ACMP Series

Heat Pump Modular Scroll Chiller

Technical Manual

380~415V/3/50Hz

Content

AIR-COOLED MODULAR CHILLER

Preface

Introduction

The air-cooled modular chiller is a type of central air-conditioning system that uses air as its cooling or heating source, with water as the medium for heat exchange. This integrated design eliminates the need for a cooling tower, cooling water pump, boiler, and other auxiliary condenser components. This simplification allows for easier installation and maintenance, improves energy efficiency, and reduces the space required for installation, making it particularly suitable for areas with limited water resources.

These modular chillers are developed with cutting-edge technology in the air-conditioning industry and incorporate high-quality, self-regulating components from renowned global manufacturers. Continuous advancements have made these units more efficient and stable. The 30kW module features a standalone frame, while the 65kW module comprises two units, and the 130kW module includes four units. Additionally, multiple modules can be connected in parallel through their inlet and outlet pipelines to form an integrated system. This setup can include 2 to 32 modules (up to 16 units for the 130kW module), providing a maximum capacity of 2080kW.

Air-cooled modular chillers are highly versatile and suitable for both residential and industrial applications, such as offices, hotels, villas, restaurants, hospitals, and factories. They offer an efficient solution for regions with limited water availability or where concerns about noise and environmental impact are a priority.

Products Line-up

No	Model	Refrigerant	Net dimension (L×W×H) (unit: mm)	Net weight (kg)	Power supply
1	ACMP010H7A-GCC030GF	R410A	1160*1920*900	320	380~415V/3ph/50Hz
2	ACMP020H7A-GCC065GF	R410A	2000*1920*900	610	380~415V/3ph/50Hz
3	ACMP040H7A-GCC130GF	R410A	2200*2200*1100	1010	380~415V/3ph/50Hz

1. External Appearance

30kW	65kW
	

130kW

2. Features

2.1 Modular design, flexible combination, more convenient for installation and transportation.

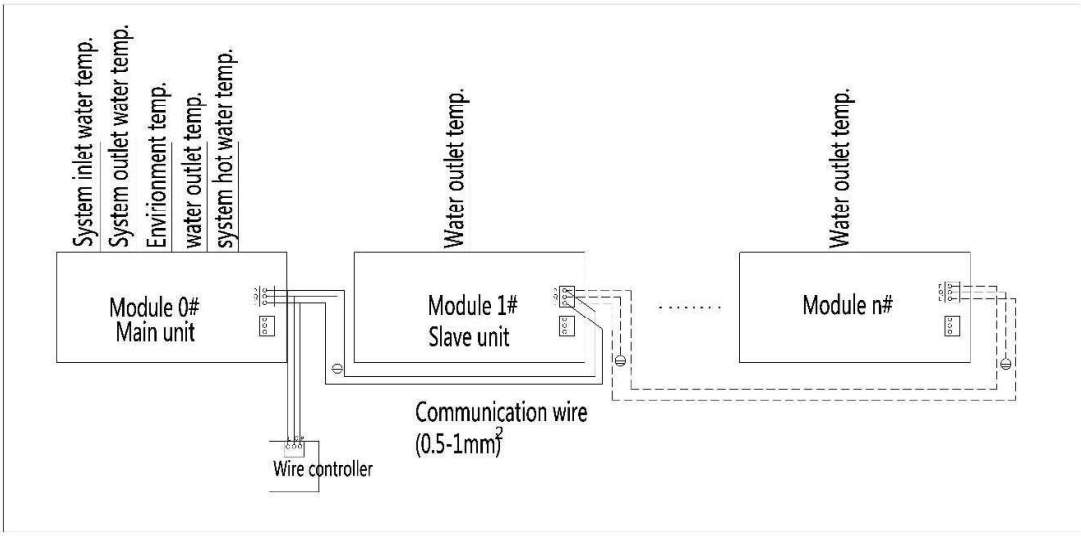
The unit features a modular design that allows multiple units to be connected together, with a maximum of 16 units in a 130kW module configuration. Each module can independently function as the main unit or operate as a slave unit within the module combination, providing greater flexibility for design and installation.

2.2 The maximum combination of the system consists of 1 main unit and 31 slave units, for 130module combine 15 slave units at most.

2.3 Chilled water outlet temperature adjustable.

The chilled water inlet temperature can be adjusted via a wired controller to meet the customer's requirements. In cooling mode, the temperature range is adjustable from 9℃ to 25℃, while in heating mode, the range is adjustable from 26℃ to 46℃.

2.4 Easy connection between main unit and slave units.



2.5 Compact structure, no need cooling tower, which reducing installation cost.

2.6 Strong micro-computer intelligent control and monitor function.

2.7 System will be more reliable with new type efficient heat exchanger

The evaporator utilizes a tube-in-shell heat exchanger, offering increased reliability and efficiency with reduced water quality requirements.

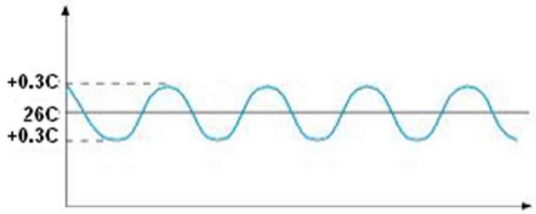
2.8 Environmental care

The R410A system meets different requirement.

- Chlorine-free and environmental friendly refrigerant, zero ozone depletion potential.
- High density refrigerant, therefore, less refrigerant required.
- Leak-tight refrigerant circuit, Brazed refrigerant connections for increased leak-tightness.

2.9 Economical operation

The new design incorporates an electronic expansion valve for precise refrigerant control over a wider range. This valve enables operation at lower condensing pressures, allowing quick linear adjustments that provide a more stable system output, more uniform indoor temperatures, and improved comfort for occupants.



The room temp fluctuation more small

2.10 Back up function

When unit is failure

- If master unit fails, all the units will stop.
- If one slave unit fails, this unit will stop but the others will keep running.
- When the master unit fails, any of the slave one can be set as the master unit by manual setting.

When unit is under protection

- If master unit's protection occurs, this system will stop.
- If slave unit's protection occurs, this unit will stop but the others will keep running.

2.11 Applicable temperature range

Mode	Ambient temperature range	Water inlet temperature range
Cooling	15℃ ~48℃（-15-48 just for 65kw）	9℃ ~25℃ (12℃ is default)
Heating	-15℃ ~30℃	26℃ ~46℃ (40℃ is default)

Chilled inlet water temperature can be adjusted by wire controller according to customer's demand.

2.12 Capacity Lineup

Model	Mode	Compressor quantity	Refrigerant	Refrigeration system	Electrical controller no.	Maximum combinations
ACMP010H7A-GCC030GF	Cooling & Heating	1	R410A	1	1	32
ACMP020H7A-GCC065GF	Cooling & Heating	2	R410A	1	1	32
ACMP040H7A-GCC130GF	Cooling & Heating	4	R410A	2	1	16

2.13 Specification

R410A/50Hz

Model			ACMP010H7A-GCC030GF	ACMP020H7A-GCC065GF	ACMP040H7A-GCC130GF
Power supply		V/Ph/Hz	380-415V/3N/50Hz	380-415V/3N/50Hz	380-415V/3N/50Hz
Capacity					
Cooling		KW	30	65	130
Heating		KW	35	70	132
Electrical data					
Power input	Cooling	kW	9.4	20.6	39.8
	EER		3.18	3.16	3.26
	SEER		3.81	3.86	3.95
	Heating	kW	9.8	21.3	40.8
	COP		3.57	3.28	3.23
	SCOP		/	/	/
	Max. power input	kW	15	28	60
Rated current	Cooling	A	18	38	78
	Heating	A	19	39	80
	Max. Current	A	30	51	106
Physical data					
Refrigerant	Weight	kg	7.3	13.5	30
	Refrigerant control		EXV	EXV	EXV
	Type		R410A	R410A	R410A
Compressor	Brand		COPELAND	COPELAND	COPELAND
	Type		Scroll	Scroll	Scroll
	Model		VP144KFE-TFP-522	VP144KFE-TFP-422	VP144KFE-TFP-422
	oil type		POE OIL		
	oil charge	kg	3.252	3.252*2	3.252*4
	Quantity	PCS	1	2	4
Fan motor	Quantity	PCS	1	2	2
	Model		YDK550-6G31	YDK550-6G31	YLS160-800-8P6
	Air flow volume	m^3/h	12000	24000	48000
Evaporator (Water side)	Heat-exchanger type		Shell and tube	Shell and tube	Shell and tube
	Water pressure drop	kPa	30	30	40
	Water inlet/outlet diameter	mm	DN40	DN65	DN65
	Water flow volume	m^3/h	5.16	11.18	22.36
	Max. Pressure	System (Mpa)	4.5	4.2	4.2
		water side(MPa)	1	1	1
	Connection type		Flange connection	Flange connection	Flange connection

Dimension (W×H×D)	Net	mm	1160*1920*900	2000*1920*900	2200*2200*1100
	Packing	mm	1240*2060*950	2080*2060*920	2280*2360*1140
Weight	Net	kg	320	610	1010
	Gross	kg	350	630	1060
Control type			Wired controller	Wired controller	Wired controller
Sound level(semi-anechoic)		dB(A)	62	64	65
Operation range					
Water temperature （inlet）	Cooling	˚C	9-25	9-25	9-25
	Heating	˚C	26-46	26-46	26-46
Water temperature （outlet）	Cooling	˚C	5-17	5-17	5-17
	Heating	˚C	30-50	30-50	30-50
Ambient temperature	Cooling	˚C	15-4	-15-48	15-48
	Heating	˚C	-15-30	-15-30	-15-30

2.14 Electric Characteristics

Model	Outdoor Unit			Application		Power Supply		Compressor			OFM		
	Hz	VOL	Ph	Min.	Max.	TOCA	MFA	LRA	RLA	Qty	W	FLA	Qty
ACMP010H7A-GCC030GF	50	380~415	3	342	418	30	60	135/153	20.2	1	550	5.06	1
ACMP020H7A-GCC065GF	50	380~415	3	342	418	51	100	135/153	20.2	2	550	5.06	2
ACMP040H7A-GCC130GF	50	380~415	3	342	418	106	205	135/153	20.2	4	800	7.02	2

Remark:

TOCA: Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A)

LRA: Locked Rotor Amps. (A)

RLA: Rated Load Amps. (A)

OFM: Outdoor Fan Motor.

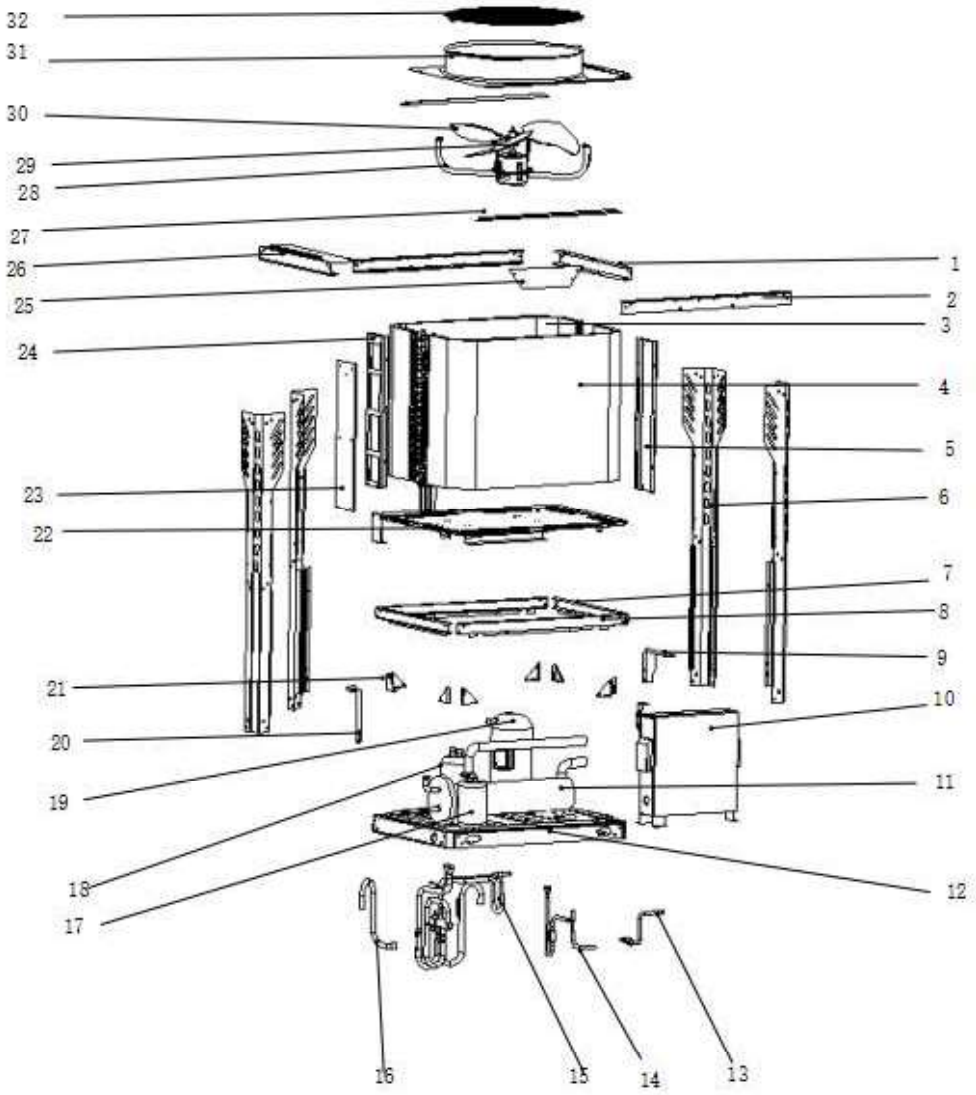
FLA: Full Load Amps. (A)

W: Rated Motor Output (W)

Voltage vibration between phases: <2%.

