DAIKIN

Catalogue/Engineering Data

ED-UHA-B5-V01

Modular Air Source Heat Pump Water Heater

Model: UHA075/100/200B5
Refrigerant: R410A
Heating Capacity: 30/40/80kW

R410A
ODP=0

DAIKIN INDUSTRIES., LTD

Literature No.: ED-UHA-B5-V01
Supersedes: N/A

Contents

Note: Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

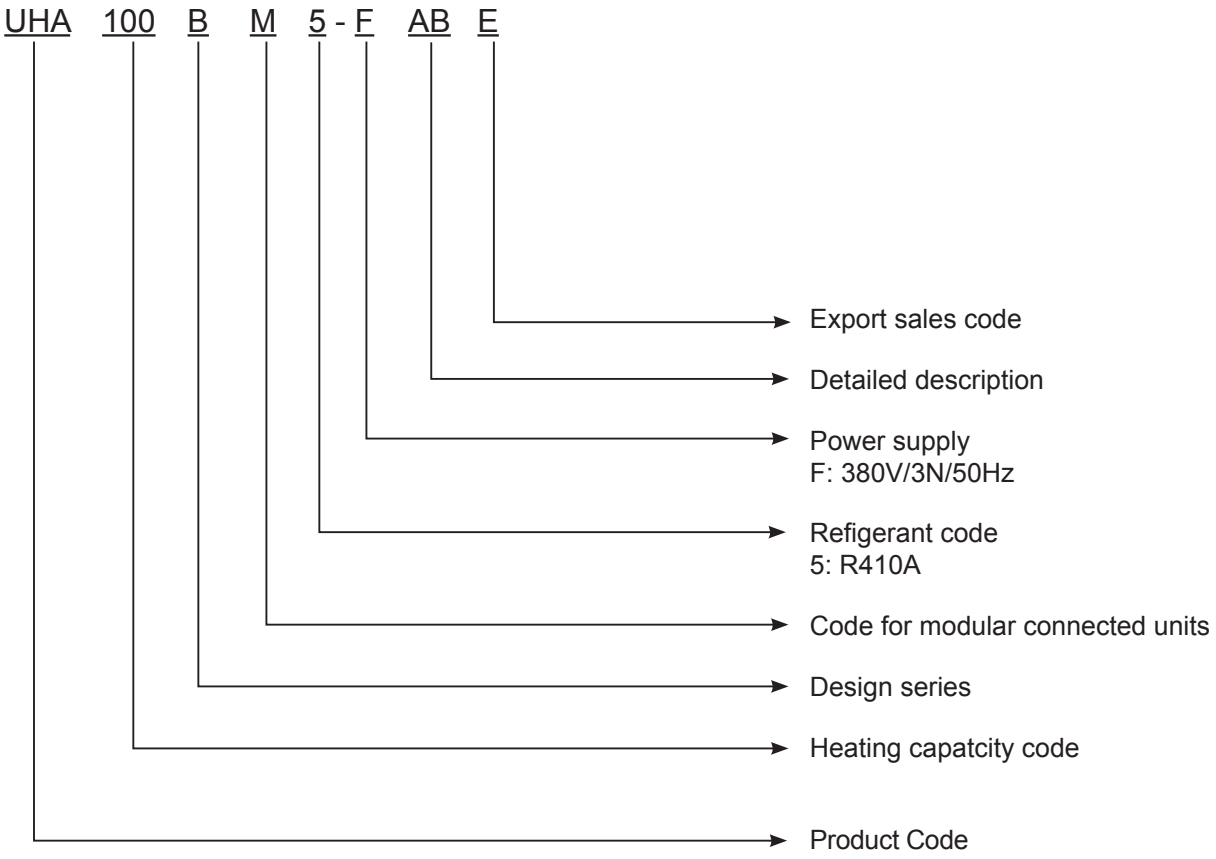
Caution: Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

Warning: Moving machinery and electrical power hazard may cause severe personal injury or death. Disconnect and lock off power before servicing equipment.

Model Series

Model	Heating Capacity	Max Combination Qty
UHA075B5	30 kW	16
UHA100B5	40 kW	16
UHA200B5	80 kW	16

Nomenclature



Product code —— UHA: Air source heat pump water heater, DAIKIN brand
Heating capacity code —— 075, 100, 200 ……
Design series —— A, B, C ……
Refrigerant code —— 3: R134a, 4: R407C, 5: R410A, default: R22
Connected code —— M: master, S: slave
Power supply —— F: 380V/3N/50Hz, A: 220V/50Hz
Detailed description —— AA, AB, AC …… ZZ
Export sales cole —— E: for export, default: for domestic

Features

Wide range of operation

UHA series air source heat pump water heater, with wider operation range, can realize normal operation from -10°C to 43°C. Breaking the limit that traditional heat pump hot water unit can only be used in most southern areas, UHA series of units are also applicable in most of northern areas.

Expand application of hot water units

UHA series air source heat pump water heater, breaks the traditional bound of domestic hot water, it can also be used for fan coil units, radiator, floor heating and other hot water demands, according to different customer requirments.

High EER

Air-cooled heat pump coheres forty years of experience, has introduced efficient and green new products, help build energyefficient society. UHA series air source heat pump water heater obtained national energysaving product certification, and were included in the government procurement list of energy-saving products. The unit, at standard conditions, reaches the highest COP 4.59, an industry-leading level.

Dedicated compressor for hot water unit

UHA series air source heat pump water heater adopts a dedicated compressor. In its unique "spray liquid" design, during low temperature running status, liquid refrigerant is sprayed into the middle of the scroll compressor cooling chamber to cool down effectively and reduce the exhaust gas temperature, so as to ensure the reliability and security. By advanced system design with special "spray liquid" compressor, the operating range and efficiency are greatly improved, to provide stable year-round hot water.

Environmental-friendly rerigerant

The unit uses environmentally friendly refrigerant R410A, ODP = 0. It does not destroy the ozone layer. The unit integrate R410A and new technologies to provide customers with more efficient, more environmentally friendly and more economical systems.

No exhaust emission

The unit is without waste gas, water, residue or other harmful substances, nor will it generate any atmospheric pollution. It's green and environmentally friendly; while absorbing heat when the unit is running, in summer it improves the surrounding environment, alleviate the urban heat island effect.

Temperature & level limit replenishment function

The unit, of its original "temperature & level limit replenishment function", is dual controlled by water tank hot water temperature and water level to decide whether to refill water. When the tank temperature is below the set temperature, it stops refilling the water, avoid water temperature fluctuates too much during peak of water use. It provides a stable temperature, to ensure comfort.

LCD controller

Using humanized microcomputer control system, LCD display controller, the unit is simple and quick to use. Single controller can control up to 16 units, monitor unit running status dynamically. The controller has parameter display, parameter settings and other functions. When the unit fails, the controller displays the fault quickly and accurately assist rapid troubleshooting, easy maintenance and management.

Schedule management

Daily timer of on-off switch time, could be set in one week cycle, to run the unit automatically, and realize unattended operation. The programmable switch timer function of the unit, during the night, utilize the low price electricity, to produce hot water and store in the storage device, with no staff on duty.

Building controller

UHA series air source heat pump water heater with default ModBus gateway protocol components, can be easily connected to building control system (BAS) for centralized control, easy to implement intelligent management, improve management efficiency, and save operating cost.

Flexible application

The unit uses a modular design, enabling free combination of 1 to 16 different units, and can be combined freely between different models to meet hot water needs of different places. When design capacity of the units change, or phased investment of project is required, it can respond flexibly.

Convenient installation

The unit is compact enough to be delivered by elevators or barrows, without any large delievering, lifting equipment. The unit can be delievered separately, and combine to install, very simple construction. It is conductive to shorten the construction period. The unit is installed outdoor, without dedicated machine room, and footprint is small enough to be adapted to irregular installation space.

Backup after failure

By its industry-leading modular design, in the modular combination, each unit is backup for each other. If any unit in a modular combination needs repair or maintenance, it will not affect the operation of other units.

Intelligent defrosting

By detecting multivariate parameters, unit accurately judge the frosting situation, and intelligently select the best time to enter or exit the defrosting condition, to avoid endless defrosting or frequent defrosting problems. Intelligent defrosting control design makes defrosting more quickly and thoroughly. Dual system design helps two systems in one unit to achieve interval defrosting, and avoid excessive temperature fluctuation.

Specifications

General data

Model			UHA075B5	UHA100B5	UHA200B5
Nominal capacity		kW	30	40	80
Nominal producing water		l/h	645	860	1720
Nominal power input		kW	6.83	8.71	18.22
COP		W/W	4.39	4.59	4.39
Nominal current		A	13.2	17.3	33.4
Power supply			380V/3N/50Hz		
Nominal cycle water flow		m^3/h	5.16	6.88	13.76
WPD		kPa	35	58	72
Throttle type			EXV		
Refrigerant	Type		R410A		
	Charging	kg	4.1	5	5.0X2
Pipes	Inlet	inch	Rc1-1/2	Rc1-1/2	Rc2
	Outlet	inch	Rc1-1/2	Rc1-1/2	Rc2
Air exhaust outlet			On top		
Fan power input (H/L)		W	490/180	680/190	680X2/190X2
Net weight		kg	220	250	500
Gross weight		kg	248	278	540
Operating weight		kg	225	255	510
Unit dimensions	L	mm	990	990	1990
	W	mm	840	840	840
	H	mm	1515	1515	1780
Packing dimensions	L	mm	1080	1080	2070
	W	mm	890	890	890
	H	mm	1700	1700	1960
Noise		dB(A)	60	62	65

Notes:

1. The nominal heating capacity above is measured at outdoor environment DB/WB temperature 20ºC/15ºC, initial water tank temperature 15ºC, and final water temperature 55ºC;
2. Nominal cycle water flow is the design value of unit heating cycle, WPD is measured at this operation mode and water flow value;
3. Noise level is measured at noise chamber whose background noise level is 11.5 dB(A), during actual use, due to environmental noise or other reasons, the real noise may be different;
4. All specifications are subjected to change by the manufacturer without prior notice.

Components data

Model			UHA075B5	UHA100B5	UHA200B5
Water side heat exchanger	Type		Tube in tube	Tube in tube	Tube in tube
	Nominal water flow	m^3/h	5.16	6.88	13.76
	Piping connecting		Rc1-1/2	Rc1-1/2	Rc2
	WPD	kPa	35	58	72
Air side heat exchanger	Material		Copper	Copper	Copper
	Type		Inner groove	Inner groove	Inner groove
	Outer dimeter	mm	7.94	7.94	7.94
Fin	Material		Aluminum	Aluminum	Aluminum
	Type		Blue fin	Blue fin	Blue fin
	Rows		2	2	2
	Fin per inch		14	14	14
Face area		m^2	1.99	2.56	3.86
Condenser fan	Type/ Drive		Low-noise axial fan	Low-noise axial fan	Low-noise axial fan
	Qty		1	1	2
	Blade model		ASG30	ASG30	ASG30
	Motor poles		10	8	8
	Air volume	m^3	8725	11846	23692
Compressor	Type		Scroll compressor	Scroll compressor	Scroll compressor
	Qty		1	1	2
Refrigerant	Type		R410A	R410A	R410A
	Charge	kg	4.1	5	5.0 × 2
Flow control			EXV	EXV	EXV
Numbers of circuits			1	1	2
Oil	Model		POE	POE	POE
	Charge	kg	3	3.3	3.3 × 2
Casing	Colour		White	White	White
	Material		Electro-galvanized Mild Steel	Electro-galvanized Mild Steel	Electro-galvanized Mild Steel
Protection devices			H/L pressure switch /Thermal and current overload prtector	H/L pressure switch /Thermal and current overload prtector	H/L pressure switch /Thermal and current overload prtector

Note: all specifications are subjected to change by the manufacturer without prior notice.

Electrical data

Model			UHA075B5	UHA100B5	UHA200B5
Compressor	Rated running current	A	19	24	24
	Locked rotor AMP (LRA)	A	98	142	142
IP/ Insulation grade			IPX4	IPX4	IPX4
Unit operating current		A	13.2	17.3	33.4
Unit max running current		A	21.3	27.3	52.4
Unit max power input		kW	11	13.8	28.6

Notes:

1. All specifictions are subjected to change by the manufacturer without prior notice.
2. The parameters above is measured at outdoor environment DB/WB temperature 20ºC/15ºC, initial water tank temperature 15ºC, and final water temperature 55ºC.

Safety devices

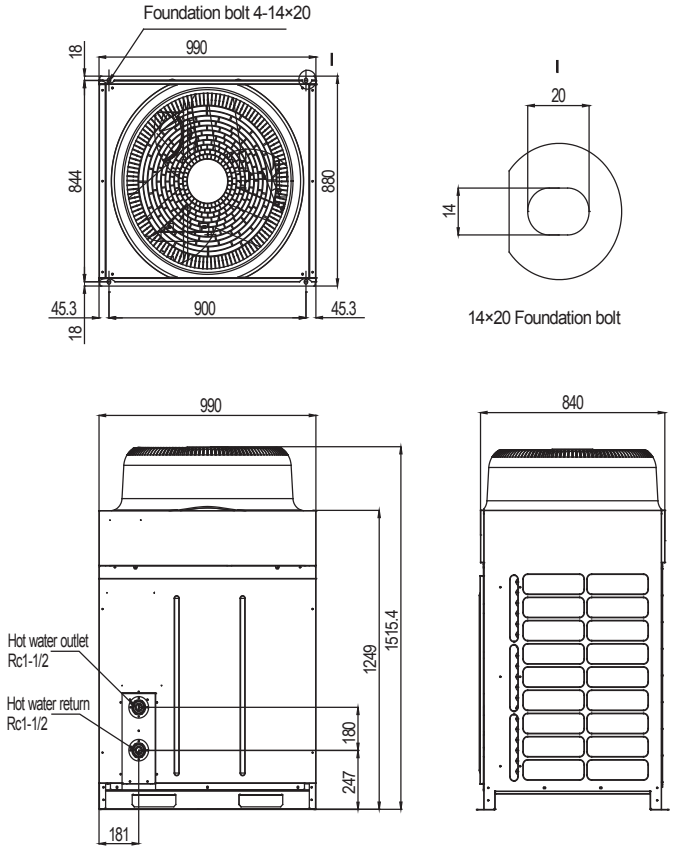
Model				UHA075B5	UHA100B5	UHA200B5
Safety device	High pressure switch	Type		PSW,H20PS B	PSW,H20PS B	PSW,H20PS B
		Open	MPa	4.15 ± 0.1	4.15 ± 0.1	4.15 ± 0.1
		Close	MPa	3.11 ± 0.1	3.11 ± 0.1	3.11 ± 0.1
	Low pressure switch	Type		N/A	N/A	N/A
		Open	MPa	N/A	N/A	N/A
		Close	MPa	N/A	N/A	N/A
	Phase sequencer			YES	YES	YES
	Discharge temperature setting		°C/°F	130/266	130/266	130/266

Notes:

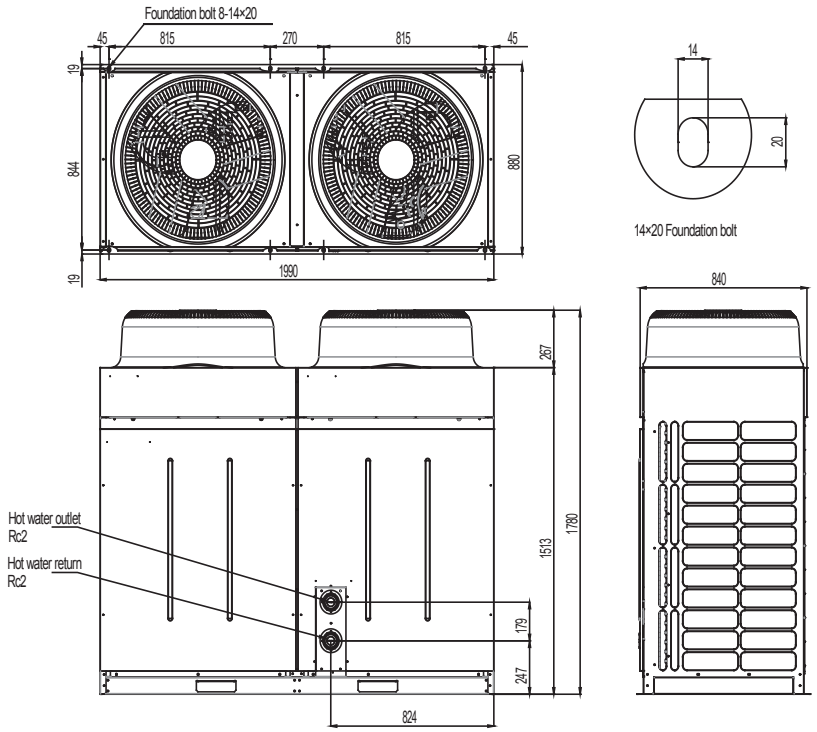
1. All specifictions are subjected to change by the manufacturer without prior notice.

