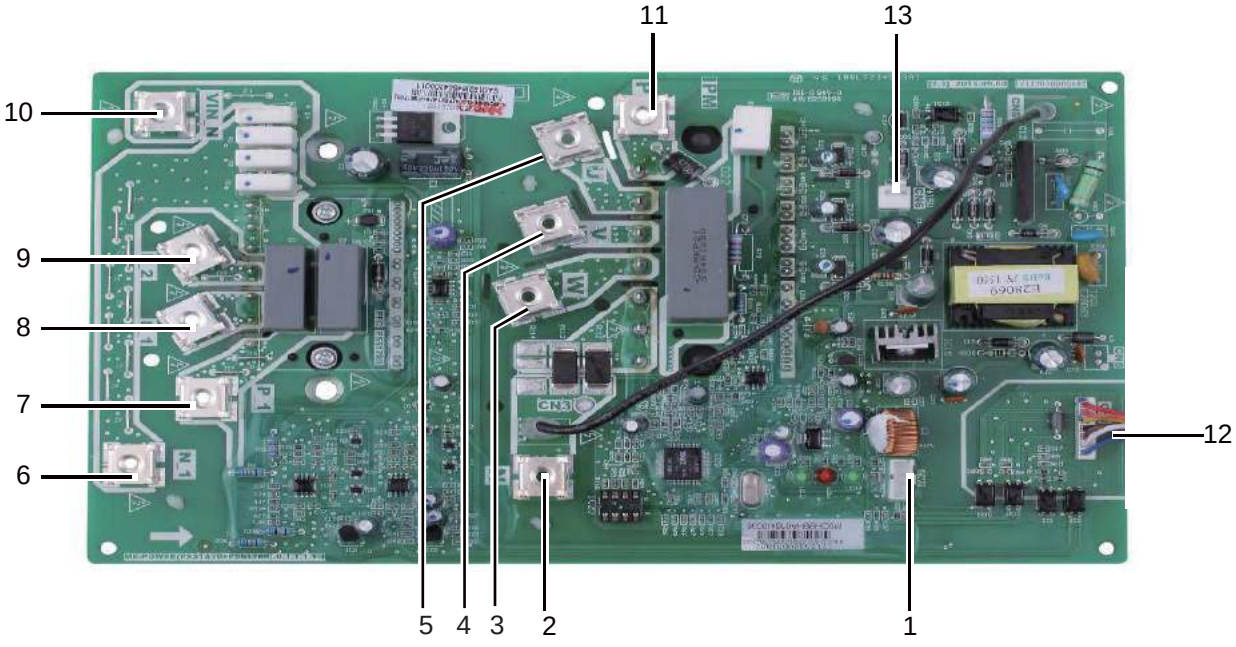
10.4 Electric box lay out for 1Ph 10-16kW products

Electric parts for refrigerant parts (door 1)

Electric parts for hydronic parts (door 2)

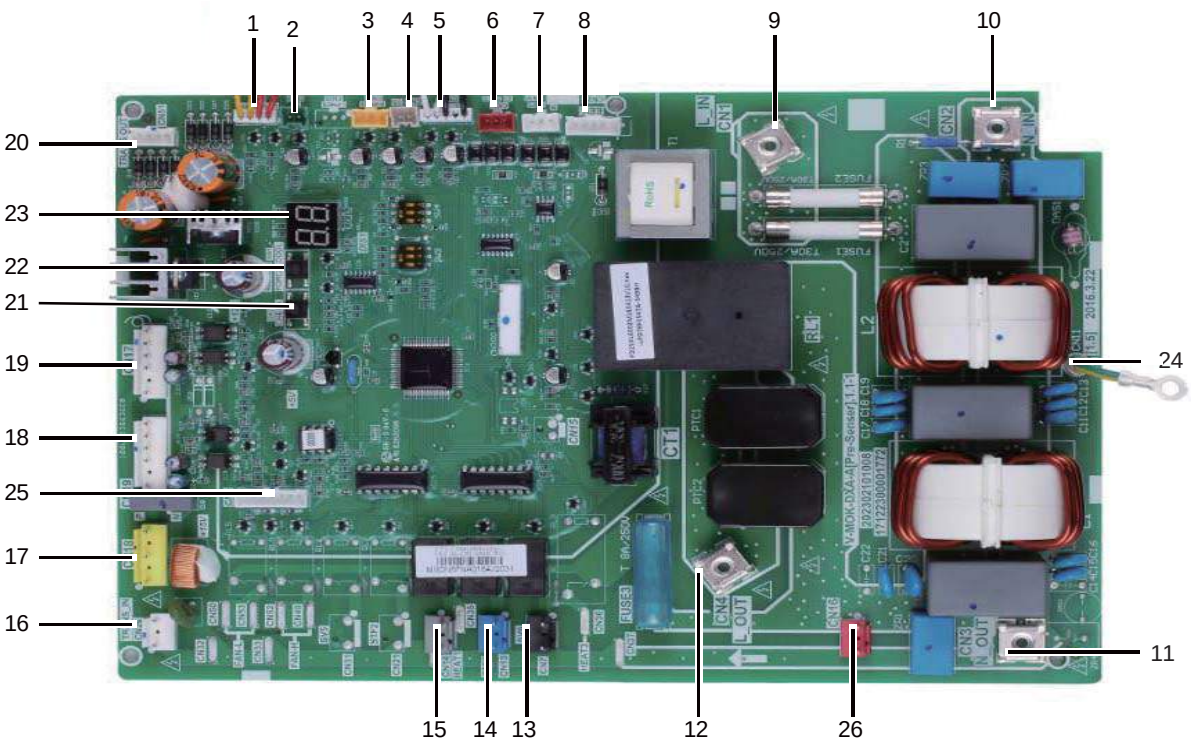
10.4.1 Electric parts for refrigerant parts (door 1)

PCB A description



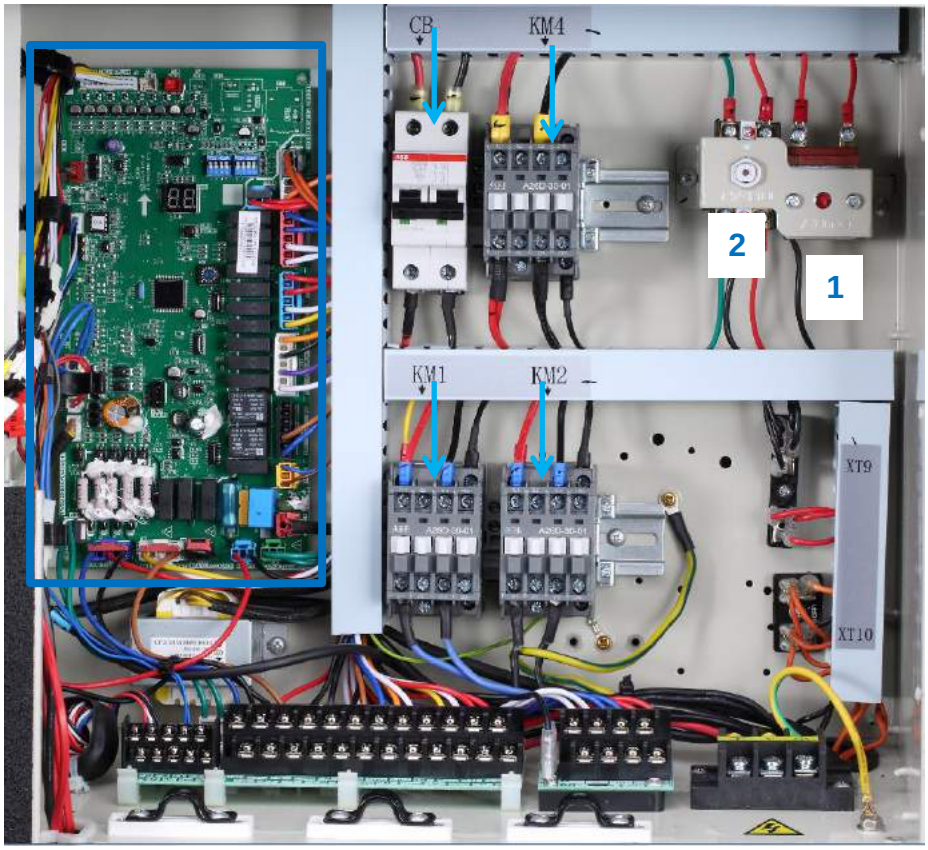
1 Reserved(CN2)	5 Power Supply Of U Phase For Compressor(U)	10 Input Port N For Pfc Module(VIN-N)
2 Input Port N For Ipm Module(N)	6 Output Port N Of Pfc Module(N_1)	11 Input Port P Foripm Modele(P)
3 Power Supply Of W Phase For Compressor(W)	7 Output Port P Of Pfc Module(P_1)	12 Communicate Port Between 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)

10.4.2 Electric parts for hydronic parts (door 2)



PCB for hydronic parts

1: Auto thermal protector

2: Manual thermal protector

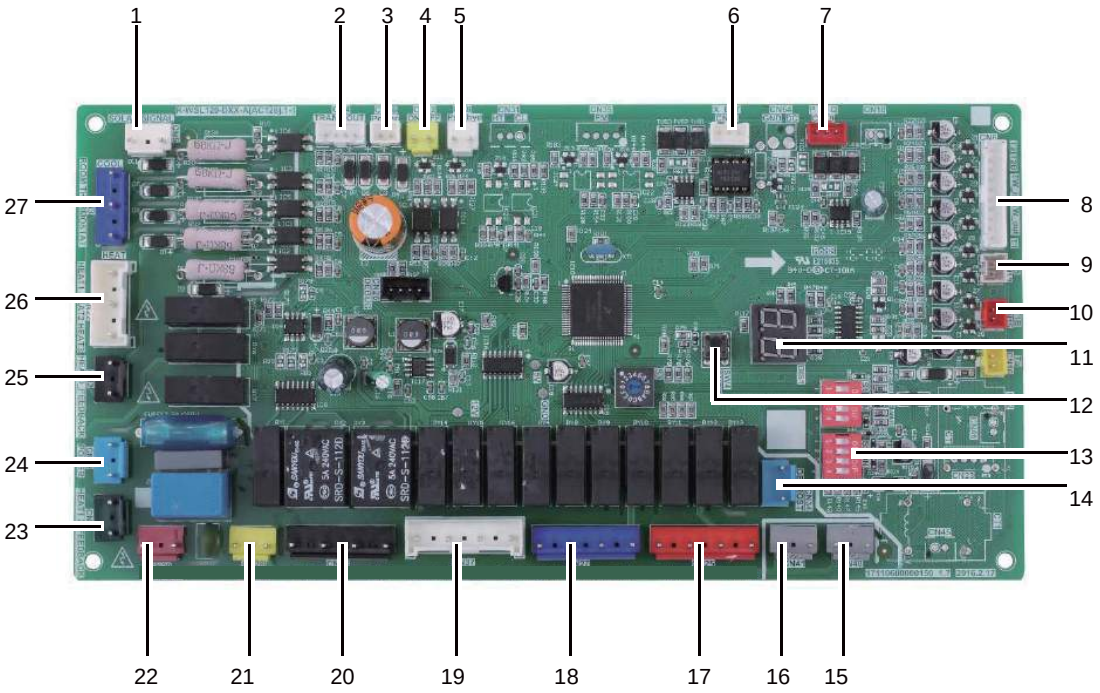
KM1: Backup heater contactor

KM2: Backup heater contactor

KM4: Backup heater contactor

CB: Backup heater circuit breaker

PCB description for hydronic parts



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 door 1 PCB B and door PCB(CN14）

7 Communicate port between door 2 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 eletric 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)

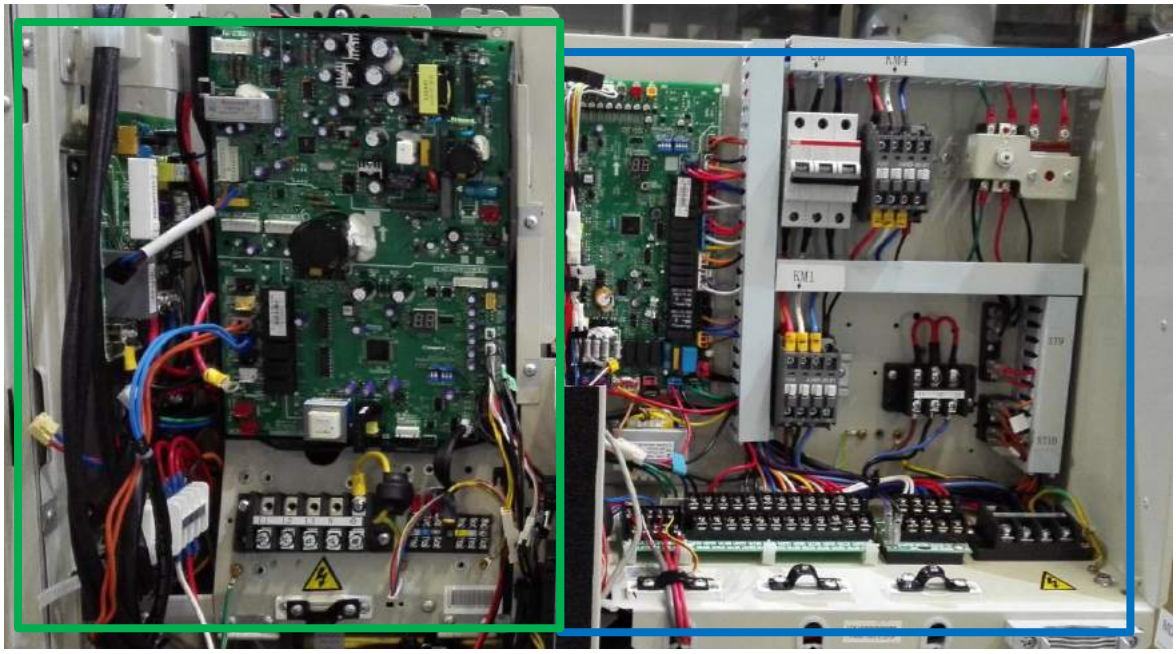
23 Feedback port for temperature switch (CN1)

25 Feedback port for external temp. switch(shorted in default)(CN2)

26 Control port backup heater/booster heaters (CN22)

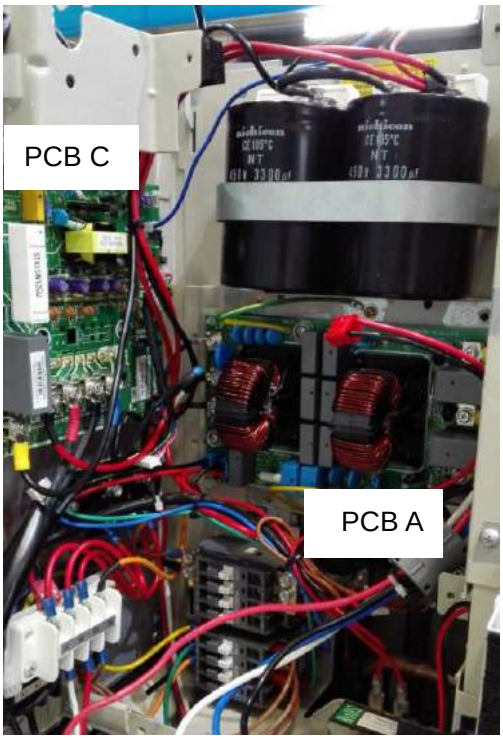
27 Control port for room thermostat (CN3)

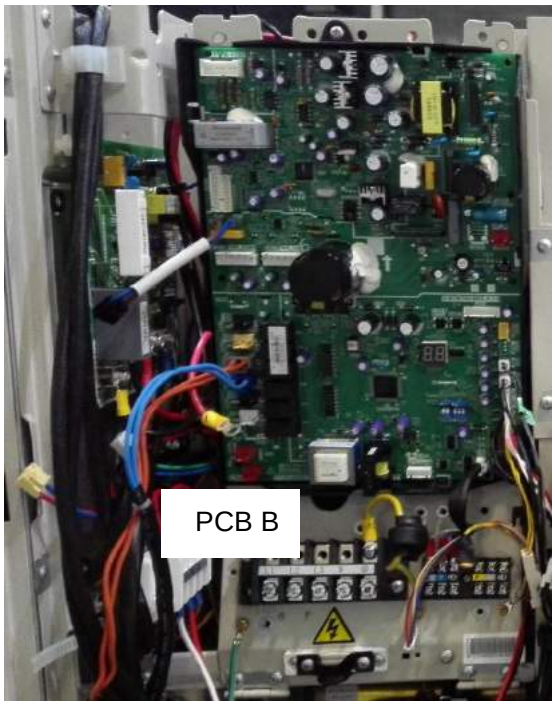
10.5 Electric box for 380-415/3/50 products



