

KAISAI



Technical manual

ARCTIC POWER HEAT PUMP





HEAT PUMP ARCTIC POWER

KCHP-SU65-RN8L KCHP-SU75-RN8L
KCHP-SU110-RN8L KCHP-SU140-RN8L

Technical Manual

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

CONTENTS

Part 1 General Information..... 3

Part 2 Engineering Data 13

Part 3 User Interface Field Settings..... 33

Part 1

General Information

1 System introduction.....4

2 Product lineup 10

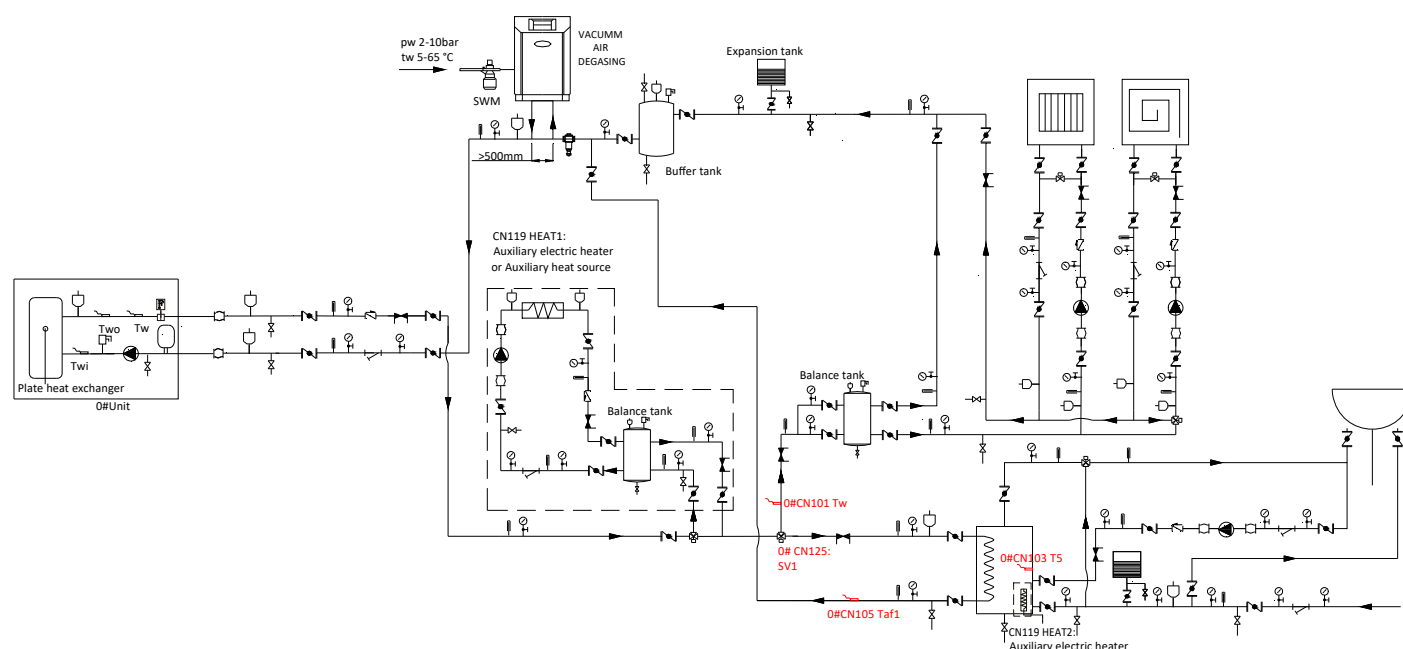
3 Nomenclature 10

4 System Design and Unit Selection 11

1.1 System Schematic

The heating capacity of heat pumps decreases with the decrease of ambient temperature. Aqua thermal Super is reserved an auxiliary electric heater control port to provide additional heating capacity for use during extremely cold weather when the heat pump capacity is insufficient. The auxiliary electric heater also serves as a backup in case of heat pump malfunction and for anti-freeze protection of the outside water piping in winter.

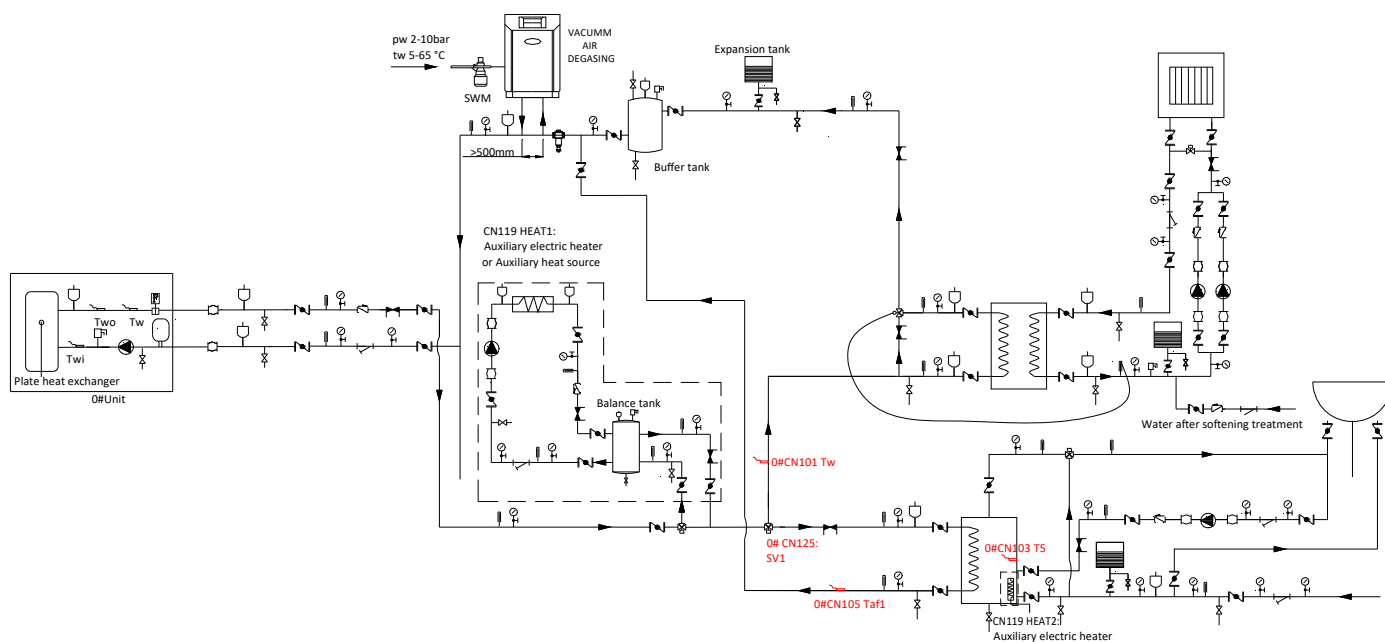
1.2.1 Scheme for a single unit with hydraulic clutch



Symbol explanation				
 Shut off valve	 Water pressure instrument	 Water flow switch	 Drain valve	 Differential pressure by-pass valve
 Y-filter	 Thermometer	 Pump	 Check valve	 Atmospheric exhaust valve
 Expansion tank	 Safety valve	 Soft joint	 Solenoid three-way valve	 Impurity separator with magnetic insert
 Balance valve				

1. The ratio of the two - way valves on the terminal shall not exceed 50 percent.
2. The main outlet water temperature sensing (Tw) head of the unit at address 0 needs to be placed on the main outlet pipe.
3. The hot water tank and the hot water exchange pump of the unit use the CN125 (220V) port control switch on the slave board of the 0 # unit, pump output is controlled through CN108 (0-10V). (CN125 is a three-way valve control port for switching between hot water mode and air conditioning mode)

1.2.2 Scheme for a single unit with heat exchanger



Symbol explanation

	Water pressure instrument	Water flow switch	Drain valve	Differential pressure by-pass valve
Y-filter	Thermometer	Pump	Check valve	Atmospheric exhaust valve
Expansion tank	Safety valve	Soft joint	Solenoid three-way valve	Impurity separator with magnetic insert
Balance valve				

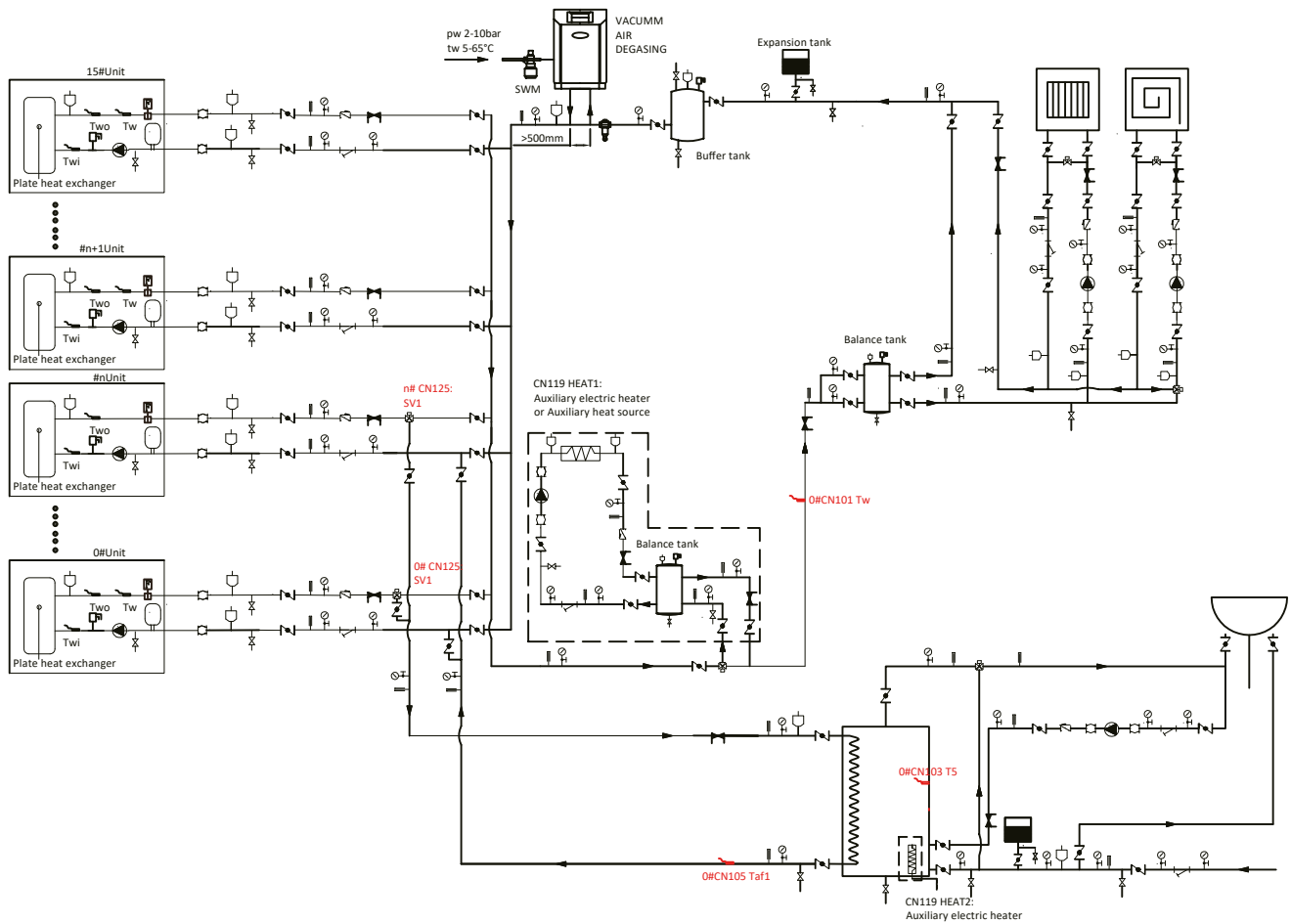
Note:

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High power heat pumps

1.2.3 Scheme for multiple units with hydraulic clutches

Simultaneous operation of Air conditioning and heating water model



Symbol explanation

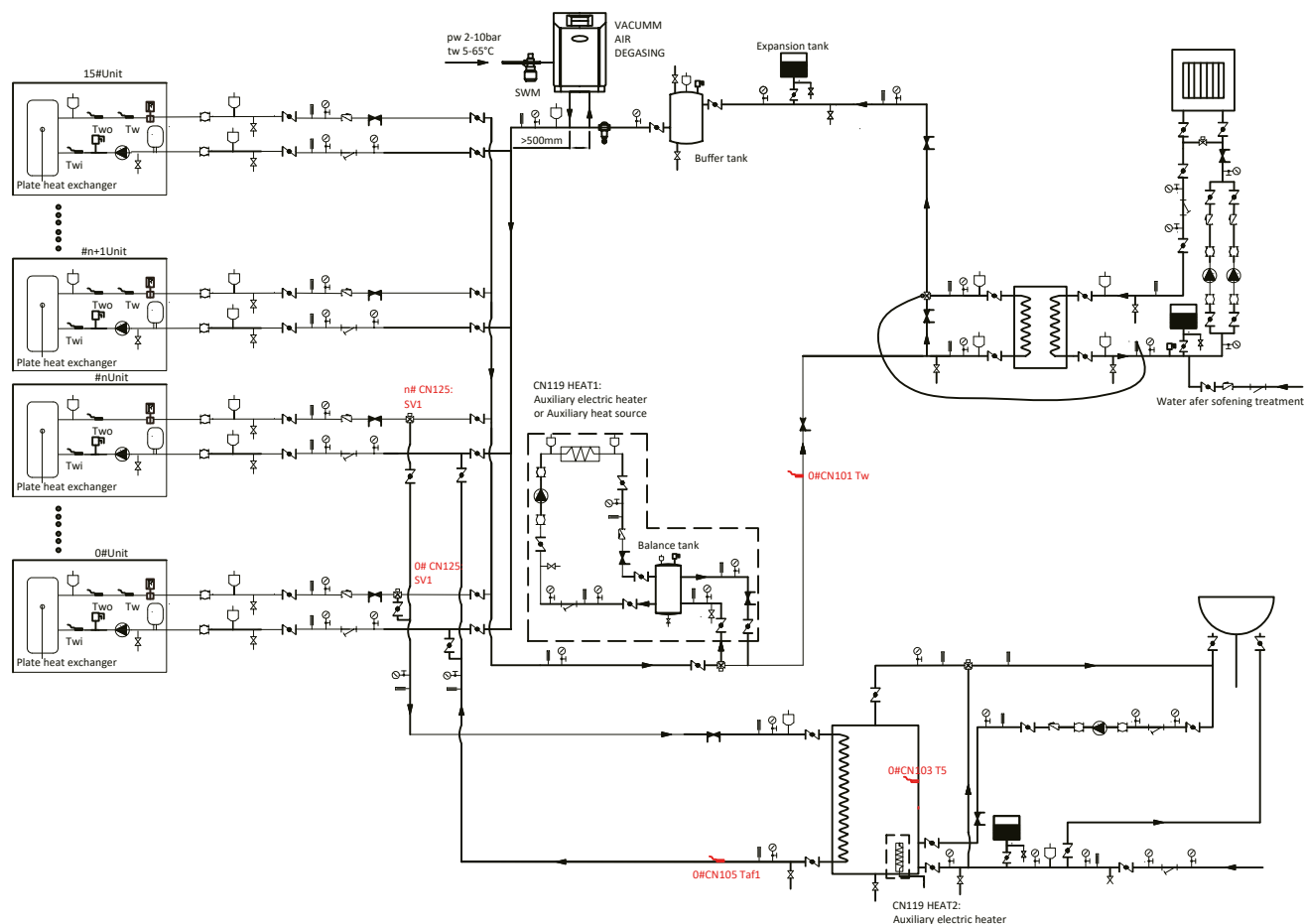
Shut off valve	Water pressure instrument	Water flow switch	Drain valve	Differential pressure by-pass valve
Y-filter	Thermometer	Pump	Check valve	Atmospheric exhaust valve
Expansion tank	Safety valve	Soft joint	Solenoid three-way valve	Impurity separator with magnetic insert
Balance valve				

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1.2.4 Scheme for multiple units with heat exchanger