4.15 Explosive view

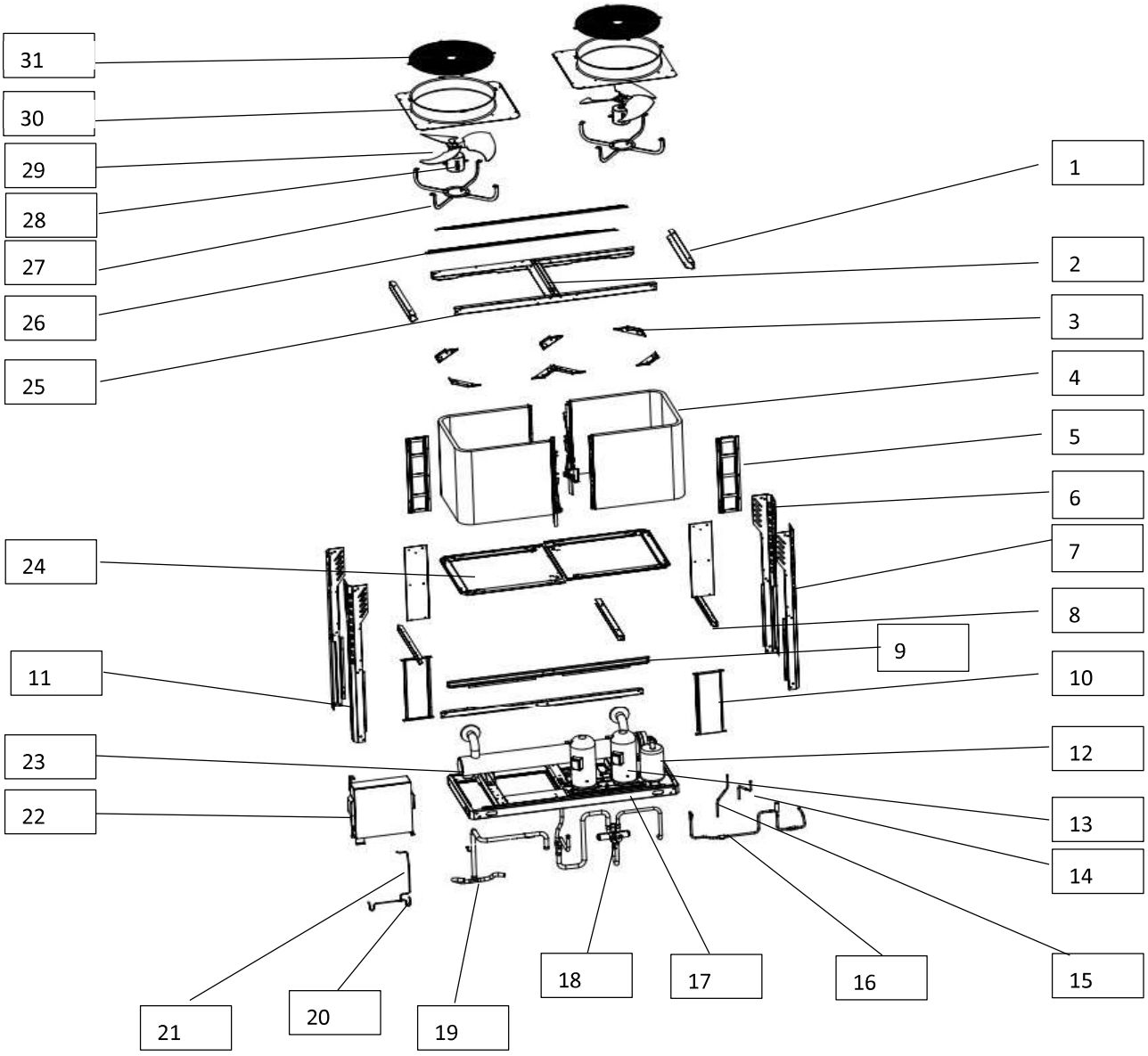
ACMP010H7A-GCC030GF



No	Name	No	Name
1	lateral support assy for Wind inlet guide	17	liquid tank
2	front support for Wind inlet guide	18	Vapour-liquid separator
3	Wind-side heat exchanger member1	19	compressor part
4	Wind-side heat exchanger member2	20	throttle fix plate
5	heat exchange menber connect plate2	21	triangular fix plate assy
6	Column	22	water tray sssy

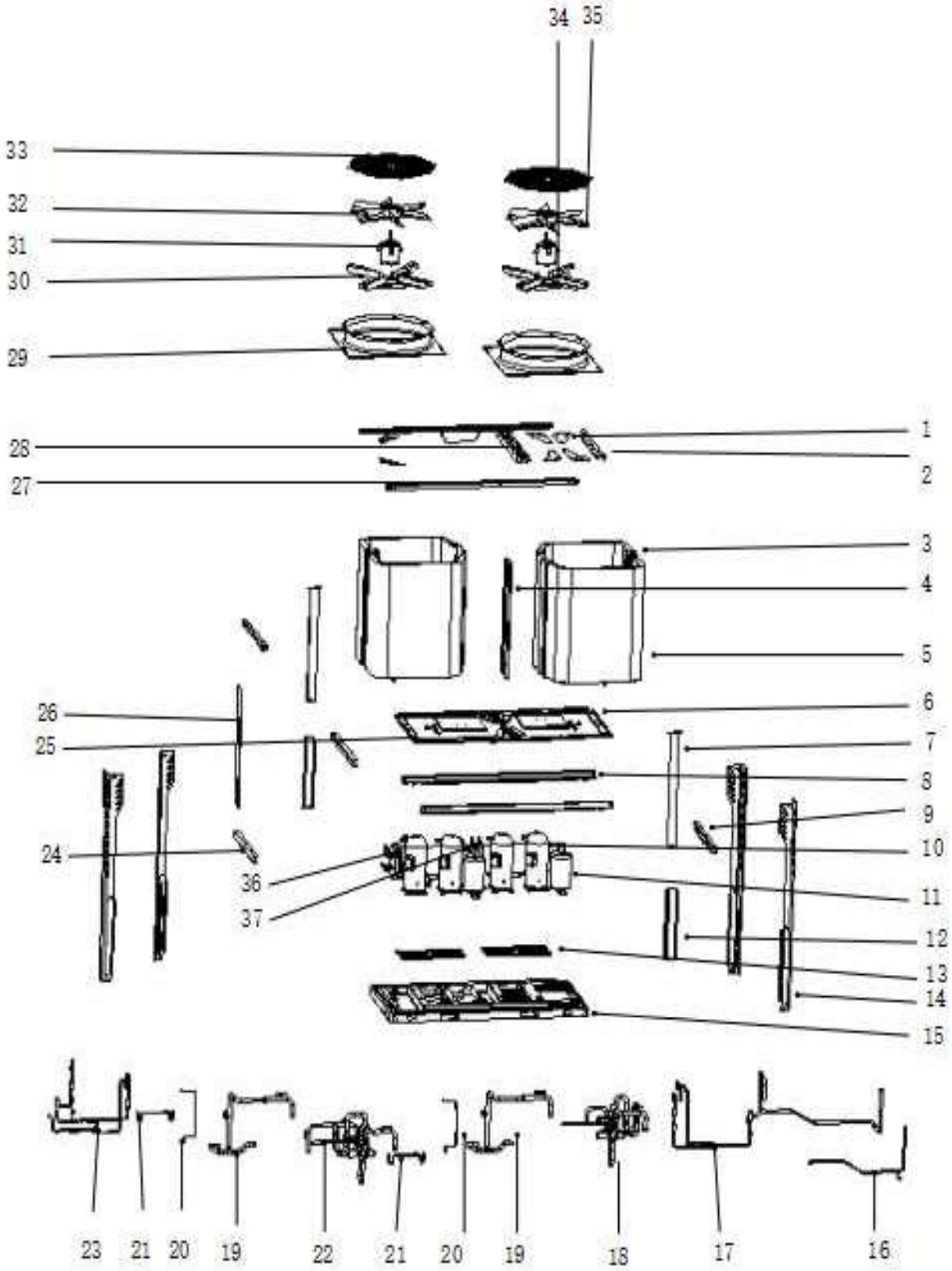
7	lateral beam assy	23	Front top Column
8	front and rear beam assy	24	heat exchange menber connect plate1
9	E-parts connect assy	25	LOGO plate
10	E-parts connect assy	26	lateral support assy for Wind inlet guide2
11	Water-side heat exchanger member	27	Guide ring splint
12	base assy	28	Holder for fan motor
13	oulet pipe liquid assy	29	Fan motor（left）
14	throttle assy	30	Propeller fan
15	4 - way reversing valve exhaust pipe welding assy	31	Wind inlet guide
16	Suction pipe assy	32	Top net for Wind inlet guide

ACMP020H7A-GCC065GF



NO	Name	NO	Name
1	lateral support assy for Wind inlet guide	17	base assy
2	middle support for Wind inlet guide	18	4- way reversing valve exhaust pipe welding assy
3	top fix plate	19	Suction pipe assy 1
4	Wind-side heat exchanger member	20	Oil balance components
5	condenser plate	21	Oil balance total piping
6	Front top Column	22	E-parts, assy
7	Column	23	Water-side heat exchanger member
8	Water collector support assy	24	Water collector assy
9	lateral beam assy	25	front and rear support for Wind inlet guide
10	front and rear beam assy	26	Guide ring splint
11	Front down Column	27	Holder for fan motor
12	Vapour-liquid separator	28	Fan motor（left）
13	compressor part	29	Propeller fan
14	Pre-welding assy for condensor shunting pipe 1	30	Wind inlet guide
15	Pre-welding assy for condensor shuntting pipe 2	31	Top net for Wind inlet guide
16	throttle assy		

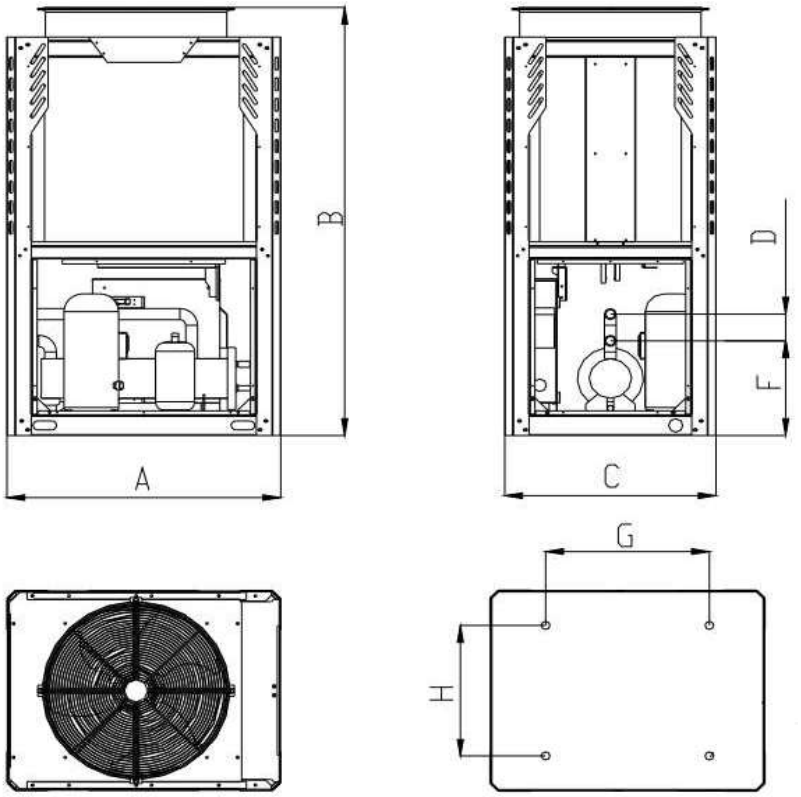
ACMP040H7A-GCC130GF



NO	Name	NO	Name
1	top fix plate 2	20	Oil balance total piping
2	lateral support assy for Wind inlet guide	21	Oil balance components
3	condenser assy1	22	4 - way reversing valve exhaust pipe welding assy 1
4	Condenser in the partition	23	throttle assy 1
5	condenser assy2	24	Water collector support assy
6	Water collector assy1	25	Water collector assy 2
7	Midel upwards to Column	26	fixing board for condenser
8	front and rear beam assy	27	front and rear support for Wind inlet guide
9	lateral beam assy	28	middle support for Wind inlet guide
10	Constant frequency compressor	29	Wind inlet guide
11	Vapour-liquid separator	30	Motor connection strip assembly
12	Midel downward to Column	31	Uniaxial outdoor three-phase motor
13	Compressor support assy	32	Propeller fan
14	Column	33	Top net for Wind inlet guide
15	base assy	34	Holder assy for fan motor
16	Evaporator inlet tube assy 2	35	Propeller fan
17	throttle assy 2	36	Water-side heat exchanger member
18	4 - way reversing valve exhaust pipe welding assy 2	37	Liquid storage tank
19	Suction pipe assy 1		