- Electric parts for refrigerant componment (door 1)
- Electric parts for hydronic componment (door 2)

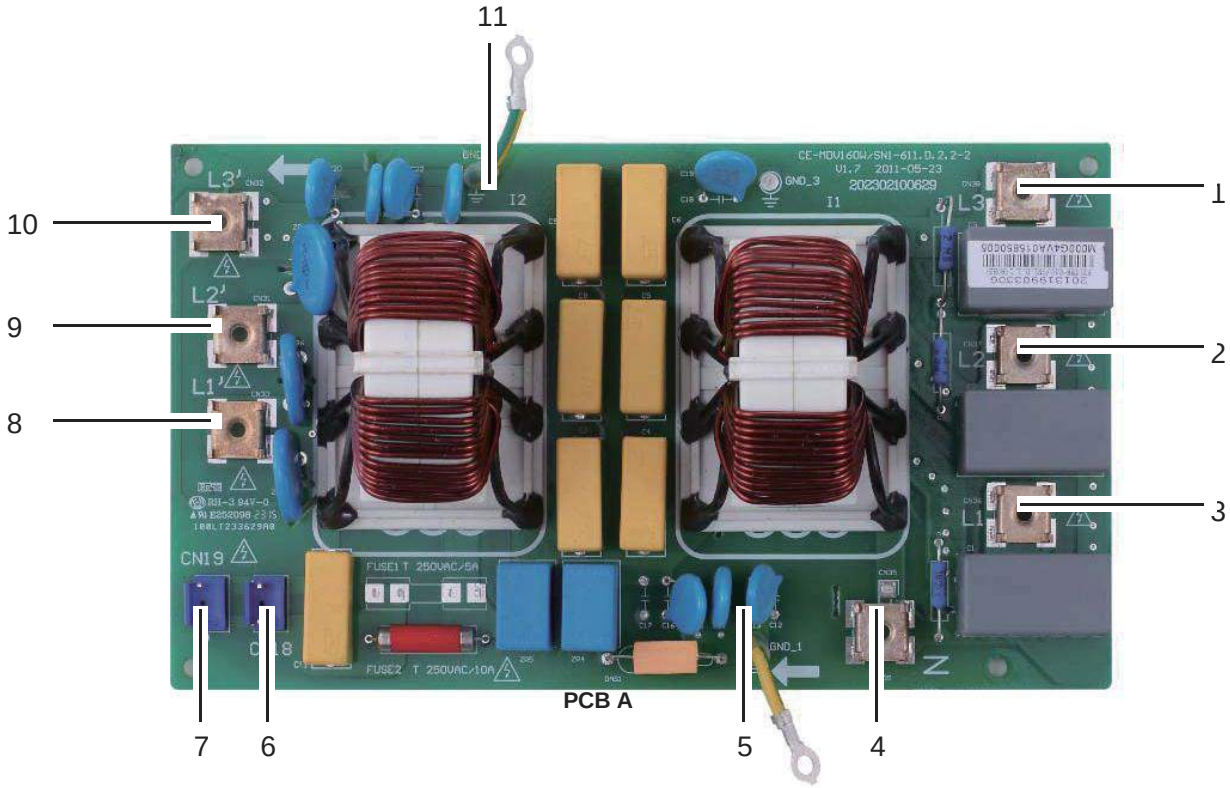
There are two layers on electric parts for refrigerant componment, the down layer contents PCB A and the upper layer contents PCB B. PCB C is placed at the side.





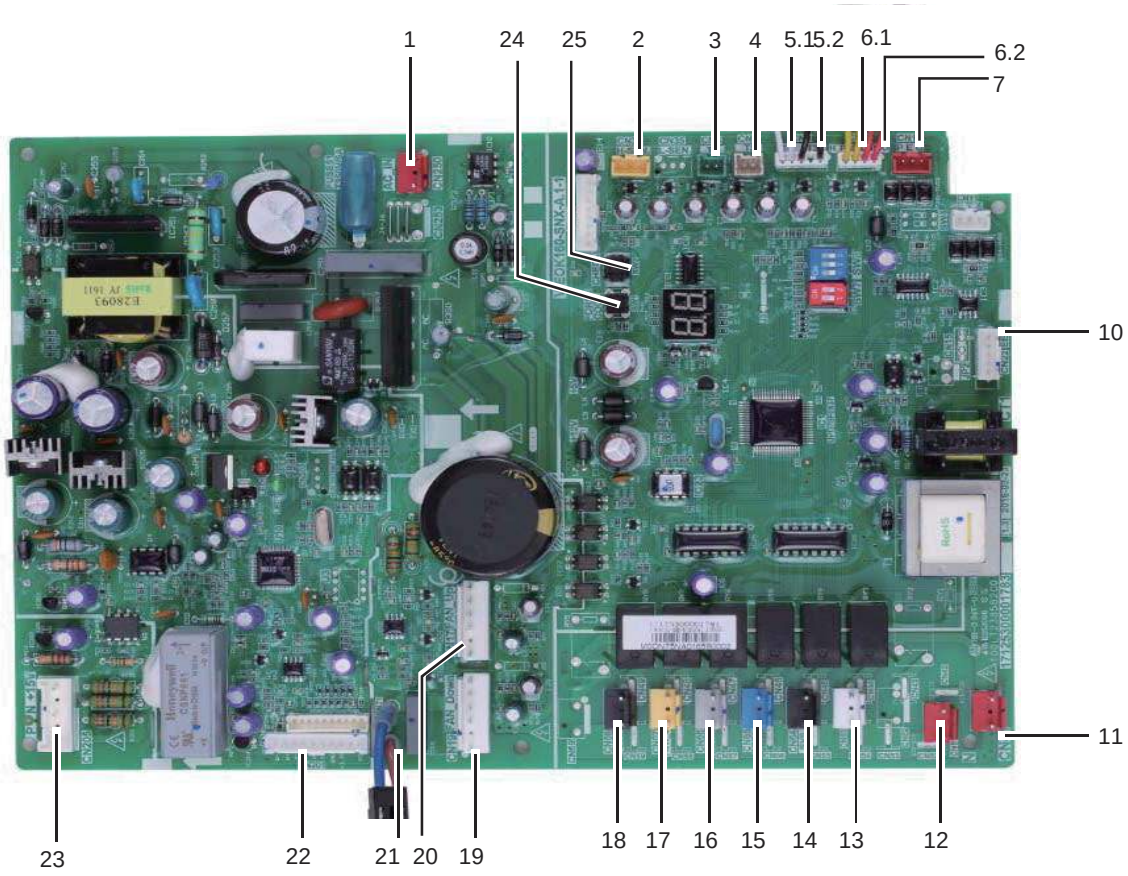
10.5.1 lectric parts for refrigerant parts (door 1)

PCB A description



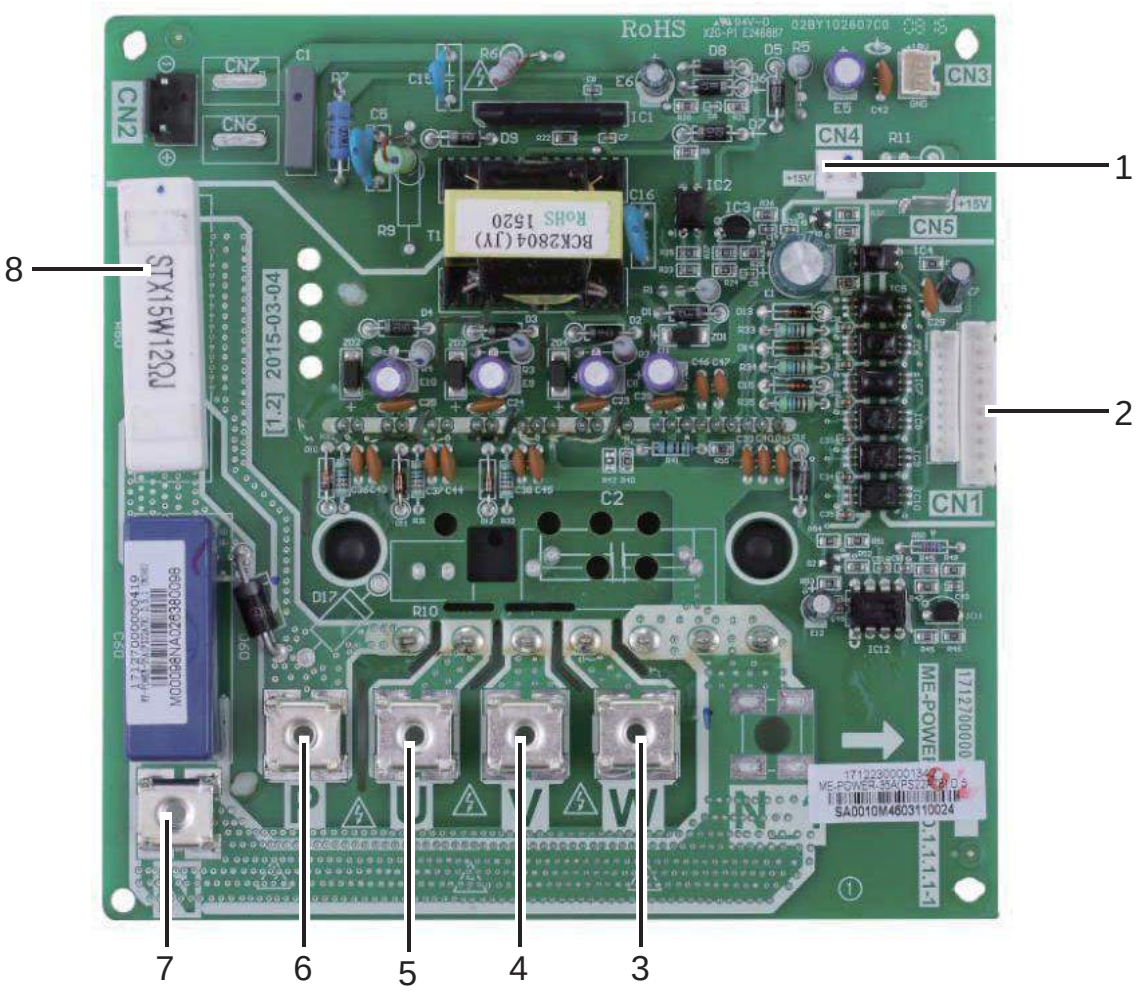
1 Power supply L3 2 Power supply L2 3 Power supply L1
4 Power supply N 5 Ground wire(GND_1) 6 Power supply for load(CN18))
7 Power supply for main control board(CN19) 8 Power filtering L1
9 Power filtering L2 10 Power filtering L3 11 Ground wire(GND_2)

PCB B description



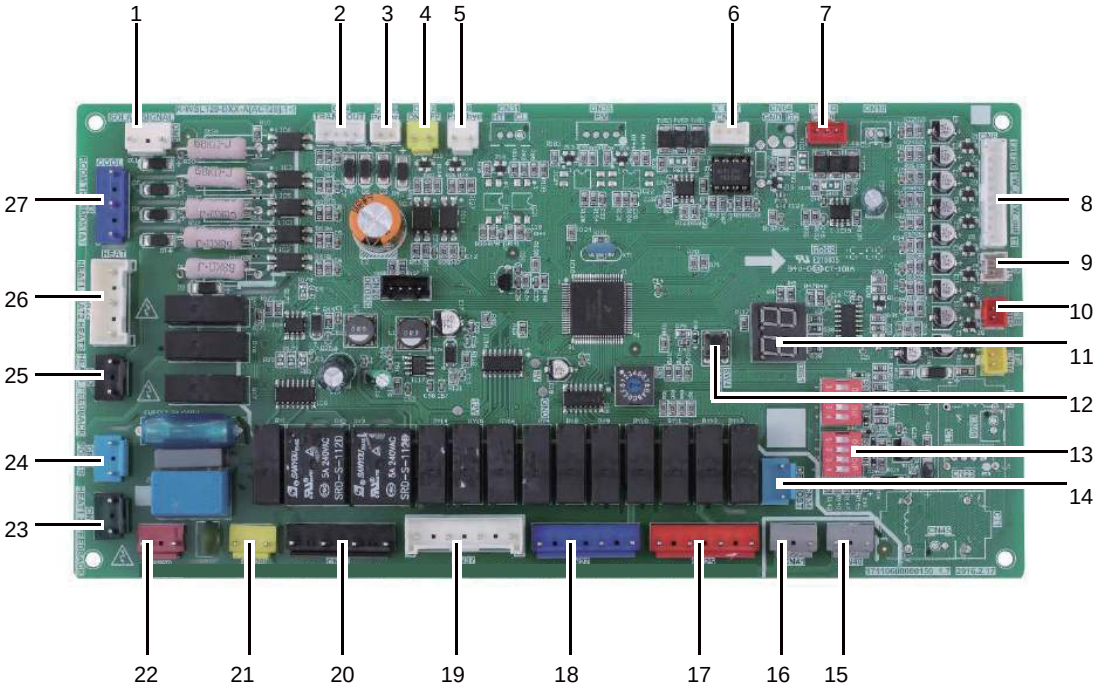
1 Power supply for the main PCB(CN250) 2 Port for pressure sensor (CN36)
3 Port for suction Temp. sensor (CN4) 4 Port for discharge Temp. sensor(CN8)
5.1 Port for outdoor Temp. sensor (CN9) 5.2 Port for condenser outlet Temp. sensor (CN9)
6.1 Port for high pressure switch (CN6) 6.2 Port for low pressure 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)

10.5.2 description for hydronic parts



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 door 1 PCB B and door 2 PCB(CN14）

7 Communicate port between door 2 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)

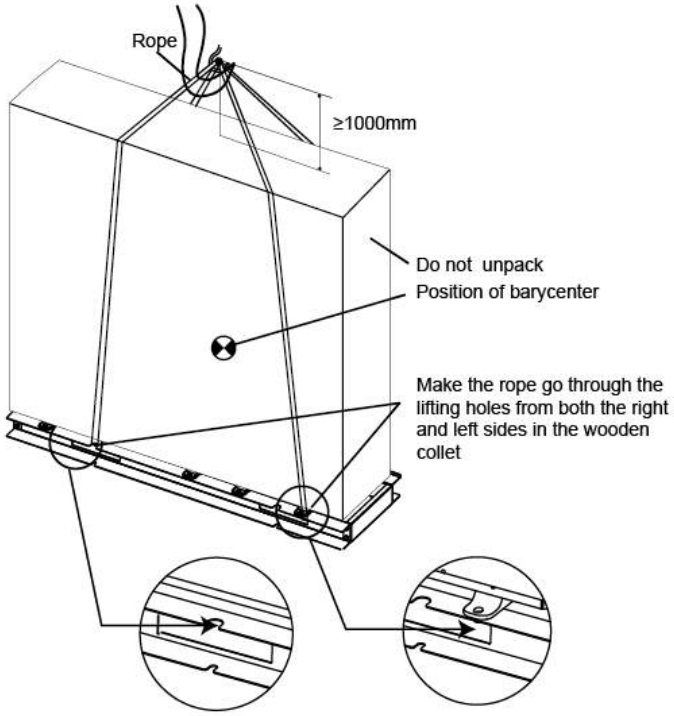
27 Control port for room thermostat (CN3)

11. Installation

11.1 Before installation

11.1.1 Handling

Due to relatively large dimensions and heavy weight, the unit should only be handled using lifting tools with slings. The slings can be fitted into foreseen sleeves at the base frame that are made specifically for this purpose.



10.1.2 Select the installation site

a. Select an installation site where the following conditions are satisfied and one that meets with your customer's approval.

- Places those are well-ventilated.
- Places where the unit does not disturb next-door neighbors.
- Safe places which can bear the unit's weight and vibration and where the unit can be installed at an even level.
- Places where there is no possibility of flammable gas or product leak.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Places where servicing space can be well ensured.