Simultaneous operation of Air conditioning and heating water mode



Symbol explanation					
 Shut off valve	 Water pressure instrument	 Water flow switch	 Drain valve	 Differential pressure by-pass valve	
 Y-filter	 Thermometer	 Pump	 Check valve	 Atmospheric exhaust valve	
 Expansion tank	 Safety valve	 Soft joint	 Solenoid three-way valve	 Impurity separator with magnetic insert	
 Balance valve					

Note:

1. The ratio of the two - way valves on the terminal shall not exceed 50 percent.
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High power heat pumps

2 Product lineup

Model	KCHP-SU65-RN8L KCHP-SU75-RN8L	KCHP-SU110-RN8L KCHP-SU140-RN8L
Power supply	380-415V/3Ph/50Hz	380-415V/3Ph/50Hz
Appearance		

3 Nomenclature

K	C	H	P	-	S	U	65	-	R	N8	L
1	2	2	2		3	4	5		6	7	8

Legend		
No.	Code	Remarks
1	K	Brand: KAISAI
2	CHP	High power heat pump
3	S	Series code
4	U	Special function code U: DC inverter compressor
5	65	Rated heating capacity (kW) 65: 65 kW /h; 75: 75 kW /h; 110: 110 kW /h; 140: 140 kW /h;
6	R	Power supply: 380-415V/3 ph/50Hz
7	N8	Refrigerant type N8: R32
8	L	L: Low temperature refrigeration function Omitted: Without low temperature refrigeration function

4 System Design and Unit Selection

4.1 Selection Procedure

Step 1: Total heat load calculation

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

Step 2: System configuration

Decide whether to enable or disable auxiliary electric heater

Step 3: Selection of outdoor units

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

Provisionally select Aqua thermal Super Series unit capacity¹ based on nominal capacity

Correct capacity of the outdoor units for the following items:
Outdoor air temperature / Outdoor humidity / Water outlet temperature² /
Altitude / Anti-freeze type

Is corrected Aqua thermal Super capacity $\geq$ Required total heat load on outdoor units³

Yes

Aqua thermal Super system
selection is complete

No

Select a larger model or enable
auxiliary electric heater operation

Notes:

- Up to 16 units can be connected together, giving a system cooling/heating capacity range from 65kW to 2240kW.
- If the required water temperatures of the heat emitters are not all the same, the Aqua thermal Super's outlet water temperature setting should be set at the highest of the heat emitter required water temperatures. If the water outlet design temperature falls between two temperatures listed in the outdoor unit's capacity table, calculate the corrected capacity by interpolation.
- Select Aqua thermal Super which satisfies both total heating and cooling load requirements.

4.2 Modular Chiller Leaving Water Temperature (LWT) Selection

The recommended design LWT ranges for different types of heat emitter are:

- For floor heating: 35 to 45°C
- For fan coil units: 40 to 45°C
- For low temperature radiators: 40 to 50°C

High power heat pumps

4.3 Optimizing System Design

To get the most comfort with the lowest energy consumption with Aqua thermal Super, it is important to take account of the following considerations:

- Choose heat emitters that allow the heat pump system to operate at as low a hot water temperature as possible whilst still providing sufficient heating.

4.4 Design of the buffer tank in the system

To prevent excessive temperature changes in the water system during the defrosting process of the unit, or frequent startup and shutdown during use, a buffer tank should be installed in the water system. The recommended calculation method for the volume of the buffer tank is as follows:

$$M = \frac{k \times Q \times T}{C \times \Delta t \times \rho} - M1$$

- n: the equation,
- M: The volume of the buffer water tank, unit: L,
- k : Defrosting capacity coefficient, taken as 0.4 based on the test result,
- Q: Unit heating capacity, unit: kW,
- T: The maximum defrosting time, unit: S, taken as 240 based on the test result,
- C: Specific heat capacity of heat exchange liquid, unit: kJ/kg °C,
- Δt : Allowable water temperature drop during defrosting process, unit: °C, usually taken as 3,
- ρ : The density of the heat exchange liquid, in kg/L,
- M1: Pipeline volume, unit: L; need to consider the minimum amount of circulating water that can occur in the system.

The selection of k and T parameters is based on the test results of the unit. The refrigeration capacity of the unit during defrosting is 0.4. The time T is around 200S. To have margin, it is recommended to choose 240S. The Δt is recommended to choose 3 °C according to our company's standard.

For a single unit water system, it is recommended to add a buffer water tank in the waterway and select the type according to the above formula. For a water system with multiple units in parallel, the capacity selection of the buffer water tank can be based on a single unit.

Part 2

Engineering Data

1 Specifications..... 14

2 Electrical Characteristics 16

3 Dimensions and Center of Gravity 17

4 Capacity Tables 19

5 Performance Adjustment Factors 27

6 Hydronic Performance 29

7 Octave Band Levels 31

1 Specifications

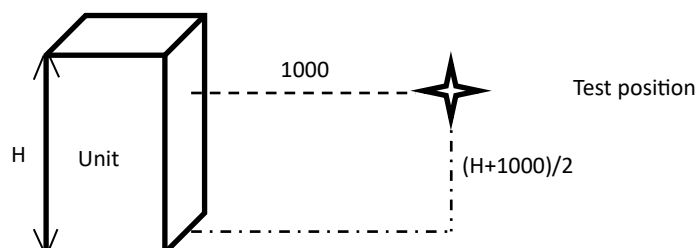
Model			KCHP-SU65-RN8L	KCHP-SU75-RN8L	KCHP-SU110-RN8L	KCHP-SU140-RN8L
Power supply		V/Ph/Hz	380~415/3/50	380~415/3/50	380~415/3/50	380~415/3/50
Cooling(A35W7)	Capacity	kW	56.68	69.29	99.33	129.29
	Input	kW	19.79	28.26	34.09	52.01
	EER		2.86	2.45	2.91	2.49
Cooling(A35W18)	Capacity	kW	75.30	85.07	127.26	137.06
	Input	kW	22.14	25.06	35.50	38.69
	EER		3.40	3.39	3.58	3.54
SEER			4.92	4.85	4.78	4.77
Heating(A7W65)	Capacity	kW	60.10	61.10	100.12	110.12
	Input	kW	26.24	26.89	43.27	50.37
	COP		2.29	2.27	2.31	2.19
Heating(A7W55)	Capacity	kW	64.15	66.15	106.32	126.37
	Input	kW	21.68	22.50	35.85	50.28
	COP		2.96	2.94	2.97	2.51
Heating(A7W45)	Capacity	kW	65.65	75.71	110.67	140.94
	Input	kW	19.43	23.51	31.21	47.10
	COP		3.38	3.22	3.55	2.99
Heating(A7W35)	Capacity	kW	64.65	77.70	113.14	142.94
	Input	kW	16.37	21.61	28.52	40.54
	COP		3.95	3.59	3.97	3.53
SCOP(55)average			3.36	3.36	3.23	3.23
SCOP(35)average			4.47	4.47	4.23	4.23
Fan	Type		DC motor	DC motor	DC motor	DC motor
	Quantity		2	2	2	2
	Air flow rate	m³/h	22000	28500	32500	50000
Air side heat exchanger	Type		Fin coil mode	Fin coil mode	Fin coil mode	Fin coil mode
	Row		2	2	2	2
	thickness	mm	0.095	0.095	0.095	0.095
	pipe diameter	mm	7	7	7	7
Water side heat exchanger	Type		Plate heat exchanger	Plate heat exchanger	Plate heat exchanger	Plate heat exchanger
	head of delivery	m	23.0	17.3	18.0	11.7
	Volume	L	5.17	5.17	11.1	11.1
	Rated water flow(cooling)	m³/h	9.8	12.04	17.2	22.36
	Rated water flow(heating)	m³/h	11.2	12.9	18.9	24.08
	Water flow range	m³/h	3~14	3~14	5~26	5~26
Refrigerant system	Type		R32	R32	R32	R32
	Charge	kg	9	9	15.5	15.5
	Throttle type		EXV	EXV	EXV	EXV

Water pump	Pump model		MHIE802-1/10/E/3-380-60-2		MHIE802-1/10/E/3-380-60-2 + MHI802-1/10/E/3-380-50-2	
Expansion tank	Volume	L	12	12	22	22
	Precharge pressure	Mpa	0.15	0.15	0.15	0.15
	Test pressure	Mpa	1	1	1	1
Sound power level (A7W45)		dB(A)	80	86	80	92
Sound pressure level(1m) ¹ (A7W45)		dB(A)	64	69	64	73
Silent mode sound power level(A7W45)		dB(A)	77	82	75	88
Super Silent mode sound power level(A7W45)		dB(A)	74	78	72	85
Net dimensions(W×H×D)		mm	2000X1770X960	2000X1770X960	2220×2300×1135	2220×2300×1135
Packed dimensions (W×H×D)		mm	2085X1890X1030	2085X1890X1030	2250×2445×1180	2250×2445×1180
Net / Gross weight		kg	475 / 490	475 / 490	746 / 767	746 / 767
Water pipe connection		mm	DN50	DN50	DN65	DN65
Ambient temperature range	Cooling	°C	-15 to 48	-15 to 48	-15 to 48	-15 to 48
	Heating	°C	-25 to 43	-25 to 43	-25 to 43	-25 to 43
	DHW	°C	-20 to 43	-20 to 43	-20 to 43	-20 to 43
Water outlet temperature range	Cooling ²	°C	0 to 20	0 to 20	0 to 20	0 to 20
	Heating	°C	25 to 65	25 to 65	25 to 65	25 to 65
	DHW(Heat pump)	°C	30 to 62	30 to 62	30 to 62	30 to 62
	DHW ³	°C	30 to 70	30 to 70	30 to 70	30 to 70

Water pump	Pump model		MHIE802-1/10/E/3-380-60-2	MHI802-1/10/E/3-380-50-2
	Power supply	V/Ph/Hz	380V ±10% 3P 50/60Hz	380V ±10% 3P 50Hz
	Rated power	KW	1.78	0.93
	Rated current	A	3.25	1.83
	Rated pump head	m	27.1	15.0
	Rated speed	r/min	3480	2825

Notes:

1. Sound pressure level is the test average measured in a semi-anechoic chamber. The test position is 1m right in front of the unit for four sides and $(1+H)/2$ m (where H is the height of the unit) above the floor. During in-situ operation, sound pressure levels may be higher as a result of ambient noise.



2. Antifreeze fluid is need when water temperature is less than 5 °C.

3. Heat pump + Electric heater, Electric heater installed in the tank is field supplied.

High power heat pumps



2 Electrical Characteristics

System	Outdoor unit				Power current		Compressor		Fan	
	Voltage	Hz	Min.	Max.	MCA	MOP	MSC	RLA	kW	FLA
	(V)		(V)	(V)	(A)	(A)	(A)	(A)		(A)
KCHP-SU65-RN8L	380-415	50	342	456	46	54	-	34.09	0.39	1.4
KCHP-SU75-RN8L	380-415	50	342	456	46	54	-	34.09	0.72	2.5
KCHP-SU110-RN8L	380-415	50	342	456	90	106	-	34.09	0.68	1.7
KCHP-SU140-RN8L	380-415	50	342	456	90	106	-	34.09	1.60	4.0

Note:

MCA: Min. Circuit Amps. (For wire diameter selection)

MOP: Maximum overcurrent protector

MSC : Max. Starting Amps.

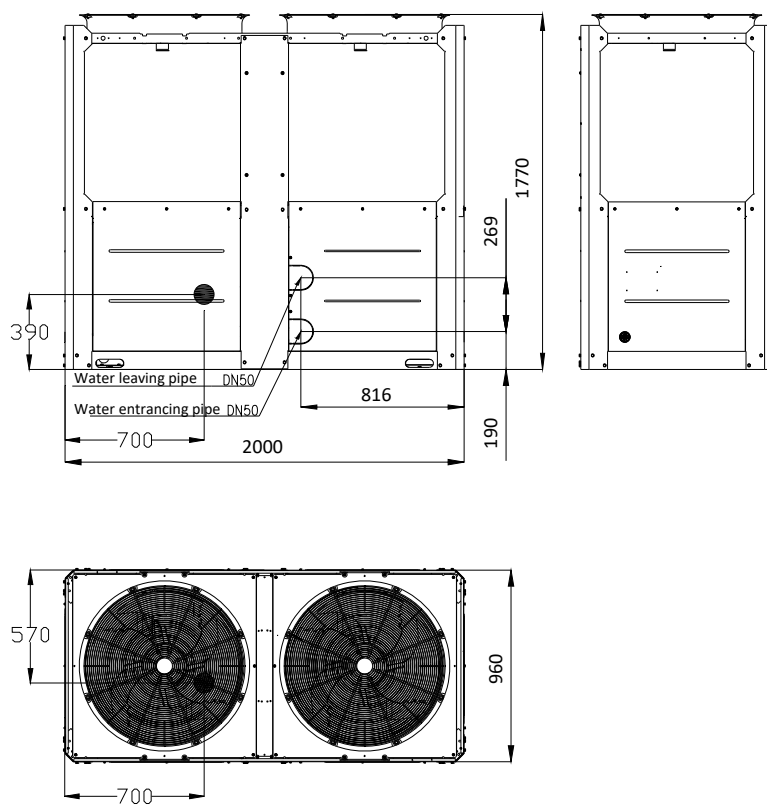
FLA: Full Load Amps.

KW: Rated Motor Output

RLA: In nominal cooling or heating test condition, the input Amps of compressor where MAX. Hz can operate Rated Load Amps.