Dimensions

UHA075/100B5



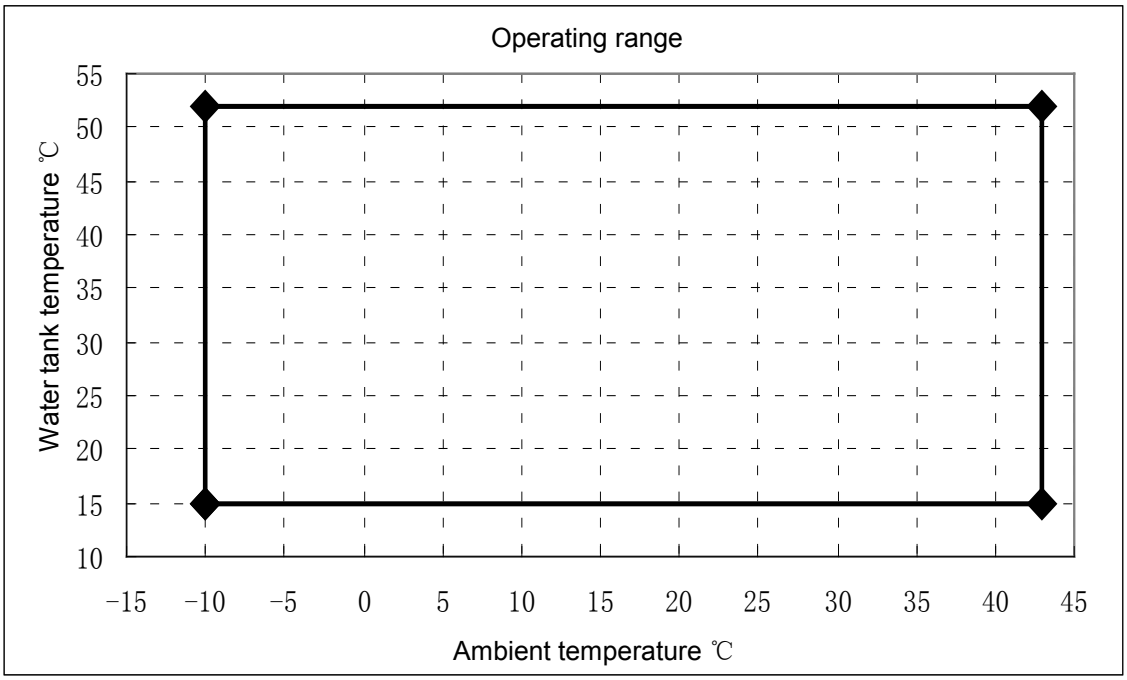
UHA200B5



Performance Data

Operating range

UHA075/100/200B5



Heating capacity performance table

Model	Inelt water temp. ºC		Ambient temp. ºC									
			-10	0	10	15	20	25	30	35	40	43
UHA075B5	15	Heating capacity (kW)	15.15	19.24	23.72	25.37	27.02	29.31	31.59	32.54	33.48	34.56
		Heating power (kW)	4.54	4.59	4.70	4.75	4.79	4.88	4.97	5.05	5.12	5.32
	20	Heating capacity (kW)	14.86	18.79	23.30	25.03	26.76	28.87	30.98	31.75	32.52	33.41
		Heating power (kW)	4.96	5.00	5.11	5.16	5.20	5.27	5.33	5.15	4.97	5.02
	30	Heating capacity (kW)	14.19	18.15	22.33	24.29	26.24	28.16	30.07	30.33	30.58	32.84
		Heating power (kW)	5.93	5.96	6.07	6.12	6.17	6.22	6.27	6.06	5.85	5.95
	40	Heating capacity (kW)	13.48	17.81	21.47	23.35	25.22	27.14	29.06	29.50	29.94	31.86
		Heating power (kW)	6.99	7.16	7.26	7.30	7.34	7.40	7.45	7.25	7.05	7.08
	50	Heating capacity (kW)	13.37	17.51	20.55	22.17	23.78	24.79	25.80	27.49	29.17	31.10
		Heating power (kW)	8.38	8.68	8.71	8.72	8.73	8.57	8.40	8.46	8.51	8.60
	52	Heating capacity (kW)	13.14	16.93	20.44	22.05	23.66	25.13	26.60	27.93	29.25	29.99
		Heating power (kW)	8.64	8.82	8.93	8.96	8.98	8.98	8.98	8.95	8.91	8.88
UHA100B5	15	Heating capacity (kW)	20.20	25.65	31.62	33.83	36.03	39.08	42.12	43.02	43.92	44.88
		Heating power (kW)	5.79	5.85	6.00	6.06	6.11	6.22	6.33	6.10	5.86	5.91
	20	Heating capacity (kW)	19.81	25.05	31.07	33.38	35.68	38.50	41.31	42.34	43.37	44.55
		Heating power (kW)	6.32	6.37	6.52	6.58	6.63	6.72	6.80	6.57	6.33	6.40
	30	Heating capacity (kW)	18.92	24.21	29.78	32.39	34.99	37.55	40.10	40.44	40.77	43.79
		Heating power (kW)	7.56	7.60	7.75	7.81	7.87	7.94	8.00	7.74	7.47	7.59
	40	Heating capacity (kW)	17.97	23.74	28.62	31.13	33.63	36.19	38.75	39.34	39.92	42.48
		Heating power (kW)	8.92	9.13	9.26	9.32	9.37	9.44	9.50	9.25	9.00	9.02
	50	Heating capacity (kW)	17.83	23.35	27.41	29.56	31.71	33.06	34.41	36.65	38.89	41.46
		Heating power (kW)	10.69	11.06	11.11	11.12	11.13	10.92	10.71	10.79	10.86	10.97
	52	Heating capacity (kW)	17.52	22.58	27.26	29.41	31.56	33.52	35.47	37.24	39.00	39.98
		Heating power (kW)	11.02	11.25	11.39	11.43	11.46	11.46	11.45	11.41	11.37	11.33
UHA200B5	15	Heating capacity (kW)	40.40	51.30	63.25	67.66	72.07	78.15	84.23	86.40	88.56	90.12
		Heating power (kW)	12.10	12.23	12.55	12.67	12.79	13.02	13.25	13.56	13.86	14.21
	20	Heating capacity (kW)	39.62	50.10	62.14	66.75	71.36	76.99	82.62	84.68	86.73	89.10
		Heating power (kW)	13.22	13.33	13.63	13.75	13.86	14.04	14.21	13.73	13.25	13.40
	30	Heating capacity (kW)	37.83	48.41	59.55	64.77	69.98	75.09	80.20	80.87	81.54	87.57
		Heating power (kW)	15.81	15.90	16.20	16.33	16.45	16.60	16.74	16.18	15.62	15.87
	40	Heating capacity (kW)	35.95	47.48	57.25	62.26	67.26	72.38	77.50	78.67	79.84	84.96
		Heating power (kW)	18.65	19.11	19.36	19.48	19.59	19.73	19.87	19.35	18.82	18.88
	50	Heating capacity (kW)	35.65	46.70	54.81	59.12	63.43	66.12	68.81	73.30	77.78	82.93
		Heating power (kW)	22.36	23.14	23.23	23.26	23.29	22.85	22.40	22.56	22.71	22.94
	52	Heating capacity (kW)	35.04	45.16	54.52	58.82	63.12	67.03	70.94	74.47	78.00	79.96
		Heating power (kW)	22.04	22.50	22.78	22.85	22.92	22.91	22.90	22.82	22.74	22.66

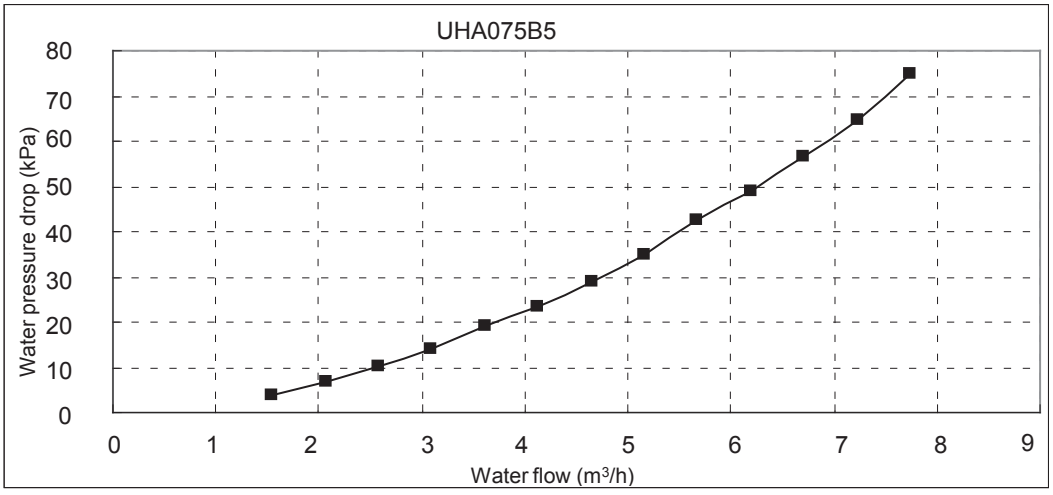
Note: The parameters above are measured base on constant inlet water temperature and nominal cycle water flow.

Model		Ambient temp. ºC										
		-10	0	7	10	15	20	25	30	35	40	43
UHA075B5	Heating capacity (kW)	16.50	21.30	24.50	25.80	27.90	30.00	31.90	33.80	34.90	36.00	37.90
	Heating power (kW)	6.54	6.65	6.72	6.75	6.79	6.83	6.84	6.84	6.71	6.57	6.63
	COP	2.53	3.21	3.64	3.82	4.11	4.39	4.67	4.95	5.22	5.48	5.72
	Water production (m^3/h)	0.36	0.46	0.53	0.56	0.60	0.65	0.69	0.73	0.75	0.77	0.81
UHA100B5	Heating capacity (kW)	22.00	28.50	32.60	34.40	37.20	40.00	42.55	45.10	46.55	48.00	50.50
	Heating power (kW)	8.34	8.49	8.57	8.61	8.66	8.71	8.72	8.72	8.55	8.37	8.45
	COP	2.64	3.35	3.81	4.00	4.30	4.59	4.88	5.17	5.45	5.73	5.98
	Water production (m^3/h)	0.47	0.61	0.70	0.74	0.80	0.86	0.92	0.97	1.00	1.03	1.09
UHA200B5	Heating capacity (kW)	44.10	56.90	65.30	68.90	74.45	80.00	85.10	90.20	93.10	96.00	101.00
	Heating power (kW)	17.45	17.75	17.93	18.01	18.12	18.22	18.23	18.24	17.88	17.51	17.68
	COP	2.52	3.21	3.64	3.82	4.11	4.39	4.67	4.94	5.21	5.48	5.71
	Water production (m^3/h)	0.95	1.22	1.40	1.48	1.60	1.72	1.83	1.94	2.00	2.07	2.17

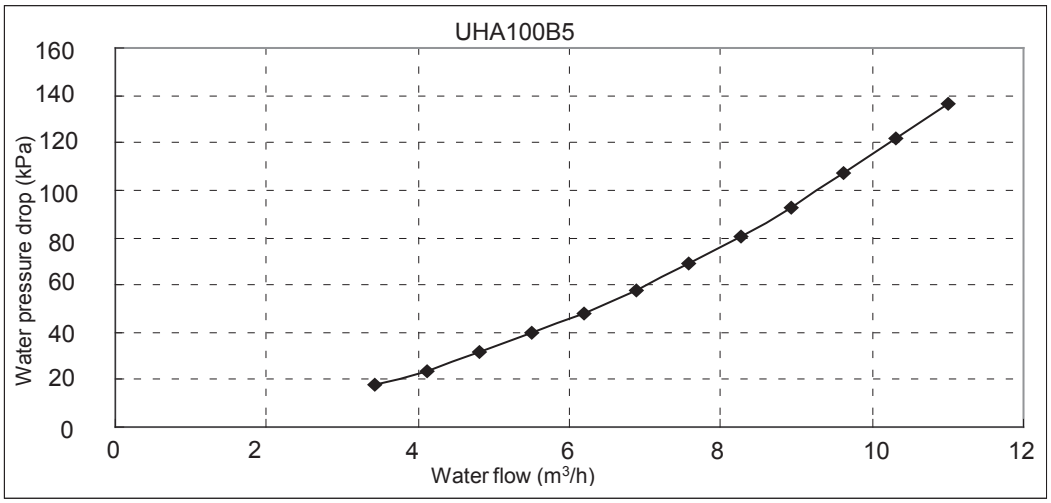
Note: The parameters above are measured at standard conditions of water tank initial water temperature 15ºC, final water temperature 55ºC.

Water Pressure Drop Curve

UHA075B5



UHA100B5



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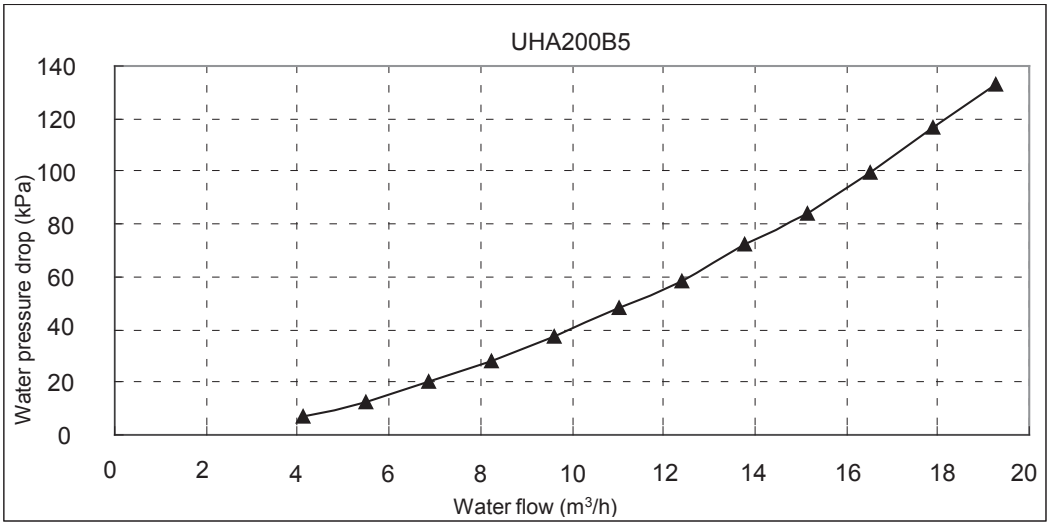


Note: Unit water pressure drop is measured at unit water inlet and water outlet.

Sound Data

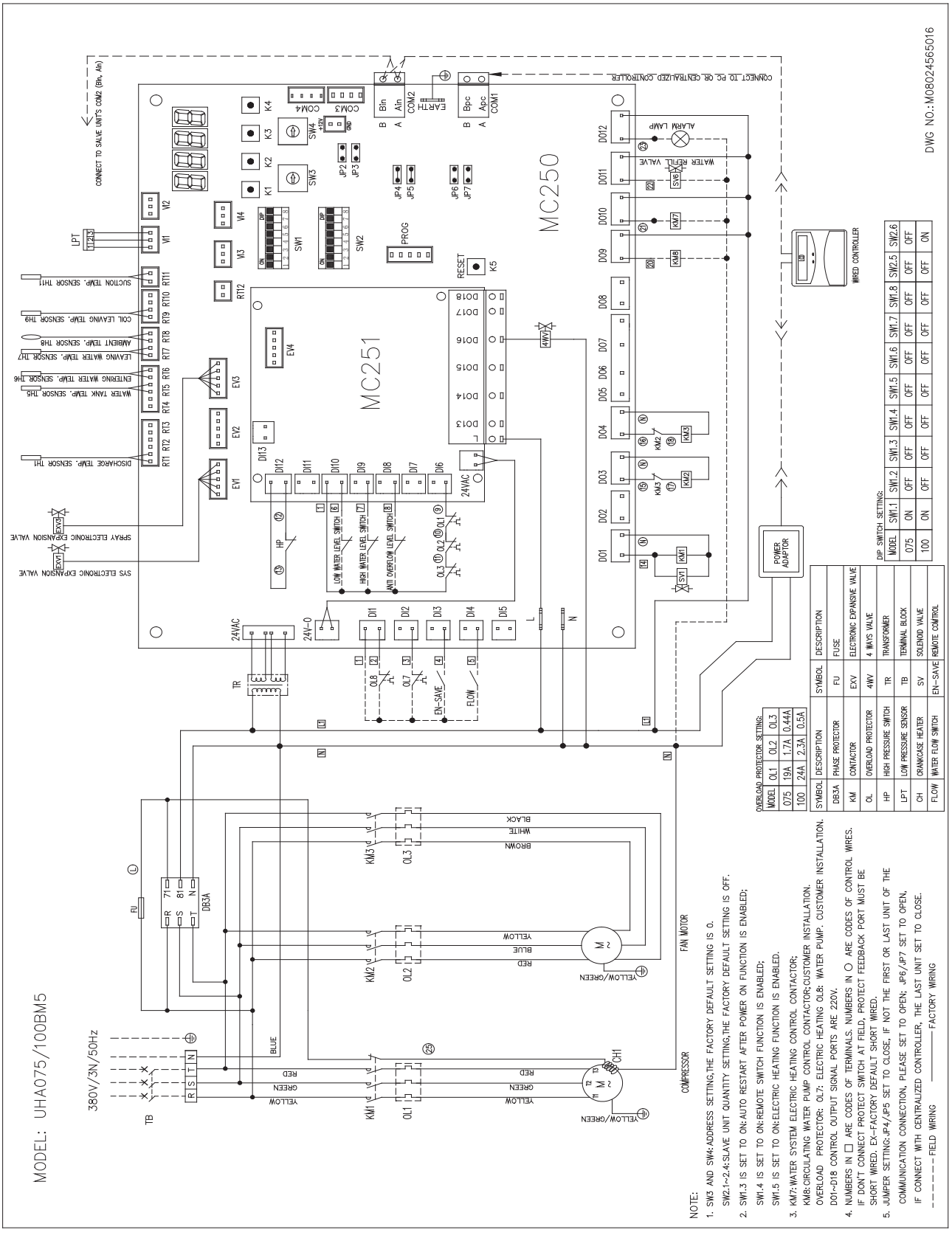
Acoustic noise

Model	Octave Band Level (dB,ref20μPa)								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Overall
UHA075B5	46	47	53	54	55	53	48	42	60
UHA100B5	43	48	54	56	57	55	51	44	62
UHA200B5	51	54	58	61	59	55	49	41	65