- Places where the units' piping and wiring lengths come within the allowable ranges.
- Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
- Places where rain can be avoided as much as possible.
- Do not install the unit in places often used as a work space.

In case of construction work (e.g. grinding etc.) where a lot of dust is created, the unit must be covered.

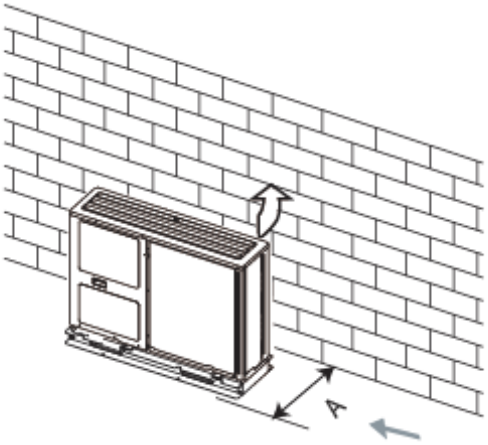
- Do not place any objects or equipment on top of the unit (top plate)
- Do not climb, sit or stand on top of the unit.
- Be sure that sufficient precautions are taken in case of refrigerant leakage according to relevant local laws and regulations.

b. When installing the unit in a place exposed to strong wind, pay special attention to the following. Strong winds of 5 m/s or more blowing against the unit's air outlet causes a short circuit (suction of discharge air), and this may have the following consequences:

- Deterioration of the operational capacity.
- Frequent frost acceleration in heating operation.
- Disruption of operation due to rise of high pressure.
- When a strong wind blows continuously on the front of the unit, the fan can start rotating very fast until it breaks.

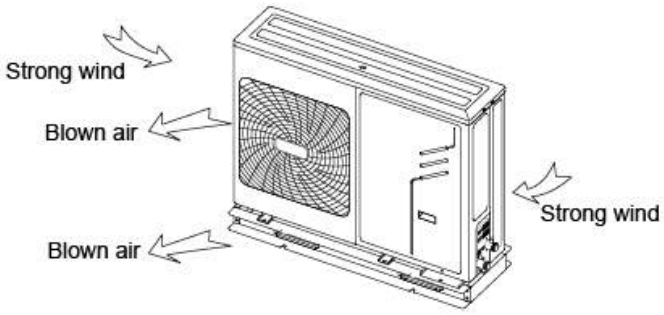
Refer to the figures for installation of this unit in a place where the wind direction can be foreseen.

- Turn the air outlet side toward the building's wall, fence or screen. Make sure there is enough room to do the installation



Model	A (mm)
5,7kW	1000
10-16kW	1500

Set the outlet side at a right angle to the direction of the wind.



C. Prepare a water drainage channel around the foundation, to drain waste water from around the unit.

D. If water does not easily drain from the unit, mount the unit on a foundation of concrete blocks, etc. (the height of the foundation should be about 100 mm.

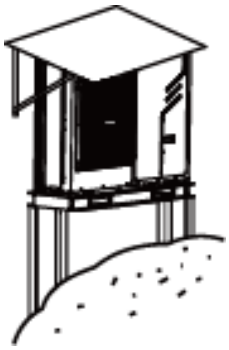
E. If you install the unit on a frame, please install a waterproof plate (about 100 mm) on the underside of the unit to prevent water from coming in from the low side.

F. When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.

G. If you install the unit on a building frame, please install a waterproof plate (field supply) (about 100 mm.) on the underside of the unit) in order to avoid drain water dripping.

10.1.3 Select a location in cold climates

- To prevent exposure to wind, install the unit with its suction side facing the wall.
- Never install the unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the unit.
- In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).



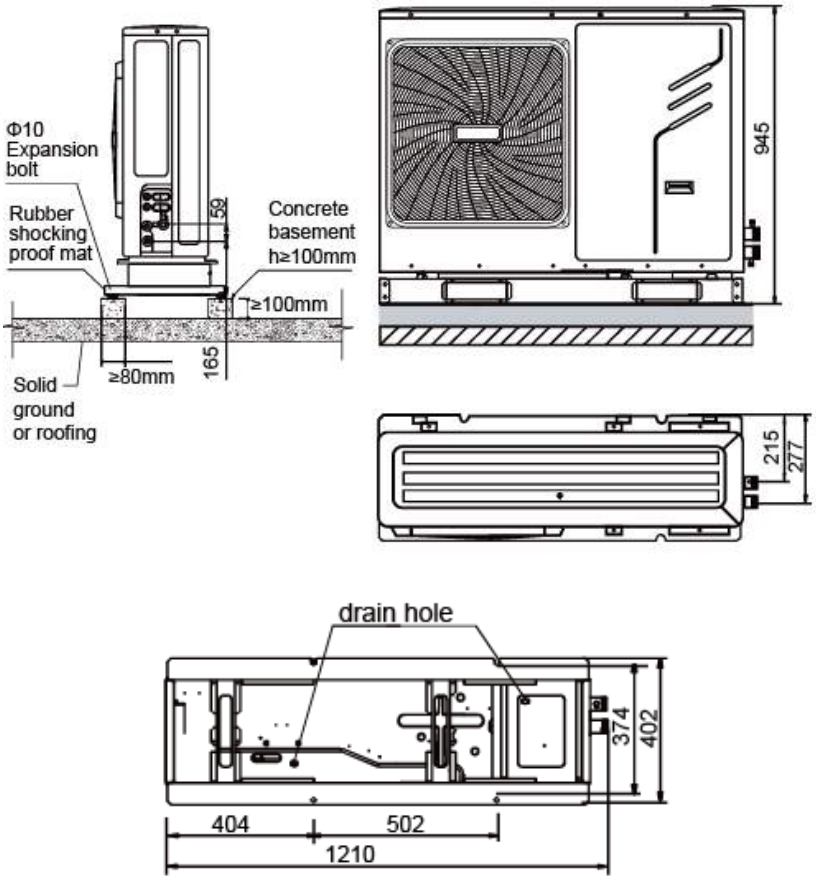
Construct a large canopy.
Construct a pedestal.
Install the unit high enough off the ground to prevent it from being buried in snow.

11.2 Installation and service space

11.2.1 Unit installation dimensions

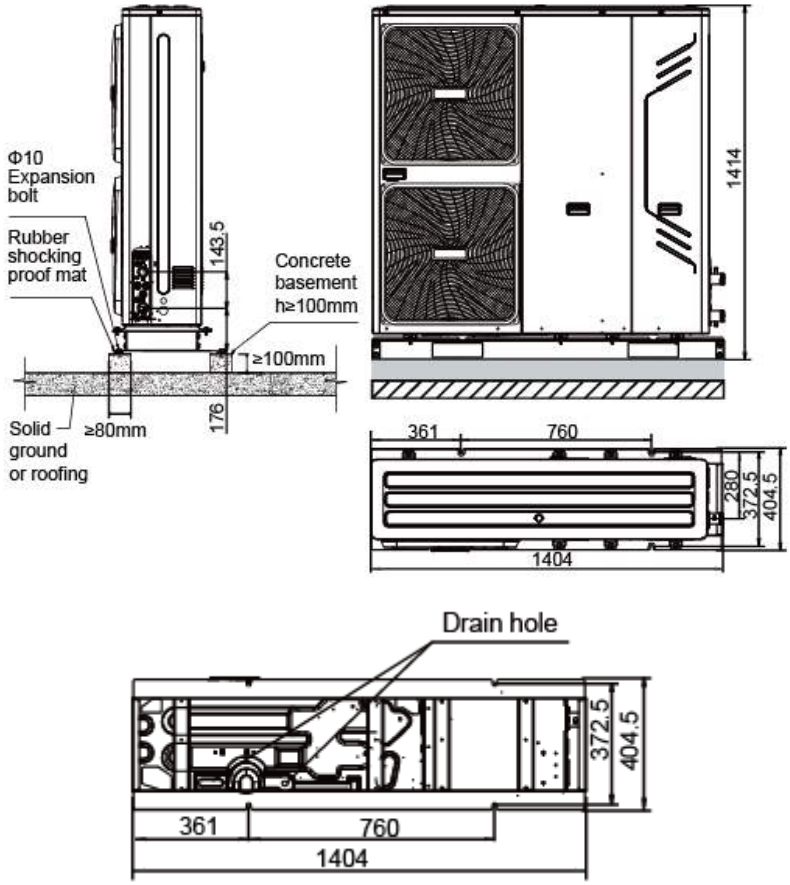
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts. (Prepare four sets each of Φ10 Expansion bolts, 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.

5/7kW



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

10-16kW

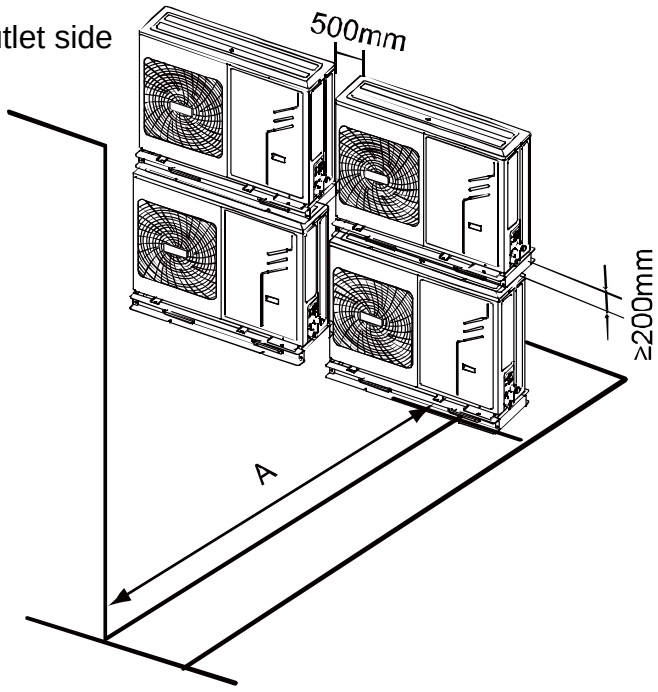


Note: The drain hole is covered by rubber plug; the bigger hole can be opened in field if necessary.

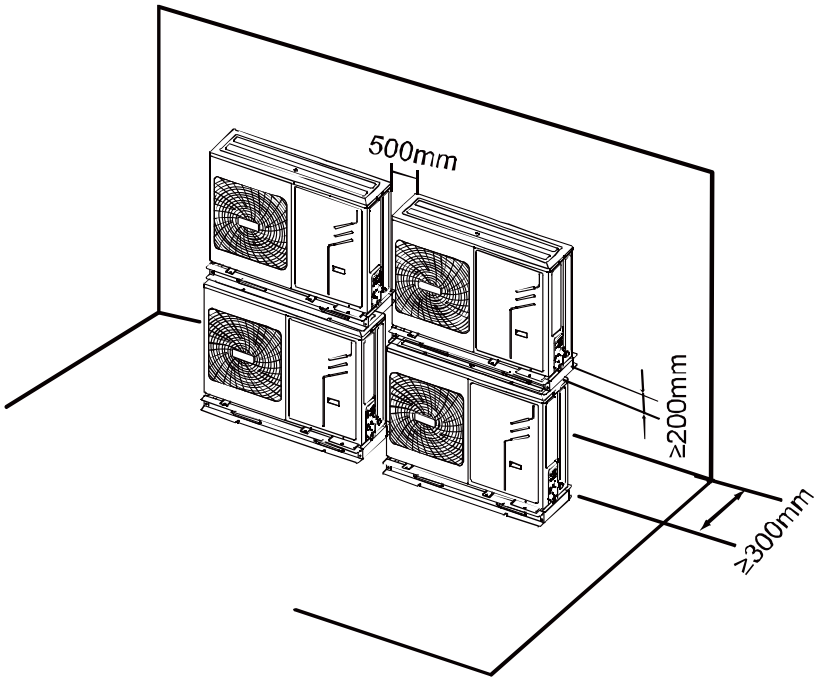
11.2.2 In case of stacked installation

Obstacles exist in front of the air outlet side

Model	A (mm)
5,7kW	1000
10-16kW	1500



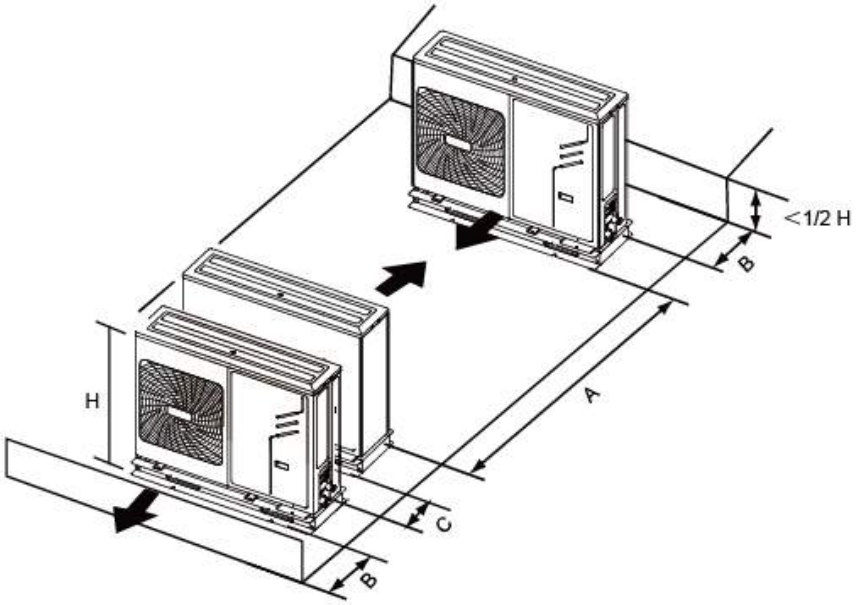
Obstacles exist at back of the air outlet side



11.2.3 In case of multiple-row installation

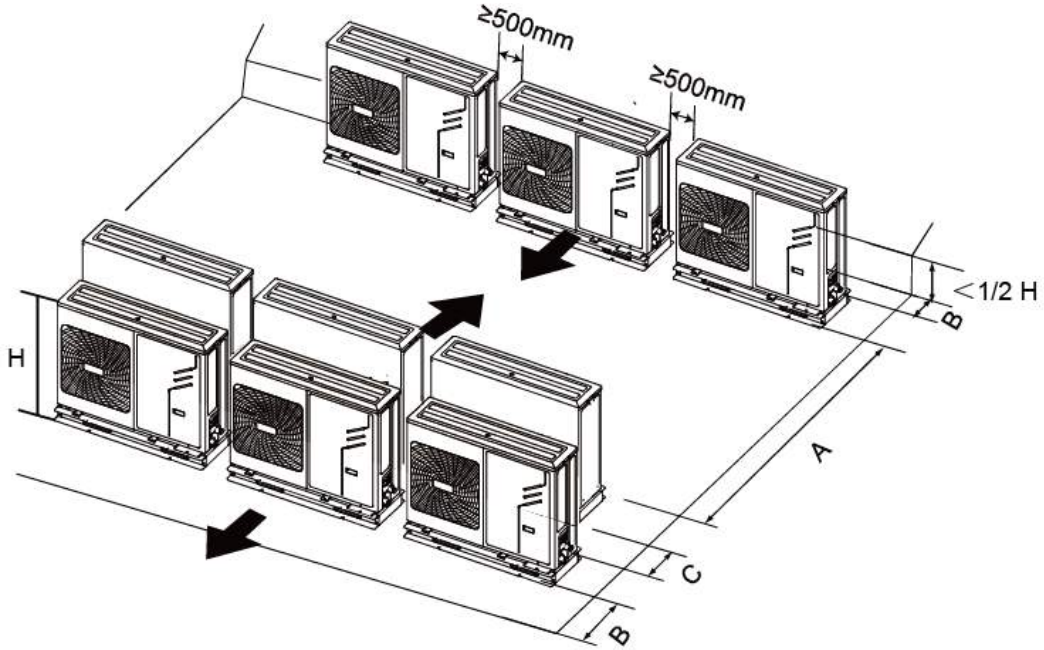
Installing one unit per row

Model	A (mm)	B(mm)	C (mm)
5,7kW	1000	500	300
10-16kW	1500	1000	300



Installing multiple units (2 units or more) in lateral connection per row

Model	A (mm)	B(mm)	C (mm)
5,7kW	2000	500	300
10-16kW	2500	1000	300

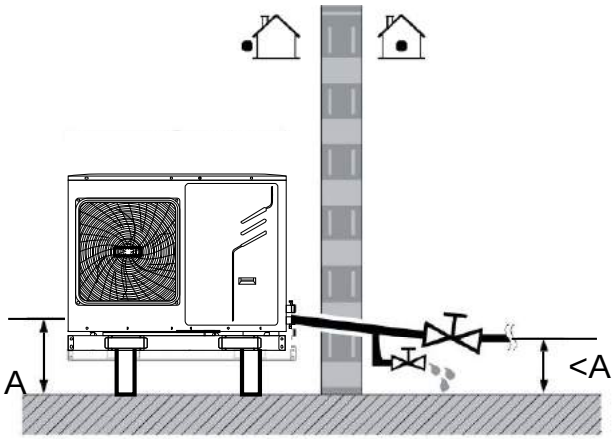


11.3 Water pipework

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.