3 Dimensions and Center of Gravity

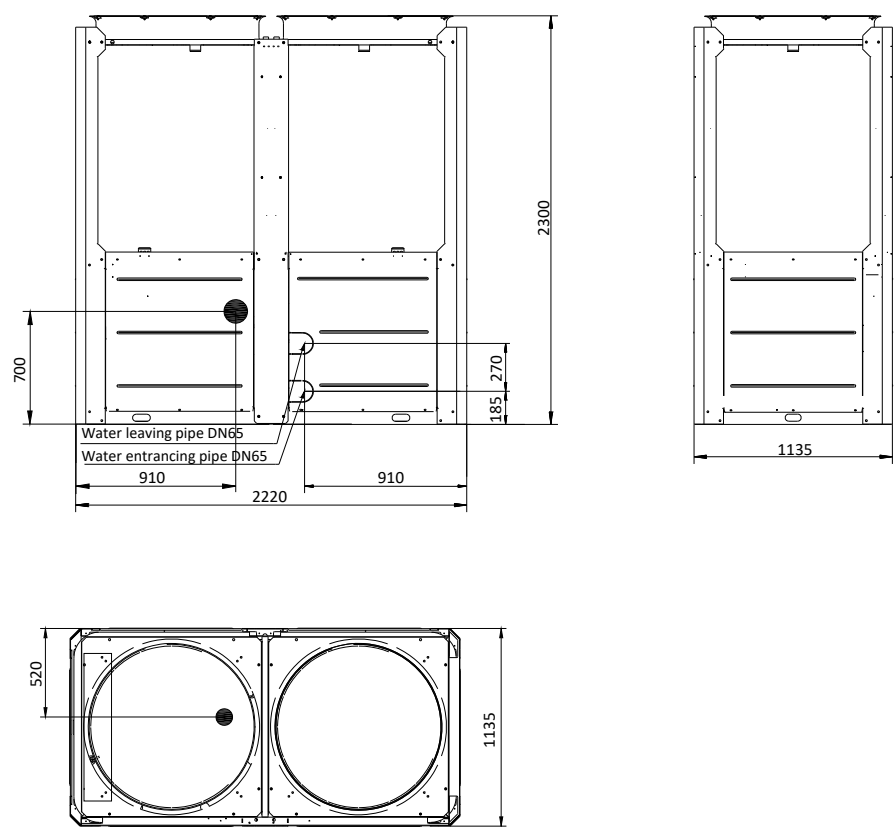
KCHP-SU65-RN8L / KCHP-SU75-RN8L



High power heat pumps



KCHP-SU110-RN8L / KCHP-SU140-RN8L



4 Capacity Tables

4.1 Heating Capacity Tables

KCHP-SU65-RN8L

LWT	DB																	
	-25			-20			-18			-15			-10			-5		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	34.54	16.15	2.14	40.35	15.83	2.55	43.73	15.17	2.88	46.60	15.12	3.08	49.55	15.96	3.11	55.72	17.30	3.22
30	32.17	17.12	1.88	37.60	16.77	2.24	42.43	15.51	2.74	45.22	15.33	2.95	48.07	16.06	2.99	53.74	17.39	3.09
35	32.61	19.08	1.71	38.11	18.68	2.04	40.50	16.74	2.42	43.06	16.51	2.61	45.89	17.43	2.63	51.23	18.69	2.74
40	30.25	19.65	1.54	35.15	19.20	1.83	40.56	20.55	1.97	43.13	20.08	2.15	45.96	20.99	2.19	51.89	21.59	2.40
45	\	\	\	35.55	22.91	1.55	39.89	23.02	1.73	42.62	22.23	1.92	45.47	23.11	1.97	52.44	24.73	2.12
48	\	\	\	33.85	27.37	1.24	38.84	27.95	1.39	41.30	25.25	1.64	43.91	24.55	1.79	50.97	25.70	1.98
50	\	\	\	\	\	\	36.34	26.45	1.37	38.86	23.94	1.62	41.32	24.15	1.71	48.92	26.28	1.86
55	\	\	\	\	\	\	\	\	\	37.48	24.18	1.55	39.86	24.21	1.65	47.78	26.65	1.79
60	\	\	\	\	\	\	\	\	\	\	\	\	38.59	25.90	1.49	45.81	28.22	1.62
65	\	\	\	\	\	\	\	\	\	\	\	\	36.42	27.48	1.33	43.90	30.40	1.44
LWT	DB																	
	0			5			7			10			15			20		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	62.00	17.85	3.47	65.82	18.06	3.64	70.08	16.65	4.21	73.56	16.60	4.43	85.87	18.02	4.76	88.64	18.14	4.89
30	59.42	18.29	3.25	63.00	17.96	3.51	67.46	16.12	4.18	72.31	17.10	4.23	80.90	17.53	4.61	85.37	18.00	4.74
35	56.79	18.62	3.05	60.22	18.00	3.35	64.65	16.37	3.95	67.36	15.99	4.21	77.89	17.46	4.46	82.45	17.94	4.60
40	58.03	20.88	2.78	61.94	19.56	3.17	65.78	18.50	3.56	68.16	18.00	3.79	75.59	18.23	4.15	77.03	17.52	4.40
45	59.43	23.46	2.53	63.62	21.26	2.99	65.65	19.43	3.38	67.79	18.85	3.60	70.47	18.18	3.88	75.67	18.56	4.08
48	58.13	24.71	2.35	62.40	21.25	2.94	65.77	20.57	3.20	66.76	18.85	3.54	69.62	18.34	3.80	74.98	18.76	4.00
50	56.53	25.94	2.18	61.96	21.61	2.87	65.46	20.97	3.12	66.25	19.10	3.47	69.08	18.58	3.72	74.41	19.00	3.92
55	55.67	26.49	2.10	60.84	22.06	2.76	64.15	21.68	2.96	64.30	20.94	3.07	66.90	20.16	3.32	71.95	20.60	3.49
60	53.01	27.86	1.90	58.81	23.55	2.50	62.09	22.92	2.71	59.59	21.71	2.74	62.00	21.29	2.91	59.96	19.75	3.04
65	51.40	30.35	1.69	56.96	25.62	2.22	60.10	26.24	2.29	55.09	22.78	2.42	57.32	22.82	2.51	43.59	16.83	2.59
LWT	DB																	
	25			30			35			40			43					
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP			
25	93.77	18.40	5.10	99.77	17.65	5.65	100.6	15.88	6.34	101.7	15.36	6.62	100.6	14.40	6.98			
30	92.44	18.37	5.03	101.3	18.67	5.43	104.3	16.93	6.16	108.1	17.25	6.26	103.0	15.91	6.47			
35	90.54	18.17	4.98	100.2	19.24	5.21	106.8	18.58	5.75	110.6	18.97	5.83	104.3	16.97	6.15			
40	85.02	17.87	4.76	92.93	19.38	4.80	99.07	18.22	5.44	103.5	18.76	5.52	97.11	16.77	5.79			
45	82.77	18.94	4.37	84.11	18.38	4.58	90.67	17.58	5.16	92.69	17.76	5.22	87.59	16.08	5.45			
48	82.45	19.18	4.30	83.99	18.60	4.51	90.56	17.78	5.09	92.64	18.19	5.09	87.48	16.24	5.39			
50	81.81	19.43	4.21	83.14	18.85	4.41	89.86	18.01	4.99	91.86	18.20	5.05	86.81	16.45	5.28			
55	78.94	21.13	3.74	80.24	20.49	3.92	86.62	19.55	4.43	88.58	19.77	4.48	83.63	17.81	4.70			
60	65.62	20.57	3.19	62.85	19.41	3.24	67.84	18.32	3.70	69.38	18.52	3.75	65.50	16.68	3.93			
65	47.77	17.20	2.78	48.56	16.67	2.91	52.45	15.58	3.37	36.01	10.09	3.57	\	\	\			

Abbreviations:

HC: Total heating capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

COP: Coefficient of Performance (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

High power heat pumps



KCHP-SU75-RN8L

LWT	DB																	
	-25			-20			-18			-15			-10			-5		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	39.91	20.31	1.97	46.67	19.99	2.34	50.58	18.81	2.69	53.88	19.76	2.73	57.40	20.65	2.78	64.52	21.97	2.94
30	37.87	21.92	1.73	44.19	21.48	2.06	49.98	19.58	2.55	53.24	20.40	2.61	56.61	21.18	2.67	63.38	22.49	2.82
35	36.71	23.44	1.57	43.08	23.01	1.87	45.88	20.32	2.26	48.78	21.15	2.31	51.87	22.02	2.36	58.12	23.38	2.49
40	33.88	23.97	1.41	39.56	23.47	1.69	45.49	24.69	1.84	48.37	25.45	1.90	51.43	26.27	1.96	58.28	26.73	2.18
45	\	\	\	39.18	27.51	1.42	42.82	26.41	1.62	47.61	28.04	1.70	50.78	28.85	1.76	58.54	30.42	1.92
48	\	\	\	36.42	30.08	1.21	39.95	29.48	1.36	44.23	28.47	1.55	47.13	29.20	1.61	54.18	30.67	1.77
50	\	\	\	\	\	\	39.01	29.44	1.33	43.20	28.34	1.52	46.03	29.07	1.58	52.91	30.53	1.73
55	\	\	\	\	\	\	\	\	\	41.34	27.90	1.48	43.99	28.56	1.54	50.52	29.96	1.69
60	\	\	\	\	\	\	\	\	\	\	\	\	42.15	30.74	1.37	48.42	32.24	1.50
65	\	\	\	\	\	\	\	\	\	\	\	\	40.65	34.46	1.18	46.68	36.11	1.29
LWT	DB																	
	0			5			7			10			15			20		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	72.05	23.23	3.10	76.43	23.44	3.26	85.39	20.82	4.10	85.52	21.52	3.97	98.83	24.10	4.10	102.3	23.70	4.31
30	70.29	24.18	2.91	74.54	23.94	3.11	82.38	20.74	3.97	84.07	22.18	3.79	93.33	23.43	3.98	98.47	23.52	4.19
35	64.28	23.31	2.76	68.34	22.85	2.99	77.70	21.61	3.59	78.32	21.70	3.61	90.03	23.11	3.90	95.34	23.44	4.07
40	65.21	26.07	2.50	69.64	24.78	2.81	77.06	21.26	3.62	79.24	23.65	3.35	87.57	24.18	3.62	89.25	22.65	3.94
45	66.32	28.99	2.29	70.99	26.43	2.69	75.71	23.51	3.35	78.16	24.37	3.21	80.98	24.01	3.37	87.18	23.96	3.64
48	61.34	29.16	2.10	65.69	26.72	2.46	71.38	23.16	3.08	72.69	24.61	2.95	75.33	24.25	3.11	81.51	24.22	3.37
50	59.80	29.04	2.06	63.99	26.43	2.42	69.72	23.06	3.02	70.84	24.48	2.89	73.58	24.14	3.05	79.42	24.12	3.29
55	57.04	28.50	2.00	60.96	25.93	2.35	66.15	22.50	2.94	67.42	23.70	2.85	69.91	23.33	3.00	75.46	23.37	3.23
60	54.67	30.70	1.78	58.43	27.93	2.09	63.60	24.01	2.65	64.63	25.52	2.53	67.01	25.13	2.67	65.05	22.58	2.88
65	52.73	34.38	1.53	56.36	31.27	1.80	61.10	26.89	2.28	55.93	25.67	2.18	58.00	25.28	2.29	47.26	19.04	2.48
LWT	DB																	
	25			30			35			40			43					
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP			
25	108.1	23.75	4.55	115.6	22.57	5.12	116.3	20.33	5.72	117.8	19.53	6.03	116.2	18.57	6.26			
30	106.6	24.00	4.44	117.4	23.89	4.91	120.5	21.70	5.55	125.2	21.98	5.70	119.0	20.55	5.79			
35	104.5	23.75	4.40	116.1	24.62	4.72	123.4	23.83	5.18	128.2	24.19	5.30	120.6	21.93	5.50			
40	98.07	23.35	4.20	107.6	24.80	4.34	114.5	23.37	4.90	119.9	23.92	5.01	112.2	21.68	5.18			
45	95.38	24.46	3.90	97.37	23.51	4.14	104.8	22.54	4.65	107.3	22.63	4.74	101.2	20.76	4.87			
48	89.40	24.72	3.62	91.27	23.76	3.84	98.26	22.98	4.28	100.7	23.08	4.36	94.92	21.17	4.48			
50	87.34	24.62	3.55	89.15	23.65	3.77	95.98	22.88	4.19	98.34	22.98	4.28	92.72	21.08	4.40			
55	82.68	23.87	3.46	84.43	22.92	3.68	91.03	22.03	4.13	93.30	22.12	4.22	87.79	20.16	4.35			
60	71.28	23.07	3.09	63.93	19.46	3.29	68.86	18.62	3.70	70.58	18.71	3.77	66.48	17.11	3.89			
65	51.82	19.49	2.66	52.92	18.70	2.83	57.01	17.90	3.18	38.70	11.89	3.25	\	\	\			

Abbreviations:

HC: Total heating capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

COP: Coefficient of Performance (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

KCHP-SU110-RN8L

LWT	DB																	
	-25			-20			-18			-15			-10			-5		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	64.68	28.92	2.24	75.40	28.44	2.65	82.50	28.30	2.92	87.93	29.78	2.95	92.30	29.13	3.17	104.7	32.31	3.24
30	59.15	27.52	2.15	68.97	27.06	2.55	78.48	27.77	2.83	82.82	29.57	2.80	88.44	29.70	2.98	99.38	32.42	3.07
35	59.81	29.30	2.04	69.74	28.80	2.42	74.85	27.56	2.72	79.19	29.24	2.71	83.92	29.16	2.88	94.42	32.13	2.94
40	52.62	30.27	1.74	61.14	29.70	2.06	69.88	29.14	2.40	74.75	29.26	2.56	78.92	28.97	2.72	89.48	32.08	2.79
45	\	\	\	50.67	33.06	1.53	67.14	35.00	1.92	71.63	32.83	2.18	75.69	32.31	2.34	87.37	36.89	2.37
48	\	\	\	40.75	28.49	1.43	64.68	35.09	1.84	69.37	33.07	2.10	73.35	32.57	2.25	85.33	37.47	2.28
50	\	\	\	\	\	\	60.29	33.93	1.78	64.24	31.70	2.03	68.76	31.68	2.17	81.10	36.65	2.21
55	\	\	\	\	\	\	\	\	\	62.74	34.42	1.82	66.79	34.13	1.96	79.96	39.92	2.00
60	\	\	\	\	\	\	\	\	\	\	\	\	64.80	38.47	1.68	77.26	44.83	1.72
65	\	\	\	\	\	\	\	\	\	\	\	\	61.42	40.82	1.50	73.23	47.56	1.54
LWT	DB																	
	0			5			7			10			15			20		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	115.4	33.77	3.42	123.2	31.45	3.92	129.7	30.28	4.28	138.5	31.47	4.40	147.3	32.91	4.48	161.0	35.17	4.58
30	108.8	34.07	3.19	115.8	31.52	3.67	123.0	30.60	4.02	135.6	32.75	4.14	145.8	34.03	4.28	154.2	35.72	4.32
35	104.4	33.60	3.11	110.4	32.35	3.41	113.1	28.52	3.97	127.3	31.43	4.05	140.2	33.36	4.20	147.4	34.79	4.24
40	100.1	34.78	2.88	106.7	33.39	3.20	112.4	29.89	3.76	120.2	31.18	3.86	134.3	33.64	3.99	136.9	32.47	4.22
45	98.5	39.59	2.49	105.8	36.24	2.92	110.7	31.21	3.55	114.2	31.79	3.59	119.8	33.05	3.62	125.5	32.05	3.92
48	97.8	40.86	2.39	103.7	36.96	2.81	109.0	31.98	3.41	111.5	32.27	3.46	118.0	33.66	3.50	123.6	32.80	3.77
50	93.9	40.70	2.31	102.6	37.86	2.71	107.3	32.43	3.31	110.3	33.08	3.33	116.1	34.33	3.38	121.6	33.31	3.65
55	92.8	44.32	2.09	100.7	41.03	2.45	106.3	35.85	2.97	107.5	35.48	3.03	114.2	36.99	3.09	119.9	35.83	3.35
60	88.5	49.15	1.80	98.54	46.50	2.12	103.5	40.43	2.56	106.0	40.63	2.61	111.4	41.88	2.66	116.9	40.55	2.88
65	86.5	53.59	1.61	95.60	50.35	1.90	100.1	43.27	2.31	102.6	42.26	2.43	92.59	36.42	2.54	97.02	35.10	2.76
LWT	DB																	
	25			30			35			40			43					
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	174.6	37.41	4.67	180.1	37.81	4.76	185.5	36.94	5.02	177.1	30.84	5.74	172.9	29.68	5.82			
30	162.4	37.03	4.39	167.0	35.42	4.72	171.6	34.73	4.94	162.0	29.47	5.50	157.2	28.38	5.54			
35	152.0	35.73	4.26	155.9	33.44	4.66	161.7	33.76	4.79	150.0	29.14	5.15	145.5	27.59	5.27			
40	140.1	32.47	4.31	136.5	29.68	4.60	143.5	30.51	4.70	132.4	27.34	4.84	126.9	25.65	4.95			
45	127.4	31.48	4.05	120.9	28.68	4.21	127.7	29.96	4.26	115.9	25.92	4.47	110.1	24.44	4.50			
48	125.5	32.22	3.89	119.1	29.36	4.06	125.7	30.52	4.12	114.2	27.36	4.18	108.4	25.46	4.26			
50	123.5	32.85	3.76	117.2	29.76	3.94	123.7	31.12	3.98	112.4	27.42	4.10	106.7	25.69	4.15			
55	121.7	35.17	3.46	115.3	31.91	3.61	122.0	33.25	3.67	110.6	29.65	3.73	105.0	27.60	3.80			
60	118.7	39.80	2.98	102.7	31.91	3.22	108.4	33.07	3.28	98.46	28.87	3.41	93.47	26.30	3.55			
65	98.38	34.53	2.85	79.99	26.01	3.08	85.85	27.40	3.13	60.42	18.61	3.25	\	\	\			

Abbreviations:

HC: Total heating capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

COP: Coefficient of Performance (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