Outlook drawing

ACMP010H7A-GCC030GF



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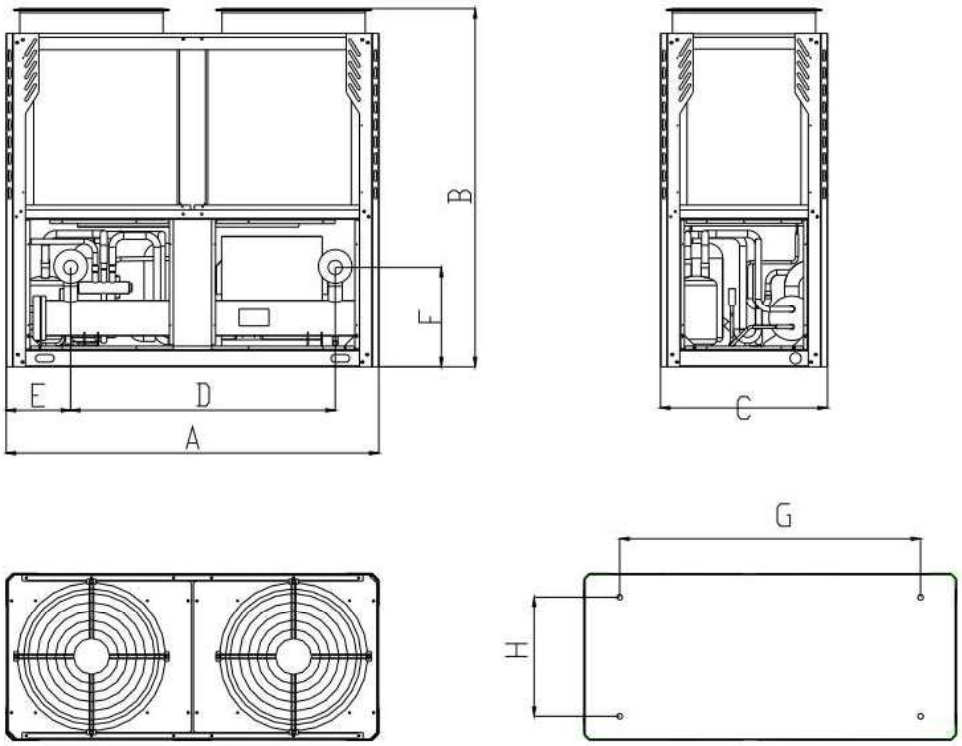

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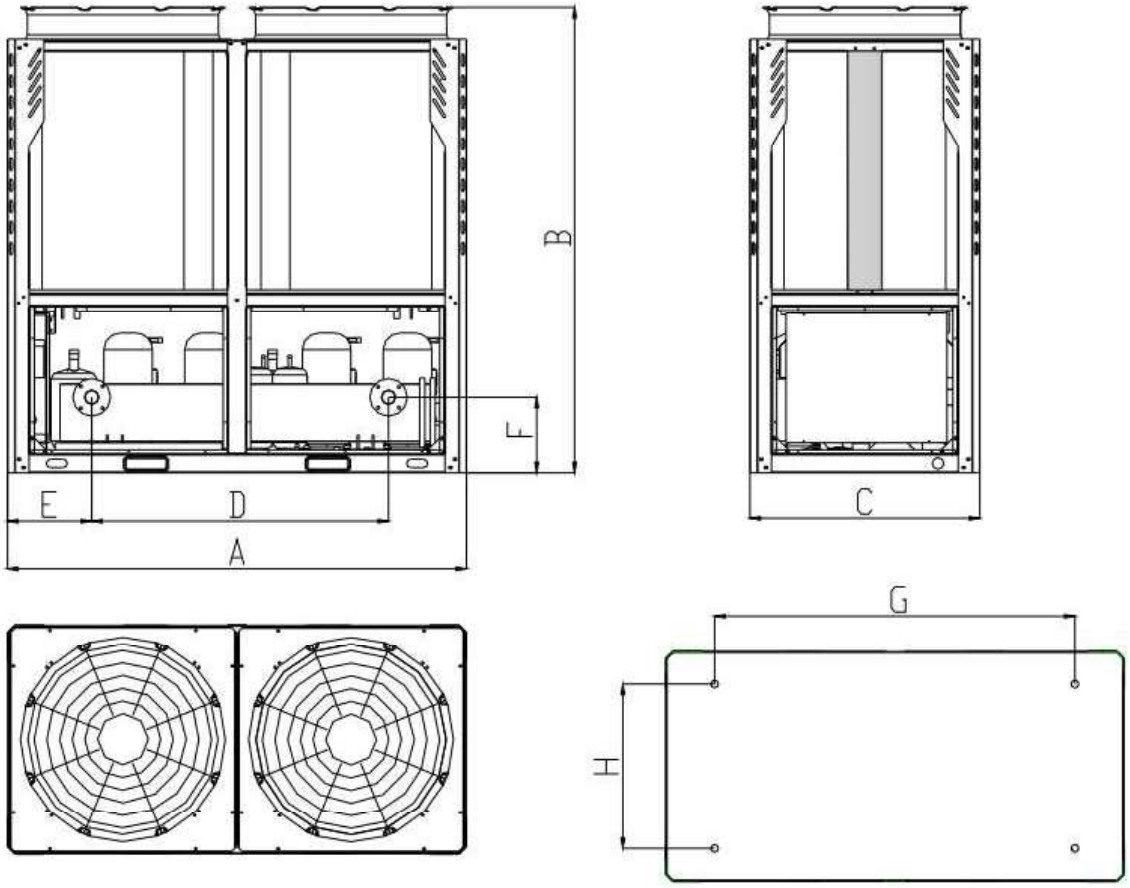


Model	A	B	C	D	E	F	G	H
ACMP010H7A-GCC030GF	1160	1920	900	120	/	426	840	850
ACMP020H7A-GCC065GF	2000	1920	900	1420	308	500	1586	850
ACMP040H7A-GCC130GF	2200	2220	1100	1420	403	306	1742	1054

3. Pipe Connection Drawing

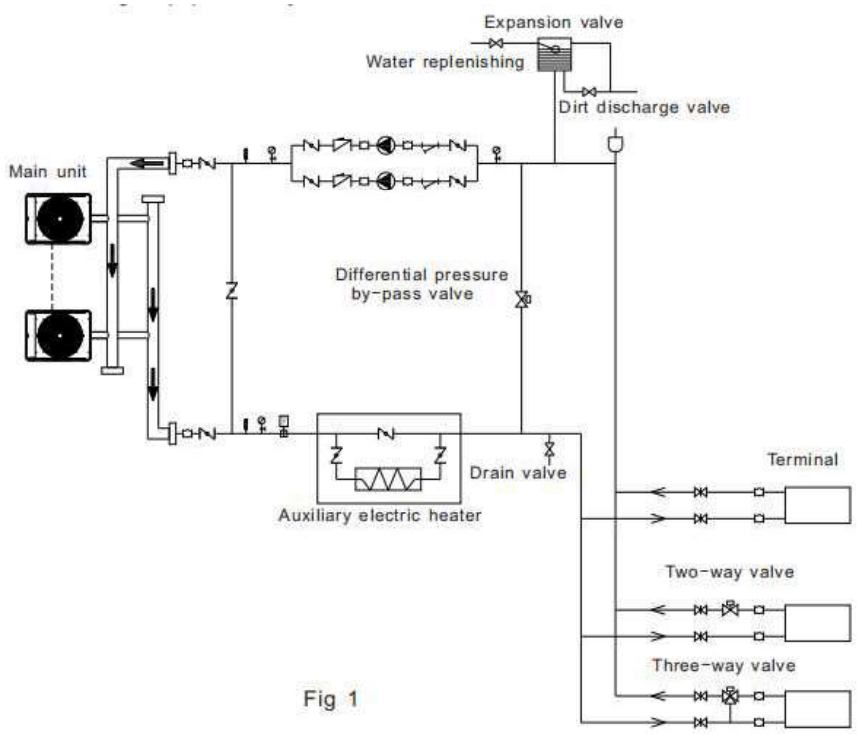


Fig 1

ACMP010H7A-GCC030GF

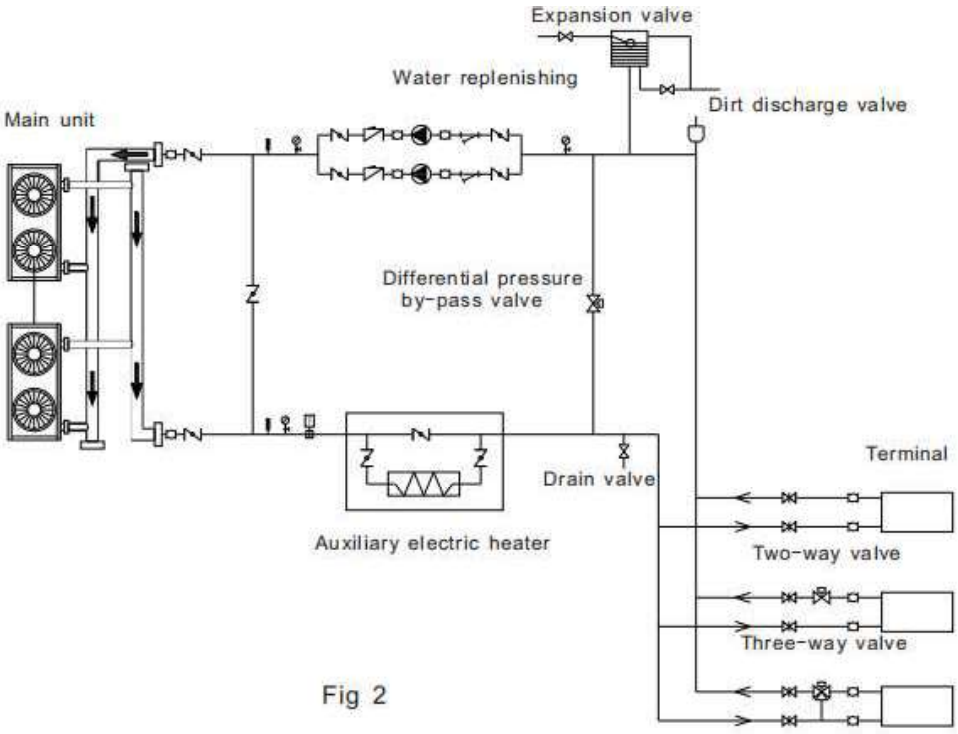
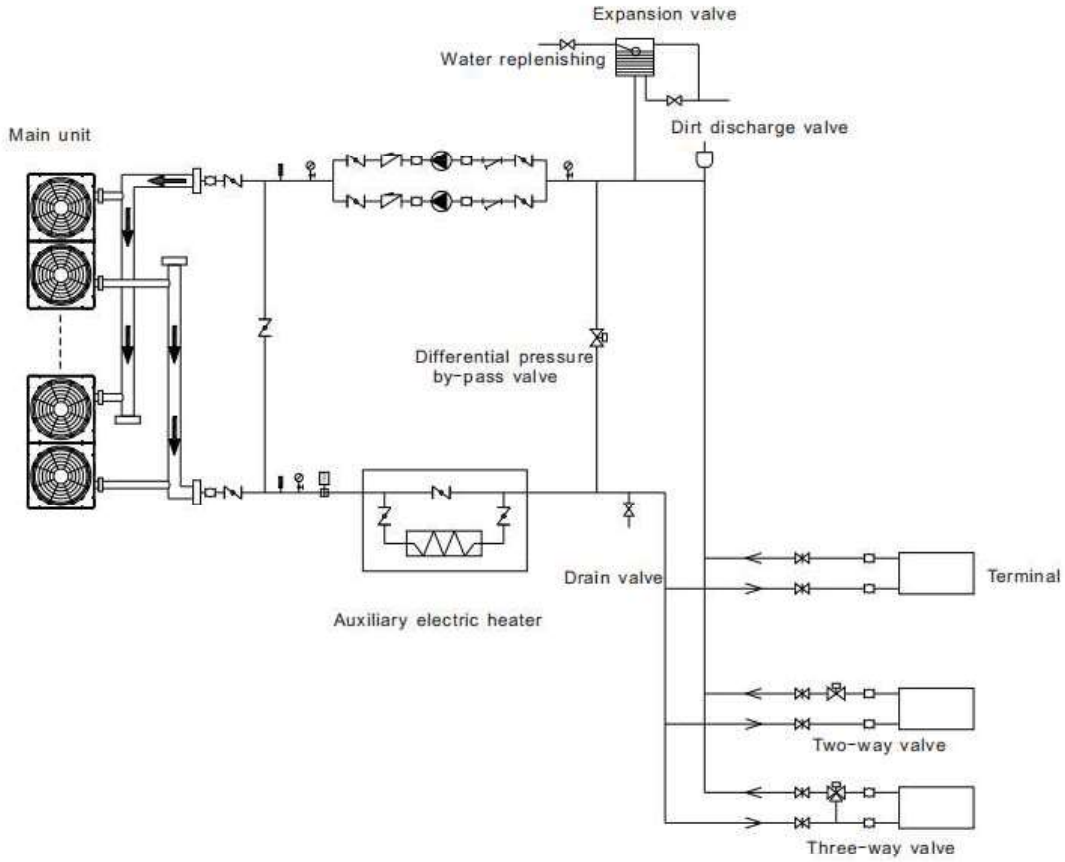