If there is no glycol (anti-freeze) in the system there is a power supply or pump failure, drain the system (as shown in the figure below)



When water is not moving inside the system in cold weather, freezing is very likely and will damage the system.

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 vessel

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：

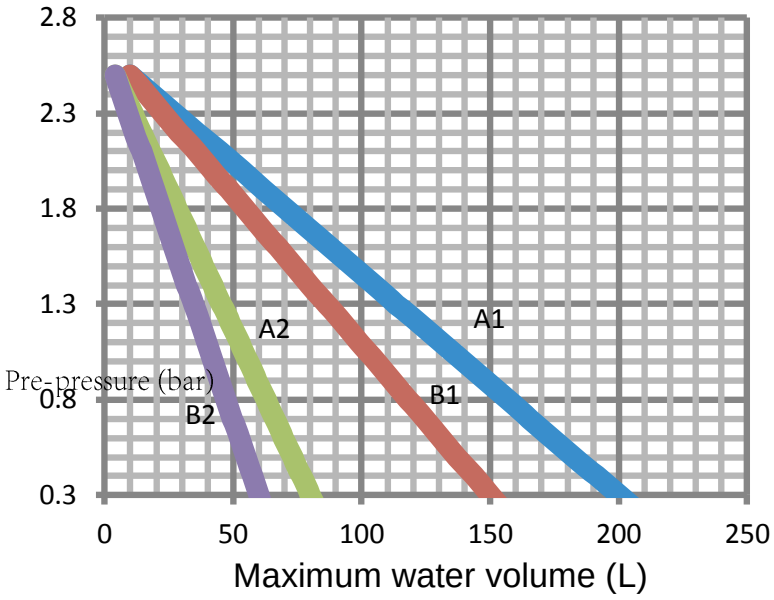
- In most applications this minimum water volume will be satisfactory.
- In critical processes or in rooms with a high heat load though, extra water might be required.
- When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume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

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 10~16 kW unit

A2 System without glycol for the 5/7 kW unit

B1 System with 25% propylene glycol for 10~16 kW unit

B2 System with 25% propylene glycol for the 5/7kW unit

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 hydraulic 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 hydraulic 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.

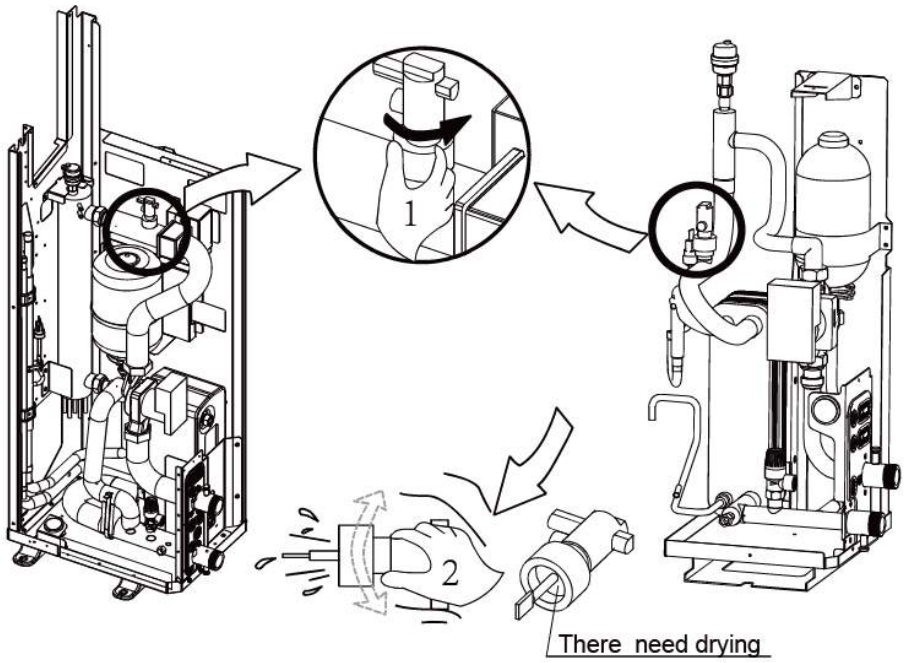
When glycol is added to the system, the performance of the unit is affected.

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.

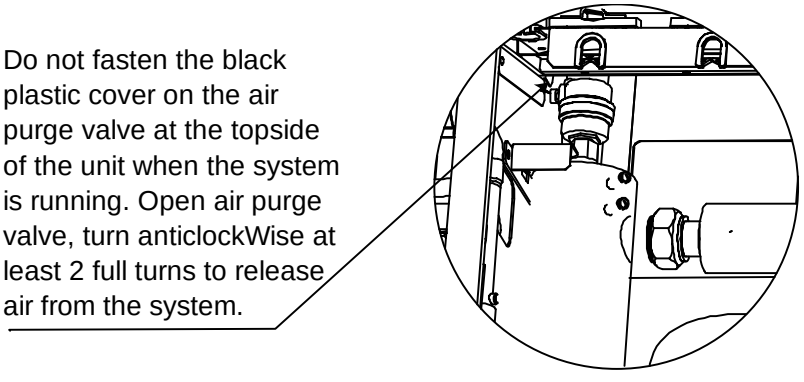
- That a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols.
- That in case of an installation with a domestic hot water tank, only the use of propylene glycol is allowed. In other installations the use of ethylene glycol is fine.
- That no automotive 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.

11.4 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.



11.5 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.

11.6 Field wiring

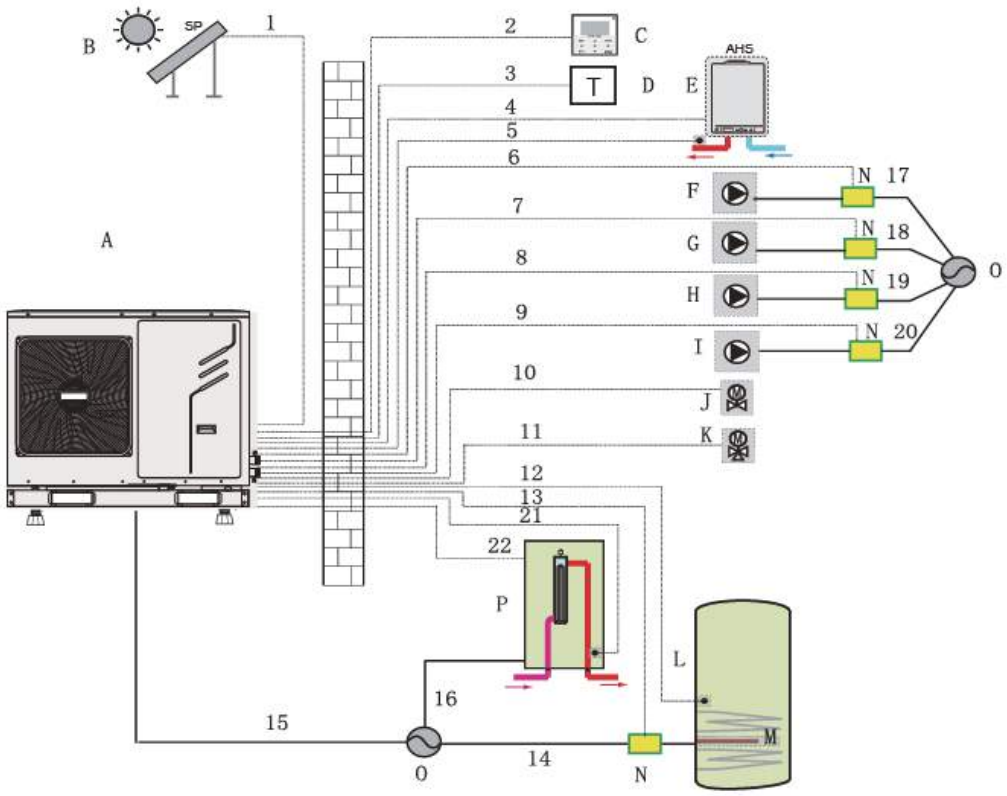
- A main switch or other means of disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations.
- Switch off the power supply before making any connections.
- Use only copper wires.
- Never squeeze bundled cables 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

11.6.1 Precautions on electrical wiring work

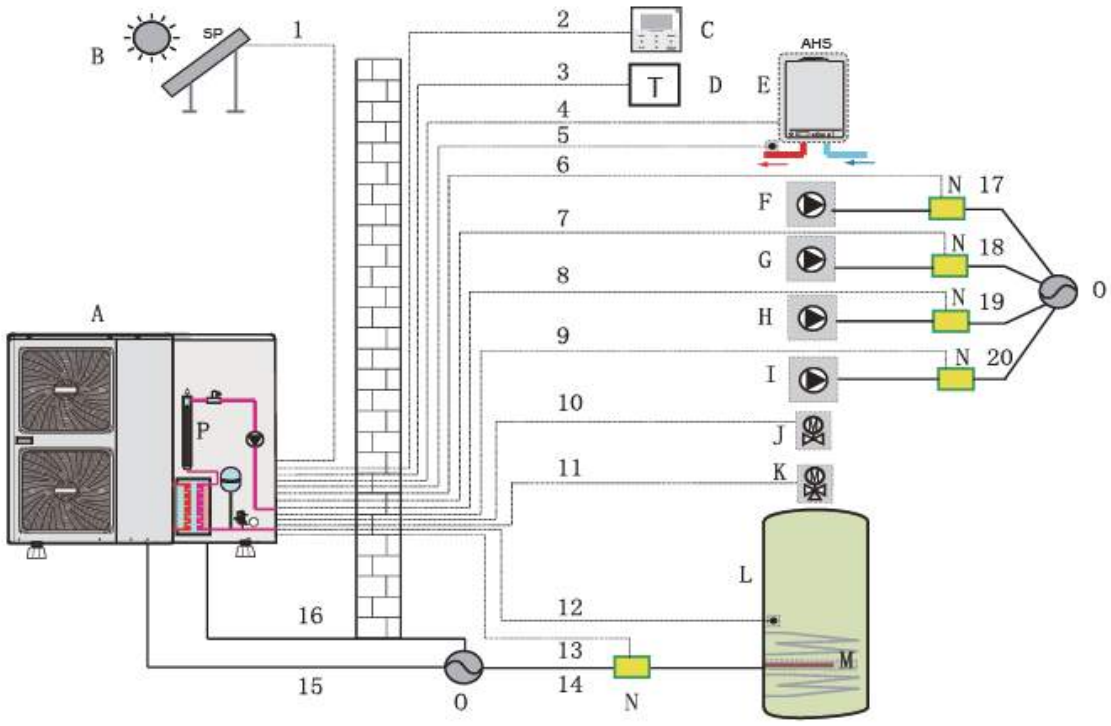
- Fix cables so that cables do not make contact with the pipes (especially on the high pressure side).
- Secure the electrical wiring with cable ties as shown in figure so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied 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.

11.6.2 Wiring overview

5/7kW



10-16kW



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

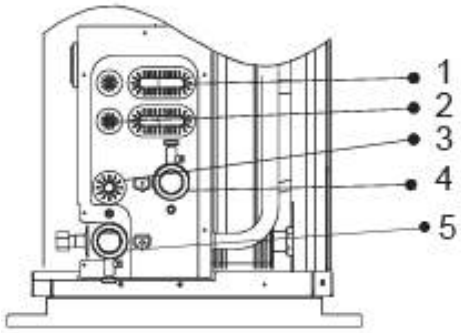
O: Power supply P: Backup heater

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)

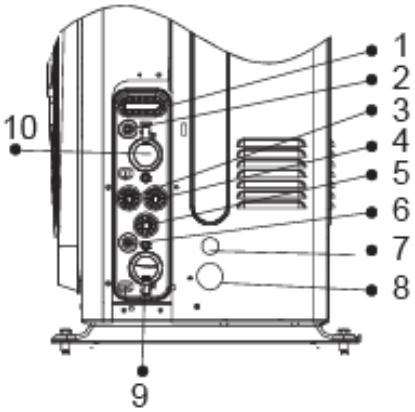
(b) The thermistor cable are delivered with the unit

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.



1 High voltage wire hole
2 Low voltage wire hole
3 Drainage pipe hole
4 Water outlet
5 Water inlet

1-phase 5/7 kW



1 High voltage wire hole
2 Low voltage wire hole
3 High voltage wire hole
4 High voltage wire hole
5 Drainage pipe hole
6 Low voltage wire hole
7 Low voltage wire hole(backup)
8 Low voltage wire hole(backup)
9 Water inlet
10 water outlet

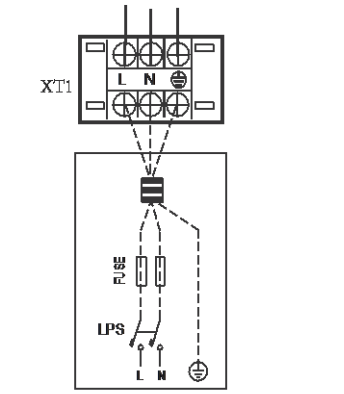
1-phase 10~16kW
3-phase 12~16kW

Specifications of standard wiring components

Door 1: compressor compartment and electrical parts: XT1

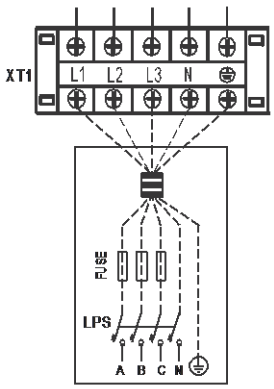
Unit	1-phase 5/7 kW	1-phase 10~16kW	3-phase 12~16kW
Maximum overcurrent protector(MOP)	25	32	25
Wiring size	4 mm^2	6 mm^2	4 mm^2

Stated values above are maximum values



OUTDOOR UNIT POWER SUPPLY

1-phase



OUTDOOR UNIT POWER SUPPLY

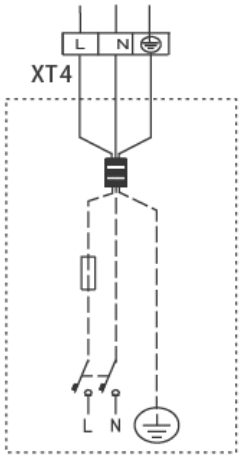
3-phase

Connection of the backup heater power supply

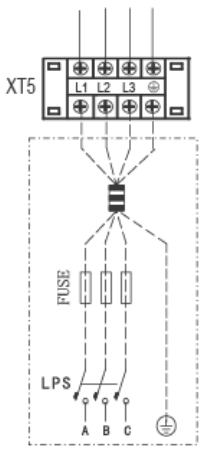
This power circuit must be protected with the required safety devices according to local laws and regulations. Select the power cable in accordance with relevant local laws and regulations. For the maximum running current of the backup heater, refer to the table below.