High power heat pumps



KCHP-SU140-RN8L

LWT	DB																	
	-25			-20			-18			-15			-10			-5		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	77.45	41.82	1.85	90.06	41.37	2.18	98.71	40.92	2.41	105.3	42.67	2.47	110.5	41.91	2.64	125.0	46.68	2.68
30	70.85	39.79	1.78	82.44	39.11	2.11	93.61	40.06	2.34	99.09	41.30	2.40	105.9	42.55	2.49	118.6	46.52	2.55
35	65.56	40.33	1.63	78.96	41.06	1.92	89.74	41.86	2.14	94.81	42.96	2.21	100.9	43.61	2.31	113.5	48.28	2.35
40	57.05	41.27	1.38	66.29	40.44	1.64	77.43	40.49	1.91	90.06	44.64	2.02	94.94	43.85	2.17	108.1	48.26	2.24
45	\	\	\	67.19	47.57	1.41	76.18	46.80	1.63	87.15	47.41	1.84	92.09	46.67	1.97	106.5	52.61	2.03
48	\	\	\	65.92	48.79	1.35	74.74	48.66	1.54	85.51	49.28	1.74	90.36	48.50	1.86	104.5	54.68	1.91
50	\	\	\	\	\	\	72.13	50.11	1.44	82.58	50.46	1.64	87.19	49.93	1.75	100.9	56.29	1.79
55	\	\	\	\	\	\	\	\	\	78.33	51.15	1.53	82.78	50.34	1.64	95.41	56.85	1.68
60	\	\	\	\	\	\	\	\	\	\	\	\	77.83	49.27	1.58	89.70	55.64	1.61
65	\	\	\	\	\	\	\	\	\	\	\	\	72.31	51.13	1.41	83.41	57.66	1.45
LWT	DB																	
	0			5			7			10			15			20		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
25	137.7	48.88	2.82	147.4	45.89	3.21	160.1	41.13	3.89	170.9	43.33	3.95	181.3	44.78	4.05	186.5	45.45	4.10
30	129.9	49.10	2.64	138.2	45.63	3.03	151.8	40.95	3.71	167.4	44.31	3.78	179.6	46.35	3.87	182.8	46.12	3.96
35	125.1	50.67	2.47	132.2	45.60	2.90	142.9	40.54	3.53	162.9	45.15	3.61	173.2	46.74	3.71	179.8	46.86	3.84
40	120.5	52.56	2.29	128.5	48.07	2.67	142.1	42.27	3.36	160.1	46.71	3.43	167.2	46.43	3.60	169.8	45.52	3.73
45	119.8	56.70	2.11	128.7	52.18	2.47	140.9	47.10	3.00	155.6	50.35	3.09	161.8	48.20	3.36	163.8	47.35	3.46
48	117.5	58.74	2.00	126.2	54.07	2.33	138.1	48.54	2.84	153.6	52.58	2.92	157.3	49.61	3.17	160.7	49.14	3.27
50	113.4	60.47	1.88	121.8	55.50	2.19	133.2	49.83	2.67	147.2	53.50	2.75	153.6	51.56	2.98	155.1	50.54	3.07
55	107.3	61.09	1.76	115.2	55.81	2.07	126.4	50.28	2.54	139.3	53.03	2.63	144.9	50.95	2.84	146.7	50.01	2.93
60	100.9	59.80	1.69	108.3	54.63	1.98	118.8	48.72	2.44	130.9	51.68	2.53	136.1	49.54	2.75	138.0	48.70	2.83
65	93.79	61.84	1.52	100.6	56.56	1.78	110.1	50.37	2.19	109.3	48.01	2.28	112.9	45.56	2.48	115.1	44.99	2.56
LWT	DB																	
	25			30			35			40			43					
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP			
25	189.8	45.68	4.15	191.5	45.54	4.20	193.8	45.46	4.26	196.7	45.00	4.37	192.7	43.40	4.44			
30	186.9	46.10	4.05	189.8	46.22	4.11	191.5	45.91	4.17	193.7	45.56	4.25	188.9	43.89	4.30			
35	183.9	46.73	3.94	186.9	46.54	4.01	189.2	46.06	4.11	189.8	45.52	4.17	181.7	43.55	4.17			
40	172.8	45.79	3.77	174.9	44.97	3.89	177.2	44.21	4.01	177.8	43.80	4.06	170.8	41.84	4.08			
45	166.8	47.57	3.51	170.2	47.86	3.56	171.9	47.55	3.61	173.9	47.26	3.68	160.8	43.36	3.71			
48	163.7	49.37	3.32	167.0	49.67	3.36	168.7	49.35	3.42	170.6	49.05	3.48	157.8	44.99	3.51			
50	158.0	50.77	3.11	161.2	51.08	3.16	162.8	50.75	3.21	164.7	50.44	3.26	152.3	46.26	3.29			
55	149.4	50.25	2.97	152.4	50.56	3.01	154.0	50.23	3.07	155.8	49.91	3.12	144.0	45.62	3.16			
60	140.5	49.20	2.86	113.0	38.64	2.93	114.2	38.39	2.98	115.5	38.14	3.03	106.8	34.82	3.07			
65	93.93	36.13	2.60	90.51	34.35	2.64	91.43	34.12	2.68	61.30	22.48	2.73	\	\	\			

Abbreviations:

HC: Total heating capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

COP: Coefficient of Performance (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

4.2 Cooling Capacity Tables

KCHP-SU65-RN8L

LWT	DB																	
	-15			-10			-5			0			5			10		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	\	\	\	35.74	6.14	5.82	34.68	6.44	5.39	32.55	7.07	4.61	31.14	7.45	4.18	45.59	10.71	4.26
5	\	\	\	44.04	7.12	6.18	43.25	7.43	5.82	41.45	8.02	5.17	39.78	8.29	4.80	50.46	11.32	4.46
7	\	\	\	46.43	7.39	6.28	45.47	7.71	5.90	44.10	8.32	5.30	42.81	8.80	4.87	53.65	11.97	4.48
10	50.64	7.59	6.67	50.04	7.72	6.48	49.43	8.19	6.04	47.75	8.73	5.47	46.35	9.23	5.02	56.95	12.17	4.68
15	57.87	7.65	7.57	57.19	7.77	7.36	56.39	8.61	6.55	53.83	8.48	6.34	52.87	8.49	6.23	61.76	10.29	6.00
20	64.20	8.44	7.61	63.44	8.50	7.46	62.87	9.03	6.97	61.88	9.09	6.81	60.17	8.96	6.72	71.56	10.91	6.56

LWT	DB																	
	15			20			25			30			35			40		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	50.36	12.92	3.90	49.64	13.22	3.76	48.97	13.63	3.59	48.24	16.18	2.98	46.61	17.70	2.63	42.81	17.57	2.44
5	58.55	13.98	4.19	57.44	14.29	4.02	55.32	14.63	3.78	53.94	17.35	3.11	52.66	18.98	2.77	48.39	18.84	2.57
7	62.82	15.04	4.18	61.94	15.23	4.07	60.72	15.88	3.82	58.68	17.72	3.31	56.68	19.82	2.86	52.19	19.44	2.68
10	66.63	15.58	4.28	65.84	15.90	4.14	65.00	16.00	4.06	62.89	18.32	3.43	61.29	20.01	3.06	54.61	18.99	2.88
15	73.33	13.76	5.33	72.53	17.04	4.98	70.93	19.65	4.61	68.30	16.90	4.04	64.48	21.56	3.59	58.45	17.37	3.36
20	85.45	15.26	5.60	84.66	18.54	5.19	83.19	20.45	4.73	82.31	18.99	4.33	78.99	22.35	4.16	68.61	17.31	3.96

LWT	DB								
	43			45			48		
	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	40.49	18.46	2.19	37.25	17.75	2.10	27.43	17.38	1.58
5	46.29	20.02	2.31	41.50	18.70	2.22	28.86	16.74	1.72
7	49.26	19.56	2.52	44.04	18.60	2.37	30.31	15.51	1.95
10	51.47	19.30	2.67	46.59	18.48	2.52	31.21	13.73	2.27
15	48.91	15.42	3.17	41.80	13.86	3.02	31.51	11.10	2.84
20	57.55	15.92	3.61	50.40	15.26	3.30	36.22	11.93	3.04

Abbreviations:

CC: Total cooling capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

EER: Energy Efficiency Ratio (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

High power heat pumps



KCHP-SU75-RN8L

LWT	DB																	
	-15			-10			-5			0			5			10		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	\	\	\	44.39	8.84	5.02	42.97	9.22	4.66	40.39	10.04	4.02	38.64	10.60	3.65	52.36	15.05	3.48
5	\	\	\	54.71	10.25	5.34	53.59	10.64	5.03	51.44	11.40	4.51	49.36	11.80	4.18	60.80	16.65	3.65
7	\	\	\	57.67	10.64	5.42	56.35	11.05	5.10	54.72	11.82	4.63	53.12	12.51	4.24	64.77	17.28	3.75
10	62.90	10.94	5.75	62.17	11.11	5.60	61.26	11.73	5.22	59.25	12.40	4.78	57.52	13.13	4.38	68.90	16.96	4.06
15	71.89	11.02	6.53	71.06	11.08	6.41	69.89	12.22	5.72	66.81	11.95	5.59	65.73	12.11	5.43	75.50	14.62	5.16
20	79.82	12.17	6.56	78.88	12.26	6.44	77.99	12.95	6.02	76.78	13.02	5.89	74.66	12.85	5.81	83.19	15.05	5.53

LWT	DB																	
	15			20			25			30			35			40		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	61.42	19.67	3.12	60.76	20.03	3.03	60.16	20.74	2.90	59.68	24.46	2.44	57.20	26.65	2.15	45.29	19.28	2.35
5	69.64	20.02	3.48	68.90	20.38	3.38	68.22	21.09	3.23	67.48	24.74	2.73	64.69	26.94	2.40	51.32	20.79	2.47
7	76.22	21.70	3.51	75.79	21.88	3.46	74.93	22.72	3.30	71.44	25.45	2.81	69.29	28.26	2.53	55.09	21.71	2.54
10	82.99	22.62	3.67	81.91	22.78	3.60	79.98	23.02	3.47	78.14	26.31	2.97	75.56	28.60	2.64	58.07	21.64	2.68
15	91.56	19.88	4.60	88.67	20.77	4.27	87.45	22.16	3.95	83.06	24.12	3.44	79.19	25.48	3.11	62.17	19.64	3.17
20	96.63	20.26	4.77	95.20	21.29	4.47	94.26	22.80	4.13	92.33	24.41	3.78	88.13	24.52	3.59	72.63	19.69	3.69

LWT	DB								
	43			45			48		
	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	42.51	19.92	2.13	39.10	19.15	2.04	28.80	18.76	1.53
5	48.13	21.41	2.25	43.15	20.00	2.16	30.04	17.92	1.68
7	50.97	20.73	2.46	45.66	19.82	2.30	31.37	16.45	1.91
10	53.10	20.40	2.60	47.98	19.44	2.47	32.14	14.45	2.22
15	50.13	16.13	3.11	42.84	14.51	2.95	32.29	11.62	2.78
20	57.61	16.29	3.54	50.45	15.61	3.23	36.25	12.21	2.97

Abbreviations:

CC: Total cooling capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

EER: Energy Efficiency Ratio (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

KCHP-SU110-RN8L

LWT	DB																	
	-15			-10			-5			0			5			10		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	\	\	\	63.15	14.07	4.49	61.18	13.97	4.38	58.65	14.57	4.03	57.01	14.72	3.87	78.25	19.77	3.96
5	\	\	\	77.83	16.32	4.77	76.29	16.12	4.73	74.69	16.53	4.52	72.83	16.39	4.44	90.41	21.90	4.13
7	\	\	\	82.04	16.93	4.85	80.22	16.73	4.79	79.46	17.15	4.63	78.38	17.38	4.51	95.25	22.48	4.24
10	89.31	17.36	5.14	88.43	17.69	5.00	87.20	17.76	4.91	86.03	17.99	4.78	84.87	18.24	4.65	97.97	21.77	4.50
15	115.2	19.55	5.89	114.0	19.92	5.73	112.4	19.87	5.65	111.3	20.02	5.56	110.2	20.17	5.46	109.6	20.42	5.37
20	124.9	18.71	6.68	123.7	19.06	6.49	122.3	19.41	6.30	121.0	19.56	6.19	119.7	19.72	6.07	119.4	19.94	5.99

LWT	DB																	
	15			20			25			30			35			40		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	89.57	25.76	3.48	88.49	27.23	3.25	87.37	27.70	3.15	82.82	29.70	2.79	81.37	33.16	2.45	71.24	31.15	2.29
5	104.8	27.39	3.83	100.8	28.24	3.57	99.87	28.51	3.50	96.21	31.44	3.06	94.09	35.44	2.65	81.02	33.38	2.43
7	110.2	28.12	3.92	107.4	28.52	3.77	106.1	28.66	3.70	102.0	32.28	3.16	99.33	34.09	2.91	86.31	33.40	2.58
10	111.0	27.77	4.00	108.8	28.41	3.83	107.7	28.95	3.72	105.7	32.06	3.30	103.6	34.27	3.02	92.98	33.63	2.76
15	127.5	27.74	4.59	125.0	28.89	4.33	123.8	29.43	4.21	121.4	34.79	3.49	119.6	34.48	3.47	108.9	35.81	3.04
20	141.4	29.54	4.79	138.6	30.35	4.57	137.3	30.99	4.43	134.7	35.07	3.84	132.0	35.19	3.75	113.1	33.50	3.38

LWT	DB								
	43			45			48		
	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	67.58	32.13	2.10	59.37	29.93	1.98	45.46	26.79	1.70
5	77.78	34.48	2.26	67.45	31.68	2.13	51.76	27.42	1.89
7	83.34	35.56	2.34	72.05	31.89	2.26	52.84	24.17	2.19
10	89.13	35.37	2.52	77.19	31.10	2.48	57.60	24.39	2.36
15	92.94	31.33	2.97	78.99	27.35	2.89	58.70	21.82	2.69
20	92.25	28.25	3.27	80.91	25.90	3.12	52.24	17.85	2.93

Abbreviations:

CC: Total cooling capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

EER: Energy Efficiency Ratio (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

High power heat pumps



KCHP-SU140-RN8L

LWT	DB																	
	-15			-10			-5			0			5			10		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	\	\	\	82.16	21.42	3.83	79.59	21.27	3.74	76.31	22.18	3.44	74.17	22.42	3.31	105.8	32.75	3.23
5	\	\	\	101.25	24.85	4.07	99.25	24.55	4.04	97.18	25.17	3.86	94.76	24.96	3.80	120.7	35.20	3.43
7	\	\	\	106.74	25.78	4.14	104.36	25.48	4.10	103.38	26.11	3.96	101.98	26.47	3.85	129.0	36.13	3.57
10	116.2	26.43	4.40	115.1	26.93	4.27	113.5	27.05	4.19	111.9	27.40	4.08	110.4	27.78	3.97	134.0	35.49	3.78
15	135.7	27.12	5.01	134.4	27.63	4.86	132.4	27.57	4.80	131.2	27.77	4.72	129.9	27.81	4.67	138.9	30.44	4.56
20	146.9	25.99	5.65	145.4	26.48	5.49	143.8	26.96	5.33	142.3	26.99	5.27	140.8	27.21	5.17	147.3	29.42	5.01

LWT	DB																	
	15			20			25			30			35			40		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	118.0	39.36	3.00	112.2	40.09	2.80	110.8	41.81	2.65	109.1	45.85	2.38	107.2	48.30	2.22	75.21	34.01	2.21
5	135.9	42.37	3.21	129.1	42.94	3.01	126.3	44.94	2.81	125.2	48.41	2.59	122.4	51.00	2.40	85.88	37.11	2.31
7	143.1	43.59	3.28	137.6	43.57	3.16	134.2	47.16	2.85	132.9	49.78	2.67	129.29	52.01	2.52	91.13	37.28	2.44
10	147.6	44.24	3.34	145.0	45.11	3.21	143.0	46.57	3.07	139.6	46.59	3.00	136.3	47.07	2.90	99.20	38.22	2.60
15	155.7	39.38	3.96	151.7	41.13	3.69	149.0	42.24	3.53	145.3	42.08	3.45	138.2	41.18	3.36	116.2	40.58	2.86
20	157.0	36.90	4.25	153.6	38.82	3.96	151.0	38.74	3.90	147.3	38.29	3.85	139.76	38.79	3.77	120.0	38.02	3.16

LWT	DB								
	43			45			48		
	CC	PI	EER	CC	PI	EER	CC	PI	EER
0	71.57	35.28	2.03	62.69	32.69	1.92	47.99	29.28	1.64
5	82.62	38.33	2.16	71.77	35.19	2.04	54.91	30.31	1.81
7	87.99	39.69	2.22	76.06	35.65	2.13	55.79	27.04	2.06
10	94.81	40.10	2.36	82.22	35.56	2.31	61.26	27.85	2.20
15	98.98	35.70	2.77	84.25	31.16	2.70	62.45	24.72	2.53
20	97.78	32.26	3.03	85.88	29.55	2.91	55.31	20.27	2.73

Abbreviations:

CC: Total cooling capacity (kW)

PI: Power input (kW)

LWT: Leaving water temperature (°C)

EER: Energy Efficiency Ratio (kW)

DB: Dry-bulb temperature for outdoor air temperature

Performance specifications measured with water pump operating at rated water flow rate.