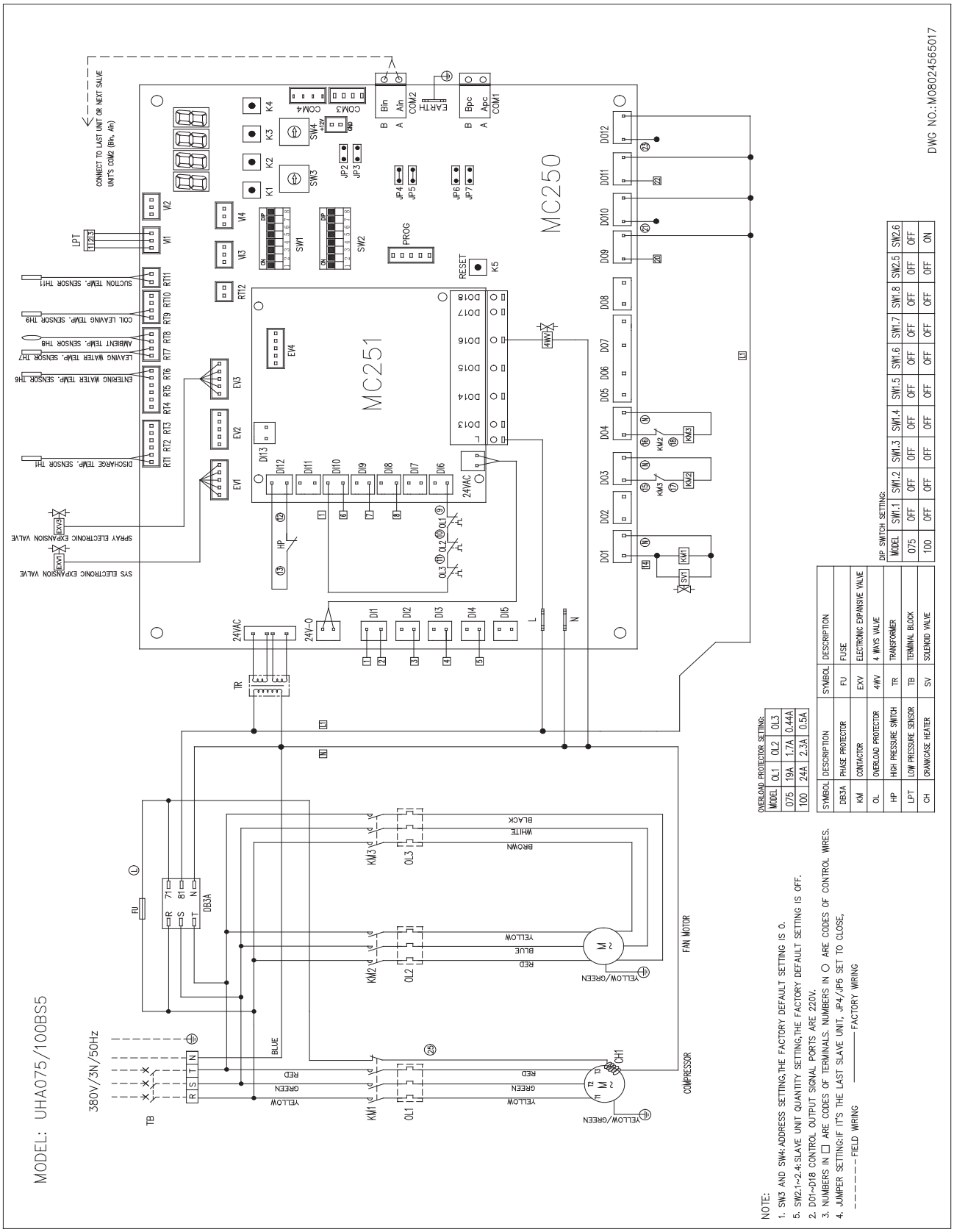
Note: Noise level in the table is measured at noise chamber whose background noise level is 11.5 dB(A), during actual use, due to environmental noise or other reasons, the real noise may be different.

Wiring Diagrams

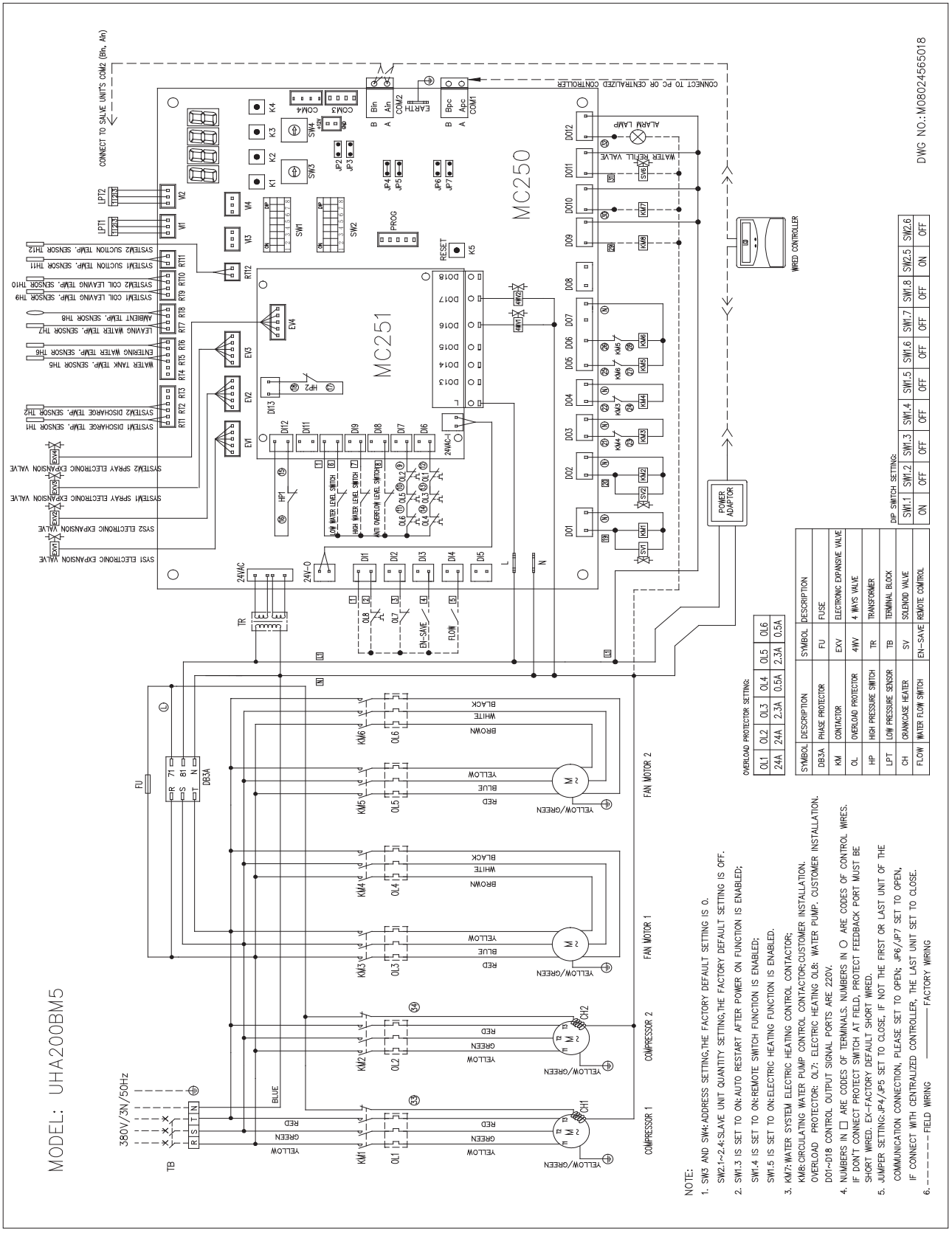
UHA075/100BM5



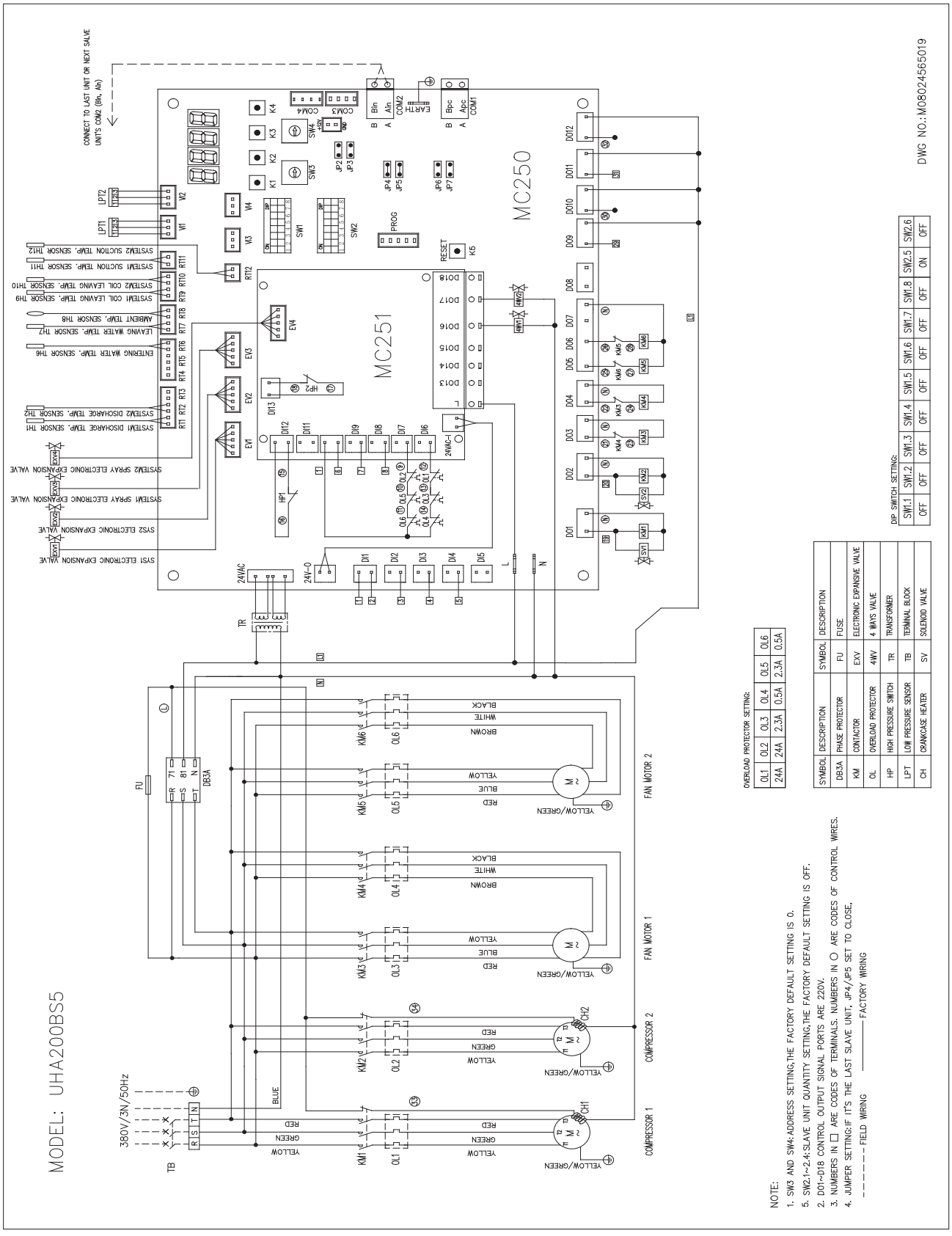
UHA075/100BS5



UHA200BM5


MODEL: UHA200BM5
380V/3N/50Hz
MC250
MC251
CONNECT TO SALVE UNIT'S COM2 (Bin, Ain)
CONNECT TO PC OR CENTRALIZED CONTROLLER
WIRED CONTROLLER
POWER ADAPTOR
ALARM LAMP
WATER REFILL VALVE
COMPRESSOR 1
COMPRESSOR 2
FAN MOTOR 1
FAN MOTOR 2
DWG NO.:M08024565018
NOTE:
1. SW3 AND SW4:ADDRESS SETTING,THE FACTORY DEFAULT SETTING IS 0.
SW2.1~2.4:SLAVE UNIT QUANTITY SETTING,THE FACTORY DEFAULT SETTING IS OFF.
2. SW1.3 IS SET TO ON: AUTO RESTART AFTER POWER ON FUNCTION IS ENABLED;
SW1.4 IS SET TO ON:REMOTE SWITCH FUNCTION IS ENABLED;
SW1.5 IS SET TO ON:ELECTRIC HEATING FUNCTION IS ENABLED.
3. KM7:WATER SYSTEM ELECTRIC HEATING CONTROL CONTACTOR;
KM8:CIRCULATING WATER PUMP CONTROL CONTACTOR;CUSTOMER INSTALLATION.
OVERLOAD PROTECTOR: OL7: ELECTRIC HEATING OL8: WATER PUMP: CUSTOMER INSTALLATION.
D01~D18 CONTROL OUTPUT SIGNAL PORTS ARE 220V.
4. NUMBERS IN □ ARE CODES OF TERMINALS. NUMBERS IN ○ ARE CODES OF CONTROL WIRES.
IF DON'T CONNECT PROTECT SWITCH AT FIELD, PROTECT FEEDBACK PORT MUST BE SHORT WIRED. EX-FACTORY DEFAULT SHORT WIRED.
5. JUMPER SETTING:JP4/JP5 SET TO CLOSE, IF NOT THE FIRST OR LAST UNIT OF THE COMMUNICATION CONNECTION, PLEASE SET TO OPEN; JP6/JP7 SET TO OPEN,
IF CONNECT WITH CENTRALIZED CONTROLLER, THE LAST UNIT SET TO CLOSE.
6. - - - - - - - FIELD WIRING ——— FACTORY WIRING
OVERLOAD PROTECTOR SETTING:
OL1 OL2 OL3 OL4 OL5 OL6
24A 24A 2.3A 2.3A 2.3A 0.5A
SYMBOL DESCRIPTION SYMBOL DESCRIPTION
DB3A PHASE PROTECTOR FU FUSE
KM CONTACTOR EXV ELECTRONIC EXPANSIVE VALVE
OL OVERLOAD PROTECTOR 4WV 4 WAYS VALVE
HP HIGH PRESSURE SWITCH TR TRANSFORMER
LPT LOW PRESSURE SENSOR TB TERMINAL BLOCK
CH CRANKCASE HEATER SV SOLENOID VALVE
FLOW WATER FLOW SWITCH EN-SAVE REMOTE CONTROL
DIP SWITCH SETTING:
SW1.1 SW1.2 SW1.3 SW1.4 SW1.5 SW1.6 SW1.7 SW1.8 SW2.5 SW2.6
ON OFF OFF OFF OFF OFF OFF OFF ON OFF

UHA200BS5


MODEL: UHA200BS5
380V/3N/50Hz
MC250
MC251
COMPRESSOR 1
COMPRESSOR 2
FAN MOTOR 1
FAN MOTOR 2
DWG NO.:M08024565019
NOTE:
1. SW3 AND SW4:ADDRESS SETTING,THE FACTORY DEFAULT SETTING IS 0.
5. SW2.1~2.4:SLAVE UNIT QUANTITY SETTING,THE FACTORY DEFAULT SETTING IS OFF.
2. DO1~D18 CONTROL OUTPUT SIGNAL PORTS ARE 220V.
3. NUMBERS IN □ ARE CODES OF TERMINALS. NUMBERS IN ○ ARE CODES OF CONTROL WIRES.
4. JUMPER SETTING:IF IT'S THE LAST SLAVE UNIT, JP4/JP5 SET TO CLOSE.
FIELD WIRING
FACTORY WIRING
OVERLOAD PROTECTOR SETTING:
OL1 OL2 OL3 OL4 OL5 OL6
24A 24A 2.3A 0.5A 2.3A 0.5A
SYMBOL DESCRIPTION SYMBOL DESCRIPTION
DB3A PHASE PROTECTOR FU FUSE
KM CONTACTOR EXV ELECTRONIC EXPANSIVE VALVE
OL OVERLOAD PROTECTOR 4WV 4 WAYS VALVE
HP HIGH PRESSURE SWITCH TR TRANSFORMER
LPT LOW PRESSURE SENSOR TB TERMINAL BLOCK
CH CRANKCASE HEATER SV SOLENOID VALVE
DIP SWITCH SETTING:
SW1.1 SW1.2 SW1.3 SW1.4 SW1.5 SW1.6 SW1.7 SW1.8 SW2.5 SW2.6
OFF OFF OFF OFF OFF OFF OFF OFF ON OFF

Installation

Working condition

Item	Description
Power supply voltage	Rated voltage ±10%
Power supply frequency	Rated frequency ±1%
Variations between phases	Rated voltage ±2%
Air quality	Must not contain solute that can corrode copper, aluminum or iron.
Flow rate of chilled water	0.5 - 2.0m/s
Pressure of chilled water	< 1.0Mpa
Quality of water	"Must not contain solute that can corrode copper, iron, or welding material. For details on the water quality requirements, see Water Quality Management."
Installation site	Take anti-snow and ventilation measures as required.
Ambient temp.	Refer to the Performae Data.
Relative humidity	<90%

Note:

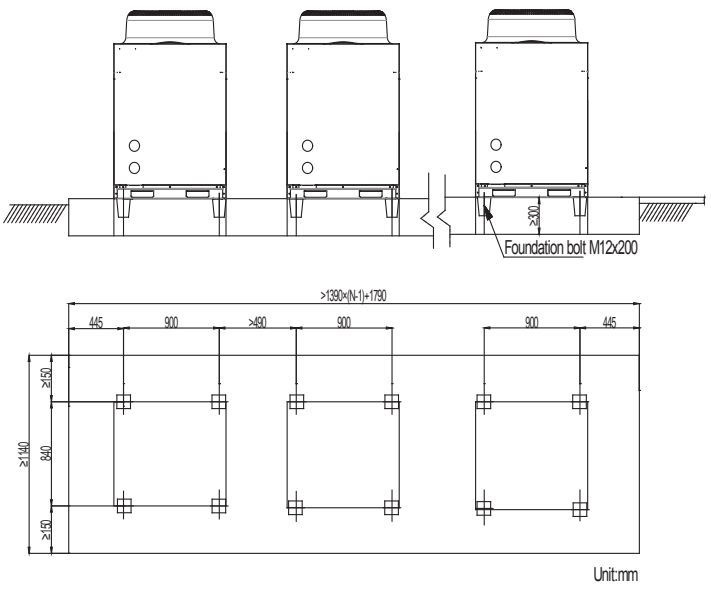
1. The unit is strictly tested before delivery and can work safely in the rated working conditions.
2. For the performance of the unit in different working conditions, please refer to performenc data.
3. This is the normal operating temperature range for the unit. Beyond this temperature range, the unit can only operate for a short moment before a failure alarm is triggered.