Door 2: electrical parts of the hydraulic compartment, backup heater: XT5 3-phase/XT4 (1-phase)

	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)	20A	20A

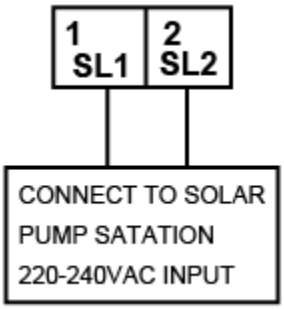


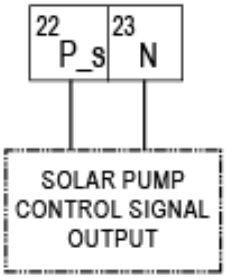
POWER SUPPLY FOR ELECTRIC HEATER



POWER SUPPLY FOR ELECTRIC HEATER

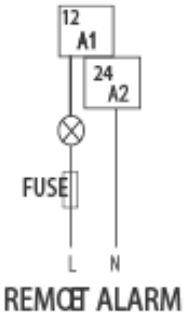
For solar energy kit





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

For remote alarm



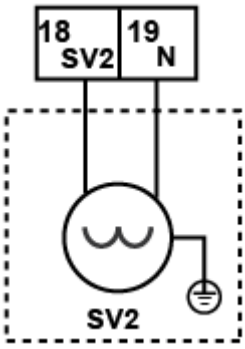
Voltage	Passive signal port
Maximum running current	0.5A
Wiring size	0.75mm^2

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

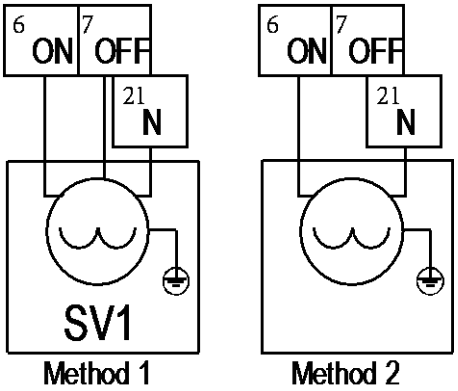
NOTE: Only a normal closing valve is available for this unit

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

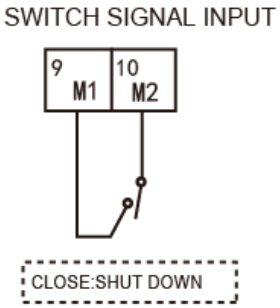
NOTE: Wiring of the 3-way valve is different for NC (normal close) and NO (normal open). Before wiring, read the Installation & Owner's manual for the 3-way valve carefully and install the valve as should in the picture. Make sure to connect it to the correct terminal numbers.

Procedure:

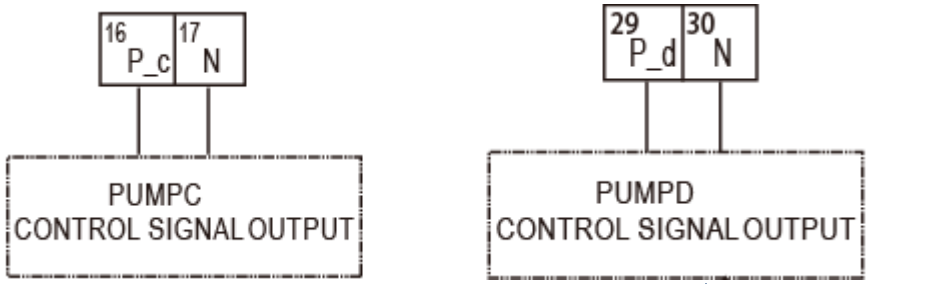
1. Connect the cable to the appropriate terminals as shown in the picture

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

For 5/7kW unit, the terminal number is 37 and 38.

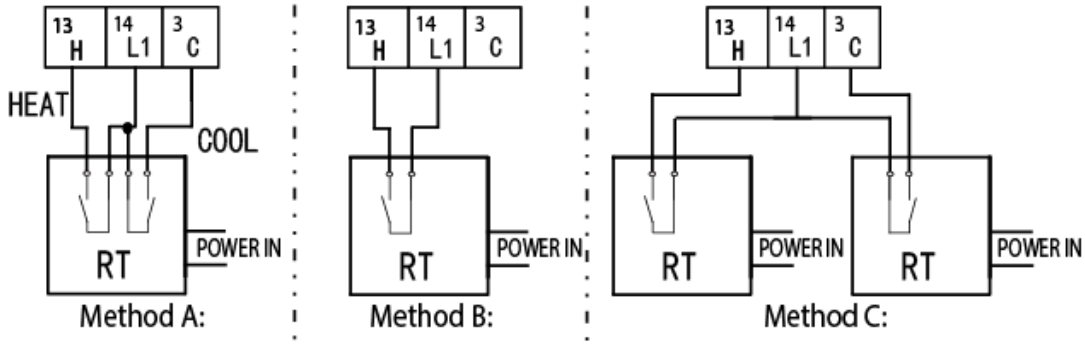
Procedure:

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

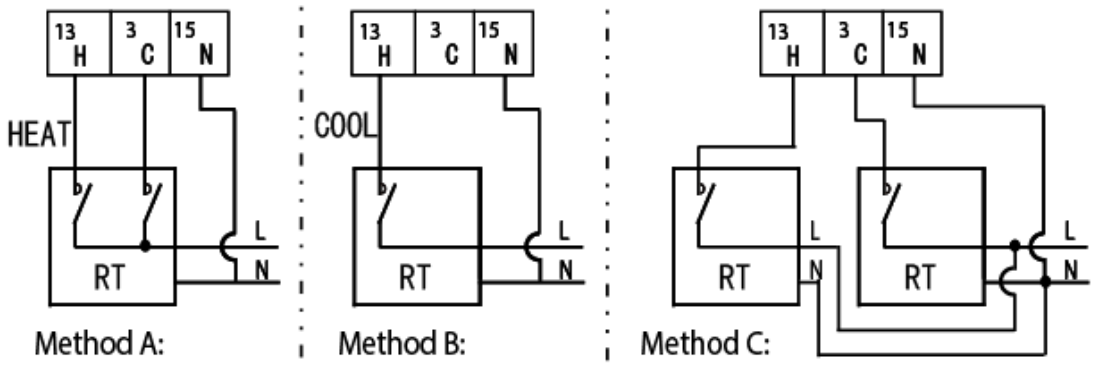
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

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.

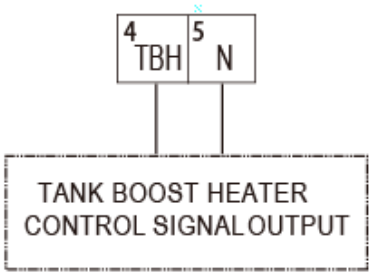
2. Power supply of machine and room thermostat must be connected to the same Neutral Line and (A) Phase Line.

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



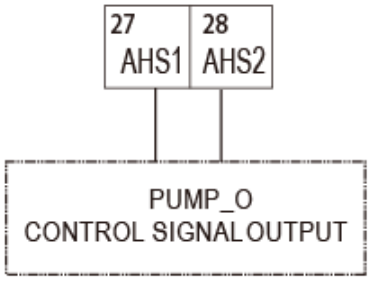
Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

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:

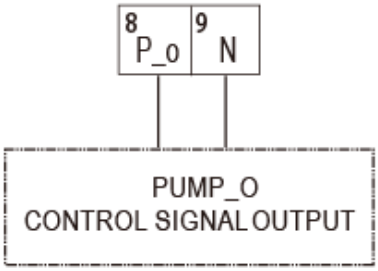
1. Connect the cable to the appropriate terminals as shown in the picture.
2. Fix the cable with cable ties to the cable tie mountings to ensure stress relief

For boiler and pipe pump P_o:



NOTE
For 5/7 kW unit, the terminal number is 25 and 26.

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



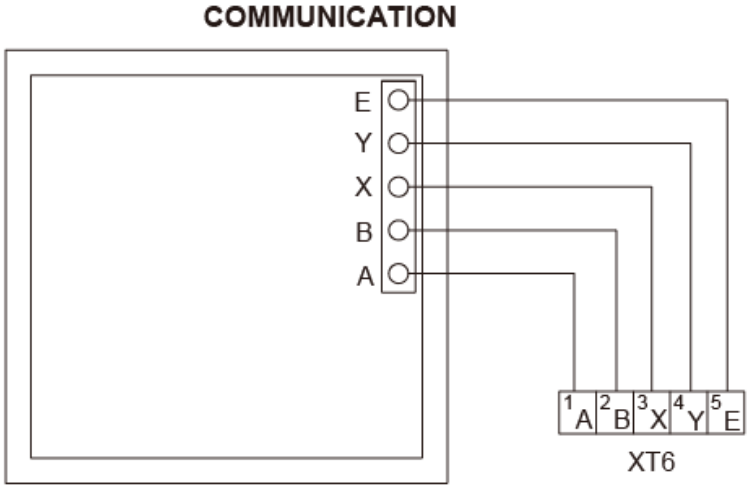
Voltage	220-240VAC
Maximum running current	0.2A
Wiring size	0.75mm^2

Procedure:

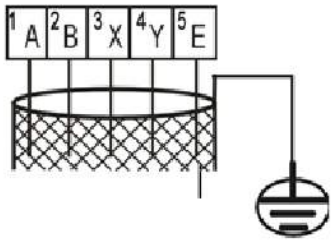
1. Connect the cable to the appropriate terminals as shown in the picture.

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

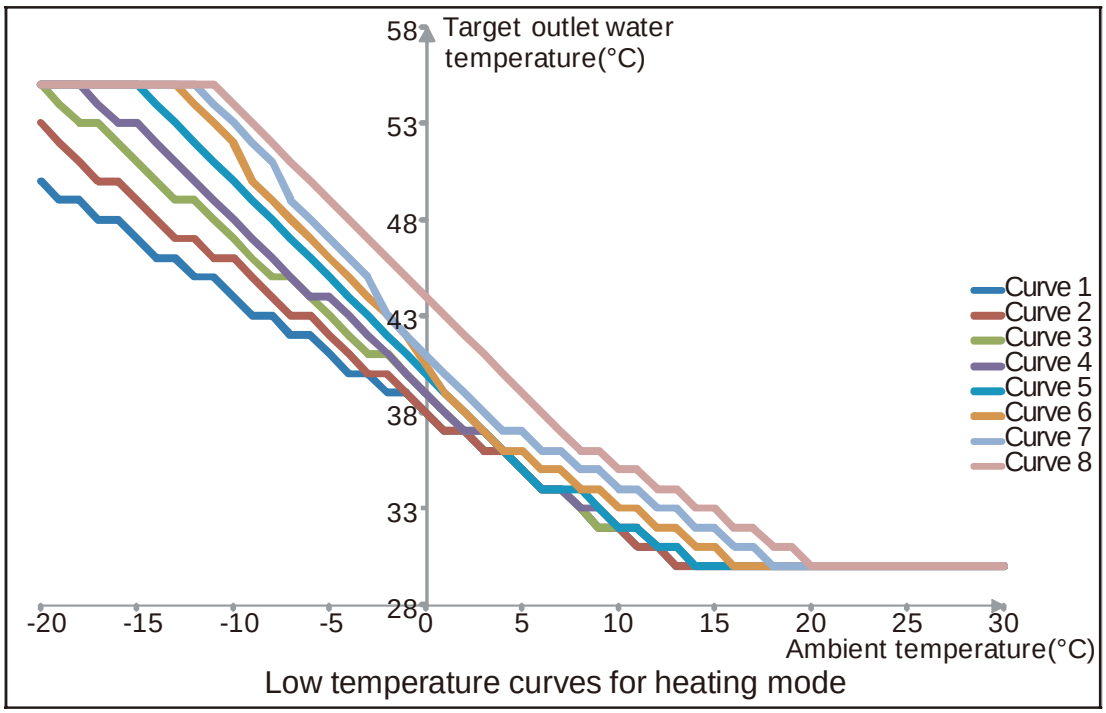
The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

12.1 Climate related curves

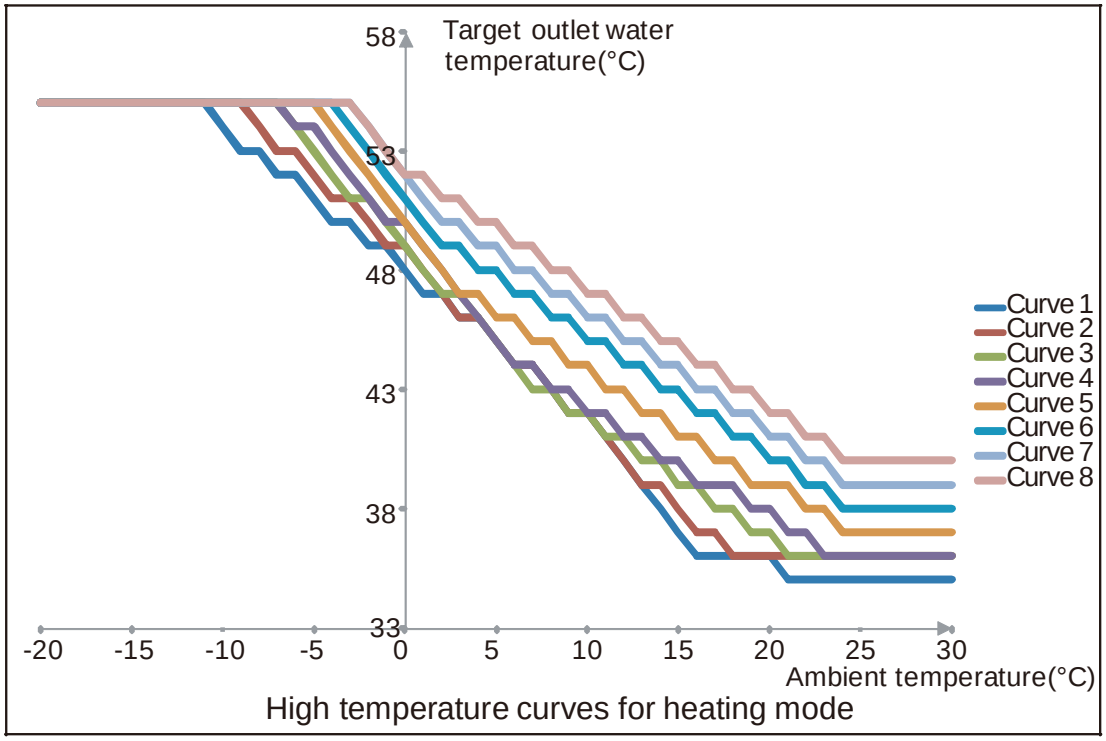
The climate related curves can be selected in the user interface. Once the curve is selected, the target outlet water temperature is determined by the outdoor temperature. In each mode, you can select one curve from 8 curves in the user interface. The target outlet water temperature decreases in the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