Fig 2

ACMP020H7A-GCC065GF

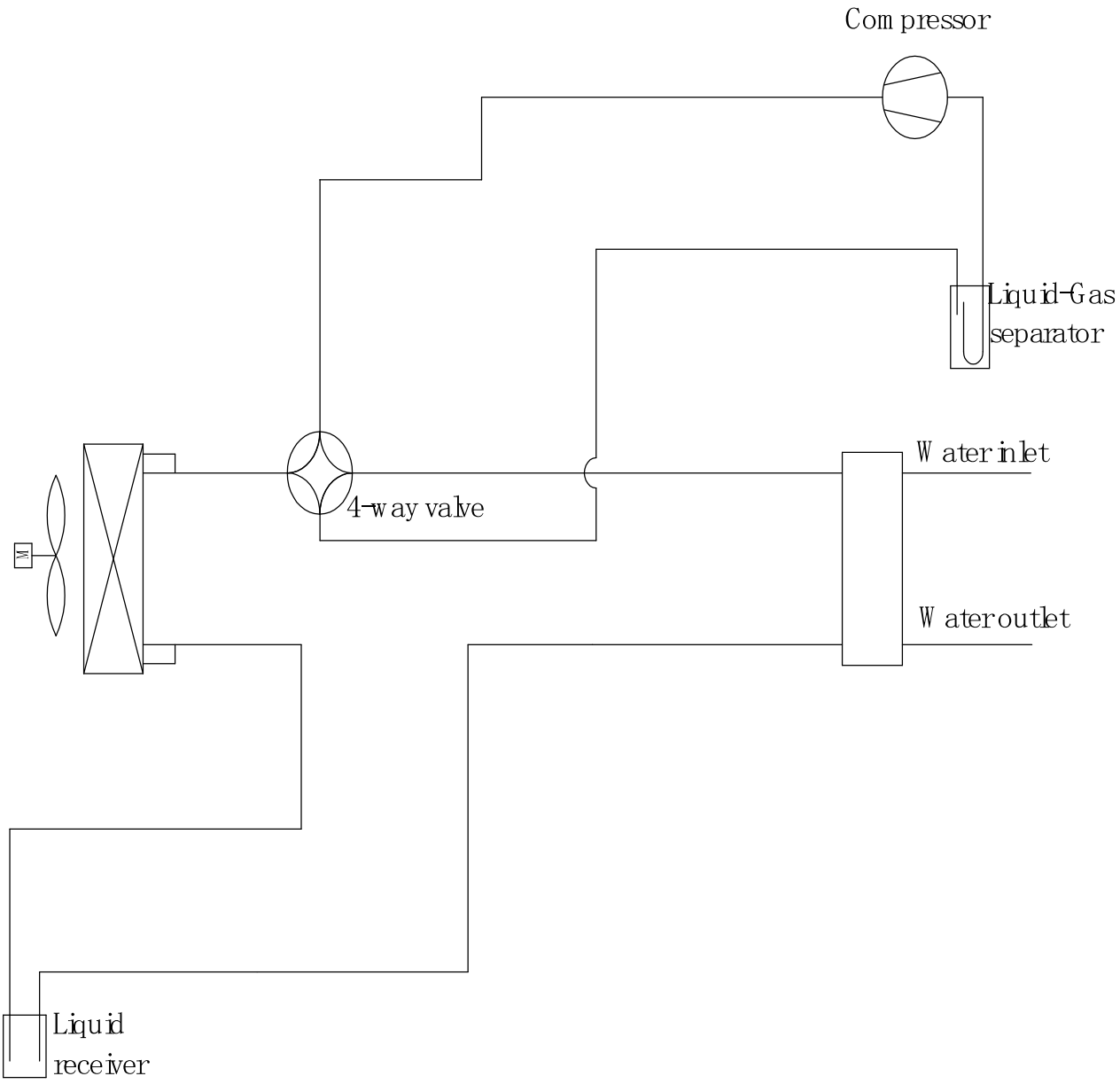


ACMP040H7A-GCC130GF

The table below describes the symbols.

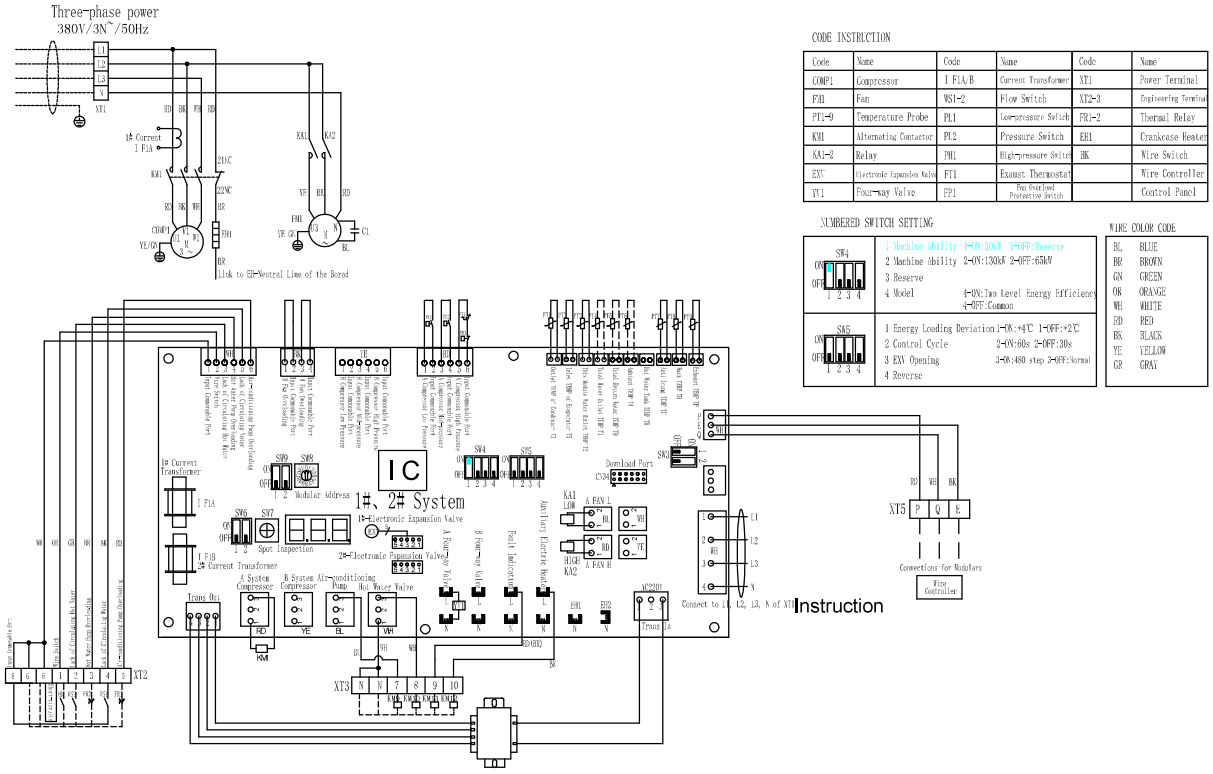
Symbol	Symbol explanation	Symbol	Symbol explanation
	Stop valve		Y-shaped filter
	Pressure gauge		Thermometer
	Water flow switch		Circulating pump
	Gate valve		Check valve
	Flexible joint		Automatic discharge valve

4. Refrigeration system drawing

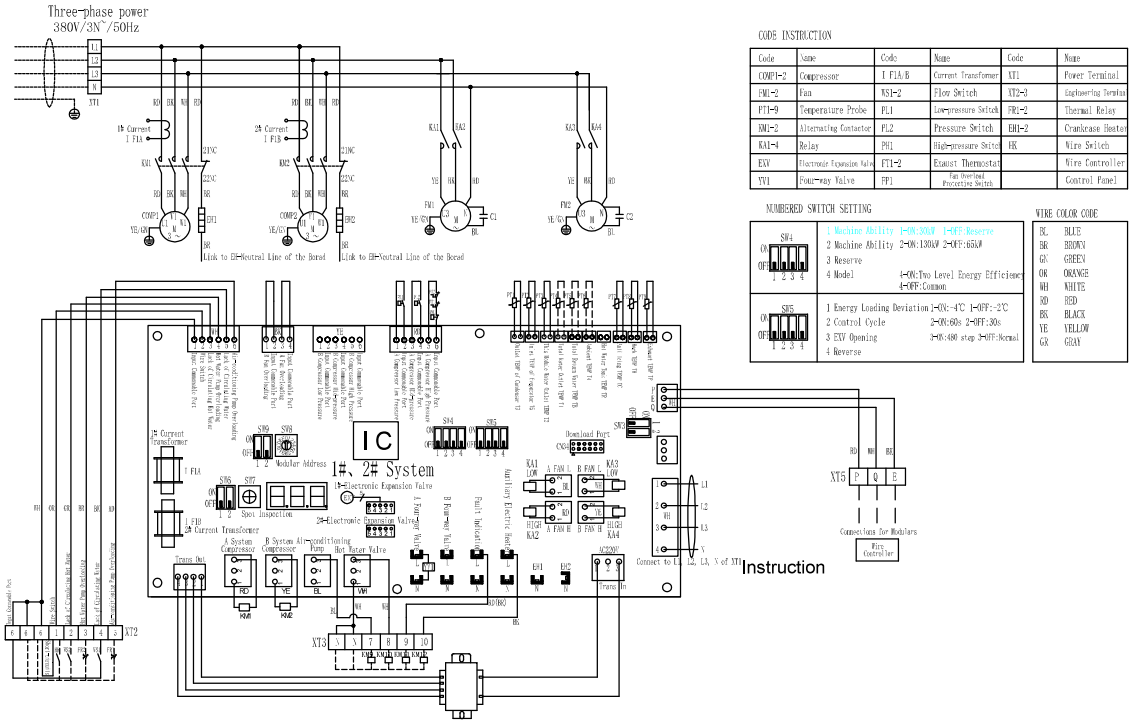


5. Wiring Diagrams

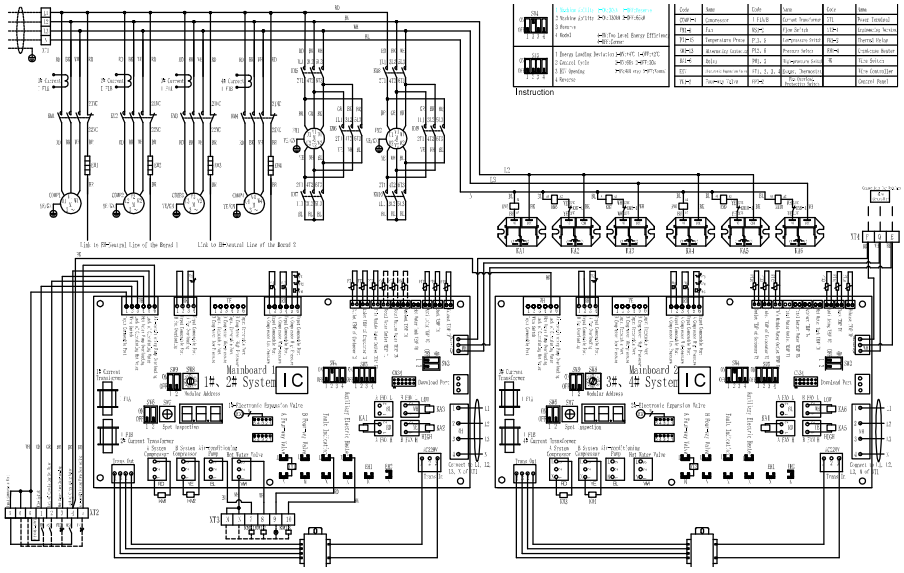
5.1 ACMP010H7A-GCC030GF



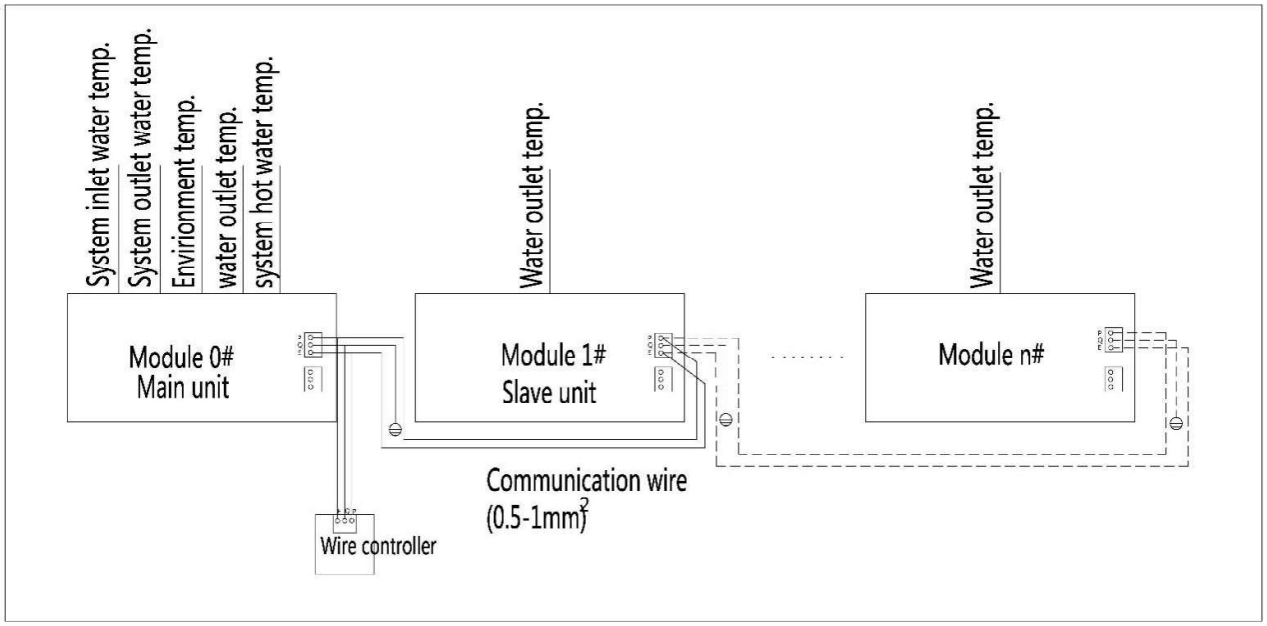
5.2 ACMP020H7A-GCC065GF



5.3 ACMP040H7A-GCC130GF



8 Networking Communication wiring diagram



Remark:

- The number of modules in each refrigeranting system is not more than 32(For 130module max. 16).
- The specification of the signal line is the two-core RVV in 2*0.5mm^2.