Installation dimensios and environment limits

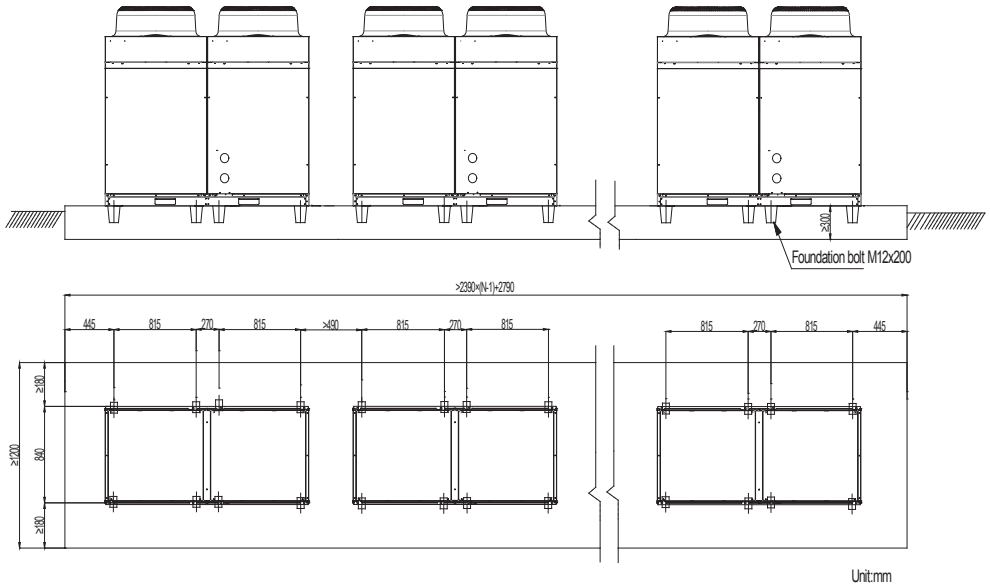
Units must be installed by DAIKIN service staff or by specially trained personnel.
Units must installed by following relevant national and local electric, building and environment protection standards as well as the installation manual.

Foundation bolts position

UHA075/100B5



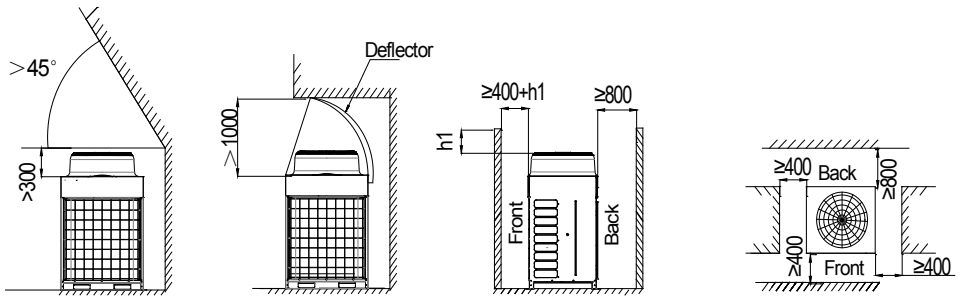
UHA200B5



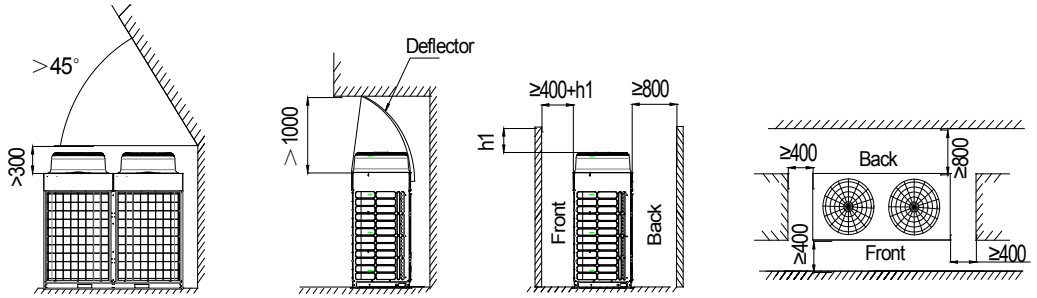
Note:

1. The groundwork must be a concrete floor or a V-iron structure that is strong enough to bear the operation pressure of the unit.
2. The groundwork must have draining facilities to discharge condensate water and defrosting water.
3. Installation on roof, strength of building must be checked and drainage measures must be adopted.
4. UHA075/100B5 must be fixed by 4 M12x220 bolts, UHA200B5 must be fixed by 8 M12x220 bolts.
5. 6 rubber cushions of 20mm thick must be installed between the unit and the groundwork.
6. N represents the number of modules installed.

Space allocated for a single unit



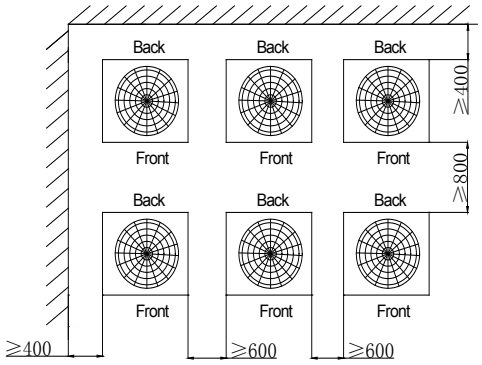
UHA075/100B5



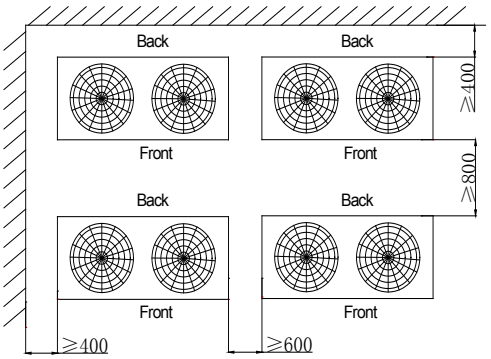
UHA200B5

Unit:mm

Space allotted for an array of units



UHA075/100B5

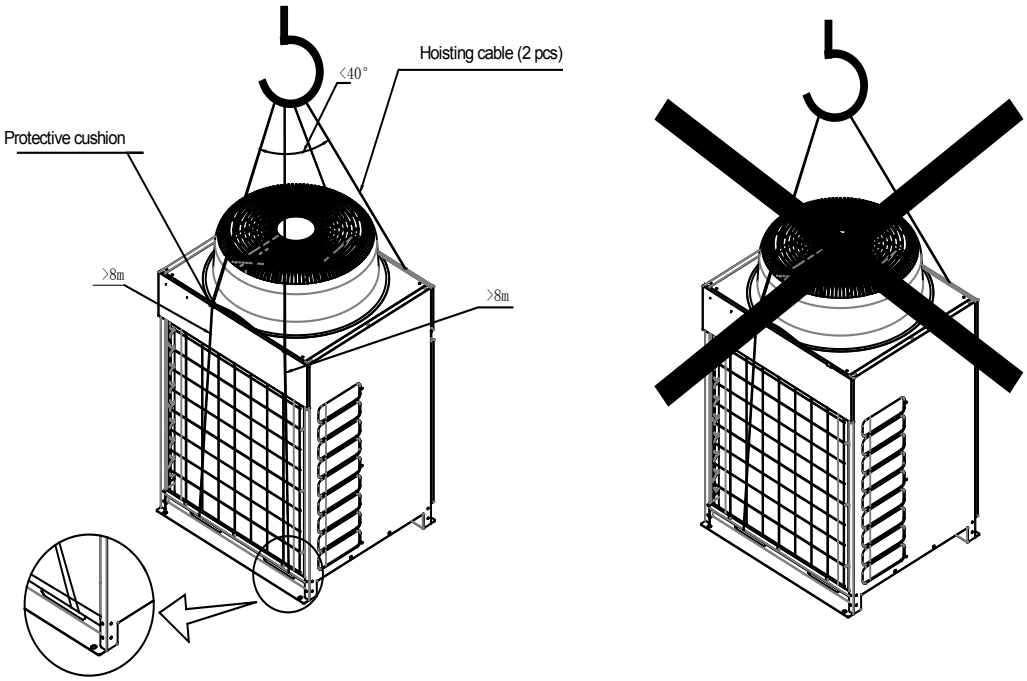


UHA200B5

Unit:mm

Note: "Front" is the side of unit airflow inlet, "Back" is the side which with water pipes.

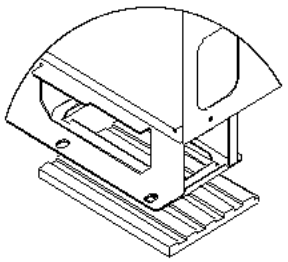
Hoisting the unit



Note:

1. The unit must be moved with great care.
2. Accessory strips cannot be used to hoist or move the unit as they might break and cause unexpected accidents.
3. Don't touch the heat sinks of the heat exchanger bare-handedly as they might cut your fingers.
4. Dispose all plastic bags properly and keep them away from children.

Fixing the unit



- Reserve sufficient maintenance space if possible.
- If the unit is installed in a place where it snows in winter, proper measures better be taken to protect the unit against snow and ensure that the unit works properly.
- Avoid installing the unit at below place as dirty, oil dirty, high salt and high sulfide gas, installation at place with flammable gas is forbidden.
- The groundwork should be made of concrete or supporting structures. While designing the groundwork, you must fully consider the strength of the floor, water discharge (the unit discharges water while working), pipeline and wiring. If the floor is not strong enough, the unit might fall off and breakdown, even incur bodily injuries.
- Screw down the unit using anchor bolts so that it will not fall off in case of strong wind or earthquakes. To avoid damages caused by strong wind or earthquakes, The unit must be securely installed at a proper place to avoid direct hit of strong winds.
- Depending on mounting conditions, operation vibration might pass through the groundwork and generate noises in the floor and walls. Therefore, proper vibration dampening mechanisms (such as bumper cushion, bumper frame etc.) should be in place.
- Corners and edges should be properly installed. Otherwise, the unit might get unbalanced and cause the grounding pins to bend. The unit might fall off and cause bodily injuries if it is not properly installed.
- If pipes need to be installed under units, to make sure the pipes can go through the unit base, the groundwork must be no less than 100mm.

Model Selection and Hydraulic Calculation

Water supply volume calculation

- All-day hot water supply system

  Centralized hot water supply system designed all-day hot water volume for where needs all-day hot water supply, such as residence, villa, rest houses, training centers, guest rooms of hotels (excluding staff dormitory), inpatient departments of the hospital, old people's home, kindergartens, nurseries (with accommodation) and other buildings:

$$G_r' = \frac{mq_r}{1000} \quad \text{Formula (1)}$$

G_r' — all-day hot water consumption amount (m^3), (water temperature at 60ºC);

m — quantity for water consumption calculation (number of persons or number of beds);

q_r — water use quota (L/person•day or L/bed•day), see Appendix I.

In formula (1), all-day hot water supply volume is calculated at water temperature of 60ºC according to Appendix I (refer to "Code for Design of Building Water Supply and Drainage").

Calculate all-day hot water consumption amount based on the set water temperature of the storage tank:

$$G_r = G_r' \frac{t - t_l}{t_r - t_l} \quad \text{Formula (2)}$$

G_r — all-day hot water consumption amount (m^3);

t — rated hot water temperature (ºC), t=60ºC in this case;

t_r — water tank water temperature (ºC);

t_l — local tap water temperature (ºC).

Designed hot water supply per hour:

$$G_h = G_r \frac{K_h}{T} \quad \text{Formula (3)}$$

G_h — designed hot water supply amount per hour (m^3/h);

K_h — hour variation coefficient, see the table below;

T — hot water supply time (h), supply for 24h.

Hot water system hour variation coefficient K_h:

Peak variation coefficient k	Number of residents for residence and hotel; number of beds for hospital													
	35	50	60	75	100	150	200	250	300	450	500	600	900	1000
Residence		6.58			5.12	4.49	4.13	3.38	3.7		3.28			2.86
Hotel			9.65			6.84			5.61	4.97		4.58	4.19	
Hospital	7.62	4.55			3.54		2.93		2.6		2.23			1.95

- Timing hot water supply system

  Centralized hot water supply system designed hourly hot water supply amount for where need timing supply of hot water, such asresidence, hotels, hospitals, rest quarters of industrial enterprises, public bathrooms, schools, theatres, gyms (stadiums) and other types of buildings:

$$G_h' = \frac{\sum q_h N_0 b}{1000} \quad \text{Formula (4)}$$

G_h' — designed hot water supply amount per hour (m^3/h);

q_h — Hourly hot water use quota of sanitary ware (L/h), see Appendix II;

N_0 — Quantity of sanitary ware of the same type;

b — Use percentage of sanitary ware: 70%~100% for bath tubs or showers in bathrooms of residence, hotels, hospitals and nursing home wards; 100% for showers and washbasins in bathrooms of industrial enterprises' rest quarters, public bathrooms, schools, theatres, gyms (stadiums), etc.

In formula (4), designed hot water supply amount per hour for all kinds of sanitary ware is calculated at water temperature of 60ºC according to Appendix II (refer to "Code for Design of Building Water Supply and Drainage").

$$G_h = G_h' \frac{t - t_l}{t_r - t_l} \quad \text{Formula (5)}$$

Then, all-day hot water consumption should be:

$$G_r = G_h' \frac{t - t_l}{t_r - t_l} T = G_h T \quad \text{Formula (6)}$$

In formula (5) and formula (6):

t — water using temperature (ºC), see table 4-2;

T — total time for hot water supply every day (h).

Unit selection calculation

Based on the calculated all-day hot water consumption, unit model and quantity can be determined according to the unit's producing water volume, at most 16 sets of unit of the same model can be combined. Producing water volume of the unit is specified in “Unit Producing Water volume Variation Table” in the User Manual where the producing water volume is for the situation with the final water temperature of 55ºC. For inlet water temperature, please refer to local cold water temperature (see Appendix III).

$$N = \frac{G_r}{g_j \times T_0} \quad \text{Formula (7)}$$

N — Quantity the unit;

G_r — all-day hot water consumption (m^3);

g_j — Producing water volume of a single unit (m^3/h);

T_0 — designed operation time of the unit (h).

Since the capacity of the unit will be affected by ambient temperature changing along seasons, the balance between the unit and the auxiliary heat source as well as the economic performance should be considered for unit selection. If the unit is selected based on working conditions in summer, large auxiliary heat source will be required in winter, which will lead to high operation cost; if the unit is selected based on working conditions in winter, the capacity of the unit will be too large in summer and the initial investment in heat pump unit will be quite large. It is necessary to find the economic balance point and design a hot water system with low investment (including auxiliary heat source for the heat pump hot water unit) and low operation cost. When determine the water volume, it is recommended to take the local annual average temperature as the ambient temperature and the designed operation time of the unit T_0 is recommenced to be set at 10~14. Without configuring of auxiliary heat source, the unit operation time is considered as 18 hours. The producing water volume of the unit is taken as under the worst local conditions.

Water tank selection calculation

- All-day hot water supply

  Service capacity of the water tank $V_{\text{water tank}}$ (the total capacity under the higher water level is the service capacity):

$$V_{\text{water tank}} \geq 1.1(G_r - G_j \frac{24}{K_{\text{h}}}) \quad \text{Formula (8)}$$

G_j is the producing water volume of the unit under worst local conditions

- Timing hot water supply system

  Service capacity of the water tank $V_{\text{water tank}}$ (the total capacity under the higher water level is the service capacity):

$$V_{\text{water tank}} \geq 1.1(G_r - G_j \frac{24}{K_{\text{h}}}) \quad \text{Formula (9)}$$

Gjis the producing water volume of the unit under worst local conditions

Thermal insulation must be applied for the water tank which should meet the following conditions:

1. Ensure that the temperature difference of the water tank in a day and night should be not more than 5ºC.
2. The design of thermal insulation structure should ensure good thermal insulation effect, convenient construction, be fire-proofing, water-proofing, durable and beautiful.
3. Dismountable thermal insulations structure should be adopted at the access hole of the water tank.
4. Water tanks placed outdoors should be configured with protective layer which should have functions of thermal insulation layer protection and water proofing. Metal protective layer is recommended, such as galvanized steel sheet at 0.3~0.8mm thickness or enclosure made of anti-rust aluminum sheet. Prevent rain water from entering at the joint of the shell by overlap joint technology.

Note: recommend the water tank capacity should be no less than 5 times of the water volume of the ordinary type of unit; For northern area with cold weather, the capacity of the water tank should be no less than the designed daily water consumption in principle.

Selection of auxiliary electric heater (Backup)

According to the project's needs, a set of auxiliary electric heater can be installed as backup system which will be started up during equipment maintenance period when a temporary failure occurs for the equipment. Besides, the backup system can also make up capacity degradation of the unit when the ambient temperature is extremely low so as to guarantee producing water volume of the unit.

Usually, the capacity of the auxiliary electric heater will be: $W=a*Q_2=a*(Q-Q_1)$. (Where, a is the margin coefficient with the value range of 1.0~1.5; the value of a should be higher in northern area; it may be 1.5 in cold northern areas).

For area with outdoor ambient temperature in winter lower than -7ºC, it is recommended to configure auxiliary heating equipment with heating capacity equivalent to the unit to ensure hot water supply when the heat pump unit does not run. Cost for hot water production can be significantly reduced by hot water production by heat pump water heater in summer and transition season, which has even better economic performance for boiler reconstruction projects in northern areas.

Water pump selection

Pump head and flow rate are two important parameters for pump selection. Selection of water pumps in the water system is introduced as below.