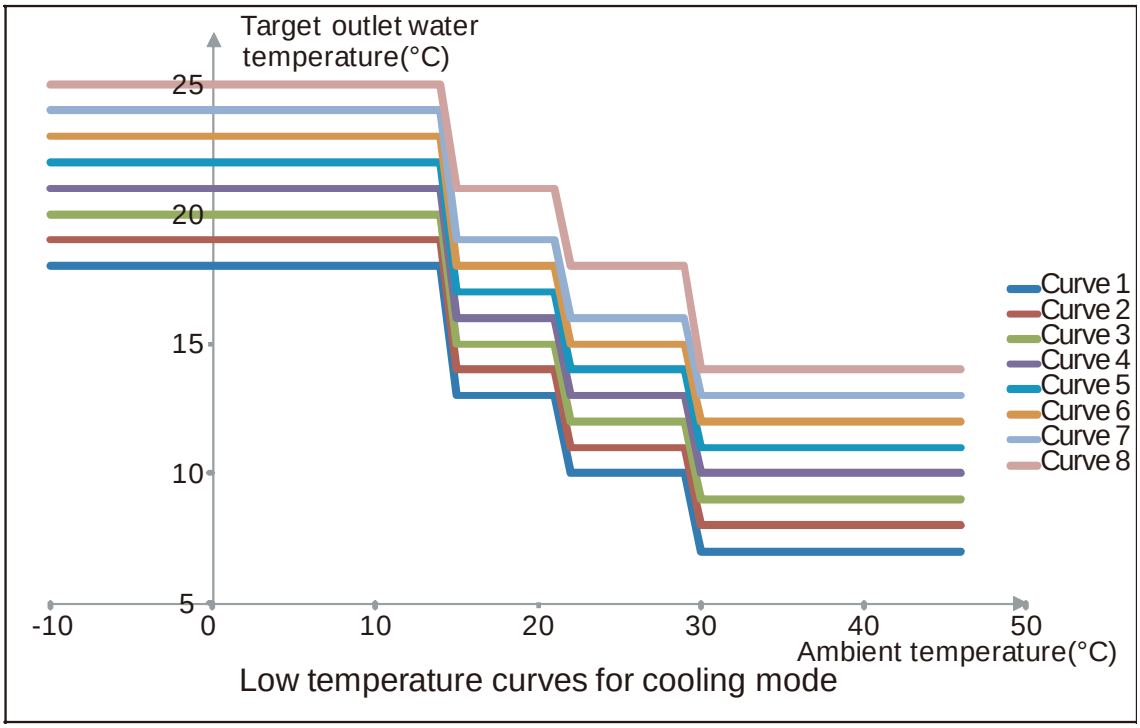
Low temperature curves for heating mode



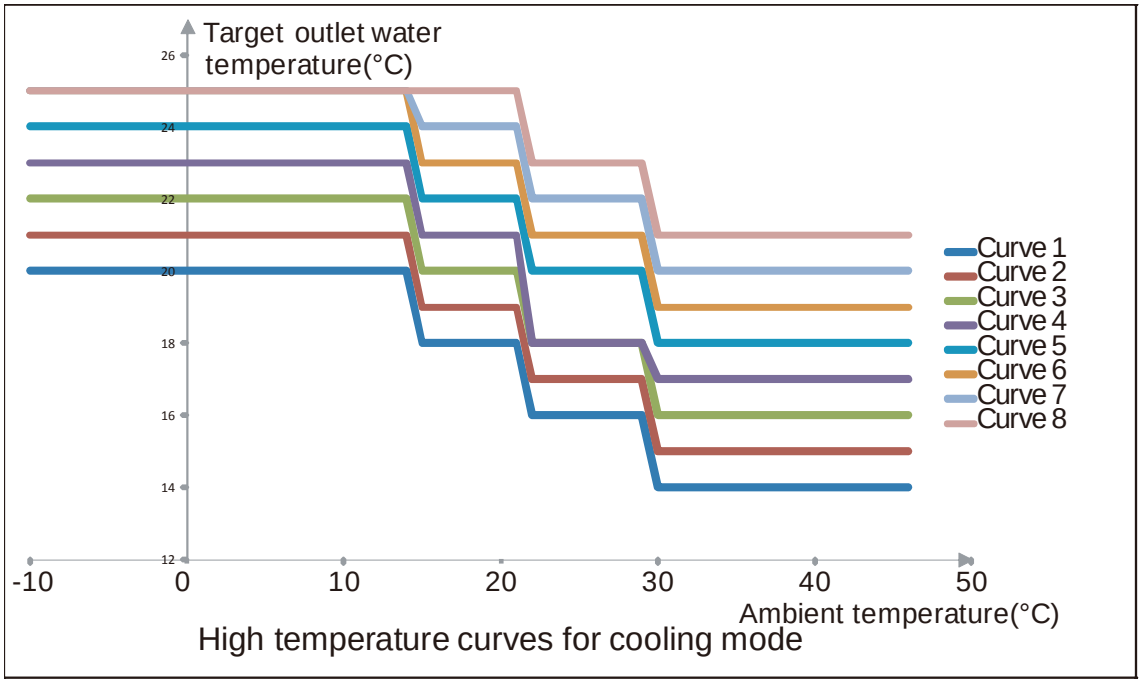
High temperature curves for heating mode



Low temperature curves for cooling mode



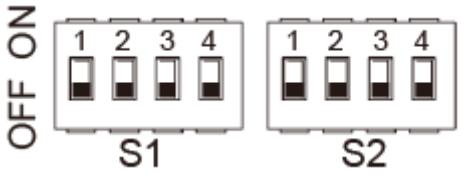
High temperature curves for cooling mode



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

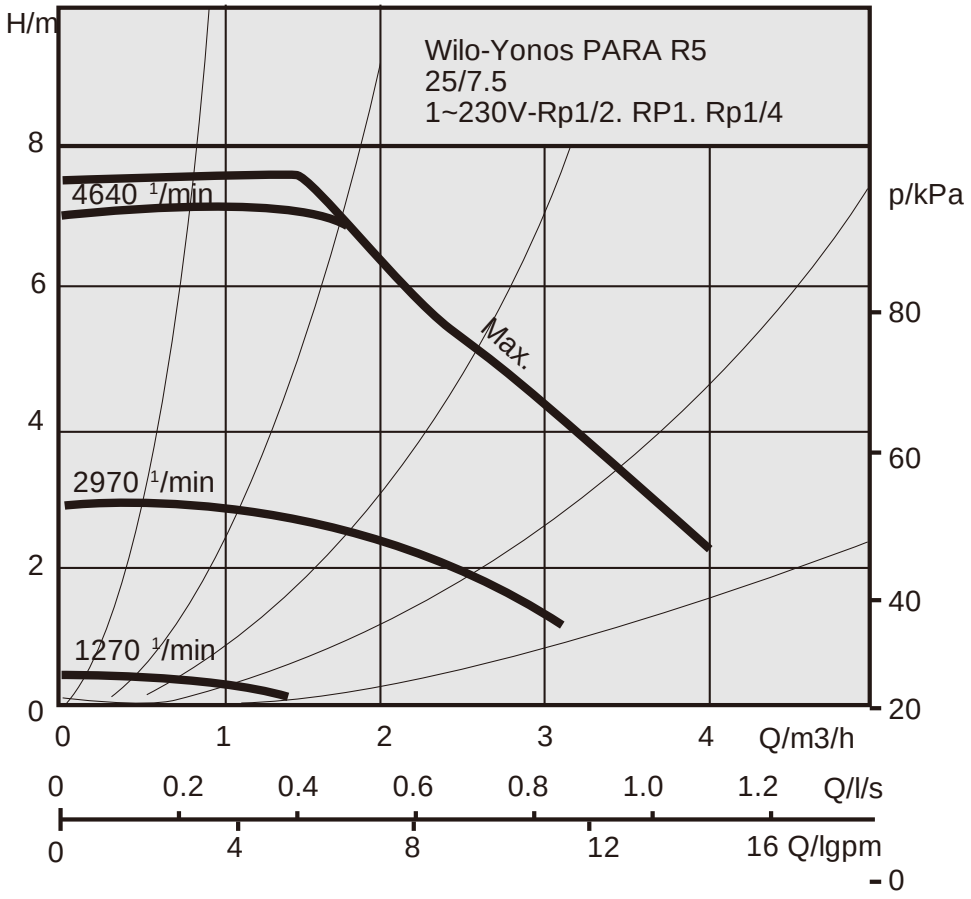
12.5 Powering up the unit

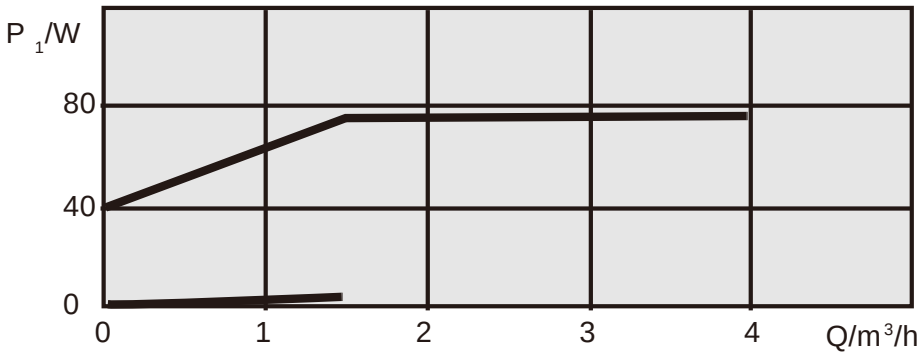
When power to the unit is turned on, "1%~99%" is displayed on the user interface during initialization. During this process the user interface cannot be operated.

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.

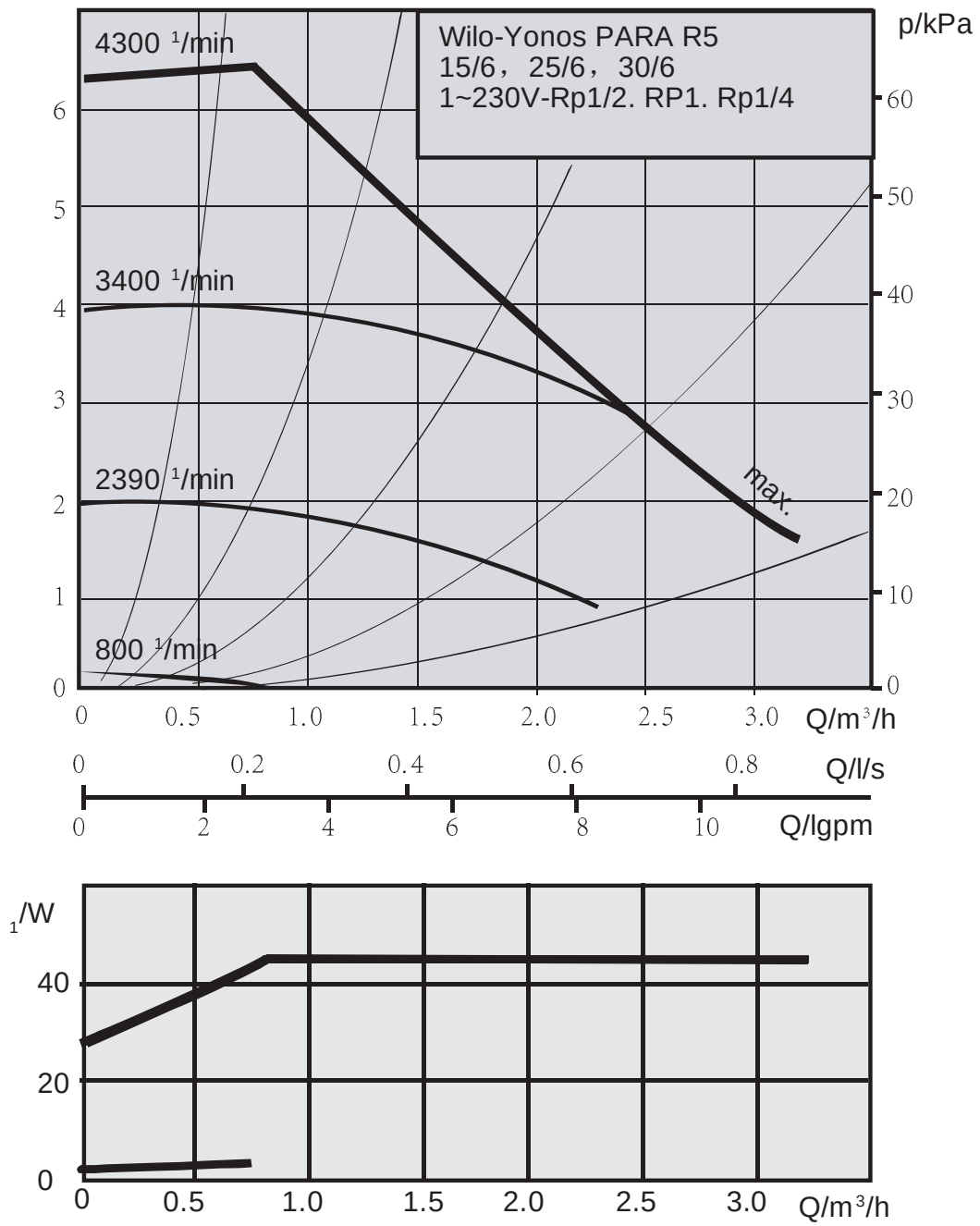
Constant speed ⅠⅡⅢ





1-phase 10~16kW
3-phase 12~16kW

Constant speed ⅠⅡⅢ



1-phase 5/7 kW

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.

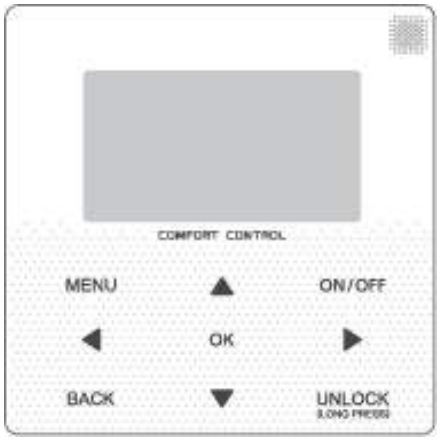
- If the LED display is flashing green, it means the pump is running the venting function. The pump runs during the 10 minute venting function. After its cycle, the installer needs to adjust the targeted performance.
- If the LED is flashing green/red, it means that the pump has stopped operating due 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

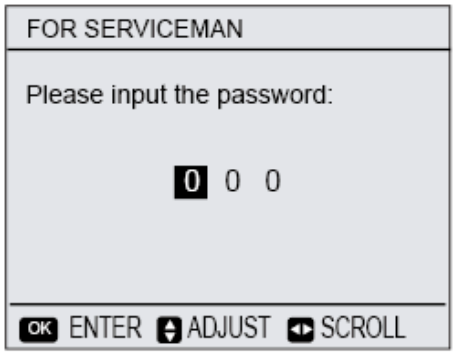
“FOR SERVICEMAN” is designed for the installer to set the parameter.

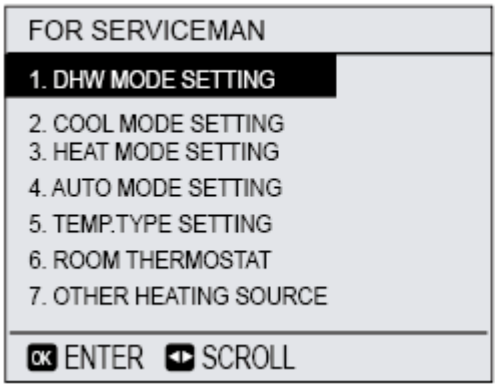
1. Setting the composition of equipment.

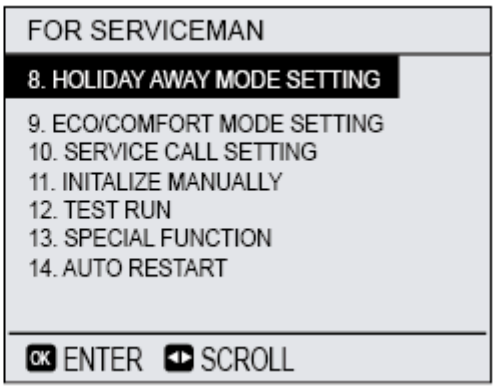
2. Setting the parameter.

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.

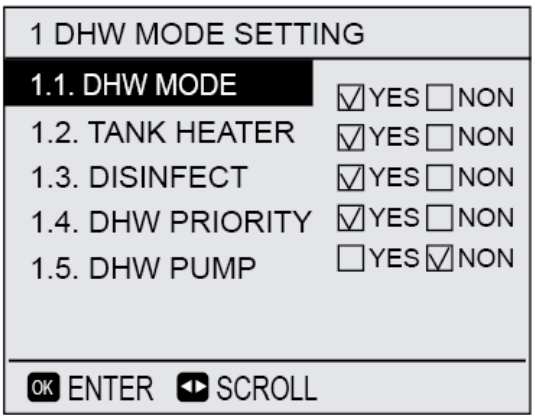
12.8.2 DHW control

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.

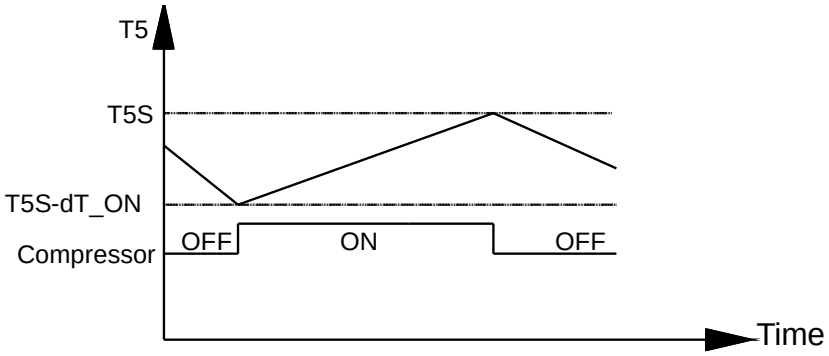
Go to MENU> FOR SERVICEMAN> DHW MODE SETTING. Press OK. The following page is displayed:



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.