Part 1.

Trouble Shooting

1. Malfunction & Protection Codes

Codes for faults：

Code	Faults	Remark
E0	Power supply fault	Master unit and auxiliary unit
E1	Overloaded water pump of air conditioner	Master unit
E2	Insufficient water flow of water pump for air conditioner	Master unit
E3	Overloaded hot water pump	Master unit
E4	Insufficient water flow of hot water pump	Master unit
E5	Fault of total return water temperature sensor	Master unit
E6	Fault of total water outlet temperature sensor	Master unit
E7	Fault of outdoor ambient temperature sensor	Master unit
E8	Fault of water outlet temperature sensor for shell and tube heat exchanger unit	Master unit and auxiliary unit
E9	Fault of outlet temperature sensor for condenser	Master unit and auxiliary unit
EA	Fault of water inlet temperature sensor for shell and tube heat exchanger unit	Master unit and auxiliary unit
EC	Fault of return water temperature sensor of living hot water in heat recovery	Master unit
ED	Fault of return gas temperature sensor	Master unit
EE	Reserved	/
EF	Reserved	Master unit and auxiliary unit
L0	EEPROM error	Master unit and auxiliary unit
L1	Communication error between each module	Auxiliary unit
L2	The module quantity decrease	Master unit
L3	Address error	Master unit
L4	Communication between wired controller and main PCB	Master unit
L5	Communication fault for main board	Master unit and auxiliary unit

Protection code of unit:

Code	Protection	Remark
P0	Low pressure protection of system A	Master unit and auxiliary unit
P1	Medium pressure protection of system A	Master unit and auxiliary unit
P2	High pressure portection or exhaust temperature too high protection of system A	Master unit and auxiliary unit
P3	Over current protection of system A	Master unit and auxiliary unit
P4	High temperature protection of condenser A	Master unit and auxiliary unit
P5	Overload protection of fan in System A	Master unit and auxiliary unit
P6	Low pressure protection of system B	Master unit and auxiliary unit
P7	Medium pressure protection of system B	Master unit and auxiliary unit
P8	High pressure portection or exhaust temperature too high protection of system B	Master unit and auxiliary unit
P9	Over current protection of system B	Master unit and auxiliary unit
PA	High temperature protection of condenser B	Master unit and auxiliary unit
PB	Overload protection of fan in System B	Master unit and auxiliary unit
PC	Single module water outlet temperature too high protection or too low protection	Master unit and auxiliary unit
PD	Low temperature of water outlet from shell and tube heat exchanger unit	Master unit and auxiliary unit
PE	Low temperature protection for anti-icing (reserved)	Master unit and auxiliary Unit
PF	High temperature protection for compressor	Master unit and auxiliary u

2. Troubles and Solutions

Code	Error description	Reason	Troubleshooting
/	No power supply for main PCB	No power output or incorrect voltage	Check the power supply
/	Main PCB burned down	Wrong connection between L and N	Connect wire correctly, change main PCB and other burned device
E0	Three phase error	Wrong phase	Change any two power supply wire
		Lack of phase	Check power supply and wire connection
E1	Overload protection of AC side water pump	The water pipe is dirty and blocked	Clean the water pipe and filter
		Lack of water supply	Check water in water tank is enough
		Lack of water flow	Check the water pipe design, the valve is open or not
		Some air inside the water pipe	Discharge the air
		The water pump is broken	Check the water pump can work or damage
		The connector on main PCB is malfunction	Change the main PCB
E2	Lack of water flow in AC side	Water pump selection is small	Change the water pump
		The water pipe is dirty and blocked	Clean the water pipe and filter
		Lack of water supply	Check water in water tank is enough
		Lack of water flow	Check the water pipe design, the valve is open or not
		Some air inside the water pipe	Discharge the air
		The connector on main PCB is malfunction	Change the main PCB
E3	Overload protection of hot water side water pump	The water pipe is dirty and blocked	Clean the water pipe and filter
		Lack of water supply	Check water in water tank is enough
		Lack of water flow	Check the water pipe design, the valve is open oe not
		Some air inside the water pipe	Discharge the air
		The water pump is broken	Check the water pump can work or damage
		The connector on main PCB is malfunction	Change the main PCB

E4	Insufficient water flow of hot water pump	Water pump selection is small	Change the water pump
		The water pipe is dirty and blocked	Clean the water pipe and filter
		Lack of water supply	Check water in water tank is enough
		Lack of water flow	Check the water pipe design, the valve is open or not
		Some air inside the water pipe	Discharge the air
		The connector on main PCB is malfunction	Change the main PCB
E5	Fault of total return water temperature sensor	The connector of sensor is loose	Check the connector and reconnect it
		TB sensor short circuit or open circuit	Measure TB sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
E6	Fault of total water outlet temperature sensor	The connector of sensor is loose	Check the connector and reconnect it
		T1 sensor short circuit or open circuit	Measure T1 sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
E7	Fault of outdoor ambient temperature sensor	The connector of T4 sensor is loose	Check the connector and reconnect it
		T4 sensor short circuit or open circuit	Measure T4 sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
E8	Fault of water outlet temperature sensor for shell and tube heat exchanger unit	The connector of T2 sensor is loose	Check the connector and reconnect it
		T2 sensor short circuit or open circuit	Measure T2 sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
E9	Condenser fin A temperature T3A sensor error	The connector of sensor is loose	Check the connector and reconnect it
		T3A sensor short circuit or open circuit	Measure T3A sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
EA	Fault of water inlet temperature sensor for shell and tube heat exchanger unit	The connector of sensor is loose	Check the connector and reconnect it
		T3B sensor short circuit or open circuit	Measure T3B sensor resistance, if it is abnormal, replace it

		The connector on main PCB is malfunction	Change the main PCB
EC	Fault of return water temperature sensor of living hot water in heat recovery	The connector of sensor is loose	Check the connector and reconnect it
		TR sensor short circuit or open circuit	Measure TR sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
ED	Fault of return gas temperature sensor	The connector of sensor is loose	Check the connector and reconnect it
		TBR sensor short circuit or open circuit	Measure TBR sensor resistance, if it is abnormal, replace it
		The connector on main PCB is malfunction	Change the main PCB
		The connector on main PCB is malfunction	Change the main PCB
L0	EEPROM error	EEPROM chip error	Check the chip is loose and change the PCB
L1	Communication error between each module	Communication wire connect badly, short circuit or open circuit	Reconnect the communication wire
L2	The module quantity decrease	Communication wire is loose	Reconnect the communication wire
		Slaver unit is power off	Give power supply
L3	Address error	Master:0, slaver:1,2,3…	Change the module address
		The address is repeat	Reset the module address
		The address value is higher than PCB number	Reset the module address
		The address setting switch is error	Change the main PCB
L4	Communication between wired controller and main PCB	Wrong connection for PQE	Reconnect the wire
		Communication wire is loose	Reconnect the wire
		No power for main PCB and wired controller	Give power supply
		Communication wire and strong power wire are mixed together	Separate communivation wire and strong power wire
		Communication wire is too long	Keep the wire length as short as possible
		The connectot on PCB is loose or error	Change the main PCB
L5	Communication fault for main board	Main board error	Replace the main board

P0	Low pressure protection of system A	Heat exchanger condition is not good (Heating mode)	Improve the heat exchanger condition and keep it is in good ventilation
		Outdoor fan motor is abnormal (Heating mode)	Check the fan motor and solve it
		There are some air inside the circuit (Heating mode)	Make sure there is no air inside
		Leakage or lack of refrigerant	Check the leakage and recharge refrigerant
		Low pressure switch is error	Change low pressure switch
		Lack of water flow in AC side (Cooling mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Cooling mode)	Clean the furring
		Malfunction for low pressure switch connector on main PCB	Change the main PCB
P1	Medium pressure protection of system A	Leakage or lack of refrigerant	Check the leakage and recharge refrigerant
		Medium pressure switch is error	Change medium pressure switch
		Lack of water flow in AC side (Cooling mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Cooling mode)	Clean the furring
		Malfunction for medium pressure switch connector on main PCB	Change the main PCB
P2	High pressure portection or exhaust temperature too high protection of system A	Heat exchanger condition is not good (Cooling mode)	Improve the heat exchanger condition and keep it is in good ventilation
		Outdoor fan motor is abnormal (Cooling mode)	Check the fan motor and solve it
		There are some air inside the circuit (Cooling mode)	Make sure there is no air inside
		Ambient temperature is too high (Cooling mode)	Turn off the uint
		Too much refrigerant	Discharge some refrigerant
		The circuit is blocked	Check there is no block
		High pressure switch is error	Change high pressure switch
		Lack of water flow in AC side (Heating mode)	Check inlet and outlet water temperature and adjust water flow

		Too much furring on the Shell and tube exchanger (Heating mode)	Clean the furring
		Lack of water flow in hot water side (Heating water mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Heating water mode)	Clean the furring
		Leakage or lack of refrigerant	Check the leakage and recharge refrigerant
		Malfunction for high pressure switch connector on main PCB	Change the main PCB
P3	Over current protection of system A	Compressor is error	Check the compressor resistance is normal
		High voltage or low voltage, phase imbalance	Check voltage is in operation range
		Water pipe is dirty or blocked (Heating or heating water mode)	Clean water pipe and filter
		Lack of water (Heating or heating water mode)	Check water in water tank is enough
		Lack of water flow (Heat or heating water mode)	Check the water pipe design, the valve is open oe not
		Some air inside the water pipe (Heat or heating water mode)	Discharge the air
		The water pump is broken (Heat or heating water mode)	Check the water pump can work or damage
P4	High temperature protection of condenser A	Temperature sensor T3A sensor error	Measure the T3A sensor resistance to check it is normal, if abnormal ,replace it
		Heat exchanger condition is not good (Cooling mode)	Improve the heat exchanger condition and keep it is in good ventilation
		Outdoor fan motor running is abnormal (Cooling mode)	Check the fan motor and solve it
P6	Low pressure protection of system B	Heat exchanger condition is not good (Heating mode)	Improve the heat exchanger condition and keep it is in good ventilation
		Outdoor fan motor is abnormal (Heating mode)	Check the fan motor and solve it
		There are some air inside the circuit (Heating mode)	Make sure there is no air inside
		Leakage or lack of refrigerant	Check the leakage and recharge refrigerant
		Low pressure switch is error	Change low pressure switch

		Lack of water flow in AC side (Cooling mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Cooling mode)	Clean the furring
		Malfunction for low pressure switch connector on main PCB	Change the main PCB
P7	Medium pressure protection of system B	Leakage or lack of refrigerant	Check the leakage and recharge refrigerant
		Medium pressure switch is error	Change medium pressure switch
		Lack of water flow in AC side (Cooling mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Cooling mode)	Clean the furring
		Malfunction for medium pressure switch connector on main PCB	Change the main PCB
P8	High pressure portection or exhaust temperature too high protection of system B	Heat exchanger condition is not good (Cooling mode)	Improve the heat exchanger condition and keep it is in good ventilation
		Outdoor fan motor is abnormal (Cooling mode)	Check the fan motor and solve it
		There are some air inside the circuit (Cooling mode)	Make sure there is no air inside
		Ambient temperature is too high (Cooling mode)	Turn off the uint
		Too much refrigerant	Discharge some refrigerant
		The circuit is blocked	Check there is no block
		High pressure switch is error	Change high pressure switch
		Lack of water flow in AC side (Heating mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Heating mode)	Clean the furring
		Lack of water flow in hot water side (Heating water mode)	Check inlet and outlet water temperature and adjust water flow
		Too much furring on the Shell and tube exchanger (Heating water mode)	Clean the furring
		Leakage or lack of refrigerant	Check the leakage and recharge refrigerant
		Malfunction for high pressure switch connector on main PCB	Change the main PCB