- Selection of hot water circulating pump

  Head of the hot water circulating pump H_2 should be 1.1~1.2 times of the sum of water pressure drop of heat exchanger at the water side of the unit ΔP, hot water inlet/ outlet height difference of the tank Z_2, pipeline fractional head loss and local resistance loss. Fractional head loss and local resistance loss may be calculated by two means: the one is based on hydraulic calculation (refer to contents below for calculation method); the second is to estimate based on experience, namely, taking local resistance loss as 5m of water column and taking fractional head loss as 5m of water column for each 100m long of pipeline. If the pipeline length is L_2, the experience formula should be:

  $$H_2 \geq 1.1\sim1.2\ (\Delta P+Z_2+0.05L_2+5) \qquad \text{Formula (11)}$$

Flow rate of the hot water circulating pump is selected based on the circulating water flow rate.

- Selection of hot water circulation booster pump at the user side

  Head of the hot water circulation booster pump at the user side H_3 should be 1.1~1.2 times of the sum of the height difference between the hot water outlet of the water tank and the highest point on the water system pipeline at the user side, pipeline fractional head loss and local resistance loss. Fractional head loss and local resistance loss may be calculated by two means: the one is based on hydraulic calculation (refer to contents below for calculation method); the second is to estimate based on experience, namely, taking local resistance loss as 5m of water column and taking fractional head loss as 5m of water column for each 100m long of pipeline. Besides, outlet pressure Pe should also be guaranteed for the user's showering equipment (the minimum working head should usually be 5~7m). If the pipeline length is L_3, the experience formula should be:

  $$H_3 \geq 1.1\sim1.2\ (Z_3+0.05L_3+5)+P_e \qquad \text{Formula (12)}$$

Note: flow rate of water pump should be 1.2 times of the "designed hourly water consumption G_h". It is recommended to install backup pump to ensure normal use in case of pump failure or maintenance.

Appendix 1: Unit Hot Water Consumption Quota

S/N	Building name	Unit	Highest water consumption quota (L)	Use time (h)
1	**Residence**			24
	With owned hot water supply and bathing equipment	Person·day	40~80	
	With centralized hot water supply and bathing equipment		60~100	
2	**Villa**	Person• day	70~110	24
3	**Single employee dormitory, students' dormitory, guesthouse, training center, ordinary hotels**			24h or timing supply
	public washroom	Person• day	25~40	
	public washroom, shower room		40~60	
	public washroom, shower room, laundry		50~80	
	separate toilet, public laundry		60~100	
4	**Hotel guest room**			24
	Guest	Bed• day	120~160	
	Employee	Person• day	40~50	
5	**In-patient department of the hospital**			24
	public washroom	Bed• day	60~100	
	public washroom, shower room	Bed• day	70~130	
	separate toile	Bed• day	110~200	
	Medical staff	Person• shift		
	Out-patient department, clinic	Patient• time	70~130	8
	Housing part of the convalescent hospital and the nursing home	Bed• day	100~160	24
6	**Old people's home**	Bed• day	50~70	24
7	**Kindergarten, nursery**			
	With accommodation	Child• day	20~40	24
	Without accommodation	Child• day	10~15	10
8	**Public bathroom**			12
	Shower	Customer• time	40~60	
	Shower, bathtub	Customer• time	60~80	
	Sauna (shower, massage pond)	Customer• time	70~100	
9	**Barbershop, beauty salon**	Customer• time	10~15	12
10	**Laundry room**	kg dry clothes	15~30	8
11	**Restaurant**			
	Restaurant	Customer• time	15~20	10~12
	Fast food restaurant, canteen for employees or students	Customer• time	7~10	11
	Bar, café, teahouse, karaoke	Customer• time	3~8	18
12	**Office building**	Person• shift	5~10	8
13	**Fitness center**	Person• time	15~25	12
14	**Gym (stadium)**			4
	Athlete showering	Person• time	25~35	
15	**Meeting room**	Seat• time	2~3	4

Note: hot water temperature at 60ºC

Appendix 2: Sanitary Ware Water Consumption Quota

S/N	Sanitary ware	One time water consumption (L)	Hourly water consumption (L)	Water temperature (ºC)
1	**Residence, hotel, villa, guest room**			
	Bathtub with shower	150	300	40
	Bathtub without shower	125	250	40
	Shower	70~100	140~200	37~40
	Nozzle of the washbasin and the sink brim	3	30	30
	Rinsing sink (pool)	-	180	50
2	**Collective dormitory, guest room, training center shower**			
	With shower compartment	70~100	210~300	37~40
	Without shower compartment	-	450	37~40
	Nozzle of the sink brim	3~5	50~80	30
3	**Restaurant**			
	Rinsing sink (pool)	-	250	50
	Washbasin: for staff	3	60	30
	For customers	-	120	30
	Shower	40	400	37~40
4	**Kindergarten, nursery**			
	Bathtub: kindergarten,	100	400	35
	Bathtub: nursery	30	120	35
	Shower: kindergarten	30	180	35
	Shower: nursery	15	90	35
	Nozzle of the washbasin	15	25	30
	Rinsing sink (pool)	-	180	50
5	**Hospital, convalescent hospital, nursing home**			
	Hand wash basin	-	15~25	35
	Rinsing sink (pool)	-	300	50
	Bathtub	125~150	250~300	40
6	**Public bathroom**			
	Bathtub	125	250	40
	Shower: with showering compartment	100~150	200~300	37~40
	Shower: without showering compartment	-	450~540	37~40
	Washbasin	5	50~80	35
7	**Barbershop, beauty salon:** Washbasin	-	35	35
8	**Laboratory**			
	Washbasin	-	60	50
	Hand wash basin	-	15~25	30
9	**Theatre**			
	Shower	60	200~400	37~40
	Washbasin for actors/ actresses	5	80	35
10	**Stadium** shower	30	300	35
11	**Rest quarter of industrial enterprises**			
	Shower: Ordinary workshop	40	360~540	37~40
	Shower: Dirty workshop	60	180~480	40
	Water nozzle of the washbasin or the sink brim: Ordinary workshop	3	90~120	30
	Water nozzle of the washbasin or the sink brim: Dirty workshop	5	100~150	35
12	**Bidet**	10~15	120~180	30

Hydraulic calculation

Hydraulic calculation can facilitate the selection of pump head and appropriate pipe diameter. Therefore, hydraulic calculation must be carried out for verification after main pipeline selection and then adjust pump head and pipe diameter based on the actual hydraulic calculation results.
Please refer to professional literature and design codes for hydraulic calculation.
Demonstration is made below by the calculation of fractional head loss and local resistance loss.

■ Fractional head loss calculation
Unit pipeline resistance loss can be calculated by Hazen-Williams formula according to the "Code for Design of Building Water Supply and Drainage" (GB50015-2003):

$$I=10.5C^{-1.85}d_j^{-4.87}Q^{1.85} \qquad \text{Formula (13)}$$

I— head loss of the unit pipeline, mH_2O/m;
Q— flow rate, m^3/s;
d_j— pipeline inner diameter, m;
C— Hazen-William coefficient (see the table below).

Pipeline	All kinds of plastic pipes and lined (coated) plastic pipes	Steel pipe, stainless steel pipe	Cast iron pipe lined with cement, resin	Ordinary steel pipe, cast iron pipe
C	140	130	130	100

Flow rate Q can be determined in actual engineering design process. Pipe diameter d_j will be determined as per the method specified below. Identify value C based on pipe material and then work out resistance loss I of unit pipeline by Hazen-William formula. Therefore, supposing that the length of pipeline at a certain diameter is L, the fractional head loss of the section of pipeline will be P=IL. Work out fractional head loss of various sections of pipeline by the foresaid method. The total fractional head loss P_y should be the sum of fractional head loss of various pipeline sections, that is $P_y=\Sigma P=\Sigma IL$.

The pipe diameter is determined based on the following:

$$d=\sqrt{\frac{4m_w}{3.14v}}$$

m_w: water flow m^3/s
v: water speed m/s

The water speed should be determined by the recommendations in the first table and design the water pipe diameters accordingly, or you can determine the water pipe diameter based on water flow in the second table.

Table 1: Recommended water speed (m/s)

Diameter (mm)	12	20	25	32	40	50	65	80
Closed water system	0.4 - 0.5	0.5 - 0.6	0.6 - 0.7	0.7 - 0.9	0.8 - 1.0	0.9 - 1.2	1.1 - 1.4	1.2 - 1.6
Open water system	0.3 - 0.4	0.4 - 0.5	0.5 - 0.6	0.6 - 0.8	0.7 - 0.9	0.9 - 1.0	0.9 - 1.2	1.1 - 1.4
Diameter (mm)	100	125	150	200	250	300	350	400
Closed water system	1.3 - 1.8	1.5 - 2.0	1.6 - 2.2	1.8 - 2.5	1.8 - 2.6	1.9 - 2.9	1.6 - 2.5	1.8 - 2.6
Open water system	1.2 - 1.6	1.4 - 1.8	1.5 - 2.0	1.6 - 2.3	1.7 - 2.4	1.7 - 2.4	1.6 - 2.1	1.8 - 2.3

Table 2: Pipe diameter and resistance loss in unit length

Diameter of the steel tube (mm)	Closed water system		Open water system	
	Water flow (m^3/h)	kPa/100m	Water flow (m^3/h)	kPa/100m
15	0 - 0.5	0 - 60	--	--
20	0.5 - 1.0	10 - 60	--	--
25	1.0 - 2.0	10 - 60	0 - 1.3	0 - 43
32	2.0 - 4.0	10 - 60	1.3 - 2.0	11 - 40
40	4.0 - 6.0	10 - 60	2.0 - 4.0	10 - 40
50	6.0 -11.0	10 - 60	4.0 - 8.0	--
65	11.0 -18.0	10 - 60	8.0 -14.0	--
80	18 - 32	10 - 60	14 - 22	--
100	32 - 65	10 - 60	22 - 45	--
125	65 - 115	10 - 60	45 - 82	10 - 40

Note: Parameters in the preceding table may vary based on the design manual. For details, see the «HVAC Design Manual». For hot water system, water speed can be a little bit smaller.

■ Calculation of local resistance loss

In the water system, water pressure drop may also be caused by some components in abnormal shape, such as bends, tee joints, valves, filters and others, which is known as local resistance loss. It should also be considered for hydraulic calculation. Local resistance ΔP (m) should be calculated as below:

$$\Delta P=\xi\rho v^2/20000 \qquad \text{Formula (14)}$$

ρ— water density, kg/m3
v— water flow velocity, m/s
ξ— local resistance coefficient, see Table 5.

Form of Local resistance	ξ	Form of Local resistance	ξ					
Water tank	2	Four-way joint for direct flow	2					
Sudden expansion	1	Four-way joint for by-pass flow	3					
Sudden shrinking	0.5	Four-way joint for converging flow	4					
Gradual expansion	0.6		ξ at various pipe diameters					
Gradual shrinking	0.3		DN15	DN20	DN25	DN32	DN40	Above DN50
Ω pipe expansion joint	0.2	Straight bar stop valve	16.0	10.0	9.0	9.0	8.0	7.0
Direct flow tee joint	1	Sway rod stop valve	3.0	3.0	3.0	2.5	2.5	2.0
By-pass flow tee joint	1.5	Rotational flow valve	4.0	2.0	2.0	2.0		
Converging flow tee joint	3	Gate valve	1.5	0.5	0.5	0.5	0.5	0.5
Check valve	2	90° bend	2.0	2.0	1.5	1.5	1.0	1.0

Therefore, the total local resistance P_j of the entire water system should be the sum of local resistance loss of various components, namely, $P_j=\Sigma\Delta P$.

In this way, total resistance loss of the pipeline section can be worked out and the pump head previous selected may also be verified on this basis. Besides, pipe diameter can then be selected in more scientific and reasonable way to achieve overall economy and rationality.

Recommended inlet/ outlet pipe diameter and the material for modular combination

Based on pipe diameter worked out in hydraulic calculation, pipe diameter for modular combination of the unit is recommended as shown in the table below for reference based on engineering experience:

Combination Qty	Return water/ outlet water pipe diameter		Combination Qty	Return water/ outlet water pipe diameter	
	UHA075/100B5	UHA200B5		UHA075/100B5	UHA200B5
1	DN50	DN80	9	DN125	DN150
2	DN80	DN80	10	DN125	DN150
3	DN80	DN100	11	DN125	DN150
4	DN80	DN100	12	DN125	DN200
5	DN100	DN125	13	DN125	DN200
6	DN100	DN125	14	DN150	DN200
7	DN100	DN125	15	DN150	DN200
8	DN125	DN150	16	DN150	DN200

Pipe material: PPR, stainless steel, etc. are recommended.

To reduce heat loss, thermal insulation composed of the erosion resistant coating, insulating layer and the protection layer must be applied (only insulating layer and protection layer are required for PPR pipe). To reduce pipe corrosion, anti-corrosion paint may be applied on the metallic surface of pipeline and equipment (heat-resisting antirust paint and resin paint are frequently applied for hot water pipelines). The structural design of the insulating layer and the protection layer should ensure good insulating effect, convenient construction, being fire-proofing, durable and beautiful. Frequently used thermal insulation materials include expanded perlite, rock wool, mineral wool, polyurethane, etc.. Design of the insulating layer and the protection layer should meet the following requirements:

1. Fixed insulation construction is recommended for the equipment, straight pipeline and fitting where service is not required; dismountable insulation construction is recommended for valves, flange and other places where service is required.
2. When the insulation layer is designed to be more than 100mm thickness, double layer should be considered; joint of the inner layer and the outer layer should be staggered.
3. Supporting rings should be set for vertical equipment and vertical pipeline more than 3m high and pipeline more than 3m long with the horizontal angle more than 45°. The pitch of supporting rings is usually 3-6m.
4. Protection layer of the pipeline should usually have protection and waterproofing performance. Metallic protection layer is recommended, such as galvanized steel sheet, anti-rust aluminum plate, etc.

Water quality requirements

Water in the water system must be softened to prevent scale in the heat exchanger and affecting the heat exchanger performance. Water not softened can also cause scale in the water pipes and cause the water resistance to increase. This affects the water flow and the performance of the water pump. Softened water must meet the following requirements.

Item			Benchmark value	Tendencies	
				Corrosion	Scaling
Benchmark items	pH (25°C)		7.5 ~ 9.0	○	○
	Conductivity (25°C)	μS/cm	< 800	○	○
	Cl^-	mg (Cl^-)/L	< 200	○	
	SO_4^{2-}	mg (SO_4^{2-})/L	< 200	○	
	Acid consumption	mg ($CaCO_3$)/L	< 100		○
	(pH = 4.8)				
	Total hardness	mg ($CaCO_3$)/L	< 200		○
Reference items	Fe	mg (Fe)/L	< 1.0	○	○
	S^{2-}	mg (S^{2-})/L	0	○	
	NH^+	mg (NH^+)/L	< 1.0	○	
	SiO_2	mg (SiO_2)/L	< 50		○
Note: ○ represents factors that may cause corrosion or scaling.					

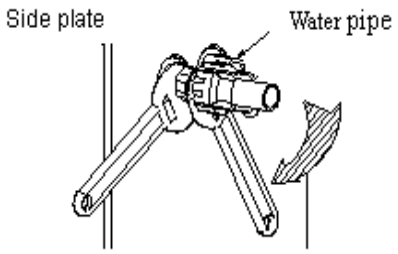
Besides, water should be meet the standard of domestic water.

Hydraulic System Installation

Note: Units must be installed by DAIKIN service staff or by specially trained personnel. The installation of units must meet requirements of national and local laws, regulation and standards on electrical, building and environmental protection as well as the installation manual.

Precautions

- Water system pipeline should not be installed until machine fastening.
- Water pipes must be insulated after installation to reduce heat loss.
- Reverse return system must be adopted when more than 3 units are comnbined to ensure better hydraulic balance.
- Connect water pipe to water inlet and water outlet of the unit.
- Fastening metal plates have been installed at joints for inlet and outlet pipes of the unit. For water pipe connection, fasten the joint by pipe wrench and rotate the water pipe. Avoid direct bearing of rotating torsion by reserved joint of the unit (see the figure).
- The flow rate of circulating water should not be lower than the nominal value of the unit.
- Configure circulating water pump with appropriate flow rate and pressure head at the circulating water side.
- Water supply safety valve must be installed.
- Install check valve at the inlet pipe joint.
- Install a proper drainage valve at the lowest point of the water system.
- The users must configure an appropriate water flow switch at the place before circulating water entering the unit.