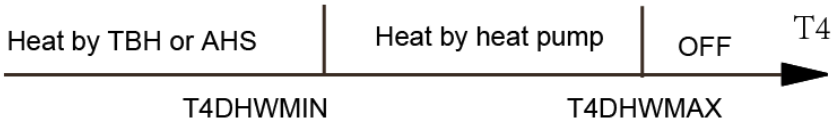


T5S is the target temperature for domestic hot water. T5 is the actual temperature of domestic hot water. When T5 drops to a certain temperature (T5≤T5S-dT5_ON) the heat pump will be available. dT1S5 is the correct value for the target outlet water temperature (T1S=T5+dT1S5).

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.

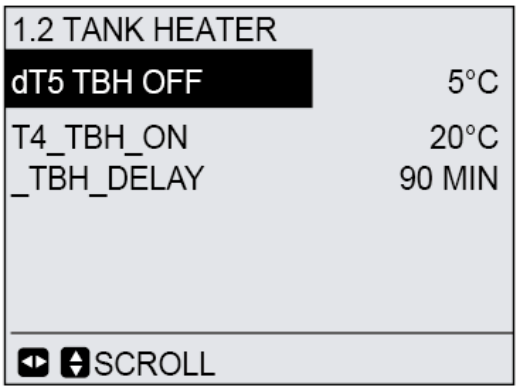
T4DHWMIN is the minimum ambient temperature that the heat pump can operate for domestic water heating. The heat pump will turn off if the ambient

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:



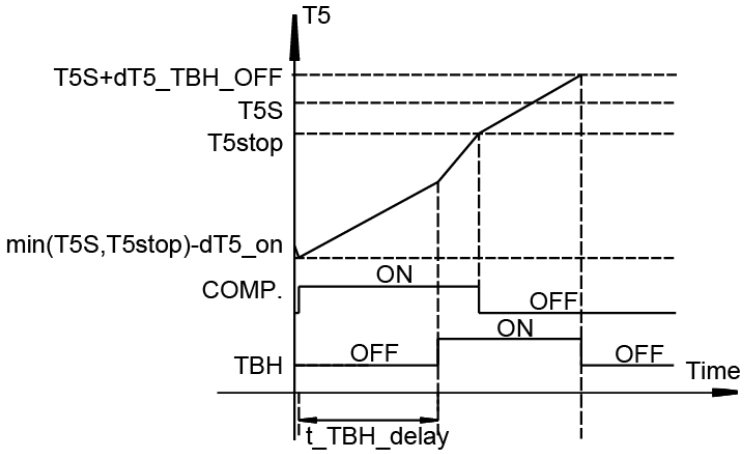
Use ◄ ► and ▼▲ to scroll and adjust parameters. Use BACK to exit.

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:

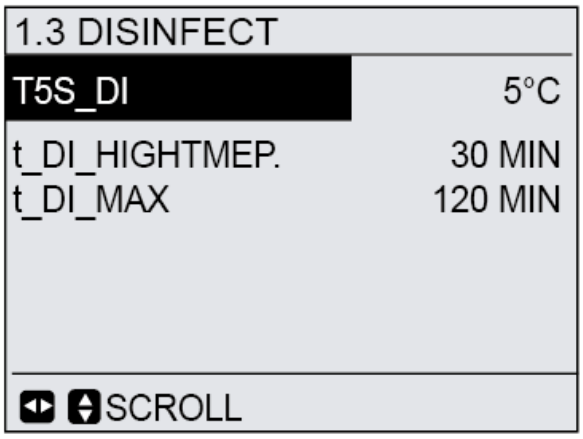


In the picture, T5stop is a parameter related to ambient temperature, which cannot be changed in the user interface. When T5≥T5stop,the heat pump will turn off.

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.

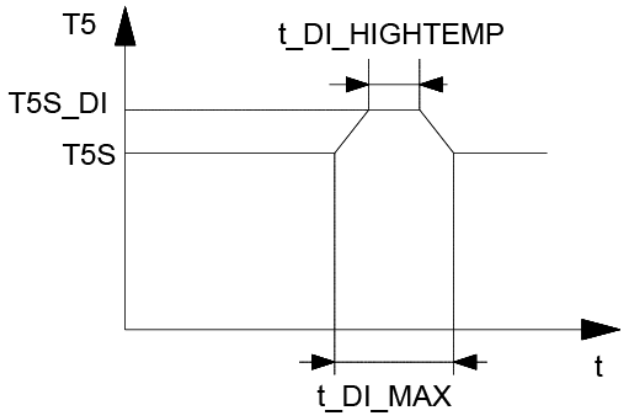
- To enable disinfect function, Go to MENU> FOR SERVICEMAN>DHW MODE SETTING> 1.3 DISINFECT and select "YES", when "OK" pressed, the following page will appear.



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

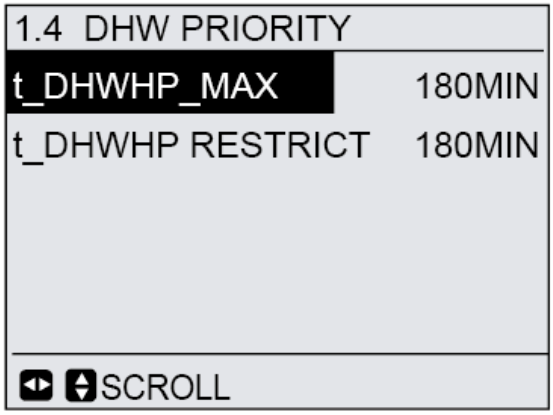
t_DI_HIGHTEMP is the time that the hot water will last.

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:

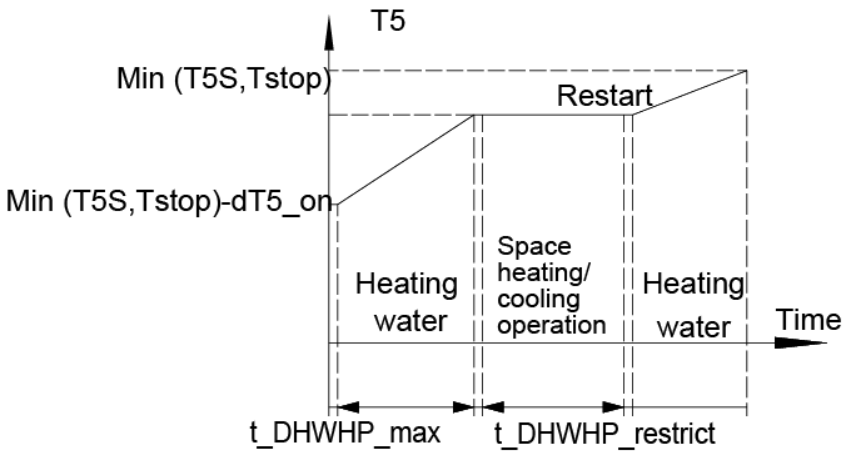


The function of the DHW PRIORITY is used to set the operation priority between domestic water heating and space (heating/cooling) operation. You can use ◄ ► and ▼▲ to scroll and adjust parameters. Use BACK to exit.

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

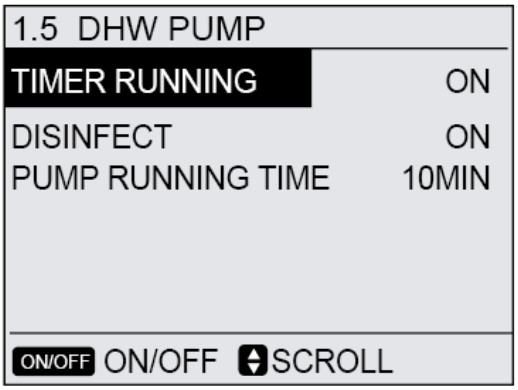
T_DHWHP_RESTRICT is the operation time for the space heating/cooling operation.

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.

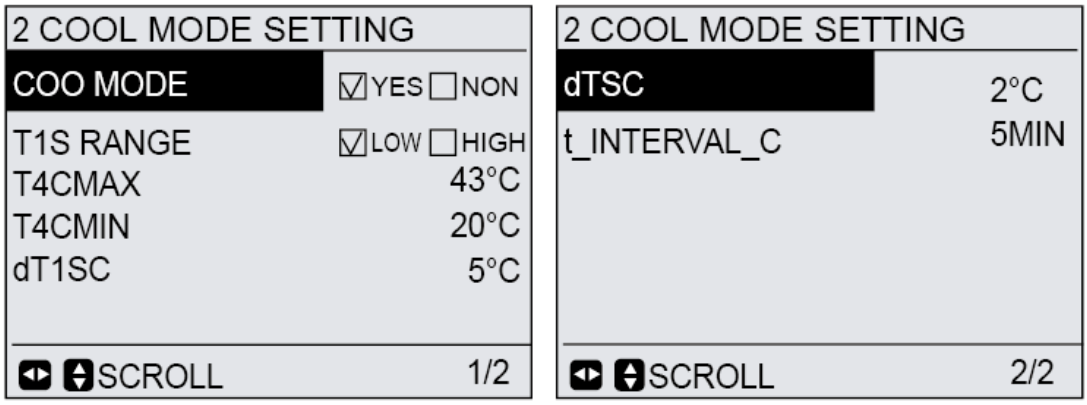
When DISINFECT is ON, the DHW pump will operate when the unit is in disinfect mode and T5≥T5S_DI-2. Pump run time is t+5min.

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

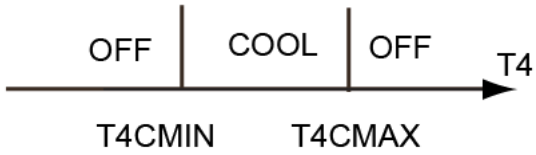
To determine whether the COOL mode is effective, go to MENU> FOR SERVICEMAN > COOL MODE SETTING. Press OK. The following page will be displayed:



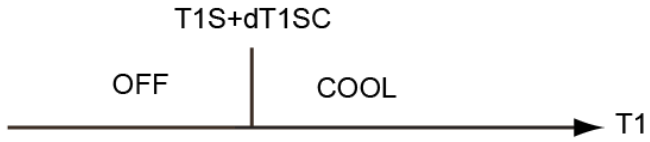
When the cursor is on COOL MODE, use ◄► to select YES or NON. Then press OK to enable or disable the cool mode. When the cursor is on T1S RANGE, use ◄►to select the range of outlet water temperature. When LOW is selected, the minimum target temperature is 5°C. If the climate-related curve function is 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

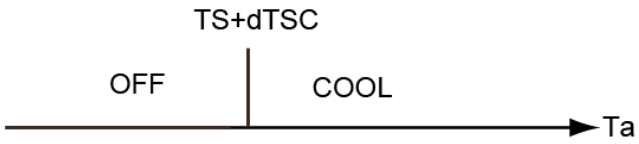
between the operation of the unit and ambient temperature is shown in the picture below:



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:



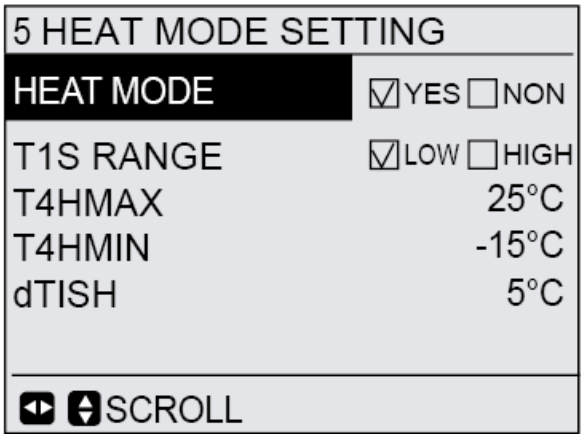
12.8.4 HEAT MODE SETTING

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.

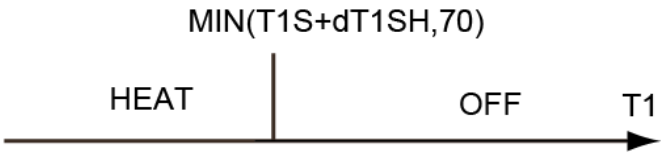
The relationship between the operation of the unit and ambient temperature can be seen in the picture below:

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.

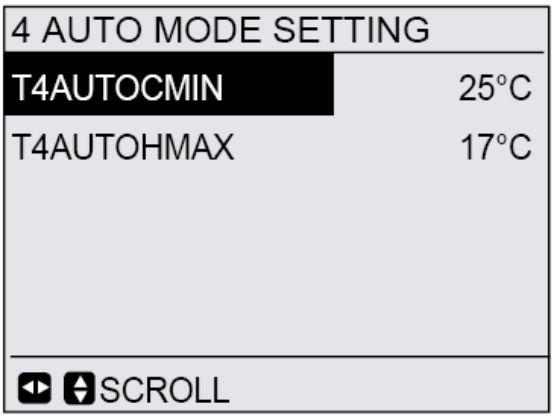
12.8.5 AUTO MODE SETTING

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.

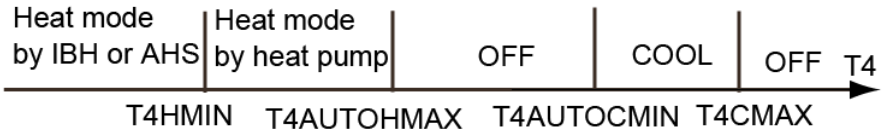


Use ◄ ► and ▼ ▲ to scroll and adjust the parameter.

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.

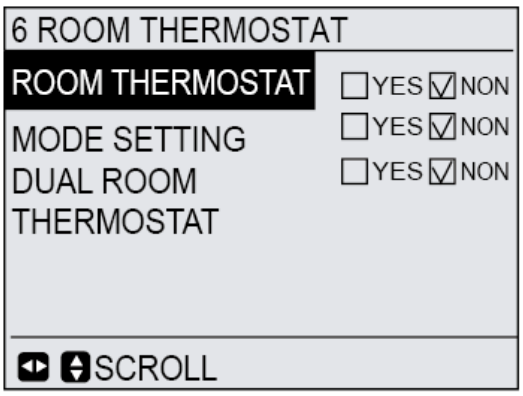
The relationship between heat pump operation and ambient temperature is described in the picture below (AHS is an additional heating source. IBH is a backup heater in the unit.):



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:



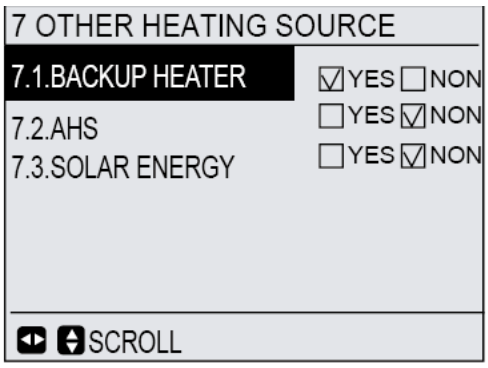
If the room thermostat is available, select YES and press OK. In MODE SETTING, if YES is selected, the mode setting and the on/off function cannot be performed from the user interface. The timer function is unavailable; the operation mode and the on/off function are decided by the room thermostat. The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

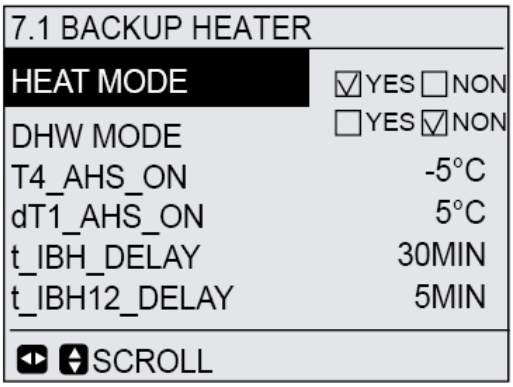
12.8.7 Other HEATING SOURCE

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:



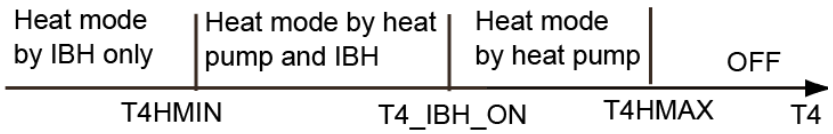
If backup heater is available, please select YES at BACKUP HEATER. Press OK and the following page is displayed:



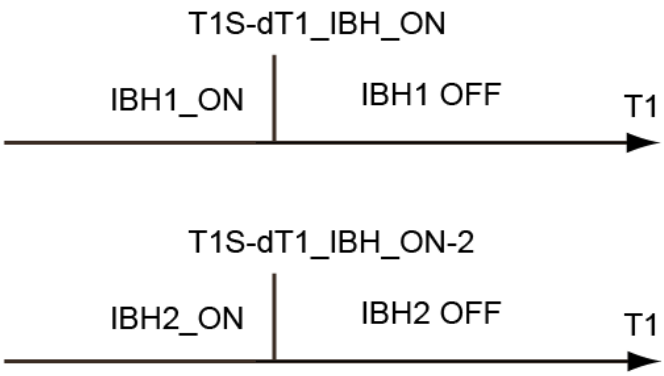
When the cursor is on HEAT MODE or DHW MODE, Use ◄ ► to select YES or NON. If YES is selected, the backup heater will be available in the corresponding mode, otherwise it will be unavailable.