P9	Over current protection of system B	Compressor is error	Check the compressor resistance is normal
		High voltage or low voltage, phase imbalance	Check voltage is in operation range
		Water pipe is dirty or blocked (Heating or heating water mode)	Clean water pipe and filter
		Lack of water (Heating or heating water mode)	Check water in water tank is enough
		Lack of water flow (Heating or heating water mode)	Check the water pipe design, the valve is open oe not
		Some air inside the water pipe (Heating or heating water mode)	Discharge the air
		The water pump is broken (Heating or heating water mode)	Check the water pump can work or damage
PA	High temperature protection of condenser B	Temperature sensor T3A sensor error	Measure the T3A sensor resistance to check it is normal, if abnormal ,replace it
		Heat exchanger condition is not good (Cooling mode)	Improve the heat exchanger condition and keep it is in good ventilation
		Outdoor fan motor running is abnormal (Cooling mode)	Check the fan motor and solve it
PC	Single module water outlet temperature too high protection or too low protection	Lack of water flow in AC side (Heating mode)	Check inlet and outlet water temperature and adjust water flow
		Lack of water flow in hot water side (Heating water mode)	Check inlet and outlet water temperature and adjust water flow
		Water is too dirty in AC side (Heating mode)	Clean water system and keep water clean
		Water is too dirty in hot water side (Heating water mode)	Clean water system and keep water clean
		T2 sensor error	Measure the sensor resistance, replace it if abnormal
		T2R sensor error	Measure the sensor resistance, replace it if abnormal
		Lack of water flow in AC side (Cooling mode)	Check inlet and outlet water temperature and adjust water flow
PF	High temperature protection for compressor	Over high air expelling pressure	
		High pressure switch error	Upon error have been confirmed place replace a new one

Part 2. Installation

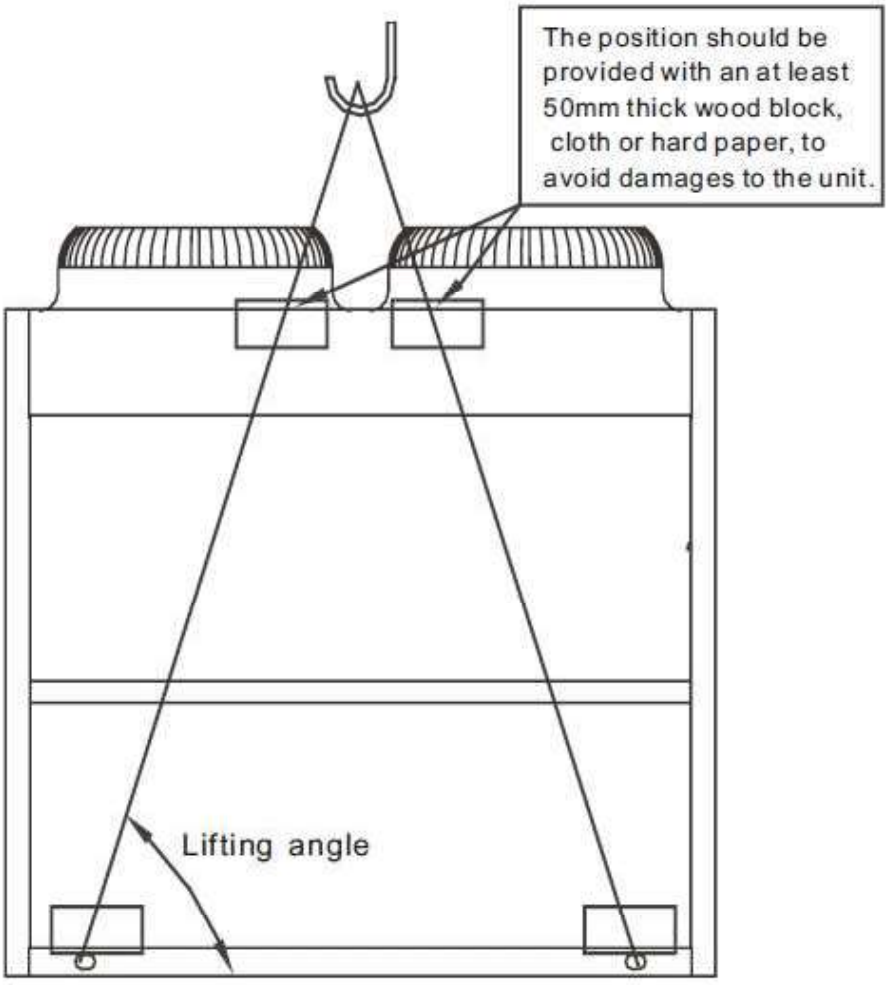
1. Transportation and Foundation Installation

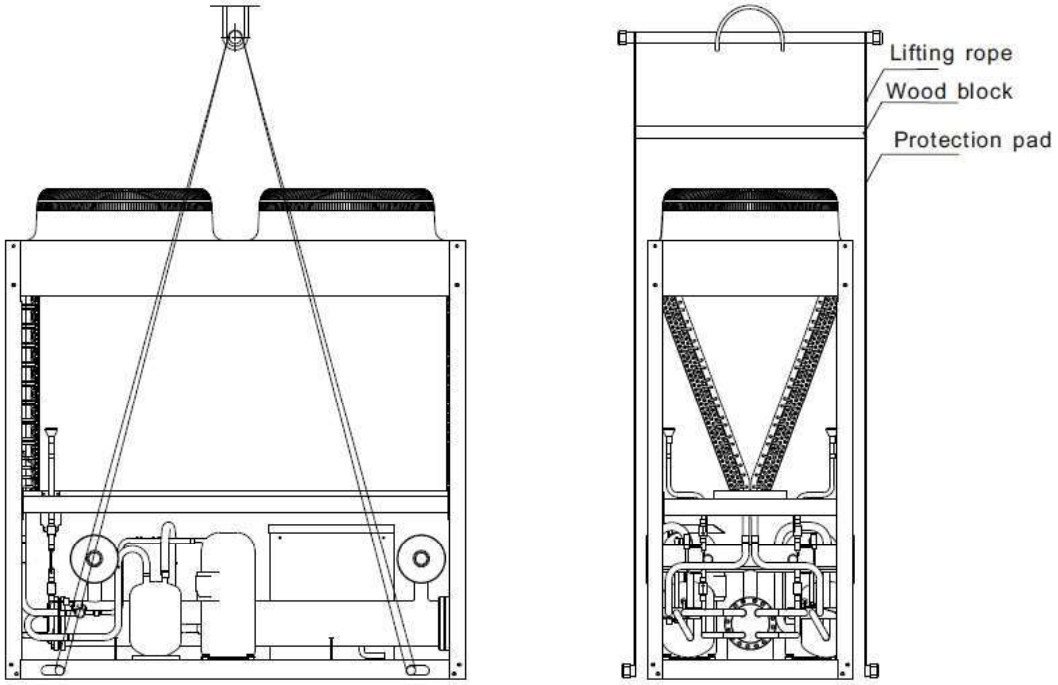
1.1 Transportation

To prevent the unit from tipping over, the angle of inclination should not exceed 15º when carrying it.

1.1.1 Rolling Transport: Place several rolling rods of equal size beneath the unit's base, ensuring each rod extends beyond the outer frame of the base to maintain balance.

1.1.2 Lifting: The lifting rope or belt used should have a load capacity four times the weight of the unit. Verify that the lifting hook is securely attached to the unit, with a lifting angle of at least 60º. To avoid damage, place a protective material, such as a wood block at least 50mm thick, cloth, or hard paper, between the unit and lifting rope at contact points. No person should stand beneath the unit while it is being lifted.

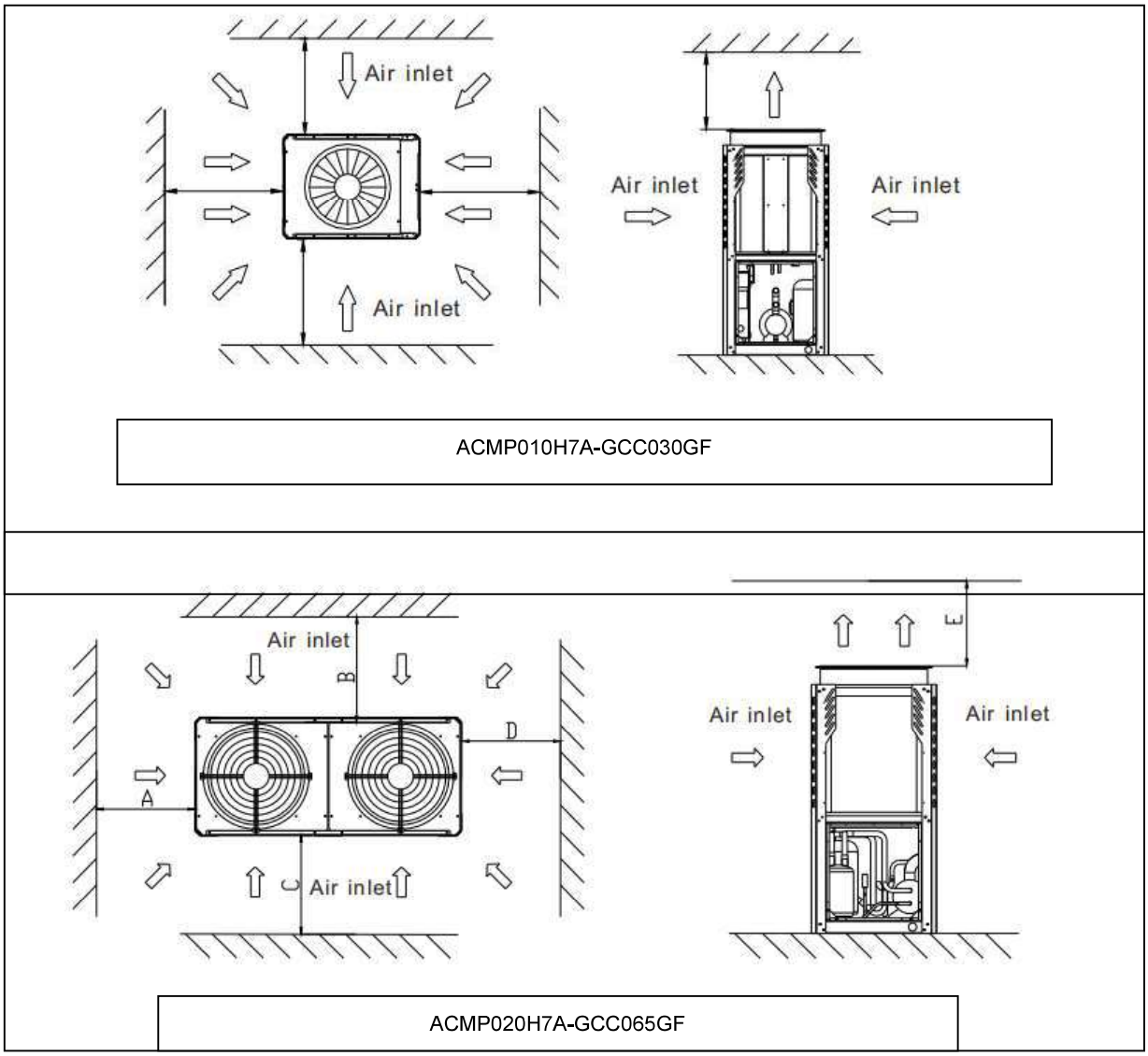


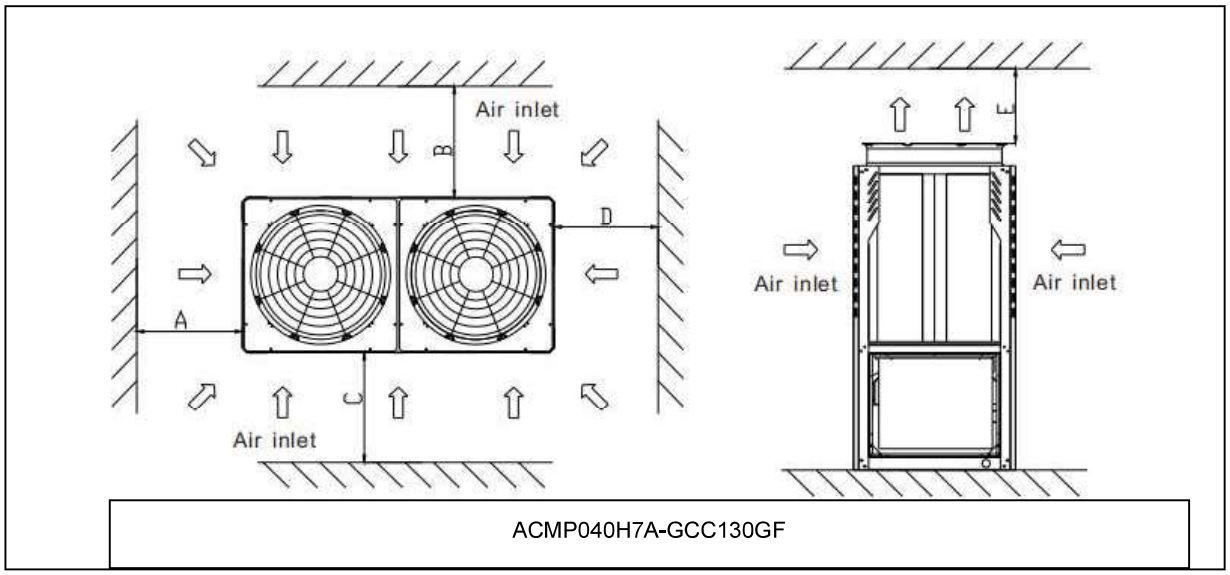

Lifting rope
Wood block
Protection pad

1.2 Installation space

1.2.1 Requirements of arrangement space of the unit

1) When installing the unit, consider the impact of descending airflow caused by surrounding high-rise buildings to ensure adequate airflow entering the condenser.
2) If the unit is installed in a location with high airspeed, such as an exposed rooftop, measures like a recessed fence or louvered blinds can help prevent turbulent airflow from disturbing the air entering the unit. If a recessed fence is used, its height should not exceed that of the unit. For louvered blinds, ensure the total static pressure loss remains below the external static pressure of the fan. Additionally, the distance between the unit and either the recessed fence or louvered blinds should meet the minimum required installation space for the unit.
3) If the unit must operate during winter and the installation site is prone to snow accumulation, position the unit above the snow level to ensure smooth airflow through the coils.