Note:

Inlet and leaving water temperature mapping table											
Heating	Inlet(°C)	20	25	30	35	40	43	45	47	50	55
	Outlet(°C)	25	30	35	40	45	48	50	55	60	65
Cooling	Inlet(°C)	5	10	12	15	21	28	\	\	\	\
	Outlet(°C)	0	5	7	10	15	20	\	\	\	\

5 Performance Adjustment Factors

5.1 Ethylene and Propylene Glycol factors

The antifreeze must be required according to anyone condition as following:

- The ambient temperature is below 0 °C,
- The outlet water temperature is lower than 5 °C,
- Don't start up the unit for a long time,
- The power supply was cut off and needn't change the water in system.

A glycol solution is required when the unit with condition as mentioned. The use of glycol will reduce the performance of the unit depending on concentration.

Concentration of ethylene glycol (%)	Modification coefficient				Freezing point (°C)
	Cooling capacity	Power input	Water resistance	Water flow	
0	1.000	1.000	1.000	1.000	0
10	0.984	0.998	1.118	1.019	-4
20	0.973	0.995	1.268	1.051	-9
30	0.965	0.992	1.482	1.092	-16
40	0.960	0.989	1.791	1.145	-23
50	0.950	0.983	2.100	1.200	-37

Concentration of propylene glycol (%)	Modification coefficient				Freezing point (°C)
	Cooling capacity	Power input	Water resistance	Water flow	
0	1.000	1.000	1.000	1.000	0
10	0.976	0.996	1.071	1.00	-3
20	0.961	0.992	1.189	1.016	-7
30	0.948	0.988	1.380	1.034	-13
40	0.938	0.984	1.728	1.078	-22
50	0.925	0.975	2.150	1.125	-35

5.2 Evaporator temperature drop factors

Performance tables are based on a 5°C temperature drop through the evaporator. Temperature drops outside this range can affect the control system's capability to maintain acceptable control and are not recommended.

5.3 Altitude correction factors

Performance tables are based at sea level. Elevations other than sea level affect the performance of the unit. The decreased air density will reduce condenser capacity and reduce the unit's performance. Maximum allowable altitude is 1800meters.

5.4 Fouling factor

Fouling refers to the accumulation of unwanted material on solid surfaces, most often in an aquatic environment. The fouling material can consist of either living organisms (biofouling) or a non-living substance (inorganic or organic). Fouling is usually distinguished from other surface-growth phenomena in that it occurs on a surface of a component, system or plant performing a defined and useful function, and that the fouling process impedes or interferes with this function.

High power heat pumps

Other terms used in the literature to describe fouling include: deposit formation, encrustation, crudding, deposition, scaling, scale formation, slagging, and sludge formation. The last six terms have a more narrow meaning than fouling within the scope of the fouling science and technology, and they also have meanings outside of this scope; therefore, they should be used with caution.

Fouling phenomena are common and diverse, ranging from fouling of ship hulls, natural surfaces in the marine environment (marine fouling), fouling of heat-transfer components through ingredients contained in the cooling water or gases, and even the development of plaque or calculus on teeth, or deposits on solar panels on Mars, among other examples.

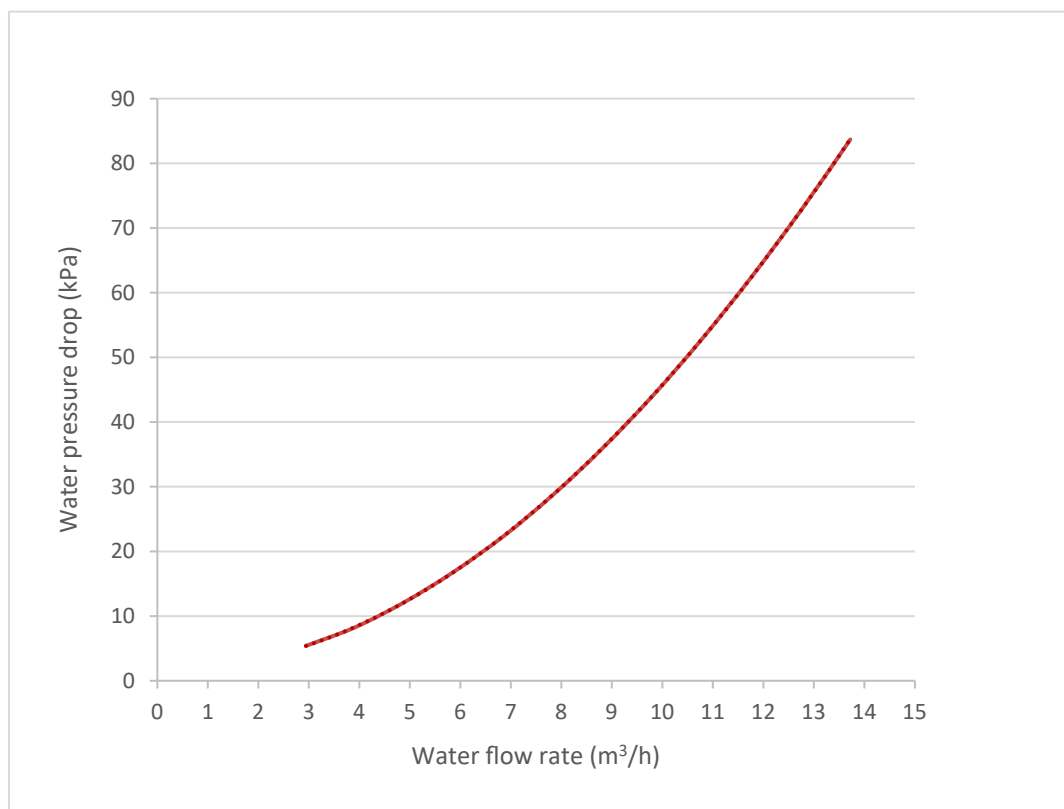
Foreign matter in the chilled water system will adversely affect the heat transfer capability of the evaporator, and could increase the pressure drop and reduce the water flow. To provide optimum unit operation, proper water treatment must be maintained. Refer to the table as following.

ALTITUDE (m)	Difference of water inlet and outlet temp. (°C)	Fouling Factor							
		0.018 m ² . °C /kW		0.044 m ² . °C /kW		0.086 m ² . °C /kW		0.172 m ² . °C /kW	
		C	P	C	P	C	P	C	P
Sea level	3	1.036	1.077	1.019	1.076	0.991	0.975	0.963	0.983
	4	1.039	1.101	1.022	1.080	0.994	0.996	0.971	0.984
	5	1.045	1.105	1.028	1.086	1.000	1.000	0.977	0.989
	6	1.051	1.109	1.034	1.093	1.006	1.004	0.983	0.994
600	3	1.024	1.087	1.008	1.064	0.980	0.984	0.951	0.991
	4	1.027	1.111	1.011	1.068	0.983	1.005	0.959	0.992
	5	1.034	1.115	1.017	1.074	0.989	1.009	0.965	0.997
	6	1.043	1.115	1.026	1.084	0.998	1.009	0.973	0.999
1200	3	1.013	1.117	0.996	1.052	0.969	1.011	0.942	1.002
	4	1.015	1.118	0.998	1.055	0.971	1.012	0.948	1.003
	5	1.023	1.122	1.006	1.063	0.979	1.015	0.955	1.005
	6	1.031	1.125	1.015	1.072	0.987	1.018	0.962	1.007
1800	3	1.002	1.128	0.986	1.042	0.959	1.021	0.935	1.007
	4	1.005	1.129	0.989	1.045	0.962	1.022	0.941	1.010
	5	1.012	1.132	0.995	1.051	0.968	1.024	0.945	1.012
	6	1.018	1.134	1.001	1.058	0.974	1.026	0.949	1.014

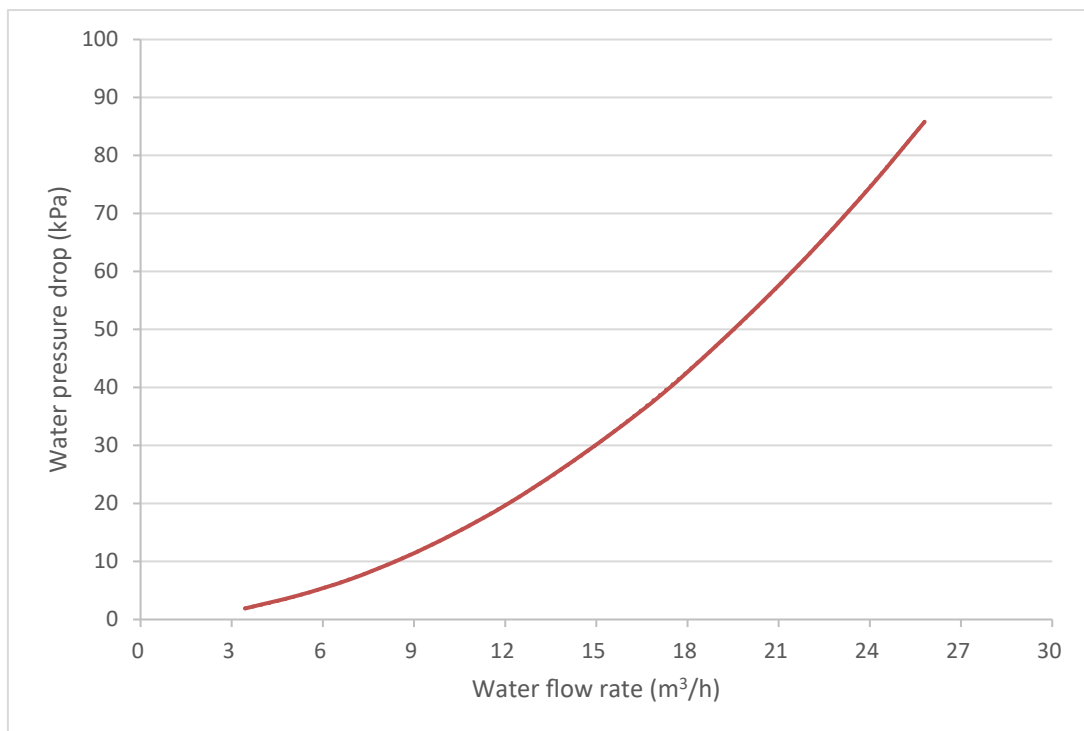
Abbreviations:
C: Cooling capacity
P: Power input