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.

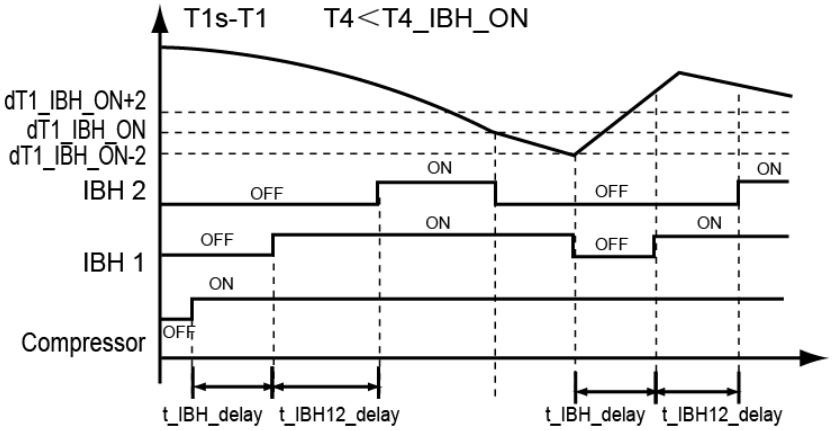


dT1_IBH_ON is the temperature difference between T1S and T1 for starting the backup heater. Only when at the T1<T1S-dT1_IBH_ON can the backup heater turn on. When a second backup heater is installed, if the temperature difference between T1S and T1 is larger than dT1_IBH_ON+2, the second backup heater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

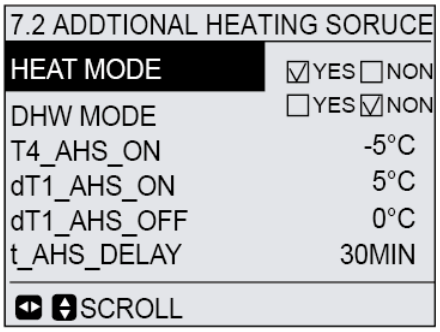


t_IBH_DELAY is the time that the compressor has run before the first backup heater turns on (if T1<T1S).

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

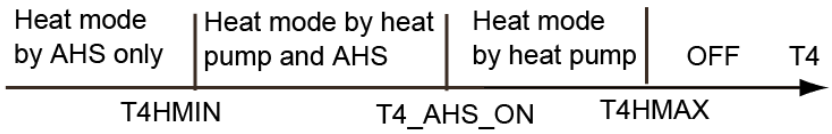


If an additional heating source is available, please select YES at the corresponding position. Press OK and the following page is displayed:

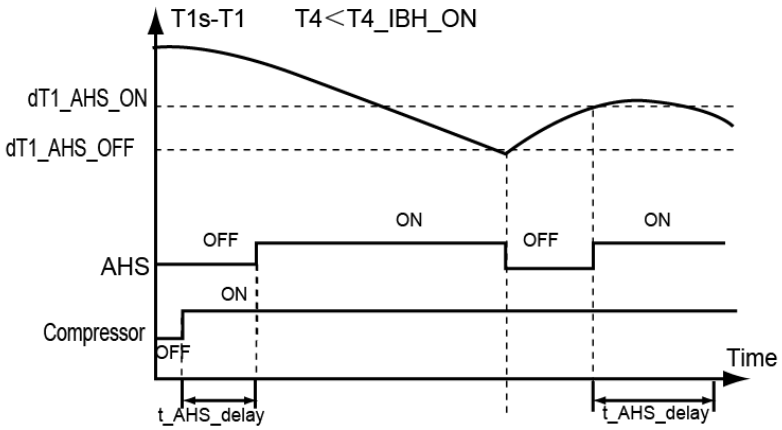


When the cursor is on HEAT MODE or DHW MODE, Use ◄► to select YES or NON. If YES is selected, the additional heating source will be available in the corresponding mode, otherwise it will be unavailable.

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:



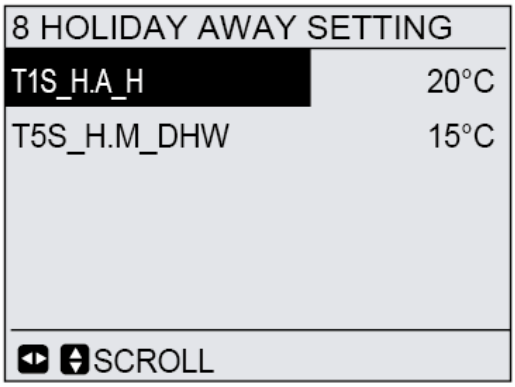
If solar energy kit is installed, please select YES at “SOLAR ENERGY”, and then the solar pump will operate when the solar energy kit operating for water heat, and the heat pump will stop operating for domestic hot water heating.

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:



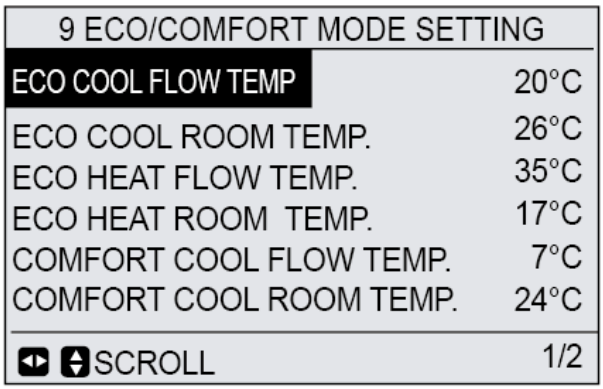
When the cursor is on T1S_H.A._H or T5S_H.M_DHW, Use◄ ► and ▼ ▲ to scroll and adjust the parameter, T1S_H.A._H is the target outlet water temperature for space heating when in holiday away mode.

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.

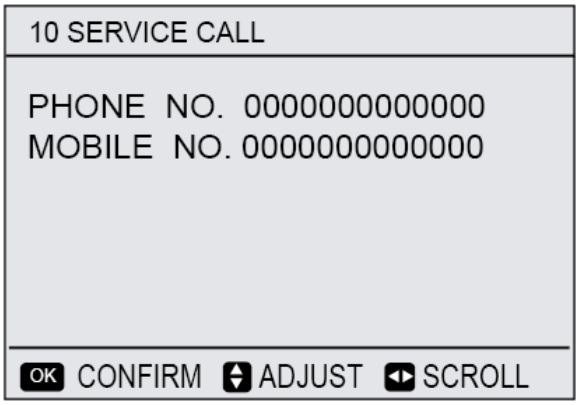
COMFORT HEAT FLOW TEMP. is the target outlet water temperature when in COMFORT HEAT mode.

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.

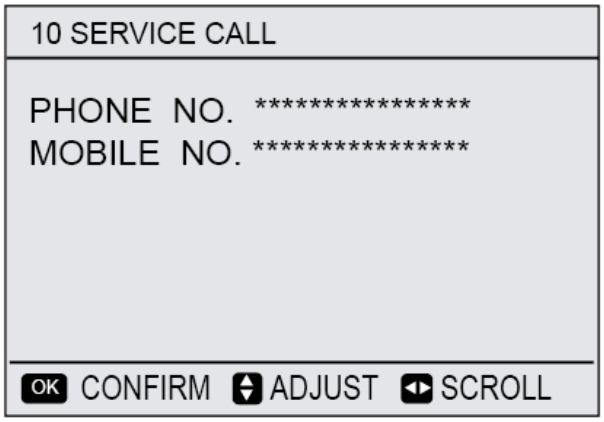
11.8.7 SERVICE CALL

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:

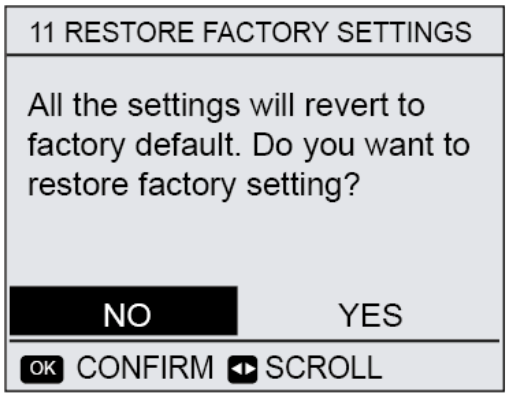


The number displayed on the user interface is the phone number of your local dealer.

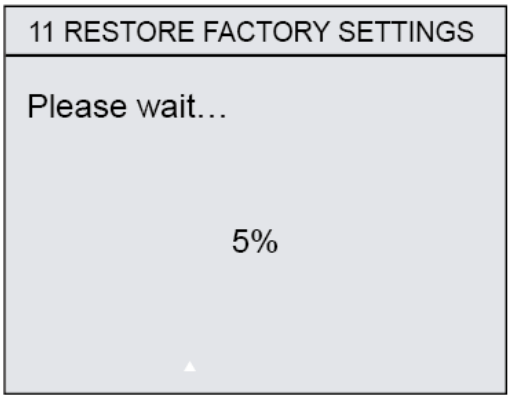
12.8.10 RESTORE FACTORY SETTINGS

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

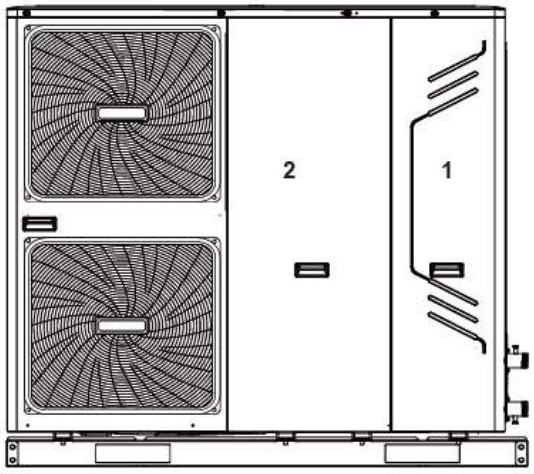
Possible causes	Corrective action
Dirty is blocking the water pressure relief valve outlet.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clock. Wise: • If you do not hear a clacking sound, contact your local dealer. • In case the water keeps running 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

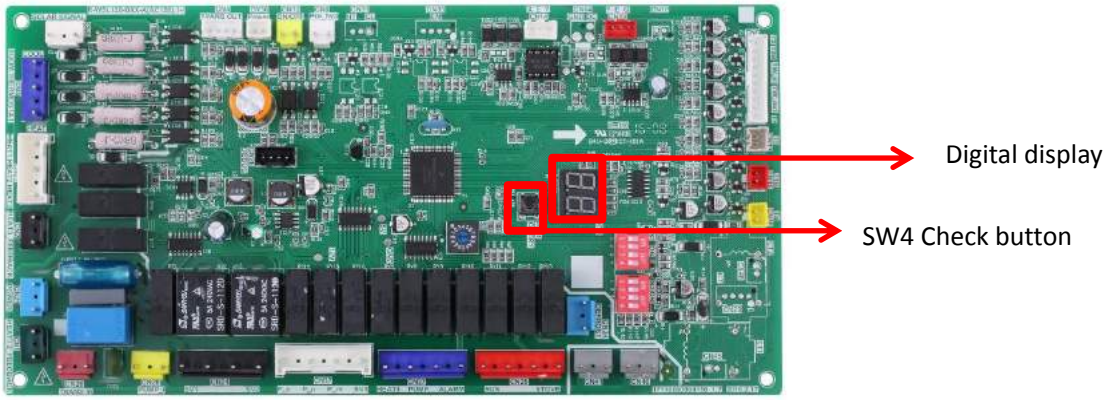
14.2.1 Check the parameters of hydraulic box



Door 1 access to the hydraulic compartment and electrical
Door 2 access to the compressor compartment and electrical

To check the parameters of hydraulic box, open door 1 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:



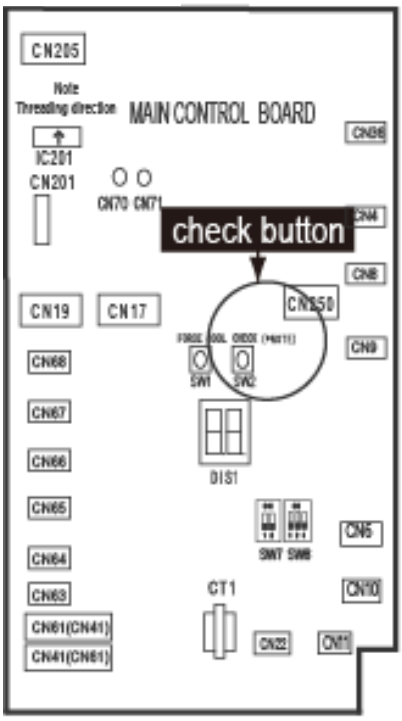
Check sequence table

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)

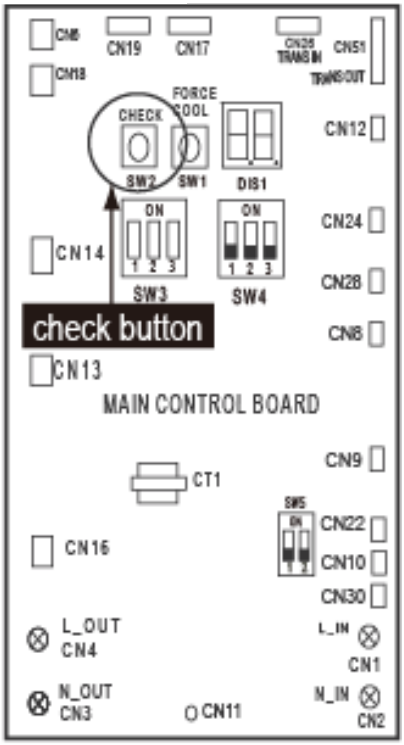
14.2.2 Check the parameters of refrigerant parts

To check the parameters on the refrigerant side, open door 2 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:

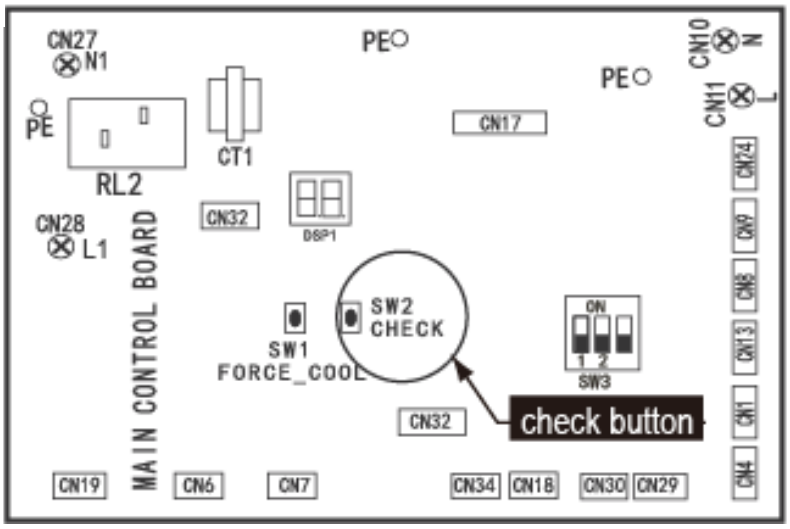
1Ph 10-16kW SW2



3Ph 12-16kW SW2



1Ph 5/7kW 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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