The recommend space parameter

Module	Installation space (mm)				
	A	B	C	D	E
ACMP010(20,40)H7A	≥1500	≥2000	≥2000	≥1500	≥8000

1.2.2 Space requirements for parallel installation of multiple modular units

To prevent air backflow in the condenser and ensure proper unit operation, multiple modular units should be installed in specified directions:

- When following directions A and D, maintain a minimum clearance of 300mm between adjacent units, as indicated in the figure above.

- When following directions B and C, ensure a minimum clearance of 600mm between adjacent units, also indicated in the figure.

- For combinations of directions A and D with B and C, keep a minimum space of 300mm between units in directions A and D, and 600mm in directions B and C.

If these clearances cannot be maintained, airflow to the coils may be restricted or backflow of discharge air could occur, potentially impacting unit performance or leading to operational failure.

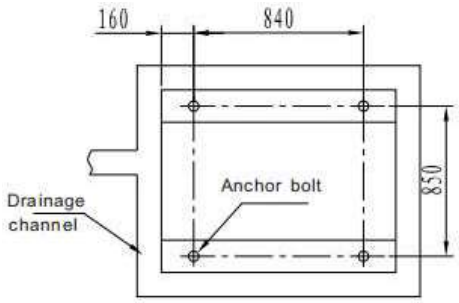
1.3 Installation Foundation

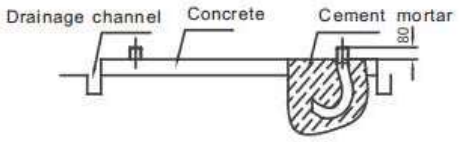
The unit should be placed on a level foundation, whether on the ground floor or on a roof that can support both the unit's operating weight and the weight of maintenance personnel. Refer to the specification table for operating weight parameters.

If the unit is positioned at a height that complicates maintenance access, appropriate scaffolding should be installed around it. The scaffolding must be capable of supporting the weight of maintenance personnel and any required maintenance equipment.

The bottom frame of the unit should not be embedded into the concrete foundation of the installation site.

Location drawing of installation foundation of the unit (unit: mm)





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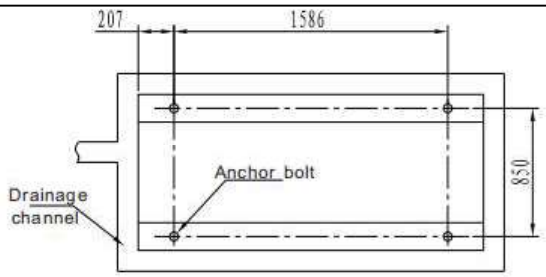

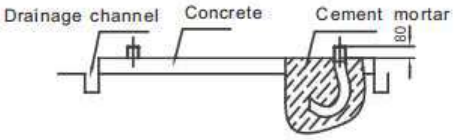

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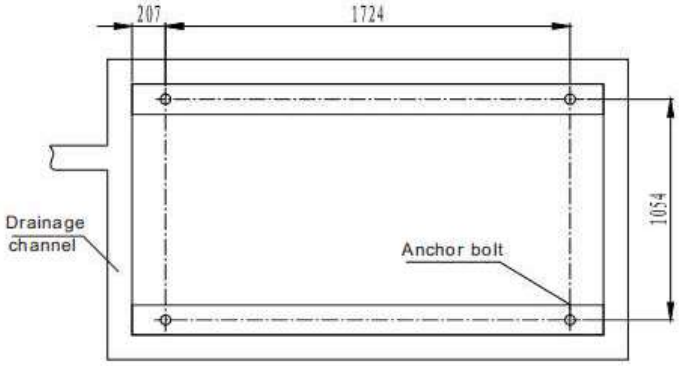

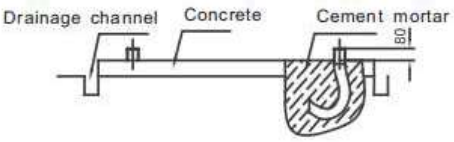

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1.4 Installation of damping devices

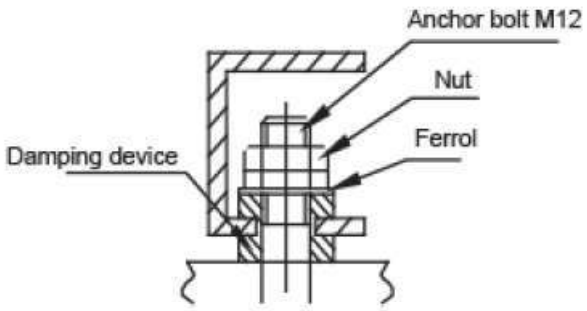
Damping devices must be provided between the unit and its foundation.

The unit can be secured to the foundation using the Φ15mm diameter installation holes on the steel frame of its base, with fastening achieved through a spring damper. For details on the center distance of the installation holes, refer to the schematic diagram of the unit's installation dimensions shown above.

Note that the damper is not included with the unit, and users should select an appropriate damper based on specific requirements. If the unit is installed on a high roof or in a vibration-sensitive area, consult with relevant experts before choosing the damper.

Installation steps of the damper

Step	Content
1	Make sure that the flatness of the concrete foundation is within ±3mm, and then place the unit on the cushion block.
2	Raise the unit to the height suitable for installation of the damping device. Remove the clamp nuts of the damper.
3	Place the unit on the damper, and align the fixing bolt holes of the damper with the fixing holes on the unit base.
4	Return the clamp nuts of the damper to the fixing holes on the unit base, and tighten them into the damper.
5	Adjust the operational height of the damper base, and screw down the leveling bolts. Tighten the bolts by one circle to ensure equal height adjustment variance of the damper.
6	The lock bolts can be tightened after the correct operational height is reached.



2. Water System Installation

Notice:

- After the unit is in place, chilled water pipes can be laid.
- The relevant installation regulations should be abided with when conducting connection of water pipes.
- The pipelines should be free of any impurity, and all chilled water pipes must conform to local rules and regulations of pipeline engineering.

2.1 Basic requirements of connection of chilled water pipes

No.	Content
1	All chilled water pipelines should be thoroughly flushed, to be free of any impurity, before the unit is operated. Any impurity should not be flushed to or into the heat exchanger.
2	Water must enter the heat exchanger through the inlet; otherwise the performance of the unit will decline.
3	The inlet pipe of the evaporator must include a target flow controller to enable flow-break protection for the unit. Horizontal straight pipe sections, each with a length equal to five times the inlet pipe's diameter, should be installed on both sides of the target flow controller. The installation of the target flow controller must strictly follow the "Installation & Regulation Guide for Target Flow Controller." The flow controller's wires should be routed to the electric cabinet using shielded cables. It operates at a working pressure of 1.0 MPa and has a 1-inch interface diameter. After the pipelines are installed, the target flow controller should be adjusted according to the unit's rated water flow.
4	The pump installed in the water pipeline system should be equipped with starter. The pump will directly press water into the heat exchanger of the water system.
5	The pipes and their ports must be independently supported but should not be supported on the unit.
6	The pipes and their ports of the heat exchanger should be easy to disassemble for operation and cleaning, as well as inspection of port pipes of the evaporator.
7	The evaporator should be provided with a filter with more than 40 meshes per inch at site. The filter should be installed near to the inlet port as much as possible, and be under heat preservation.
8	Bypass pipes and bypass valves, as illustrated in the "Connection Drawing of Pipeline System," must be installed for the heat exchanger. This setup allows for cleaning the external water passage system before the unit is adjusted. During maintenance, the water passage to the heat exchanger can be isolated without affecting other heat exchangers.
9	The flexible ports should be adopted between the interface of the heat exchanger and on-site pipeline, to reduce transfer of vibration to the building.
10	To facilitate maintenance, the inlet and outlet pipes should be provided with thermometer or manometer. The unit is not equipped with pressure and temperature instruments, so they need to be purchased by the user.
11	All low points in the water system should have drainage ports to allow complete drainage of water from the evaporator and the system, while all high points should be fitted with discharge valves to expel air from the pipelines. To facilitate maintenance, the discharge valves and drainage ports should remain uninsulated.
12	All possible water pipes in the system to be chilled should be under heat preservation, including inlet pipes and flanges of the heat exchanger.
13	Outdoor chilled water pipelines should be insulated with an auxiliary heating belt to prevent freezing and potential cracking in low temperatures. The heating belt should be made of materials such as PE or EPDM, with a thickness of 20mm for effective insulation. The heating belt's power supply should be equipped with an independent fuse for added safety.
14	When the ambient temperature is lower than 2℃, and the unit will be not used for a long time, water inside the unit should be drained. If the unit is not drained in winter, its power supply should not be cut off, and the fan coils in the water system must be provided with three-way valves, to ensure smooth circulation of the water system when the anti-freezing pump is started up in winter.
15	The common outlet pipelines of combined units should be provided with mixing water temperature sensor.

Warning:

In the water pipeline network, including filters and heat exchangers, debris or dirt can severely damage heat exchangers and water pipes. Installation personnel and users must ensure the quality of the chilled water, ensuring that de-icing salt mixtures and air are excluded from the system to prevent oxidation and corrosion of the steel components inside the heat exchanger.

2.2 Water Quality

Water quality control

When industrial water is used as chilled water, minimal scaling may occur; however, using well or river water as chilled water can introduce significant sediment, such as scaling, sand, and other particulates. Therefore, well or river water must be filtered and softened in water treatment equipment before entering the chilled water system. Sediment, such as sand and clay, settling in the evaporator can obstruct chilled water circulation, potentially causing freezing incidents. High hardness in chilled water increases the risk of scaling and corrosion of the equipment. To prevent these issues, chilled water quality should be thoroughly analyzed before use, including parameters like pH value, conductivity, chloride ion concentration, and sulfide ion concentration.

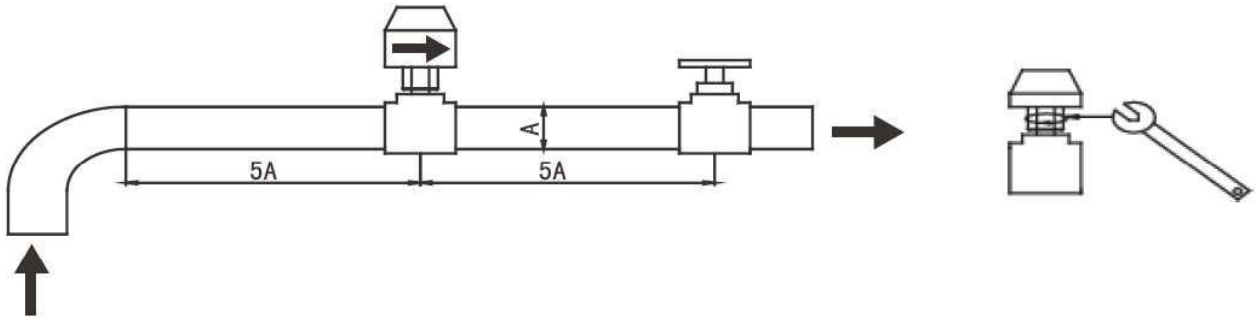
Applicable standard of water quality for the unit

PH value	Total hardness	Conductivity	Sulfide ion	Chloride ion	Ammonia ion	Sulfate ion	Silicon	Iron content	Sodium ion	Calcium ion
7～8.5	<50ppm	<200μV/cm(25℃)	No	<50ppm	No	<50ppm	<30ppm	<0.3ppm	No requirement	<50ppm

2.3 Installation & regulation guide for target flow controller

- *Inspection:* Before installing the target flow controller, inspect the flow switches to ensure they are in good condition. Packaging should be intact, with no visible damage or deformation. If issues are found, contact the manufacturer.
- *Installation:*
  - Flow switches can be installed on horizontal pipelines or vertical pipelines with an upward flow. They should not be installed on pipelines with a downward flow. Consider the effect of gravity when installing in upward-flowing pipelines.
  - Install the target flow controller on a straight section of pipeline, ensuring each end has a straight-line section at least five times the pipe diameter. Ensure the flow direction aligns with the arrow on the controller. Position the connection terminal where wiring can be easily accessed.
- *Installation and Wiring Precautions*
  - Avoid collisions between the wrench and the flow switch's soleplate to prevent deformation or damage.
  - Turn off the power supply when connecting wires or making adjustments to prevent electric shock or equipment damage.
  - Do not adjust screws other than the micro switch connection terminals and ground screws, and avoid excessive force to prevent displacement or failure of the micro switches.
  - Use dedicated grounding screws for earth connection. Do not remove bolts arbitrarily to avoid deformation or damage to the flow switches.
  - Flow switches are pre-set to a minimum flow value at the factory. Do not adjust them below this value to avoid failure. After installation, press the flow switch lever several times to test for a "click" response. If no sound is heard, turn the screw clockwise until a "click" occurs.
  - Select the correct target slice based on the unit's rated flow, outlet pipe diameter, and adjustment range. Ensure the target slice does not contact any restrictors or the inner wall of the pipeline, as this may prevent the flow switch from resetting.
- - Operational Testing: Confirm proper operation of the flow switch and connected system by measuring flow meter values. When the reading falls below 60% of the unit's rated flow, the target flow controller should be cut off and observed for three operational cycles. Cover the flow switch shell promptly after testing.