6 Hydronic Performance

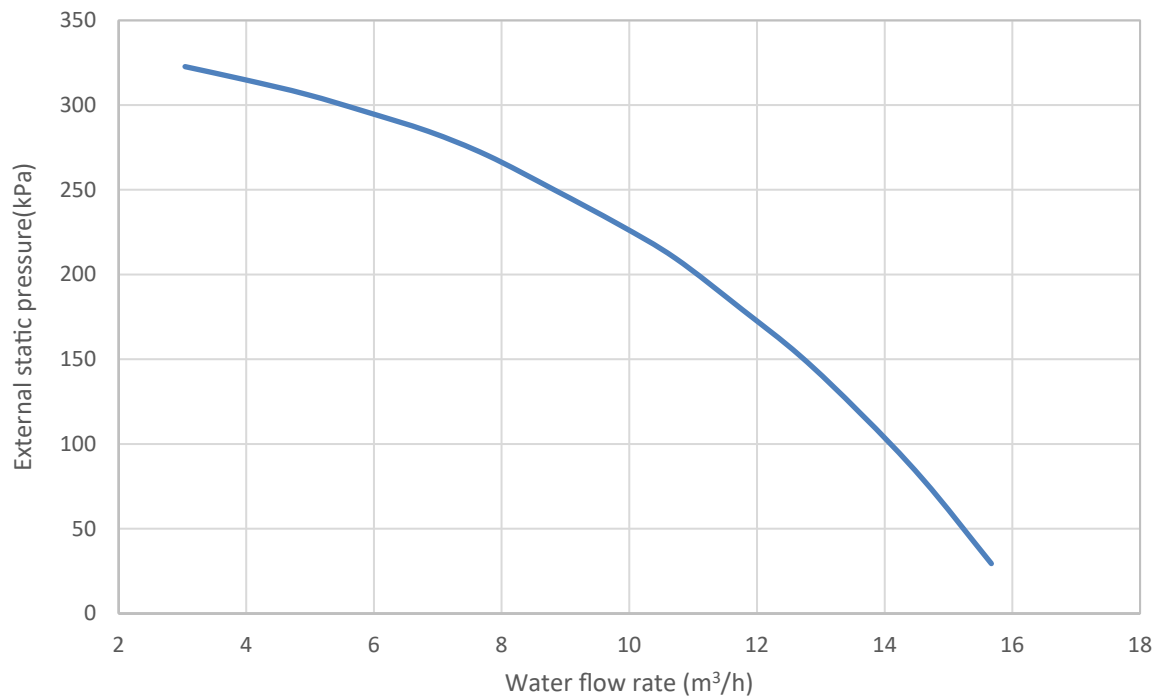
65/75KW



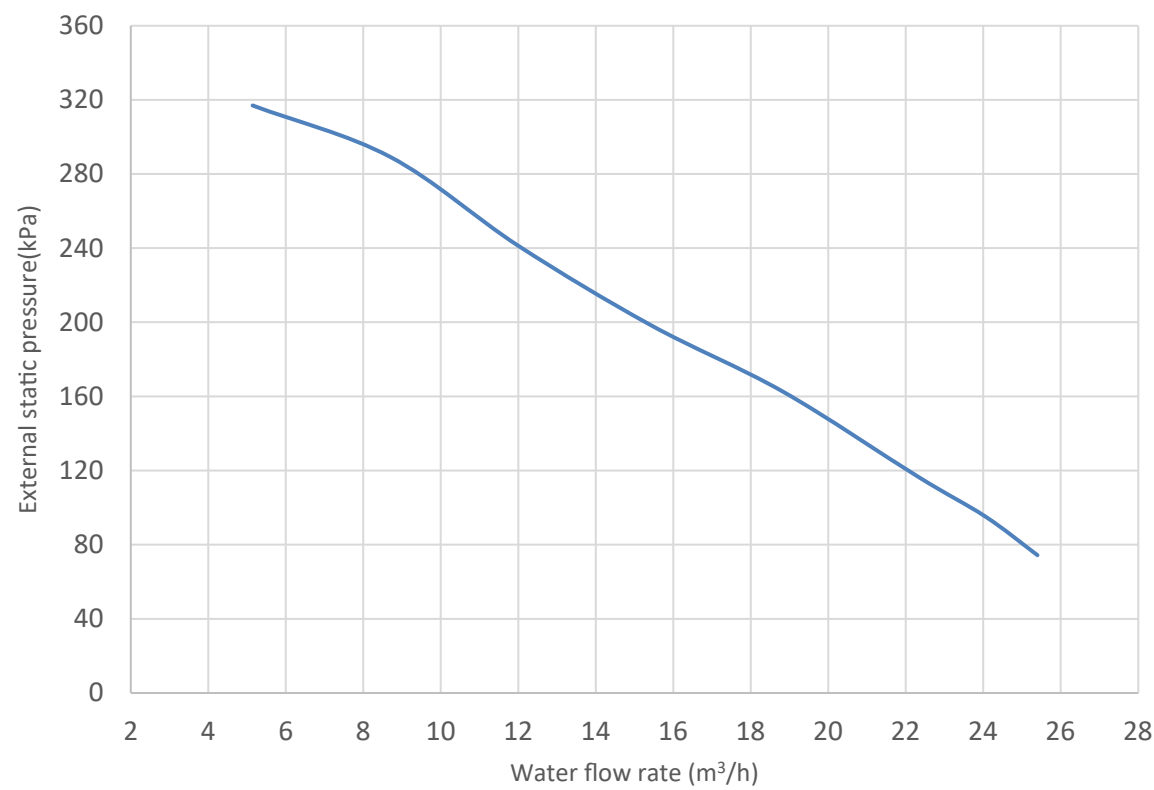
110/140KW



65/75KW

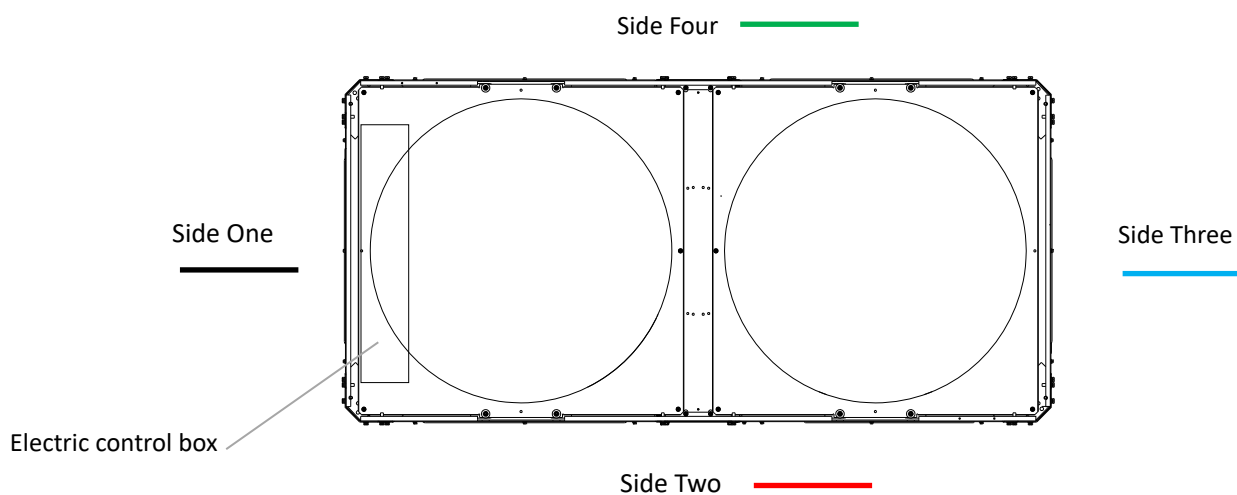


110/140KW

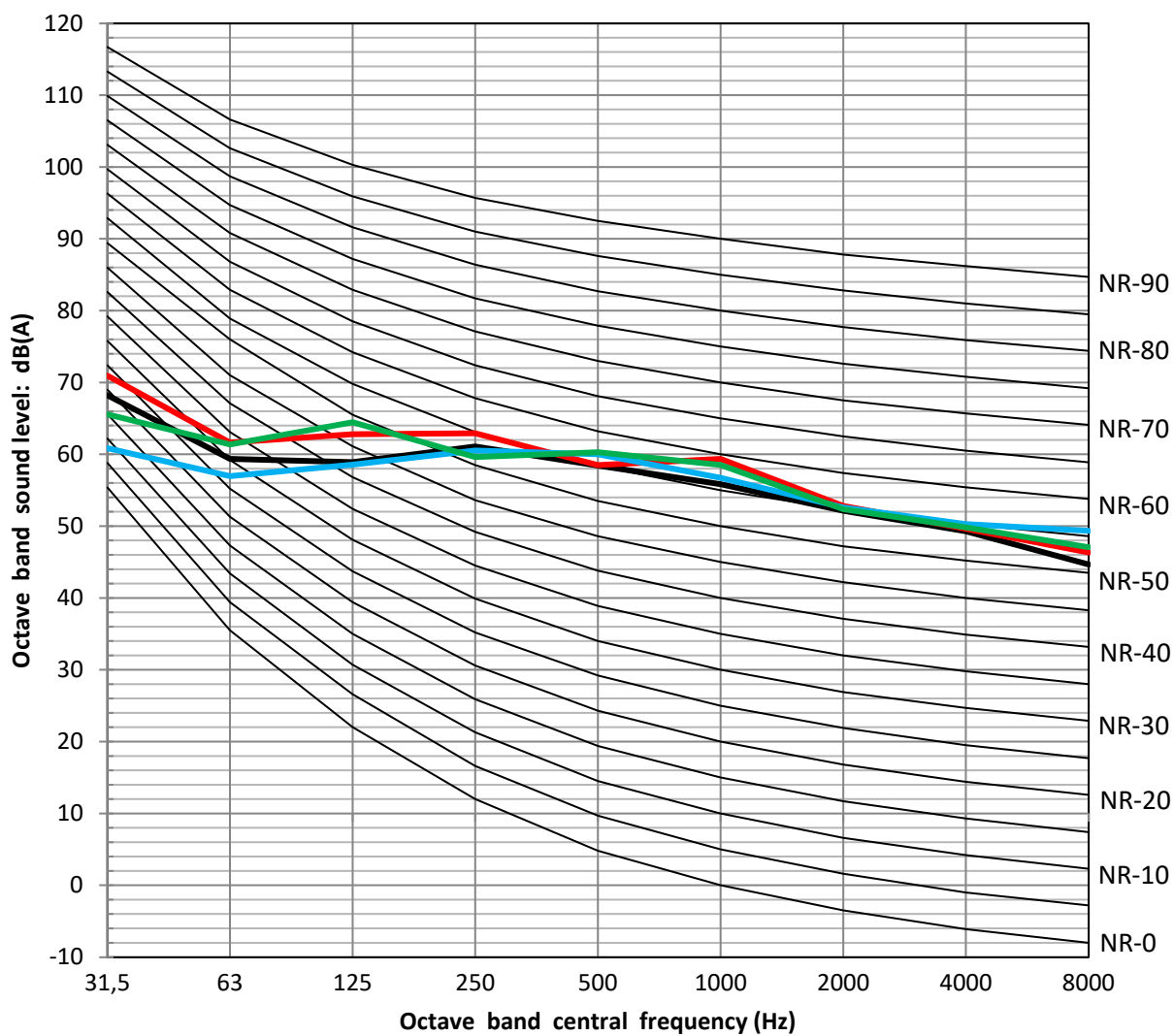


7 Octave Band Levels

For 65/75kW

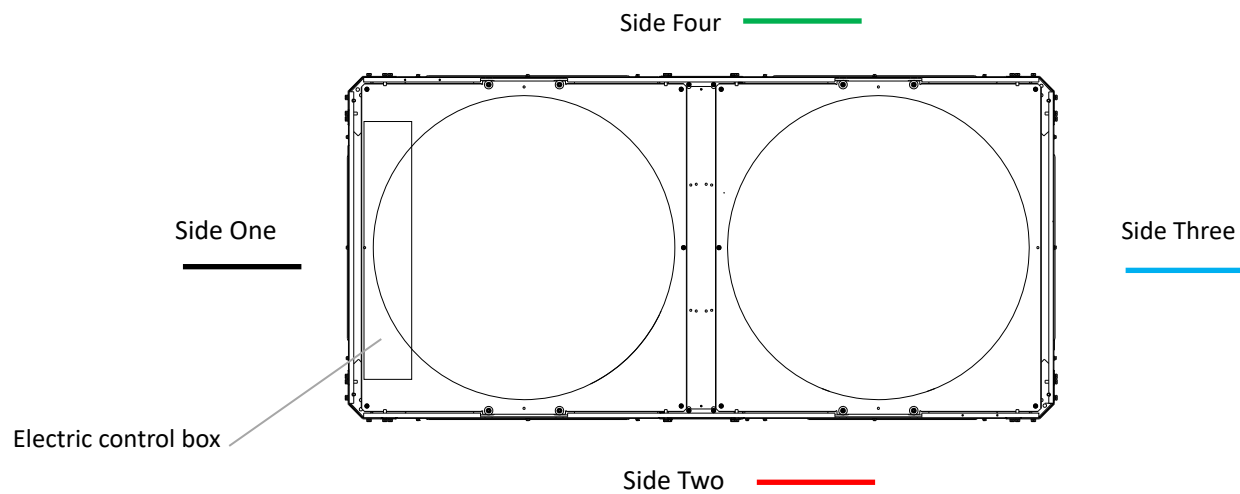


Test condition: Outdoor ambient temperature 35°C DB. EWT 12°C, LWT 7°C

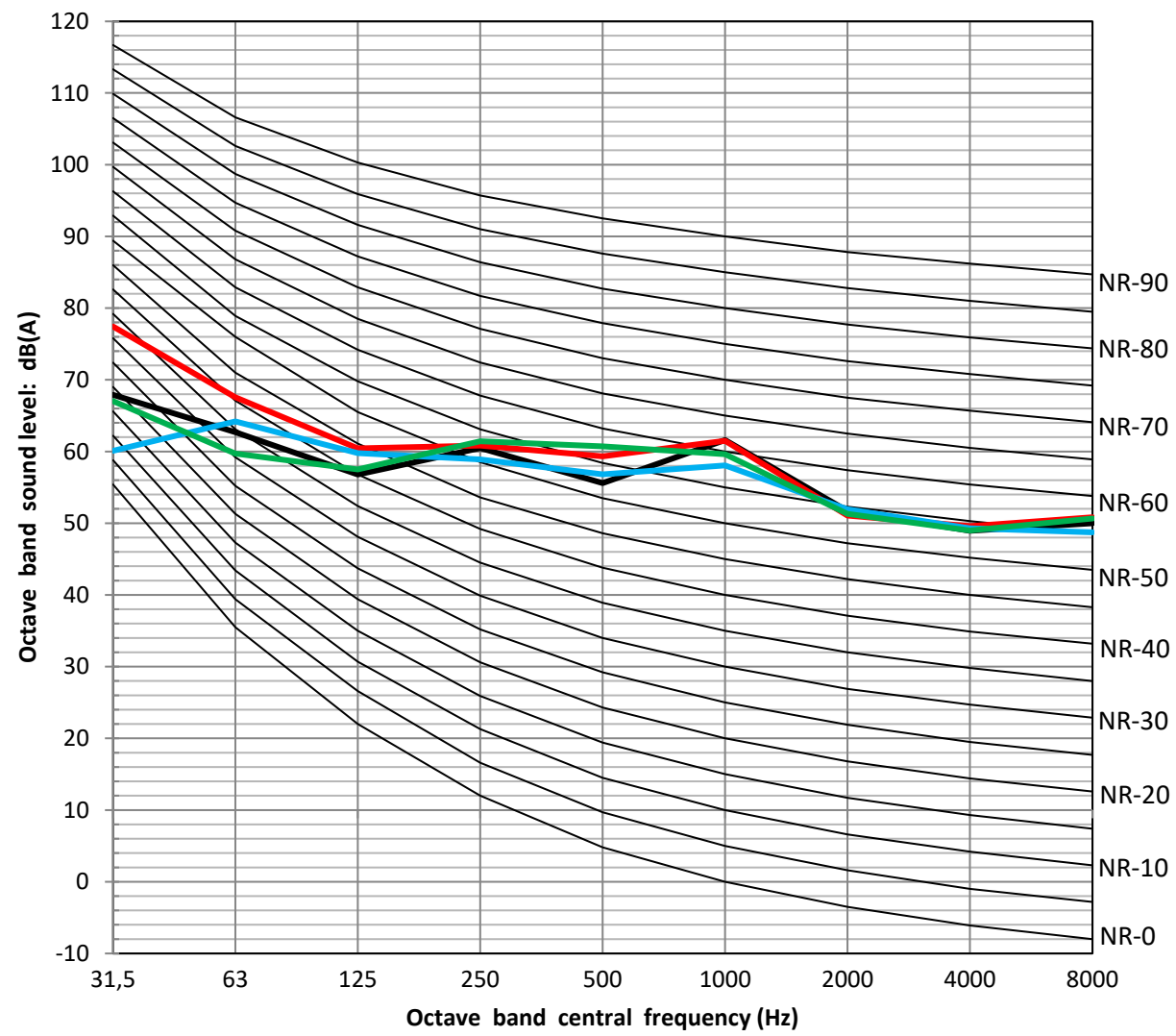


High power heat pumps

For 110/140kW



Test condition: Outdoor ambient temperature 35°C DB. EWT 12°C, LWT 7°C



Part 3

User Interface

Field Settings

1 Introduction 34

2 Service menu 35

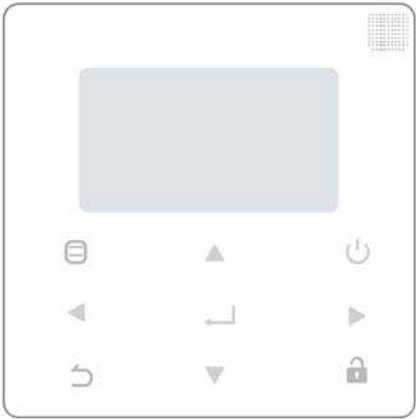
3 Project meun..... 44

4 Parameters setting 48

1 Introduction

During installation, the unit’s settings and parameters should be configured by the installer to suit the installation configuration, climate conditions and end-user preferences. The relevant settings are accessible and programmable through the SERVICE and PROJECT menu on the wired controller’s user interface.

KJRM-120H2/BMWKO-E



Icon	Function
	Enter the menu structure from the home page
	Navigate the cursor on the display/navigate in the menu structure/ adjust the settings
	Turn on or off the space operation mode
	Come back to the up level
	Long press for unlocking /locking the controller
	Go to the next step when programming a schedule in the menu structure / confirm a selection/enter a submenu in the menu structure

2 Service menu

2.1 Structure

For SERVICE Menu

1. STATE QUERY
2. CLEAR HSITORY ERRORS
3. SETTING ADDRESS
4. HEAT CONTROL
5. TEMPERATURE COMPENSATION
6. PUMP CONTROL
7. MANUAL DEFROST
8. LOW OUTLET WATER CONTROL
9. VACUUM SWITCH
10. ENERGY SAVING SWITCH
11. DHW ENABLE
12. FACTORY DATA RESET

1. STATE QUERY

2. CLEAR HISTORY ERRORS

CLEAR UNIT HISTORY ERRORS
 CLEAR ALL HISTORY ERRORS
 CLEAR LOCK ERRORR
 CLEAR RUN TIME

3. SETTING ADDRESS

CONTROLLER ADDRESS
 CONTROL ENABEL
 MODBUS ENABLE
 MODBUS ADDRESS

4. HEAT CONTROL

HEAT1
 HEAT2
 FORCED HEAT2 OPEN

5. TEMPERATURE COMPENSATION

COOL MODE ENABLE
 T4_COOL_1
 T4_COOL_2
 OFFSET-C
 HEAT MODE ENABLE
 T4_HEAT_1
 T4_HEAT_2

6. PUMP CONTROL

FORCED PUMP OPEN
 INV PUMP SETTING
 PUMP ON/OFF TIME

7. MANUAL DEFROST

8. LOW OUTLETWATER CONTROL

9. VACUUM SWITCH

10. ENERGY SAVING SWITCH

11. DHW ENABLE

12. FACTORY DATA RESET

High power heat pumps

2.2 Service Menu

MENU > Service Menu

Service Menu allows installers to input the system configuration and set the system parameters. Enter the password, using ◀ ▶ to navigate between digits and using ▼ ▲ to adjust the numerical values, and then press ↵. The password is 234.

SERVICE MENU	
PLEASE INPUT THE PASSWORD	
0 0 0	
OK	▼ ▲

The following pages will be displayed after putting the password.

SERVICE MENU	
STATE QUERY	
CLEAR HISTORY ERRORS	
SETTING ADDRESS	
HEAT CONTROL	
OK	1/3 ▼ ▲

SERVICE MENU	
TEMPERATURE COMPENSATION	
PUMP CONTROL	
MANUAL DEFROST	
LOW OUTLET WATER CONTROL	
OK	2/3 ▼ ▲

SERVICE MENU	
VACUUM SWITCH	
ENERGY SAVING SWITCH	
DHW ENABLE	
FACTORY DATA RESET	
OK	3/3 ▼ ▲

2.3 State query

MENU > Service Menu > State query

SERVICE MENU	
STATE QUERY	
CLEAR HISTORY ERRORS	
SETTING ADDRESS	
HEAT CONTROL	
OK	1/3 ▼ ▲

STATE QUERY allows installers to check the operation parameters. Press ◀ ▶ to select the address of units.