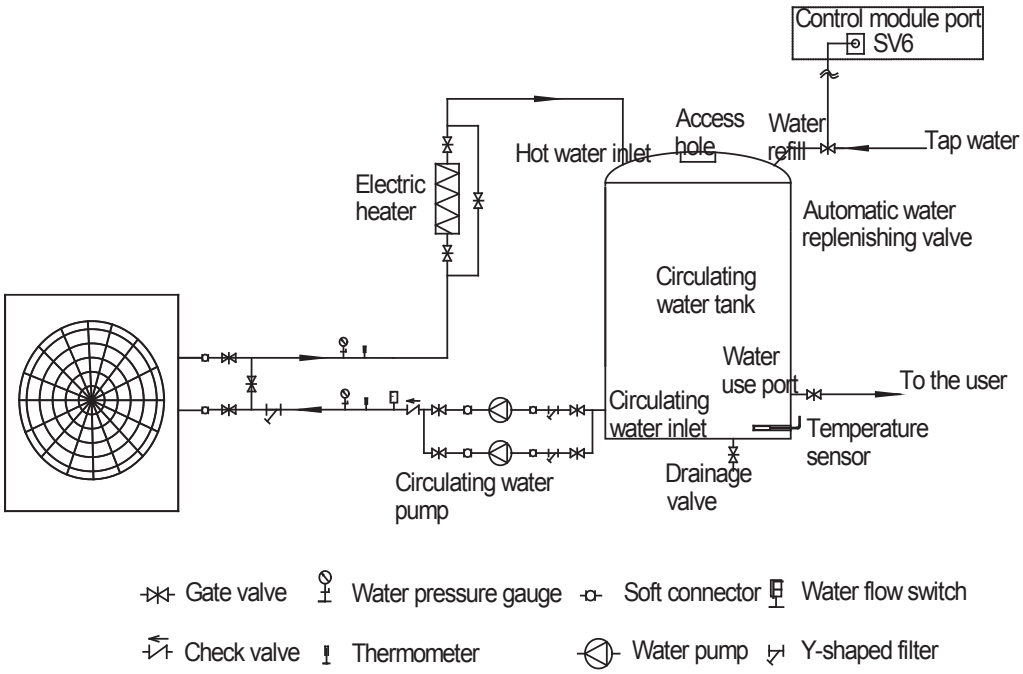


- Please refer to the “Hydraulic system installation schematic diagram” for water system installation; specific installation work should be carried out according to design drawings.
- Install the Y-shaped water filter in the water inlet pipe (more than 18 meshes recommended) and rinse the filter screen after commissioning.
- Before injecting water, make sure that no sand, rubble, rust, soldering tin residue or other impurities exist in the pipe, as these things might damage the heat exchanger. While rinsing the water system, please bypass the unit and the terminal heat exchanger using by-pass valves.
- The water system should be inspected by the customer once every half a month

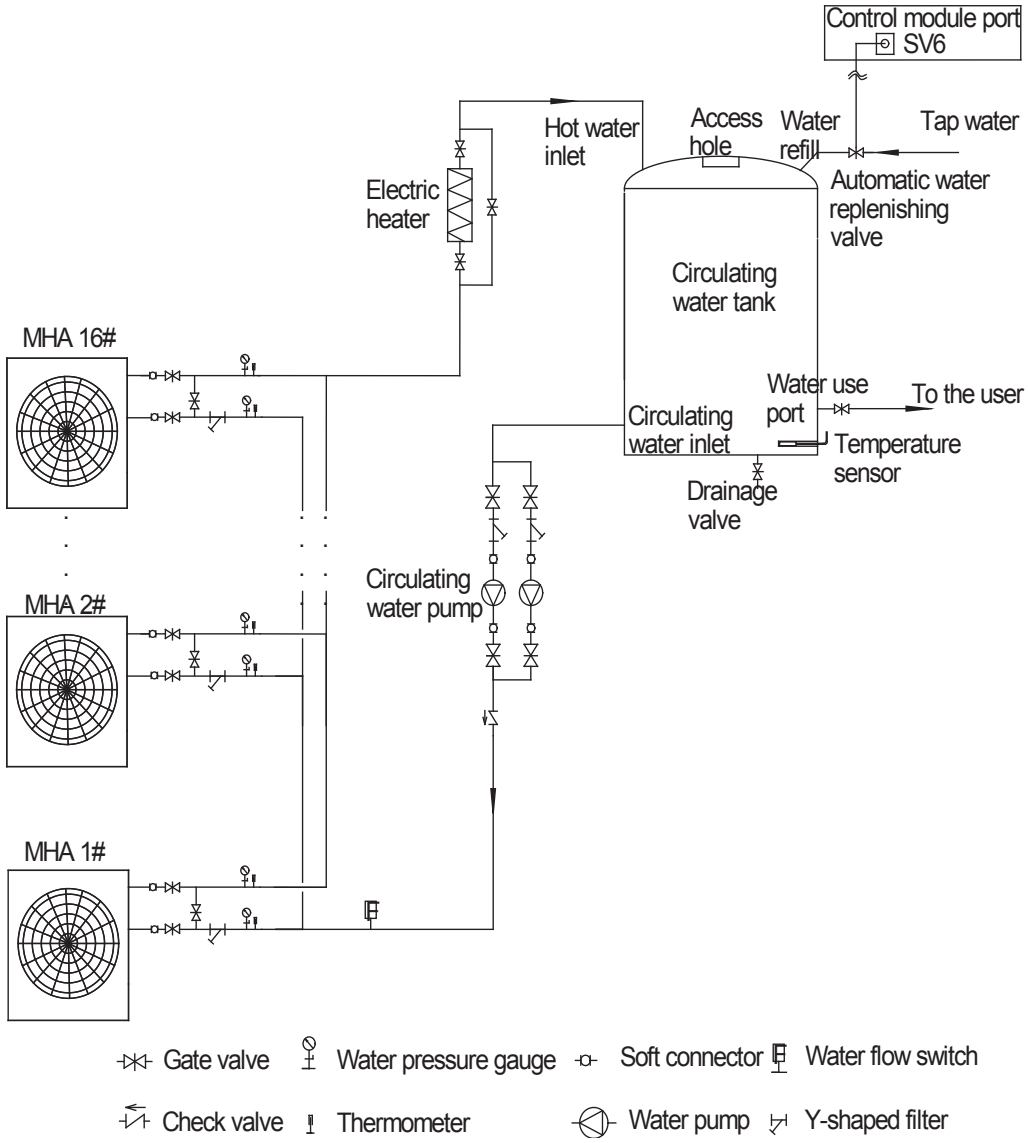
Hydraulic system installation schematic diagram

For single unit

Tap water will directly enter the water tank; water level in the tank will be controlled by the ball float valve (configured by the customer). The unit will heat the water in the tank by circles. See the schematic diagram for the water system installation as below:



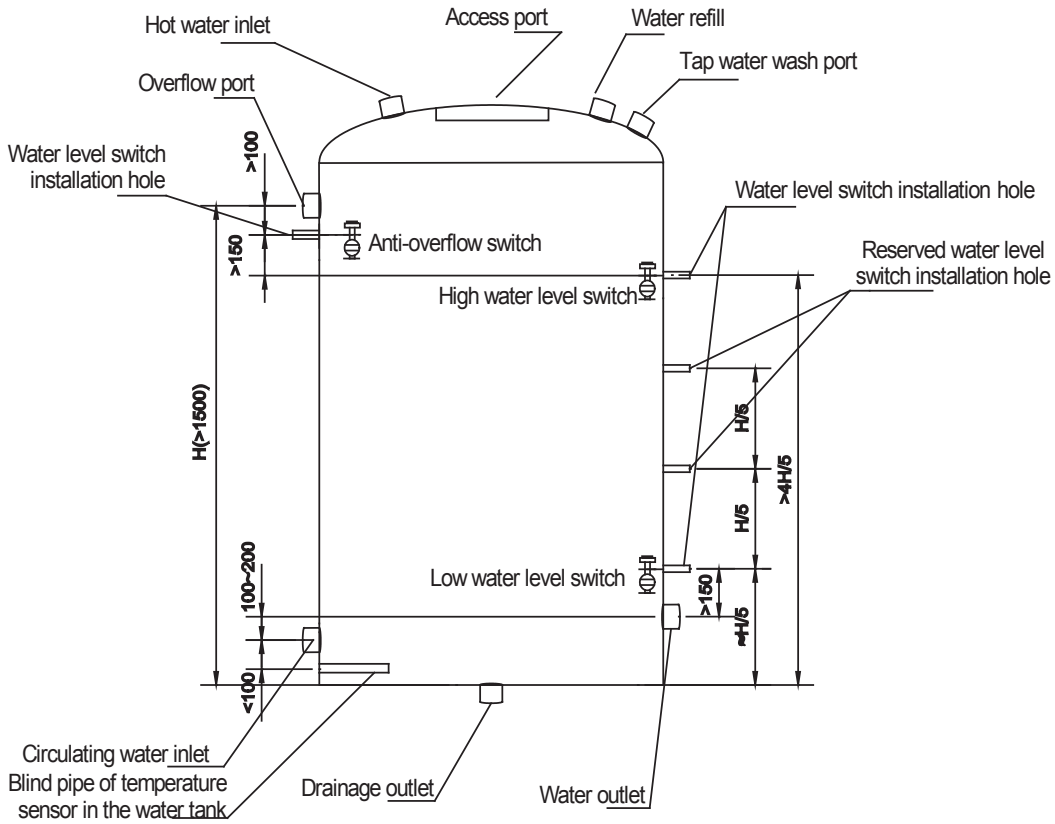
For a group of combined units



Notes:

1. Before putting into normal use for the first time, be sure to operate circulating water pumps for a certain period of time, clean the filter and ensure that there is no debris inside the external circulating system.
2. The water outlet and the circulating water inlet must be lower than the water level switch. See details in "Water tank structure diagram".
3. Reserve return water system is recommended for combination of more than 3 sets of units.
4. An automatic vent valve should be installed at the highest place of the water system (between the water tank and the unit).

Water tank structure diagram



Notes:

1. The water tank must have access hole, tap water wash port and drainage outlet, etc.
2. The unit is configured with the water tank temperature sensor blind tube with the joint size of R1/2, please reserve a port at Rc1/2 on the tank and ensure that the port is not lower than the circulating water inlet.
3. When install the temperature sensor, ensure that the sensor is inserted to the most front end of the blind tube and fill the blind tube with thermal-sensitive gel so as to achieve the optimal sensing effect, then, plug rubber bar to fasten sensor wire and prevent it from falling down.
4. Water level switch should be installed strictly according to the drawing above and should be connected into the electrical cabinet. Refer to "Water level switch and overflow prevention switch connection" for details.
5. Low water level switch must be installed above the water outlet to avoid lack of water at user side, and low waer level switch must be installed above circulating water inlet to avoid unit failure due to water shortage.
6. Circulating water volume at the water refill port must be larger than the circulation volume at the water outlet in peak hours, otherwise, unit failure due to water shortage may occur.

Commissioning and Operation

Carry out necessary inspection before commissioning to ensure safety. After entering stable operation in commissioning process, keep records on relevant data.

Items to be checked before commissioning. If no problem, mark "√" in the confirmation column:

S/N	Inspection item	Inspection contents	Confirmation
1	Installation correctness	1. The machine is firmly fastened with measures for vibration mitigation.	
		2. All components of the unit are in good conditions; pipeline is in good conditions; no refrigerant leakage.	
		3. No obstacle at the return air side and the air outlet side.	
		4. Drainage exit smooth without obstacle.	
2	Water system installation correctness	1. The pipeline is firmly connected without water leakage; sound thermal insulation, anti-corrosion or anti-rusting measures for the pipeline.	
		2. Complete valves, convenient for opening.	
		3. Complete components in correct direction, such as water filter, water flow switch, hydraulic pressure gauge, thermometer, electromagnetic valve, pump etc.	
		4. The water tank is installed firmly with thermal insulation and protection measures.	
3	Electrical connection correctness	1. Correct power supply wiring and grounding; power supply conforming to specific requirements for rated power supply.	
		2. Correct wiring of water tank temperature sensor, pumps and auxiliary electric heating.	
		3. Master/ slave unit communication line and wiring are corrected laid.	
		4. The wire controller is correctly connected.	
		5. Strong current and weak current are separate from each other without interference.	
4	Unit DIP correct	1. Capacity DIP has been set at the factory before delivery; check to ensure that it is correct.	
		2. Correct slave number DIP (S3).	
		3. Correct DIP address (S1, S2).	
		4. Correct SW1 DIP.	

Note:

1. After unit installation, short circuit the water pump and clean the pipeline, for the first time operation, power on at least 12 hours in advance for preheating.
2. Commissioning should not be carried out until all valves have been opened.

Check the following items during commissioning:

S/N	Item	Contents	Remarks
1	Control module and wire controller	1. Whether red indicating lamp of the control module and the wire controller is on normally.	Fault alarm may occur for first time powering on. Please eliminate according to instructions given in the “error code list”.
		2. Whether the control module and the wire controller has error code flickering.	
		3. Whether NULL standby state is displayed on LED of the control module.	
		4. Whether various keys of the wire controller are normal.	
		5. Carefully read wire control manual and get familiar with wire controller operation.	
2	Wire controller setting	1. Check water tank temperature setting, 50°C by default.	Set value may be modified in commissioning process. Reset to default values after commissioning.
		2. Start up for operation.	
3	Unit operation	1. Whether fault alarm appears after unit startup.	"When the unit operates normally, HOT will be displayed on LED. Record parameters and fill in the table below for every 10 minutes. "
		2. Whether water pumps, fans and compressors are normally started.	
		3. Whether there is abnormal vibration or noise.	
		4. Monitor various parameters to see whether they are normal.	

Record parameters and fill in the table below for every 10 minutes.

	Suction pressure (bar)	Exhaust pressure (bar)	Voltage (V)	Current (A)	Discharge air temperature (°C)	Suction temperature (°C)	Water tank temperature (°C)	Inlet water temperature (°C)	Outlet water temperature (°C)	Ambient temperature (°C)	Recorded by/ time
1st time											
2nd time											
3rd time											
4th time											
5th time											
6th time											

Maintenance

Note: Before checking and maintaining the unit, confirm the safety precautions again.

Note: Before delivery, strict factory test is conducted to ensure the unit works at optimal performance. The unit must be maintained from time to time.

The unit can only be repaired and serviced by specially-trained technicians. After a unit is serviced, safety controls must be checked and analyzed before the unit is turned on.

Items to be checked periodically

■ Clean the heat exchanger periodically.

To optimize heat exchange efficiency,please clean the heat exchanger periodically.

■ Check the status of the water from time to time.

Discharge water by loosening the air or water discharge plug.

If the water quality degrades, replace water in the system timely.

Contaminated water can degrade the cooling capacity and corrode the heat exchanger and water pipes.

■ Check whether free air exists in the water pipe system.

Free air may get into the system even during the air discharging process. Discharge air from time to time.

■ Clean the Y-shaped water filter in the water system periodically.

■ Replenishing refrigerant and lubricant.

Each unit is filled with enough refrigerant and lubricant before delivery.

If the system operates smoothly, customers neither need nor are allowed to replenish or change the refrigerant or lubricant.

If replenishment is necessary due to leakage, please refill the quantity specified in the nameplate of the unit.

■ Clean the water tank.

Maintenance

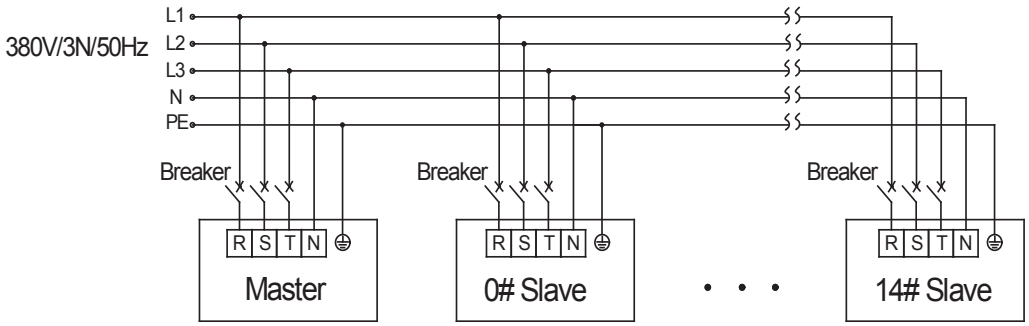
The unit must be checked on a routine basis to ensure performance. Routine check is the best way to reduce downtime and waste. The following needs to be checked on a routine basis:

Items	Monthly	Quarterly	Once half a year	Once a year	If necessary
1. Compressor					
Performance appraisal; whether there is abnormal sound	●				
Whether wires are securely connected	●				
Whether the working current is abnormal (fluctuation: 10%)		▲			
Discharge air temperature of the compressor		▲			
Check the oil level					▲
Check the color of the lubricant					▲
2. Controller					
Check parameter settings			▲		
Check protective device			▲		
Delay protector			▲		
Phase order protector			▲		
High/low pressure switch					▲
Differential water pressure switch/water flow switch					▲
Overload protector			▲		
Protector against extreme temperature of discharged air			▲		
3. Tube in tube heat exchanger					
Check the water quality	●				
Clean the plate heat exchanger					▲
Seasonal protection measures (anti-freeze in winter)					▲
4. Fin heat exchanger					
Clean the fin heat exchanger		▲			
5. Water tank	●				
6. Others					
Whether the Y-shaped filter needs to be cleaned or replaced	●				
Whether bolts have loosened		●			

Note:
1. The preceding maintenance plan is for reference only. The maintenance plan may vary based on region.
2. ● indicates items to be checked by customers; ▲ indicates items to be checked by professional technicians.

Control System Instruction

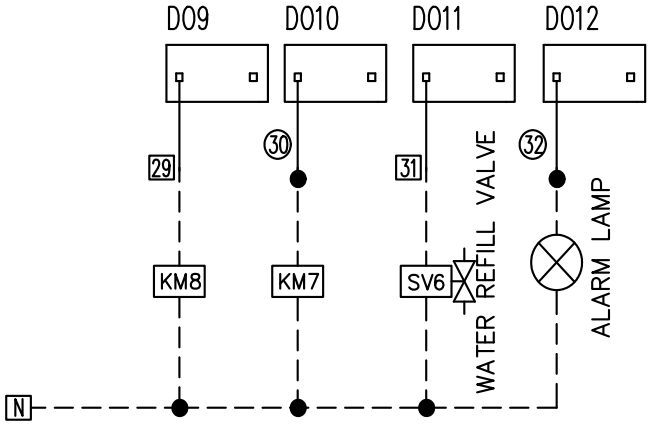
Power cable connection diagram



1. The dimension of power cable connection refer to electical parameters.
2. All wires must be securely connected.
3. Wires must not contact the refrigerating pipes or moving parts of the compressor.

PCB instruction

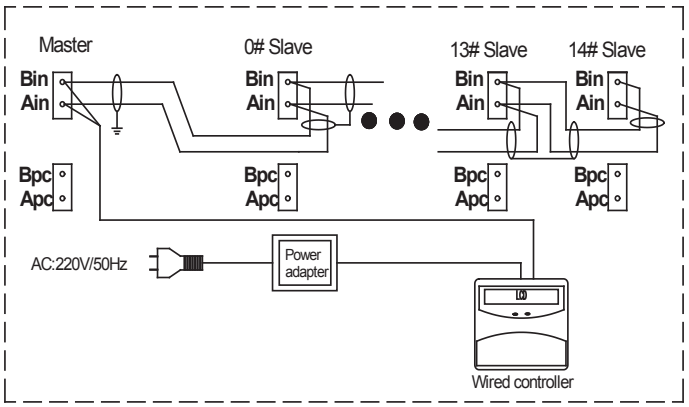
■ Connection illustration for pumps and auxiliary heater



1. KM8 is contactor for pump, KM7 is contactor for auxiliary heater, they are customer provided.
The connecting ports are only for control signal but not for driving the parts, and it's for master unit wiring only, slave unit doesn't need to wire.
2. SV6 is solenoid valve for water refill, customer provided.