STATE QUERY	
SELECT ADDRESS	◀ 07 ▶ #
ODU MODEL	130 kW
COMP FREQUENCY	50 Hz
COMP1 CURRENT	20 A
COMP2 CURRENT	20 A
BACK	▼ ▲

STATE QUERY	
H-P PRESSURE	3.83 MPa
L-P PRESSURE	1.00 MPa
TP1 DISCHARGE TEMP	30 °C
TP2 DISCHARGE TEMP	30 °C
TH SUCTION TEMP	-20 °C
OK	2/9 ▼ ▲

STATE QUERY	
TZ TEMP	-20°C
T3 TEMP	-20°C
T4 TEMP	-20°C
T6A TEMP	40°C
T6B TEMP	40°C
BACK	3/9 ▼ ▲

STATE QUERY	
TFIN1 TEMP	60 °C
TFIN2 TEMP	60 °C
TDSH	30 °C
TSSH	15 °C
TCSH	15 °C
BACK	4/9 ▼ ▲

STATE QUERY	
FAN1 SPEED	850 RPM
FAN2 SPEED	850 RPM
FAN3 SPEED	850 RPM
EXV A	1800 P
EXV B	1800 P
BACK	5/9 ▼ ▲

STATE QUERY	
EXV C	1800P
Tw1 TEMP	30°C
Two TEMP	30°C
Tw TEMP	30°C
TAF1 TEMP	30°C
BACK	6/9 ▼ ▲

STATE QUERY	
TAF2 TEMP	30 °C
T5 TEMP	30 °C
COMP TIME1	120 MIN
COMP TIME2	120 MIN
COMP TIME3	120 MIN
BACK	7/9

STATE QUERY	
COMP TIME	65535 H
FIX PUMP TIME	65535 H
INV PUMP TIME	65535 H
ODU SOFTWARE	V45
HMI SOFTWARE	V45
BACK	8/9

STATE QUERY	
DEFROSTING STATE	
00	01
02	03
04	05
06	07
08	09
10	11
12	13
14	15
E2 SOFTWARE V45	
END	
OK	9/9

Note:

1. Tz plate heat exchanger outlet temperature

T3 lowest temperature of condenser tube

T4 ambient temperature

T6A, T6B EVI plate heat exchanger refrigerant temperature

Tfin1, Tfin2 inverter module temperature

TDSH Discharge superheat temperature

TSSH Suction superheat temperature

TCSH Injection superheat temperature

Twi Unit water inlet temperature

Two Unit water outlet temperature

Tw Total water outlet temperature

Taf1 DHW water pipe antifreeze temperature

Taf2 Water side antifreeze temperature

T5 Water tank temperature

2. For ODU SOFTWARE and HMI SOFTWARE, the version number will vary with product iterations.

2.4 Clear history errors

MENU > Service Menu > Clear history errors

SERVICE MENU	
STATE QUERY	
CLEAR HISTORY ERROR	
SETTING ADDRESS	
HEAT CONTROL	
OK	1/3

CLEAR HISTORY ERRORS	
CLEAR UNIT HISTORY ERRORS	
CLEAR ALL HISTORY ERRORS	
CLEAR LOCK ERROR	
CLEAR RUN TIME	
OK	

CLEAR HISTORY ERRORS is used to clear the history error codes and component operation time.

CLEAR UNIT HIS ERRS	
SELECT ADDRESS	◀ 07 ▶
DO YOU WANT TO CLEAR?	◀ YES ▶
OK	

CLEAR ALL HIS ERRS	
DO YOU WANT TO CLEAR?	◀ YES ▶
OK	

CLEAR LOCK ERR	
DO YOU WANT TO CLEAR?	◀ YES ▶
OK	

CLEAR RUN TIME	
SELECT ADDRESS	◀ 07 ▶
CLEAR COMP TIME?	◀ NO ▶
CLEAR FIX PUMP TIME?	◀ NO ▶
CLEAR INV PUMP TIME?	◀ NO ▶
OK	

High power heat pumps

2.5 Setting address

MENU > Service Menu > Setting address

SERVICE MENU		
STATE QUERY		
CLEAR HISTORY ERROR		
SETTING ADDRESS		
HEAT CONTROL		
OK	1/3	

SETTING ADDRESS is used to set whether the unit can be controlled by wired controller and through MDOBUS. SETTING ADDRESS can also enter by combining buttons pressing ,  for 3s.

CONTROLLER ADDRESS	◀ 10 ▶ #	
CONTROL ENABEL	◀ NO ▶	
MODBUS ENABLE	◀ NO ▶	
MODBUS ADDRESS	◀ 10 ▶ #	
OK		 

CONTROLLER ADDRESS selects the unit address then we can check the parameters about this unit.

If CONTROL ENABLE sets as YES, it means the controller can set all the parameters; if CONTROL ENABLE sets as NO, it means the controller can only display the parameters.

If the chiller system access to MODBUS system, MODBUS ENABLE should be set as YES. Please note that in this case,

CONTROL ENABLE should be also set as YES, otherwise the units cannot be controlled.

MODBUS ADDRESS set the controller address if the Modbus system is available.

2.6 Heat control

MENU > Service Menu > Heat control

SERVICE MENU		
STATE QUERY		
CLEAR HISTORY ERROR		
SETTING ADDRESS		
HEAT CONTROL		
OK	1/3	

HEAT CONTROL
HEAT1
HEAT2
FORCED HEAT2 OPEN
OK

HEAT1 means pipe electric heating in heating mode.

HEAT2 means tank electric heating in DHW mode.

HEAT1	
HEAT1 ENABLE	◀ NO ▶
TEMP-AUXHEAT1-ON	◀ 07 ▶ °C
TW.HEAT1-ON	◀ 25 ▶ °C
TW.HEAT1-OFF	◀ 45 ▶ °C
OK 1/2	
 	

HEAT2	
ALL HEAT2 DISABLE	◀ YES ▶
SELECT ADDRESS	◀ 10 ▶ #
HEAT2-ENABLE	◀ NO ▶
T-HEAT2-DELAY	◀ 190 ▶ MIN
DT5-HEAT2-OFF	◀ 10 ▶ °C
OK	1/2

HEAT2														
T4-HEAT2-ON ◀ 10 ▶ °C														
00	01	02	03	04	05	06	07							
08	09	10	11	12	13	14	15							
OK			2/2											

FORCED HEAT2 OPEN														
SELECTED ADDRESS ◀ 10 ▶ #														
FORCED HEAT2 OPEN ◀ NO ▶														
00	01	02	03	04	05	06	07							
08	09	10	11	12	13	14	15							
OK														

TEMP-AUXHEAT1-ON sets the ambient temperature below which the pipe heater (field supplied) turns on.

When the leaving water temperature reaches TW. HEAT1-ON, the pipe electric heater (field supplied) turns on automatically.

When the leaving water temperature reaches TW. HEAT1-OFF, the pipe electric heater (field supplied) turns off automatically.

If the system is installed with tank booster heater, ALL HEAT2 DISABLE should be set as YES.

HEAT2-ENABLE sets the state of tank booster heater of SELECT ADDRESS.

T-HEAT2-DELAY sets the delay time for tank booster heater to turn on after the compressor starts.

DT5-HEAT2-OFF sets the temperature difference between the actual water temperature and setting temperature above which the tank booster heater turns off.

T4_HEAT2_ON sets the ambient temperature that tank booster heater turns on. (00~15 means unit address)

If **FORCED HEAT2 OPEN** is set as YES, when $T5 < T5S-1$, then tank electric heater turns on; when $T5 \geq T5S$, then tank electric heater off. (00~15 means unit address)

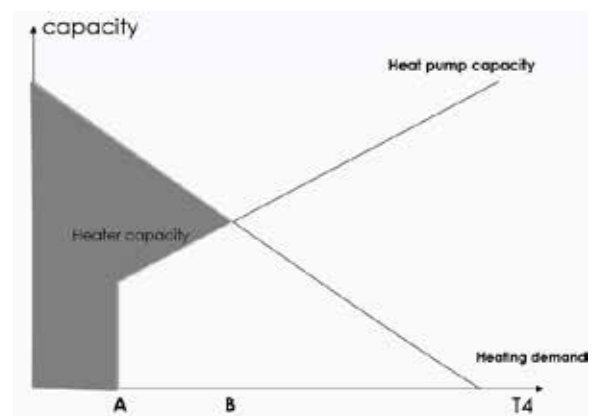
Space heating bivalent control (HEAT1)

A: T4—_Heatpump_OFF1

In space heating mode Below this T4 temperature the heat pump will be stop and only electric heater1 ON, the setting Range is (-25~10°C), default setting is -25°C, this Setting value can not be bigger than B value.

B: Temp_AuxHeat_ON

In space heating mode Bivalent point control, below this T4 value the electric Heater1 will be started and above this point the hetaer1 will be stopped. The setting range is (-15~10°C), default setting is -5°C.



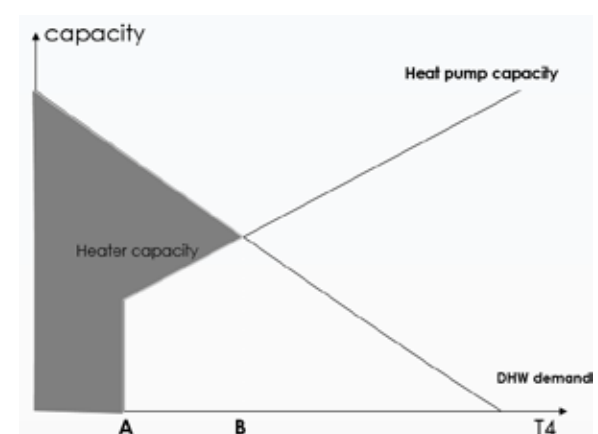
DHW heating bivalent control (HEAT2)

A: T4—_Heatpump_OFF2

In DHW mode, below this T4 temperature the heat pump will be Stop and only electric heater2 ON, the setting range is(-25~10°C), default setting is -25°C, this setting value can not be bigger than B value.

B: T4_Heat2_ON

In DHW mode Bivalent point control, below this T4 value the electric Heater2 will be started and above this point the hetaer2 will be stopped. The setting range is (-5~20°C), default setting is -5°C.



High power heat pumps

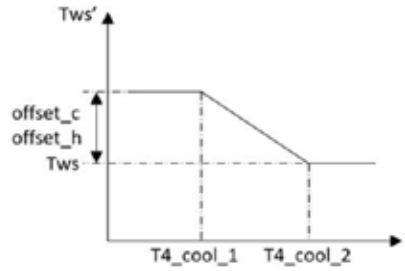
2.7 Temperature Compensation

MENU > Service Menu > Temperature Compensation

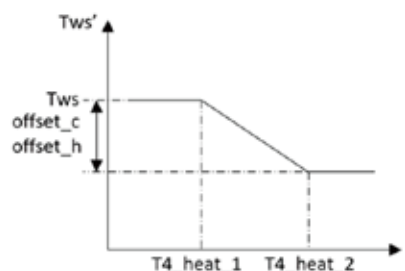
SERVICE MENU		
TMEPERATURE COMPENSATION		
PUMP CONTROL		
MANUAL DEFROST		
LOW OUTLET WATER CONTROL		
OK	2/3	

With the help of **TEMPERATURE COMPENSATION**, water temperature will automatically change as outside air temperature changes. When outdoor air temperature increases/decreases, the heating load will decrease/increase and water temperature will decrease/increase automatically. When outdoor air temperature decreases/increases, the cooling load will decrease/increase and water temperature will increase/decrease automatically.

TEMP. COMPENSATION	
COOL MODE ENABLE	◀ YES ▶ °C
T4 COOL-1	◀ 08 ▶ °C
T4 COOL-2	◀ 15 ▶ °C
OFFSET-C	◀ 10 ▶ °C
OK	1/2



TEMP. COMPENSATION	
HEAT MODE ENABLE	◀ YES ▶ °C
T4 HEAT-1	◀ 08 ▶ °C
T4 HEAT-2	◀ 15 ▶ °C
OFFSET-H	◀ 10 ▶ °C
OK	2/2



T4 COOL-1, T4 COOL-2 set the ambient temperature for cooling mode.
T4 HEAT-1, T4 HEAT-2 set the ambient temperature for heating mode.
Offset_c , Offset_h is the temperature difference between current water temperature and T4_cool_1, T4_heat_1 corresponding water temperature.

2.8 Pump Control

MENU > Service Menu > Pump Control

SERVICE MENU
TEMPERATURE COMPENSATION
PUMP CONTROL
MANUAL DEFROST
LOW OUTLET WATER CONTROL
OK 2/3

PUMP CONTROL
FORCED PUMP OPEN
INV PUMP SETTING
PUMP ON/OFF TIME
OK

FORCED PUMP OPEN
SELECT ADDRESS ◀ 0 ▶ #
FORCED PUMP OPEN ◀ NO ▶
OK

INV PUMP SETTING
SELECT ADDRESS ◀ 07 ▶ #
SWITCH ON THE PUMP ◀ NO ▶
RATIO PUMP ◀ 100 ▶ #
OK

PUMP ON/OFF TIME
PUMP ON TIME ◀ 05 ▶ MIN
PUMP OFF TIME ◀ 05 ▶ MIN
OK

FORCED PUMP OPEN is used to control the fixed frequency pump (field supplied) operation.

INV PUMP SETTING is used to control the inverter water pump (field supplied) operation, the setting range of RATIO-PUMP is 30%-100%. It should ensure its flow meet the requirement of whole unit, otherwise the unit may be damaged.

PUMP ON TIME sets the pump operation time after the unit stops.

If PUMP OFF TIME sets as 0, the pump will run all the time. Otherwise, the pump will operate intermittently according to the PUMP ON TIME and PUMP OFF TIME setting.

	Set range	Default value	Adjustment range
PUMP ON TIME	5~60min	5	5
PUMP OFF TIME	0~60min	0	5

2.9 Manual Defrost

MENU > Service Menu > Manual Defrost

SERVICE MENU
TEMPERATURE COMPENSATION
PUMP CONTROL
MANUAL DEFROST
LOW OUTLET WATER CONTROL
OK 2/3

MANUAL DEFROST
SELECT ADDRESS ◀ 07 ▶ #
MANUAL DEFROST ◀ NO ▶
OK

MANUAL DEFROST can force the unit to enter the defrost mode manually.

If the external unit successfully enters the defrost mode after the "MANUAL DEFROST" is turned on, the defrost icon  will be displayed at homepage of the wired controller.

High power heat pumps

2.10 Low outlet water temperature control

MENU > Service Menu > Low outlet water temperature control

SERVICE MENU
TEMPERATURE COMPENSATION
PUMP CONTROL
MANUAL DEFROST
LOW OUTLET WATER CONTROL
OK 2/3

At this page, the historical minimum water outlet temperature setting (setting range 0-20°C) can be viewed.

LOW OUTLET WATER CTRL	
MIN TEMP FOR COOL	◀ 50°C ▶
HISTORICAL SETTING	
04/06/2020 11:30A	5°C
04/06/2020 11:30A	5°C
04/06/2020 11:30A	5°C
OK	

MIN TEMP FOR COOL sets the lowest water temperature for cooling mode. Please notice that When the setting temperature is less than 5°C, antifreeze liquid should be added in the water system.

LOW OUTLET WATER CONTROL	
The setting temp is below 5 degree please confirm whether it is an antifreeze system?	
OK	

2.11 Vacuum switch

MENU > Service Menu > Vacuum switch

SERVICE MENU
VACUUM SWITCH
ENERGY SAVING SWITCH
DHW ENABLE
FACTORY DATA RESET
OK 3/3

VACUUM SWITCH	
VACUUM SWITCH	◀ NO ▶
OK	

VACUUM SWITCH is used for vacuuming.

2.12 Energy saving mode

MENU > Service Menu > Energy saving mode

SERVICE MENU
VACUUM SWITCH
ENERGY SAVING SWITCH
DHW ENABLE
FACTORY DATA RESET
OK 3/3

ENERGY SAVING SWITCH	
SAVING SWITCH	◀ 80% ▶
HISTORICAL SETTING	
04/06/2020 11:30A	80%
04/06/2020 11:30A	80%
04/06/2020 11:30A	80%
OK	

For projects with temporary electricity supply restrictions, the outdoor unit supports 7 levels of energy management which can be set to output 40-100% capacity. It prevents tripping during electricity supply restriction conditions and remains system continue to operate. The historical energy saving switch setting can be viewed.

2.13 DHW ENABLE

MENU > Service Menu > DHW ENABLE

Domestic hot water function can be customized.

DHW ENABLE	
DHW ENABLE	◀ NO ▶
OK	

2.14 Factory data reset

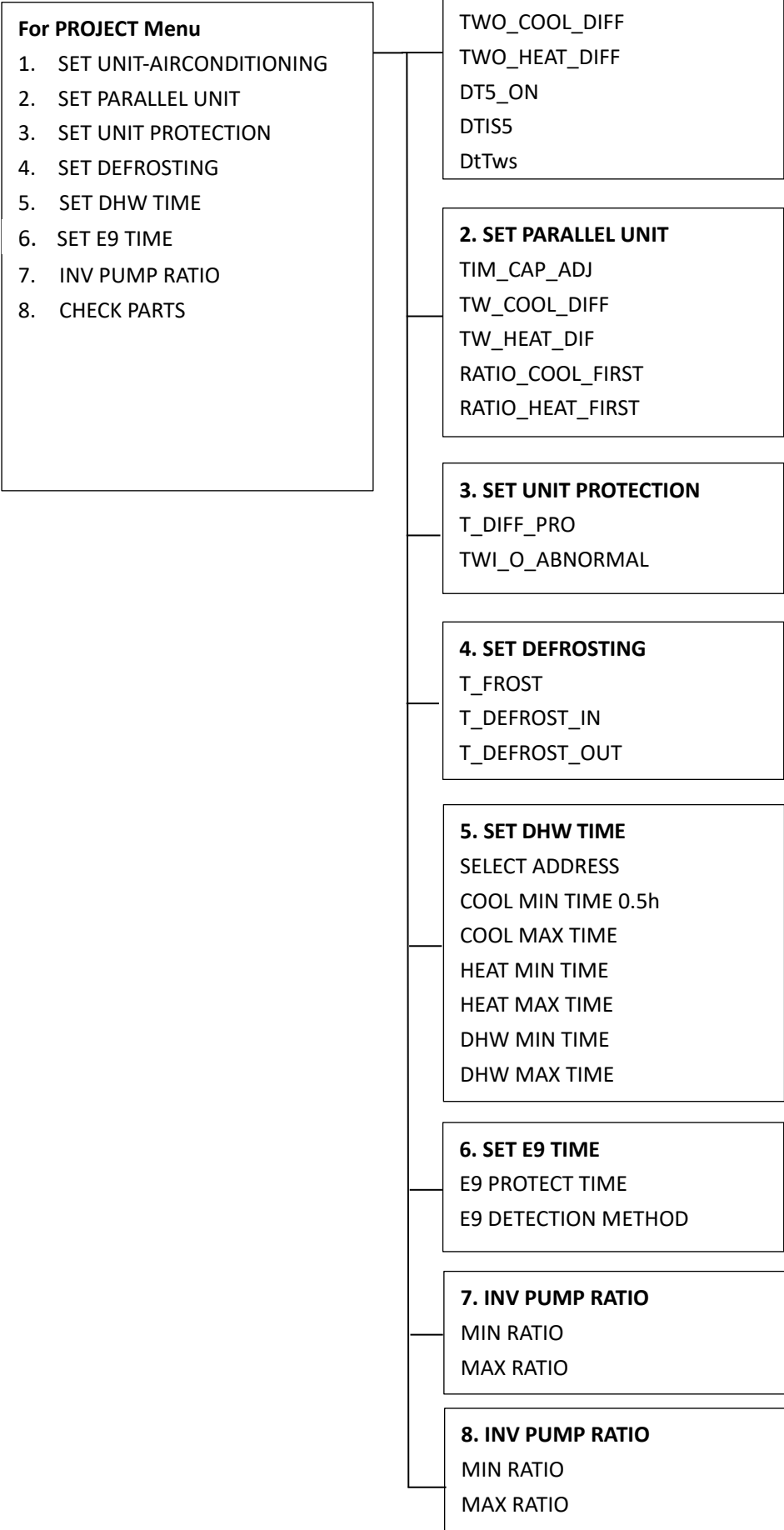
MENU > Service Menu > Factory data reset

Factory data reset is used to reset all the data to the factory default setting.

FACTORY DATA RESET	
DO YOU WANT TO RESET?	◀ YES ▶
OK	

3 Project menu

3.1 Structure



3.2 Project Menu

MENU > Project Menu

Project Menu allows installers to input the system configuration and set the system parameters. Enter the password, using ◀ ▶ to navigate between digits and using ▼ ▲ to adjust the numerical values, and then press **OK**. The password is 9877.

PROJECT MENU	
PLEASE INPUT THE PASSWORD	
0 0 0 0	
OK	▼ ▲

The following pages will be displayed after putting the password.

PROJECT MENU	
SET UNIT AIRCONDITIONING	
SET PARALLEL UNIT	
SET UNIT PROTECTION	
SET DEFROSTING	
OK	1/2 ▼ ▲

PROJECT MENU	
SET DHW TIME	
SET E9 TIME	
INV PUMP RATIO	
CHECK PARTS	
OK	2/2 ▼ ▲

3.3 SET UNIT-AIRCONDITIONING

MENU > Project Menu > SET UNIT-AIRCONDITIONING

SET UNIT	
TWO_COOL_DIFF	◀ 2 ▶ °C
TWO_HEAT_DIFF	◀ 2 ▶ °C
DT5_ON	◀ 8 ▶ °C
DTIS5	◀ 10 ▶ °C
DtTws	◀ 1 ▶ °C
OK	▼ ▲

TWO_COOL_DIFF sets the minimum temperature difference between the leaving water temperature (Two) and the leaving water set temperature (TwoS) above which the unit will start for cooling mode. When $\text{Two} - \text{TwoS} \geq \text{TWO_COOL_DIFF}$, unit starts. When $\text{TwoS} - \text{Two} \geq 2$ lasts for 5s, unit stops.

TWO_HEAT_DIFF sets the minimum temperature difference between the leaving water temperature (Two) and the leaving water set temperature (TwoS) above which the unit will start for heating mode. When $\text{TwoS} - \text{Two} \geq \text{TWO_HEAT_DIFF}$, unit starts. When $\text{Two} - \text{TwoS} \geq 2$ lasts for 5s, unit stops.

If unit is customized with the DHW function, when $\text{TempW_heat_Min_n} \leq \text{T5} < \text{Min}(\text{T5S}, \text{TempW_heat_Max_n}) - \text{dT5_ON}$ and $\text{Two} < \text{Min}(\text{T5S}, \text{TempW_heat_Max_n}) - 2$, then DHW mode is on.

Note:

The value of TempW_heat_Min_n , T5S , TempW_heat_Max_n are related to the ambient temperature, which are already fixed in the program.

T5 means the water tank temperature

T5S means the setting temperature of DHW mode

The target leaving water temperature of DHW mode is $\text{Twos} = \text{T5S} + \text{DT1S5}$. If $\text{Two} > \text{TempW_heat_Max_n}$, then DHW mode is off.

DtTws is reserved.

High power heat pumps

3.4 SET PARALLEL UNIT

MENU > Project Menu > SET PARALLEL UNIT

SET PARALLEL UNIT		
TIM_CAP_ADJ	◀ 180 ▶	S
TW_COOL_DIFF	◀ 2 ▶	°C
TW_HEAT_DIFF	◀ 2 ▶	°C
RATIO_COOL_FIRST	◀ 0 ▶	%
RATIO_HEAT_FIRST	◀ 50 ▶	%
OK  		

TIM_CAP_ADJ sets the period of capacity adjustment

TW_COOL_DIFF sets the minimum temperature difference between the total leaving water temperature (Tw) and the total leaving water set temperature (TwS) above which the unit will start for cooling mode. When $Tw - TwS \geq TW_COOL_DIFF + 1$, unit starts. When $TwoS - Tw \geq 2$ lasts for 5s, unit stops.

TW_HEAT_DIFF sets the minimum temperature difference between the total leaving water temperature (Tw) and the total leaving water set temperature (TwS) above which the unit will start for heating mode. When $TwS - Tw \geq TW_HEAT_DIFF + 1$, unit starts. When $Tw - TwS \geq 1$ lasts for 5s, unit stops.

RATIO_COOL_FIRST sets the number of initial startup units for cooling mode.

RATIO_HEAT_FIRST sets the number of initial startup units for heating mode.

3.5 SET UNIT PROTECTION

MENU > Project Menu > SET UNIT PROTECTION

SET UNIT PROTECTION		
T_DIFF_PRO	◀ 12 ▶	°C
TWI_O_ABNORMAL	◀ 2 ▶	°C
OK  		

T_DIFF_PRO set the absolute difference between entering water temperature (Twi) and leaving water temperature (Two). If $|Twi - Two| \geq T_DIFF_PRO$, unit stops and error code P9 appears. Normal heat pumps when $|Twi - Two| \geq 10^\circ\text{C}$ [T_DIFF_PRO], or high temperature heat pumps $|Twi - Two| \geq 15^\circ\text{C}$, error code disappears.

TWI_O_ABNORMAL sets the difference between Inlet water temperature (Twi) and Outlet water temperature (Two). For cooling mode, if $Two - Twi \geq TWI_O_ABNORMAL$ and lasts for 20min, unit stops and error code PA appears. If $Two - Twi \leq TWI_O_ABNORMAL - 1$, error code disappears. For heating mode, if $Twi - Two \geq TWI_O_ABNORMAL$ and lasts for 20min, unit stops and error code PA appears. If $Two - Twi \leq TWI_O_ABNORMAL - 1$, error code disappears.

3.6 SET DEFROSTING

MENU > Project Menu > SET DEFROSTING

SET DEFROSTING	
T_FROST	◀ 35 ▶ min
T_DEFROST_IN	◀ 0 ▶ °C
T_FROST_OUT	◀ 0 ▶ °C
OK  	

T_FROST sets the time between the end of the last defrost mode and the beginning of the next defrost mode.

T_DEFROST_IN sets the temperature for T3 of entering defrosting mode. When T3 reaches T_DEFROST_IN, unit enters defrosting mode.

T_FROST_OUT sets the temperature for T3 of exiting defrosting model. When T3 reaches T_DEFROST_IN, unit exits defrosting mode.

3.7 DHW time setting (Customized)

MENU > Project Menu > SET DHW TIME

SET DHW TIME	
SELECT ADDRESS	◀ 07 ▶ #
COOL MAX TIME	◀ 08 ▶ h
COOL MIN TIME	◀ 0.5 ▶ h
HEAT MAX TIME	◀ 08 ▶ h
HEAT MIN TIME	◀ 0.5 ▶ h
OK 1/2  	

SET DHW TIME	
DHW MIN TIME	◀ 0.5 ▶ h
DHW MAX TIME	◀ 08 ▶ h
OK 2/2  	

COOL MAX TIME sets the maximum operation time for cooling mode when DHW requirement exists.

COOL MIN TIME sets the minimum operation time for cooling mode when DHW requirement exists.

HEAT MAX TIME sets the maximum operation time for heating mode when DHW requirement exists.

HEAT MIN TIME sets the minimum operation time for heating mode when DHW requirement exists.

DHW MIN TIME sets the minimum operation time for DHW mode.

DHW MAX TIME sets the maximum operation time for DHW mode.

3.8 SET E9 TIME

MENU > Project Menu > SET E9 TIME

SET E9 TIME	
E9 PROTECT TIME	◀ 10 ▶ S
E9 DETECTION METHOD	◀ 1 ▶ #
OK  	

E9 PROTECT TIME sets the delay time of water flow detection. When unit starts, water flow will not be detected until at least (2+ **E9 PROTECT TIME**/60) minutes have elapsed.

E9 DETECTION METHOD sets the method of water flow detection. If "1" is selected, the water flow switch is detected after water pump starts. If "2" is selected, the water flow switch is both detected before and after the water pump starts.

High power heat pumps

3.9 INV PUMP RATIO

MENU > Project Menu > INV PUMP RATIO

INV PUMP RATIO	
MIN RATIO	◀ 70 ▶ %
MAX RATIO	◀ 100 ▶ %
OK ⬆ ⬇ ⬇ ⬆	

MIN RATIO sets the minimum output ratio of inverter pump which is installed in the main water pipe.

MAX RATIO sets the maximum output ratio of inverter pump which is installed in the main water pipe.

3.10 CHECK PARTS

MENU > Project Menu > CHECK PARTS

State of different parts can be checked in this menu.

CHECK PARTS	
SELECT ADDRESS	◀ 07 ▶ #
FIX PUMP STATE	OFF
INV PUMP STATE	80%
FOUR-WAY VALVE	OFF
SV1 STATE	OFF
BACK 1/3 ⬆ ⬇ ⬇ ⬆	

CHECK PARTS	
SV2 STATE	OFF
SV4 STATE	OFF
SV5 STATE	OFF
SV6 STATE	OFF
SV8A STATE	OFF
BACK 2/3 ⬆ ⬇ ⬇ ⬆	

CHECK PARTS	
SV8B STATE	OFF
HEAT1 STATE	OFF
HEAT2 STATE	OFF
COIL VALVE	OFF
BACK 3/3 ⬆ ⬇ ⬇ ⬆	

4 Parameters setting

Menu	Parameters	Setting range	Default value	Adjustment range
Service menu	TEMP_AUXHEAT_ON	0~10°C	5°C	1°C
	TW_HEAT1_ON	0~50°C	25°C	1°C
	TW_HEAT1_OFF	0~60°C	45°C	1°C
	T_HEAT2_DELAY	60~240min	90min	5min
	DT5_HEAT2_OFF	2~10°C	5°C	1°C
	T4_HEAT2_ON	-5~20°C	5°C	1°C
	T4_COOL_1	15~30°C	25°C	1°C
	T4_COOL_2	35~45°C	40°C	1°C
	OFFSET_C	0~15°C	10°C	1°C
	T4_HEAT_1	-10~10°C	2°C	1°C
	T4_HEAT_2	15~30°C	15°C	1°C
	OFFSET_H	0~30°C	10°C	1°C
	RATIO_PUMP	30%~100%	100%	5%
	PUMP ON TIME	5~60min	5min	5min
	PUMP OFF TIME	0~60min	0min	5min
	MIN TEMP FOR COOL	0~20°C	7°C	1°C
	ENERGY SAVING SWITCH	40~100%	100%	10%

Menu	Parameters	Setting range	Default value	Adjustment range
Project menu	TWO_COOL_DIFF	1°C~5°C	2°C	1°C
	TWO_HEAT_DIFF	1°C~5°C	2°C	1°C
	TIM_CAP_ADJ	60~360s	80s	20s
	TW_COOL_DIFF	1°C~5°C	2°C	1°C
	TW_HEAT_DIFF	1°C~5°C	2°C	1°C
	RATIO_COOL_FIRST	0~100%	50%	5%
	RATIO_HEAT_FIRST	0~100%	50%	5%
	T_DIFF_PRO	Normal: 8~15°C	Normal: 10°C	1°C
		Hot: 8~20°C	Hot: 15°C	
	TWI_O_ABNORMAL	1~5°C	2°C	1°C
	T_FROST	20~120 min	35 min	5min
	T_DEFROST_IN	-5~5°C	0°C	1°C
	T_FROST_OUT	-10~+10°C	0°C	1°C
	E9 PROTECT TIME	2~20s	5s	1
	E9 DETECTION METHOD	1~2	1	1
	MIN RATIO	Normal: 40~100%	75%	5%
		Hot: 25~100%	25%	5%
	MAX RATIO	70~100%	100%	5%
Project menu (customized with DHW)	dT5_ON	2~10°C	8°C	1°C
	dT1S5	5~20°C	10°C	1°C
	COOL MIN TIME	0.5~24h	0.5h	0.5h
	COOL MAX TIME	0.5~24h	8h	0.5h
	HEAT MIN TIME	0.5~24h	0.5h	0.5h
	HEAT MAX TIME	0.5~24h	8h	0.5h
	DHW MIN TIME	0.5~24h	0.5h	0.5h
	DHW MAX TIME	0.5~24h	8h	8h

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