Note:
------- Parts within the dashed box are to be connected onsite. The output voltage of the module interface is 220-240V.
—— Parts within the real-line box are connected before delivery.
For more detials of onsite wiring instruciton please refer to wiring digrams.

■ Control (communication) wire connection



A) conductor (WTC pair with cross section area of at least 0.5mm^2 or 20AWG); B) insulator; C) Screen layer (twisted WTC with a screening factor no less than 95%); D) Outer jacket (PVC);

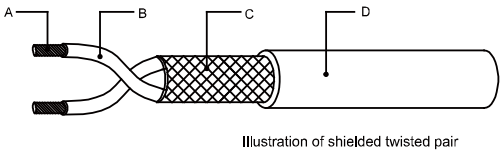
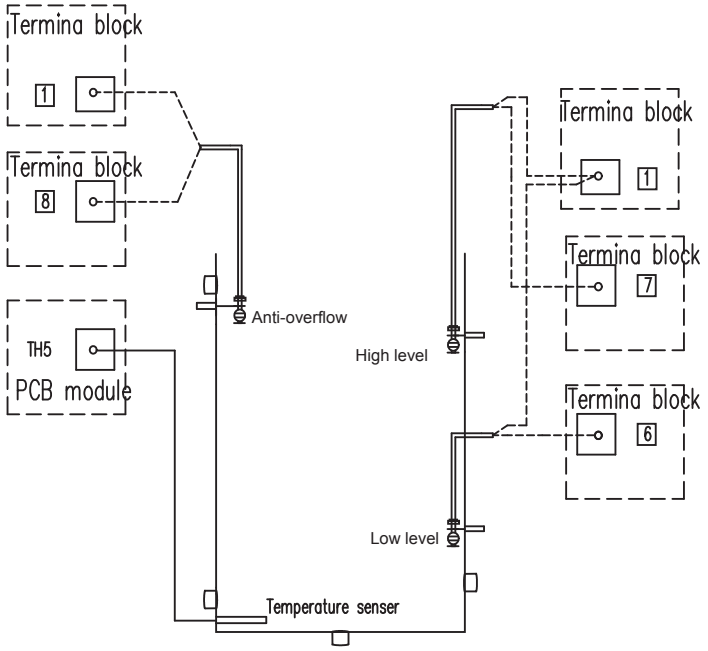


Illustration of shielded twisted pair

Note:
Better choose network cables with a tenser shielding layer and smaller twisting distance.
Please refer to the UL2547 or UL2791 wire specification.
The control wire must not be longer than 1000 meters.
The control wire must be at least 20cm away from major current wire.

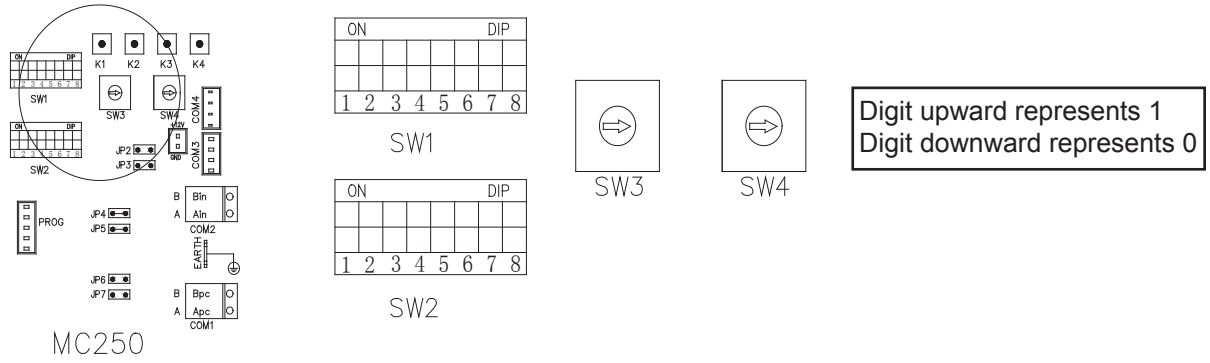
■ Water level switch and anti-overflow switch connection



Note:
Water level switch and anti-overflow switch working range: -10°C~+80°C.
Standard cable for water level switch is 8m.
Standard cable for anti-overflow switch is 8m.
Standard cable for temperature sensor is 8m, max length can be 20m.

■ Setting up address using DIP switch

The controller can be used to set the unit's capacity, address and slave unit number. The capacity DIP has been set at delivery time and cannot be changed. The address DIP and slave number DIP need to be set as needed after the unit is installed. Customers need to take down the address number and location of the unit and keep the record in good condition for maintenance reference.



1. The master unit must set the quantity of slave units connected, The slave unit doesn't need to set (bits 1~4 of SW2):

Slave unit qty	1	2	3	4	Slave unit qty	1	2	3	4
0	0	0	0	0	8	1	0	0	0
1	0	0	0	1	9	1	0	0	1
2	0	0	1	0	10	1	0	1	0
3	0	0	1	1	11	1	0	1	1
4	0	1	0	0	12	1	1	0	0
5	0	1	0	1	13	1	1	0	1
6	0	1	1	0	14	1	1	1	0
7	0	1	1	1	15	1	1	1	1

2. Address setting (SW3 and SW4: When SW1.1 is set as master unit, the setting is for master address, range is 0~99. When SW1.1 is set as slave unit, the setting is for slave address, range is 0~14).

0#	0	0	8#	0	8	16#	1	6	24#	2	4
1#	0	1	9#	0	9	17#	1	7	25#	2	5
2#	0	2	10#	1	0	18#	1	8	26#	2	6
3#	0	3	11#	1	1	19#	1	9	27#	2	7
4#	0	4	12#	1	2	20#	2	0	28#	2	8
5#	0	5	13#	1	3	21#	2	1	29#	2	9
6#	0	6	14#	1	4	22#	2	2	……	……	……
7#	0	7	15#	1	5	23#	2	3	99#	9	9

3. Other settings.
SW1.1 ON: master unit, OFF: slave unit
SW1.3 ON: function of auto re-start after power on, OFF: no function of auto re-start after power on.
SW1.4 ON: remote start/stop, OFF: no remote start/stop.
SW1.5 ON: with water system auxiliary heating, OFF: without water system auxiliary heating.

Note:
Address numbers must be unique in the same system.
The unit can only be powered on and commissioned after the address numbers are configured.
The inner side of the control box cover of the unit is attached with an electrical wiring diagram of the unit, which provides detailed description for DIP settings. Please keep it properly.

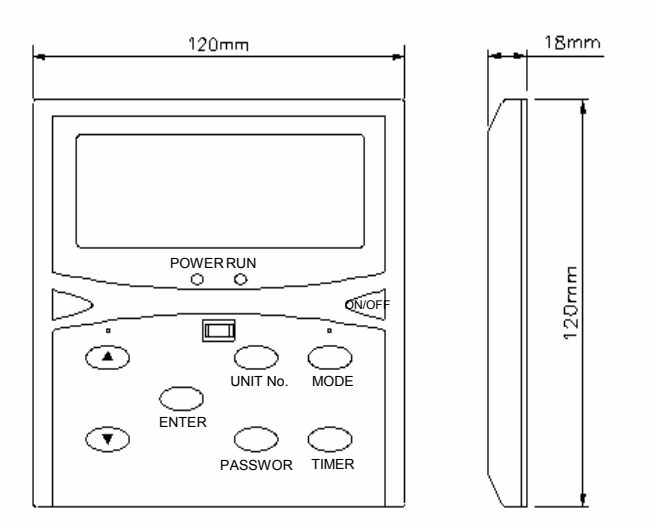
Wired Controller Instruction

Features

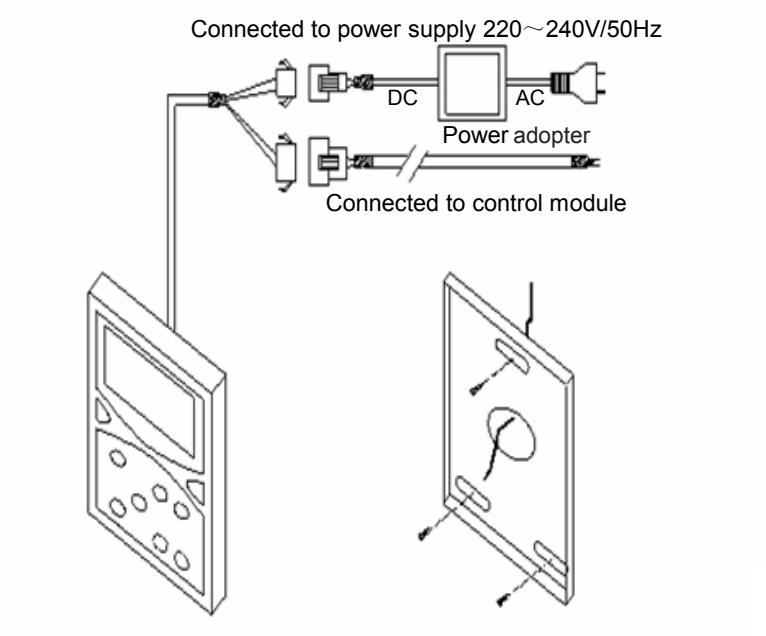
MC312 is a wall-mounted LCD controller which directly controls water heater unit through keys on its panel.

- Temperature setting range: hot water tank 25°C~52°C.
- A LED is used to indicate the status of the unit (ON/OFF).
- Timed ON/OFF: a timing schedule can be set for a maximum of 7 days with up to 4 timed actions each day.
- Real-time clock.
- Error code display speeds up diagnosis.
- Blue back light will shine 5 seconds if any key is pressed, it makes sure that we can browse or modify parameters even in dark.

Dimensions



Controller installation



Controller operating

1. Power on/off
   Press the ON/OFF key to turn on or turn off a unit.

2. Choose a unit
   Press “Unit” key, number of the unit will display, press “▲” or “▼” to choose the unit you want, and then press“Enter” for confirmation, you can view unit parameters and operation status. “FF” indicates master unit, “01” indicates 1# salve unit, and so on.

3. View unit status

■ Defrost status:

Single/dual system	Status	Display
Single	Not defrost	No display
Single	Defrosting	“DEFROST 1”
Dual	Not defrost	No display
Dual	System 1 defrosting	“DEFROST 1”
Dual	System 2 defrosting	“DEFROST 2”
Dual	two system defrosting	“DEFROST 12”

■ Compressor status:

Single/dual system	Status	Display
Single	OFF	No display
Single	ON	“COMP 1”
Dual	OFF	No display
Dual	Compressor 1 ON	“COMP 1”
Dual	Compressor 2 ON	“COMP 2”
Dual	Two compressor ON	“COMP 12”

■ Water level status:

Water level	Display
Lack of water	“LOW”
Full	“FULL”
Between low level and high level	No display
Between low level and overflow level	No display

■ Auxiliary heating:

Heating	Display
OFF	No display
ON	“AUXI HEATER”

■ Anti-freezing status:

Anti-freezing in winter	Display
Master unit protect	“ANTIFREEZE”
Slave unit protect	“ANTIFREEZE”
not enter protect	No display

4. View parameters
   View the parameters of the unit on the controller include EWT, LWT, hot water temperature, hot water setting temperature, entering water setting temperature and so on, press “▲”or“▼” to view the parameters.

5. Setting parameters
   ① Press the “Password” key to display “PASSWORD” and “00” in the lower left box of the LCD, press the “▲” or “▼” key to select the highest digit of the password, press the “Enter” key to confirm this digit and move the password leftward; press the “▲” or “▼” key to select the next digit, till two digits are entered; press the “Enter” key to exit the password entry interface, and the display box displays time. When the correct user password “55” is selected (the user password can be used to change the hot water setting temperature and inlet water setting temperature), you can perform the following settings. The password entry status exits if there is no operation within 5s after the password is entered.
   ② You can choose the parameter to be set by pressing the “▲” or “▼” key and then press “Enter”. The parameter name blinks. You can press the “▲” or “▼” key to set the parameter value, and then press “Enter” to save the setting result.
   ③ You can repeat step ② to set other parameters (note: password access will exit if no key is pressed within 60s; to set parameters again, you need to enter the password).
   Note: Parameters can be set only when the unit is off.

6. Choose temperature unit
   Press "password" key for 5s, temperature unit will change between ºC and ºF, buzzer will have a short ring when successfully choosing.

7. Setting real time
   ① To set week and time, stick the small hole above the "Mode" key using a needle-like tool (the LCD displays "WEEK SET"), indicating access to the weekday adjustment phase.
   ② Press the “▲” or “▼” key to set the weekday of the current time.
   ③ Press the small button to set the weekday successfully. Meanwhile, the “CLOCK SET” text is displayed and blinks on the LCD, indicating access to the time adjustment phase.
   ④ Press the “▲” key to change hour, and the “▼” key to change minute.
   ⑤ Press the small button again to save the set time.
   Note: If the “Unit”, “Password”, “Timer” or “Enter” key is pressed or no key is pressed within 5s in the time setting process, time setting will exit without saving the set time.

8. Timer Setting

① After the “Timer” key is pressed, “WEEK SET” and “TIMER SET” are displayed at the same time on the LCD, indicating access to the weekday adjustment phase.

② Press the “▲” key or “▼” key to select the weekday of the timer time to be set.

③ After selection, press the “Enter” key. “Timer Setting” is displayed on the LCD, indicating that timing weekday has been selected and setting of timing times is accessed.

④ After setting of timing times is accessed, press the “▲” key or “▼” key to set the specific timing point of the current day (four timing times can be set each day, and the timing No. is displayed on the left of the on/off status).

⑤ Press the “Enter” key to select a timing point and access selection of timed ON or OFF.

⑥ Press the “▲” key or “▼” key to select “Timed ON” or “Timed OFF”.

⑦ Press the “Enter” key to select timed ON or OFF and access selecting of the timing time. Now the LCD displays “Timer Setting” and “Time Setting” and the time blinks.

⑧ Press the “▲” key to change hour, and press the “▼” key to change minute. After setting time, press the “Enter” key to complete all settings of this timing and go to step ③. The timing times increase in order (if the previous timing times are 4, the system automatically goes to the first time of timing next day). Timing of one week can be set cyclically till timing setting exits.

⑨ To cancel a timing, set the time of this timing to 00:00.

⑩ To cancel all timed actions, press and hold “Mode” + “Unit” until you hear a long beep sound.

⑪ After the timing mode exits, the time display area displays the next timing action time every 2s (it is not displayed if the unit has been powered on/off manually).

Note: Timed ON/OFF actions are triggered when the time of the wire controller reaches the set time. Therefore, if the time of the wire controller is inaccurate, the actual ON/OFF time is also inaccurate. If you press the “Unit”, “Mode” or “Password” key or press nothing within 5s in the timer setting process, the controller will exit timer setting automatically without saving settings. The previous settings are not affected. No timing action is set by default before delivery.

9. Reset

You can use a needle tool to press the small button above “▲” to reset the controller.

10. Locking the wire controller

You can lock up the wire controller by holding “Enter” for 5s. The lockup icon is displayed on the upper right corner. When the controller is locked up, you can only turn on or turn off the controller and cannot perform other actions. You can unlock the controller by holding “Enter” for 5s again. The lockup icon is also cleared.

11. Manual defrosting

Input password and then press“▲” or “▼” until “Manual defrosting” display, then press “Enter” key to enter manual defrosting.

Error Code and Trouble Shooting

Error code on wired controller

When the unit has failure alarm, wired controller will display the error code.
Alarm display has two parts, A is error code, B is unit number.
If the unit has 2-way valve interlocking function on, when the unit interlocked by 2-way valve, wired controller display "SA".

S/N	Code	Symptoms	S/N	Code	Symptoms
1	F6	Communication failure with master unit	24	37	Superheat of #2 is too low
2	01~15	1# ~15# slave communication failure	25	38	Refrigerant leakage in #1
3	16	Overload of compressor or fan in #1	26	39	Refrigerant leakage in #2
4	17	Overload of compressor or fan in #2	27	40	TH1 temperature sensor malfunction
5	18	Overload of pump	28	41	TH2 temperature sensor malfunction
6	19	Lack of water flow	29	42	TH3 temperature sensor malfunction
7	20	High pressure of #1	30	43	TH4 temperature sensor malfunction
8	21	Low pressure of #1	31	44	TH5 temperature sensor malfunction
9	22	Dicharge superheat of #1 is too low	32	45	TH6 temperature sensor malfunction
10	23	Dicharge superheat of #2 is too low	33	46	TH7 temperature sensor malfunction
11	24	High pressure of #1	34	47	TH8 temperature sensor malfunction
12	25	Reserved	35	48	TH9 temperature sensor malfunction
13	26	Overload of water system heater	36	49	TH10 temperature sensor malfunction
14	27	Ambient temperature too high/low	37	50	TH11 temperature sensor malfunction
15	28	Reserved	38	51	TH12 temperature sensor malfunction
16	29	Superheat of #1 is too low	39	52	Low pressure sensor malfunction of #2
17	30	Reserved	40	53	Low pressure sensor malfunction of #1
18	31	Communication failure with master unit	41	54	Memory failure
19	32	Suction temperature #1 is too high	42	55	Water tank temperature too high/ low
20	33	Discharge temperature #1 is too high	43	56	Water level switch malfunction
21	34	Suction temperature #2 is too high	44	57	EWT/LWT too high
22	35	Discharge temperature #2 is too high	45	58	Anti-freezing protection
23	36	Low pressure of #2	46	60	No system can start up

Error code on LED indicator and running status

■ Characters displayed by the LED indicator are explained in the following table.

Character	Content	Character	Content	Character	Content	Character	Content	Character	Content	Character	Content
0	0/O	2	2	4	4	6	6	8	8	A	A
1	1	3	3	5	5	7	7	9	9	b	B

Character	Content	Character	Content	Character	Content	Character	Content	Character	Content	Character	Content
C	C	E	E	H	H	n	N	r	R	U	U
d	D	F	F	L	L	P	P	t	T	y	Y

■ Codes representing normal operation statuses are explained in the following table.

Code	Status	Code	Status	Code	Status
NULL	NULL: standby	HOP	HOP: hot water OFF	HOt	HOT: hot water ON
rESt	REST: reset	dEF	DEF: defrosting		

■ Error code display on LED indicator

Code	Symptoms	Code	Symptoms	Code	Symptoms
ECXX	XX slave communication failure	ER30	Reserved	ER45	TH6 temperature sensor malfunction
ER16	Overload of compressor or fan in #1	ER31	Communication failure with master unit	ER46	TH7 temperature sensor malfunction
ER17	Overload of compressor or fan in #2	ER32	Suction temperature #1 is too high	ER47	TH8 temperature sensor malfunction
ER18	Overload of pump	ER33	Discharge temperature #1 is too high	ER48	TH9 temperature sensor malfunction
ER19	Lack of water flow	ER34	Suction temperature #2 is too high	ER49	TH10 temperature sensor malfunction
ER20	High pressure of #1	ER35	Discharge temperature #2 is too high	ER50	TH11 temperature sensor malfunction
ER21	Low pressure of #1	ER36	Low pressure of #2	ER51	TH12 temperature sensor malfunction
ER22	Dicharge superheat of #1 is too low	ER37	Superheat of #2 is too low	ER52	Low pressure sensor malfunction of #2
ER23	Dicharge superheat of #2 is too low	ER38	Refrigerant leakage in #1	ER53	Low pressure sensor malfunction of #1
ER24	High pressure of #1	ER39	Refrigerant leakage in #2	ER54	Memory failure
ER25	Reserved	ER40	TH1 temperature sensor malfunction	ER55	Water tank temperature too high/low
ER26	Overload of water system heater	ER41	TH2 temperature sensor malfunction	ER56	Water level switch malfunction
ER27	Ambient temperature too high/low	ER42	TH3 temperature sensor malfunction	ER57	EWT/LWT too high
ER28	Reserved	ER43	TH4 temperature sensor malfunction	ER58	Anti-freezing protection
ER29	Superheat of #1 is too low	ER44	TH5 temperature sensor malfunction	ER60	No system can start up

Trouble shooting

S/N	Error code	Symptom	Possible cause	Solution
1	Wired controller F6 alarm	Communication failure between wired controller and master unit	1. A/B communication lines of the wired controller and master unit are incorrectly connected.	Check and troubleshoot the communication lines.
			2. The communication line has broken off.	
			3. Communication wires between the wired controller and the master unit cross over strong-current cables.	Rewire the unit, use shielded communication lines or keep the communication lines away from strong current cables.
			4. Control panel of the master unit is not powered on.	Check and troubleshoot the control panel
			5. The communication line between the master unit and the wired controller is too long.	1. Use shield lines
				2. Short the JP7 jumper on the control panel
			6. Can communicate with the monitoring software while the wired controller sends out the alarm F6.	Remove resistance R44 on the wire controller or replace the wire controller.
			7. Failure of communication ports on the control panel of the master unit.	Replace
			8. Failure of communication ports on the wired controller.	Replace
			9. Incorrect address setting for the master unit.	Check and troubleshoot the communication lines.
2	The LED indicator of the unit displays ECXX and the wired controller displays XX (XX represents 00 ~ 15)	Communication failure of slave unit No. XX	1. Communication line of slave unit No. XX has broken off	Check communication cables and solve the problem.
			2. The control panel of slave unit No. XX is not powered on.	Check and troubleshoot the control panel
			3. Incorrect DIP address setting for the slave unit	Reset the addresses of all slave units and check that there is no duplicate address
			4. The number of slave unit is set incorrectly for the master unit.	Reset the number of slave units and check that the number match with all the addresses
			5. The PC communication port of the slave unit has broken down	1. Exchange positions of the two 485 on slave unit No. XX
				2. Replace the control panel
			6. The communication line of slave unit No. XX is incorrectly connected.	Connect the communication line of slave unit No. XX to Apc/Bpc port

S/N	Error code	Symptom	Possible cause	Solution
3	The LED indicator of the unit displays ER16 and the wired controller displays 16	Overload of compressor or fan in #1	1. Over current of the compressor #1, the overload protector triggered.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit.
				2. Check whether the resistor of the malfunctioned compressor meets specification requirements.
			2. Over current of the fan #1, the overload protector triggered.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit.
				2. Check whether the resistor of the malfunctioned fan meets specification requirements.
4	The LED indicator of the unit displays ER17 and the wired controller displays 17	Overload of compressor or fan in #2	1. Over current of the compressor #2, the overload protector triggered.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit.
				2. Check whether the resistor of the malfunctioned compressor meets specification requirements.
			2. Over current of the fan #2, the overload protector triggered.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit.
				2. Check whether the resistor of the malfunctioned fan meets specification requirements.
5	The LED indicator of the unit displays ER18 and the wired controller displays 18	Overload of pump	Over current in the pump has triggered the overload protector.	1. Check whether the electric current parameter of the overload pump is configured correctly by referring to the electric circuit.
				2. Check whether the resistor of the malfunctioned pump meets specification requirements.
6	The LED indicator of the unit displays ER19 and the wired controller displays 19	Lack of water flow	1. Pump is too small	Replace the pump
			2. Blocked of water filter	Clean water filter
			3. Air inside water system	Discharge air by opening the pump
			4. Water pressure drop to large, water system is not balance	Optimize the water system
			5. Blocked of other parts in water system	Check and repair

S/N	Error code	Symptom	Possible cause	Solution
7	The LED indicator of the unit displays ER20 and the wired controller displays 20	High pressure of #1	1. Heat exchanger dirty	Check and troubleshoot
			2. Blocked of refrigerant filter	Check and replace.
			3. Water temperature too high (condenser)	Tune down the water temperature
			4. Lack of water (condenser)	Check and troubleshoot
			5. Blocked of water filter (condenser)	Clean the water filter.
			6. Too much refrigerant	Release a proper amount of refrigerant
			7. Failure of high-voltage modular output port	Replace the module.
			8. The switch has broken down	Replace the pressure switch.
8	The LED indicator of the unit displays ER21 and the wired controller displays 21	Low pressure of #1	1. Malfunction of heat exchanger	Check and troubleshoot
			2. Malfunction of the fan	Check and troubleshoot
			3. Insufficient refrigerant or leakage	Check and replenish refrigerant
			4. Failure of low pressure modular input port	Replace the module
			5. The low pressure sensor has broken down	Replace the pressure sensor
9	The LED indicator of the unit displays ER22 and the wired controller displays 22	Dicharge superheat of #1 is too low	1. The low pressure sensor or temperature sensor has broken down	Replace
			2. EXV control unreasonable	Update model program
10	The LED indicator of the unit displays ER23 and the wired controller displays 23	Dicharge superheat of #2 is too low	1. The low pressure sensor or temperature sensor has broken down	Replace
			2. EXV control unreasonable	Update model program
11	The LED indicator of the unit displays ER24 and the wired controller displays 24	High pressure of #2	1. Heat exchanger dirty	Check and troubleshoot
			2. Blocked of refrigerant filter	Check and replace.
			3. Water temperature too high (condenser)	Tune down the water temperature
			4. Lack of water (condenser)	Check and troubleshoot
			5. Blocked of water filter (condenser)	Clean the water filter.
			6. Too much refrigerant	Release a proper amount of refrigerant
			7. Failure of high-voltage modular output port	Replace the module.
			8. The switch has broken down	Replace the pressure switch.
12	The LED indicator of the unit displays ER26 and the wired controller displays 26	Overload of water system heater	1. Check if there is heater	If no, short connect overload switch
			2. Heater short circuit	Replace the heater
13	The LED indicator of the unit displays ER27 and the wired controller displays 27	Ambient temperature too high/low	1. Ambient temperature sensor broken down	Replace the sensor
			2. Ambient temperature too high/ low	Stop the unit
14	The LED indicator of the unit displays ER29 and the wired controller displays 29	Superheat of #1 is too low	1. The low pressure sensor or temperature sensor has broken down	Replace
			2. EXV control unreasonable	Update model program

S/N	Error code	Symptom	Possible cause	Solution
15	The LED indicator of the unit displays ER31 and the wired controller displays 31	Communication failure with master unit	1. Communication line of the slave unit has loosen	Check and troubleshoot the communication lines.
			2. Incorrect DIP address setting for the slave unit	Reset the addresses of all slave units and check that there is no duplicate address
			3. The number of slave unit is set incorrectly for the master unit	Reset the number of slave units and check that the number match with all the addresses
			4. The PC communication port of the slave unit has broken down	1. Exchange positions of the two 485 on the slave unit
				2. Replace the control panel of the unit
			5. Communication line of the slave unit connects wrong port	Connect the communication line of the slave unit to the Apc/Bpc port
16	The LED indicator of the unit displays ER32 and the wired controller displays 32	Suction temperature #1 is too high	1. 4-way valve slider blocked at middle	Restart the unit and knock two sides of the valve, if no effect, replace the valve
			2. 4-way valve coil operated wrongly	Replace the coil
			3. The temperature of discharge air is too high and has triggered the racing protector of the compressor	see Item 17 in the table
17	The LED indicator of the unit displays ER33 and the wired controller displays 33	Discharge temperature #1 is too high	1. The electronic expansion valve is not opened as expected	Check and troubleshoot the electronic expansion valve
			2. The water temperature is too high	Change the setting for return water temperature (to be performed by service personnel)
			3. Insufficient refrigerant or leakage	Replenish a proper amount of refrigerant
			4. Defrosting not complete	Change the setting for defrosting (to be performed by service personnel)
18	The LED indicator of the unit displays ER34 and the wired controller displays 34	Suction temperature #2 is too high	1. 4-way valve slider blocked at middle	Restart the unit and knock two sides of the valve, if no effect, replace the valve
			2. 4-way valve coil operated wrongly	Replace the coil
			3. The temperature of discharge air is too high and has triggered the racing protector of the compressor	see Item 19 in the table
19	The LED indicator of the unit displays ER35 and the wired controller displays 35	Discharge temperature #2 is too high	1. The electronic expansion valve is not opened as expected	Check and troubleshoot the electronic expansion valve
			2. The water temperature is too high	Change the setting for return water temperature (to be performed by service personnel)
			3. Insufficient refrigerant or leakage	Replenish a proper amount of refrigerant
			4. Defrosting not complete	Change the setting for defrosting (to be performed by service personnel)

S/N	Error code	Symptom	Possible cause	Solution
20	The LED indicator of the unit displays ER36 and the wired controller displays 36	Low pressure of #2	1. Malfunction of heat exchanger	Check and troubleshoot
			2. Malfunction of the fan	Check and troubleshoot
			3. Insufficient refrigerant or leakage	Check and replenish refrigerant
			4. Failure of low pressure modular input port	Replace the module
			5. The low pressure sensor has broken down	Replace the pressure sensor
21	The LED indicator of the unit displays ER37 and the wired controller displays 37	Superheat of #2 is too low	1. The low pressure sensor or temperature sensor has broken down	Replace
			2. EXV control unreasonable	Update model program
22	The LED indicator of the unit displays ER38 and the wired controller displays 38	Refrigerant leakage in #1	1. Low pressure sensor failure	Replace the low pressure sensor
			2. Insufficient refrigerant	Add refrigerant
23	The LED indicator of the unit displays ER39 and the wired controller displays 39	Refrigerant leakage in #2	1. Low pressure sensor failure	Replace the low pressure sensor
			2. Insufficient refrigerant	Add refrigerant
24	The LED indicator of the unit displays ER40 and the wired controller displays 40	TH1 temperature sensor malfunction	TH1 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH1 temperature sensor is shorted/ open	Test whether the resistance of TH1 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
25	The LED indicator of the unit displays ER41 and the wired controller displays 41	TH2 temperature sensor malfunction	TH2 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH2 temperature sensor is shorted/ open	Test whether the resistance of TH2 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
26	The LED indicator of the unit displays ER42 and the wired controller displays 42	TH3 temperature sensor malfunction	TH3 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH3 temperature sensor is shorted/ open	Test whether the resistance of TH3 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module

S/N	Error code	Symptom	Possible cause	Solution
27	The LED indicator of the unit displays ER43 and the wired controller displays 43	TH4 temperature sensor malfunction	TH4 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH4 temperature sensor is shorted/ open	Test whether the resistance of TH4 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
28	The LED indicator of the unit displays ER44 and the wired controller displays 44	TH5 temperature sensor malfunction	TH5 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH5 temperature sensor is shorted/ open	Test whether the resistance of TH5 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
29	The LED indicator of the unit displays ER45 and the wired controller displays 45	TH6 temperature sensor malfunction	TH6 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH6 temperature sensor is shorted/ open	Test whether the resistance of TH6 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
30	The LED indicator of the unit displays ER46 and the wired controller displays 46	TH7 temperature sensor malfunction	TH7 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH7 temperature sensor is shorted/ open	Test whether the resistance of TH7 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
31	The LED indicator of the unit displays ER47 and the wired controller displays 47	TH8 temperature sensor malfunction	TH8 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH8 temperature sensor is shorted/ open	Test whether the resistance of TH8 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module

S/N	Error code	Symptom	Possible cause	Solution
32	The LED indicator of the unit displays ER48 and the wired controller displays 48	TH9 temperature sensor malfunction	TH9 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH9 temperature sensor is shorted/ open	Test whether the resistance of TH9 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
33	The LED indicator of the unit displays ER49 and the wired controller displays 49	TH10 temperature sensor malfunction	TH10 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH10 temperature sensor is shorted/ open	Test whether the resistance of TH10 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
34	The LED indicator of the unit displays ER50 and the wired controller displays 50	TH11 temperature sensor malfunction	TH11 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH11 temperature sensor is shorted/ open	Test whether the resistance of TH11 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
35	The LED indicator of the unit displays ER51 and the wired controller displays 51	TH12 temperature sensor malfunction	TH12 temperature sensor is not properly plugged or has broken off	Check the control module and replug the temperature sensor
			TH12 temperature sensor is shorted/ open	Test whether the resistance of TH12 sensor meets specification requirements/ replace if not
			There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
36	The LED indicator of the unit displays ER52 and the wired controller displays 52	Low pressure sensor malfunction of #2	1. Three lines of the low pressure sensor is incorrectly connected	Reconnect the connecting lines of the low pressure sensor
			2. The low pressure sensor is shorted/ open	Repair or replace the lines of the low pressure sensor
			3. The Low pressure sensor has broken down	Replace the low pressure sensor
			4. There is something wrong with the test circuit of the low pressure sensor in the control module	Replace the control module

S/N	Error code	Symptom	Possible cause	Solution
37	The LED indicator of the unit displays ER53 and the wired controller displays 53	Low pressure sensor malfunction of #1	1. Three lines of the low pressure sensor is incorrectly connected	Reconnect the connecting lines of the low pressure sensor
			2. The low pressure sensor is shorted/ open	Repair or replace the lines of the low pressure sensor
			3. The Low pressure sensor has broken down	Replace the low pressure sensor
			4. There is something wrong with the test circuit of the low pressure sensor in the control module	Replace the control module
38	The LED indicator of the unit displays ER54 and the wired controller displays 54	Memory failure	Memory damage	Replace the control module
39	The LED indicator of the unit displays ER55 and the wired controller displays 55	Water tank temperature too high/low	1. Entering/leaving water temperature too high	See item 41
			2. water tank temperature too low	Heating (heater or unit heating)
			3. TH5 sensor malfunction	Replace sensor
40	The LED indicator of the unit displays ER56 and the wired controller displays 56	Water level switch malfunction	1. Wrong wired	Wiring again
			2. Open or short circuit	Replace
41	The LED indicator of the unit displays ER57 and the wired controller displays 57	Entering/leaving water temperature too high	1. Entering water temperature setting too high	Set the entering water temperature
			2. Water flow too small cause large temperature difference	See item 6
42	The LED indicator of the unit displays ER58 and the wired controller displays 58	Anti-freezing protection	1. Water tank temperature too low	Heating (heater or unit heating)
			2. TH6 sensor malfunction	Replace sensor
43	The LED indicator of the unit displays ER60 and the wired controller displays 60	No system can start up	All unit alarm and stop(can't reset autometicly)	Check unit error code
				Trouble shooting

Warning

- Daikin Industries, Ltd.'s products are manufactured for export to numerous countries throughout the world. Daikin Industries, Ltd. does not have control over which products are exported to and used in a particular country. Prior to purchase, please therefore confirm with your local authorized importer, distributor and/or retailer whether this product conforms to the applicable standards, and is suitable or use, in the region where the product will be used. This statement does not purport to exclude, restrict or modify the application of any local legislation.
- Ask a qualified installer or contractor to install this product. Do not try to install the product yourself. Improper installation can result in water or refrigerant leakage, electrical shock, fire or explosion.
- ● Use only those parts and accessories supplied or specified by Daikin. Ask a qualified installer or contractor to install those parts and accessories. Use of unauthorized parts and accessories or improper installation of parts and accessories can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Read the User's Manual carefully before using this product. The User's Manual provides important safety instructions and warnings. Be sure to follow these instructions and warnings. If you have any enquiries, please contact your local importer, distributor and/or retailer.

MOODY INTERNATIONAL CERTIFICATION UKAS QUALITY MANAGEMENT 014

The air conditioners manufactured by Daikin Industries have received ISO 9001 series certification for quality assurance.

Certificate Number. 9601019

BSI UKAS ENVIRONMENTAL MANAGEMENT 003

The airconditioning factories of Daikin Industries have received environmental management system standard ISO 14001 certification.

Certificate Number. EMS80362

Cautions on product corrosion

1. The units should not be installed in areas where corrosive gases, such as acid gas or alkaline gas, are produced.
2. If the unit is to be installed close to the sea shore, direct exposure to the sea breeze should be avoided. If you need to install the unit close to the sea shore, contact your local distributor.

Dealer

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