Schematic diagram of target flow controller



3. Installation of water system pipeline

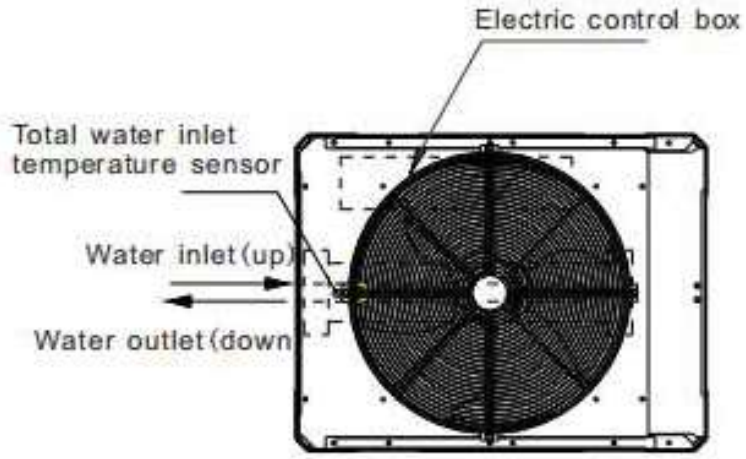
The total outlet water pipe diameter after combined as below table:

Total cooling capacity (Unit model x quantity)kW	Total inlet and outlet water pipe diameters (nominal diameter)	Total cooling capacity (Unit model x quantity)kW	Total inlet and outlet water pipe diameters (nominal diameter)
(30×1=) 30	DN40	(130×6=) 780	DN150
		(130×7=) 910	
(65×1=) 65	DN65	(65×11=) 715	
(130×1=) 130		(65×12=) 780	
(30×2=) 60		(65×13=) 845	
(65×2=) 130		(65×14=) 910	
(30×3=) 90		(30×23=) 690	
(30×4=) 120		(30×24=) 720	
(30×5=) 150		(30×25=) 750	
(65×3=) 195	DN80	(30×26=) 780	
(30×6=) 180		(30×27=) 810	
(30×7=) 210		(30×28=) 840	
(130×2=) 260	DN100	(30×29=) 870	
(130×3=) 390		(30×30=) 900	
(65×4=) 260		(130×8=) 1040	DN200
(65×5=) 325		(130×9=) 1170	
(65×6=) 390		(130×10=) 1300	
(30×8=) 240		(130×11=) 1430	
(30×9=) 270		(65×15=) 975	
(30×10=) 300		(65×16=) 1040	
(30×11=) 330		(65×17=) 1105	
(30×12=) 360		(65×18=) 1170	
(30×13=) 390		(65×19=) 1235	
(130×4=) 520	DN125	(65×20=) 1300	
(130×5=) 650		(65×21=) 1365	
(65×7=) 455		(65×22=) 1430	
(130×4=) 520		(30×31=) 930	
(130×5=) 650		(30×32=) 960	
(65×7=) 455		(130×12=) 1560	DN250
(65×8=) 520		(130×13=) 1690	
(65×9=) 585		(130×14=) 1820	
(65×10=) 650		(65×23=) 1495	
(30×14=) 420		(65×24=) 1560	
(30×15=) 450		(65×25=) 1625	
(30×16=) 480		(65×26=) 1690	
(30×17=) 510		(65×27=) 1755	
(30×18=) 540		(65×28=) 1820	
(30×19=) 570		(130×15=) 1950	DN300
(30×20=) 600		(130×16=) 2080	
(30×21=) 630		(65×29=) 1885	
(30×22=) 660		(65×30=) 1950	
		(65×31=) 2015	
		(65×32=) 2080	

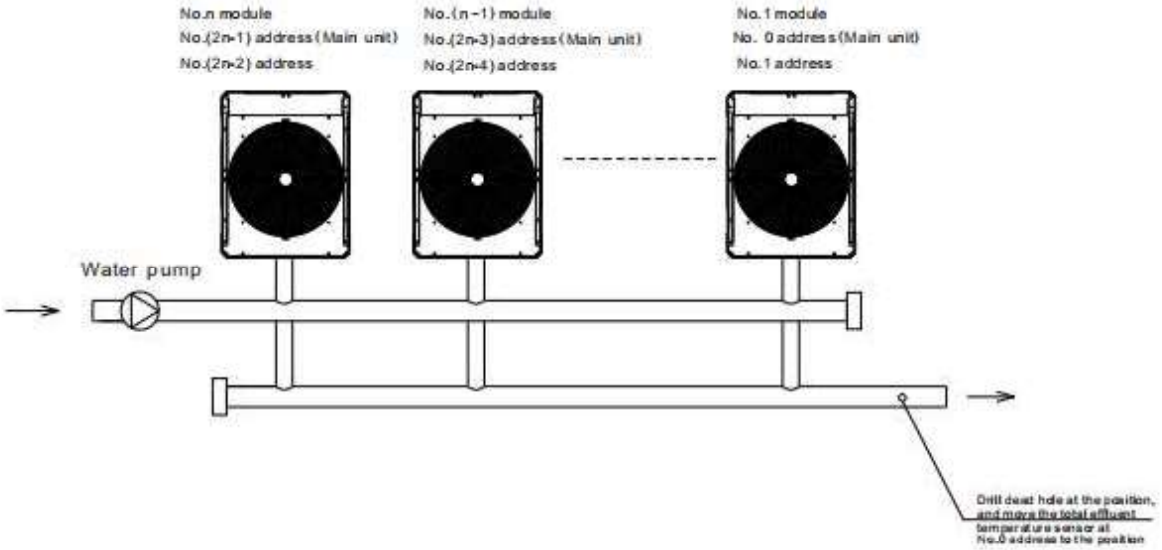
3.1

ACMP010H7A-GCC030GF

Installation of single-module water system pipeline



Installation of multi-module water system pipeline



3.2

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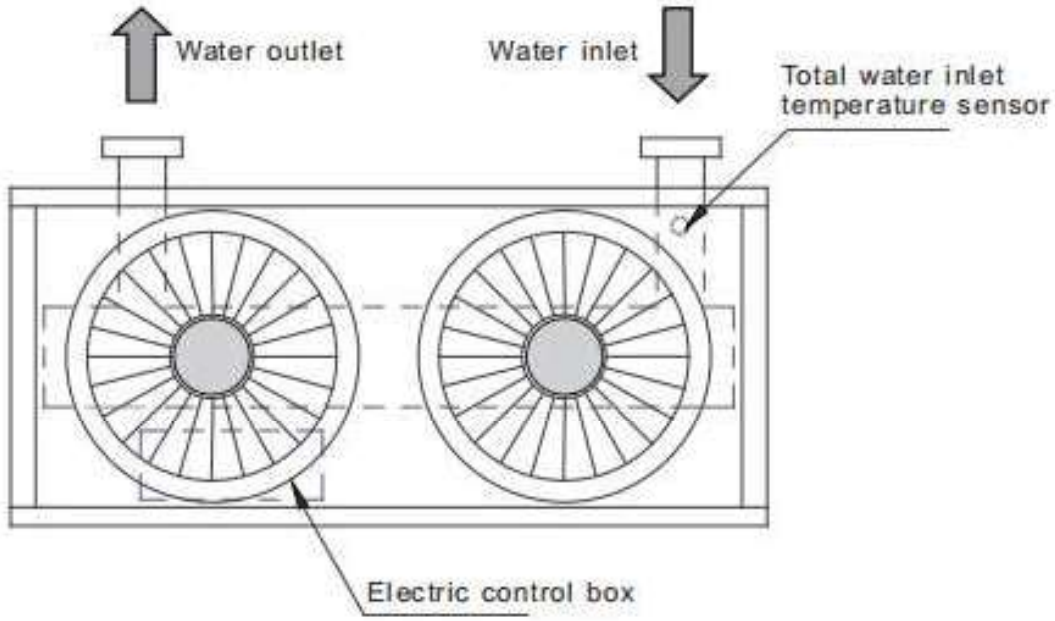
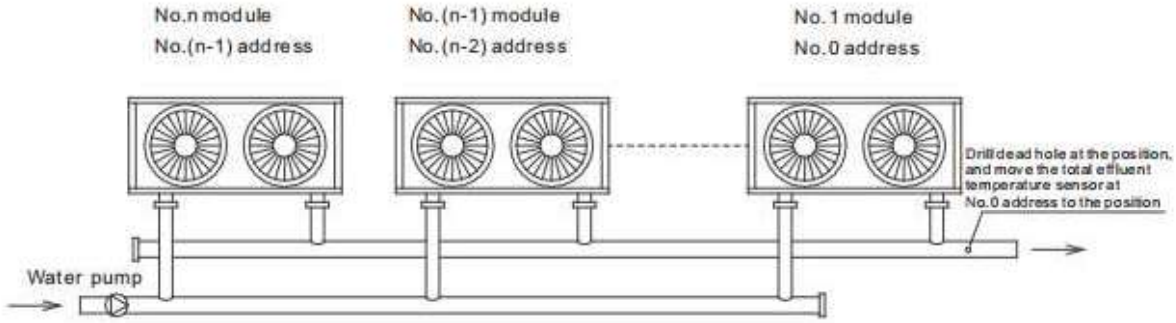
Installation of single-module water system pipeline



Installation of multi-module water system pipeline

3.2.1 Installation mode I (recommended installation mode)



3.3

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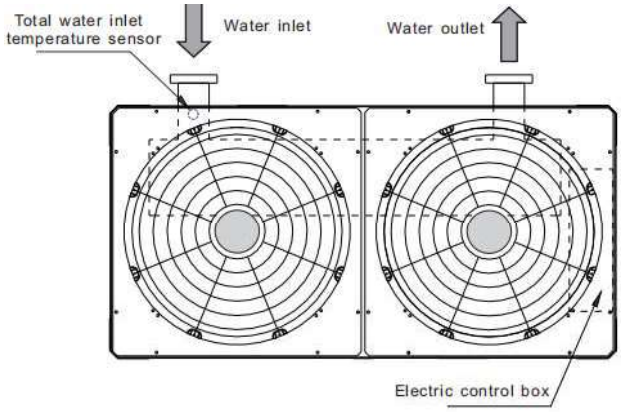
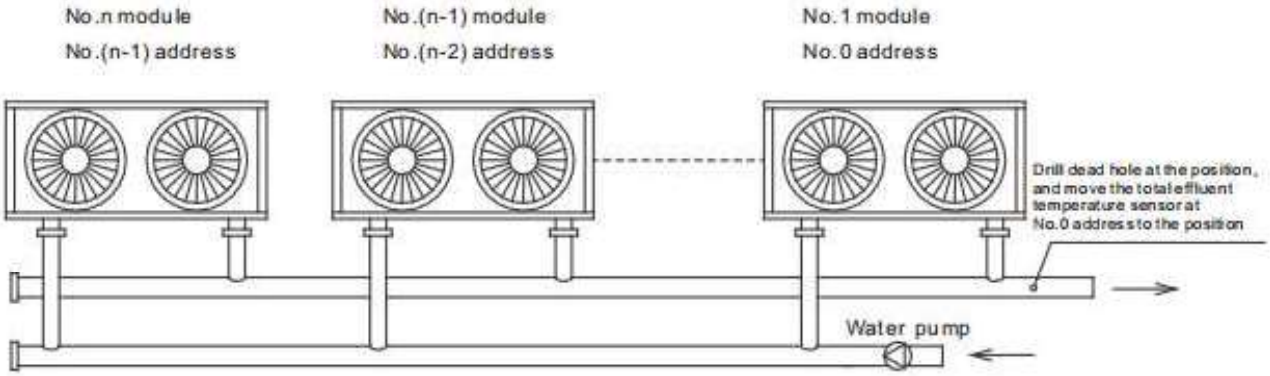
Installation of single-module water system pipeline



Installation of multi-module water system pipeline

3.3.1 Installation mode I (recommended installation mode)



Notices:

- For installation of multi-module, please drill a dead hole(Φ9mm) at the total water outlet pipeline, and move the total water effluent temperature sensor at No.0 address to the hole.

Please pay attention to the following items when installing multiple modules:

- - Each module is assigned a unique address code that cannot be duplicated.
- - The main module controls the primary water outlet temperature sensor, target flow controller, and auxiliary electric heater.
- - A single wired controller and target flow controller are required, both of which should be connected to the main module.
- - The unit can only be started via the wired controller after all addresses are set and the above components are verified. The wired controller should be located within 50 meters of the outdoor unit.

4. Wiring Installation

All wiring installation should be done by qualified person.

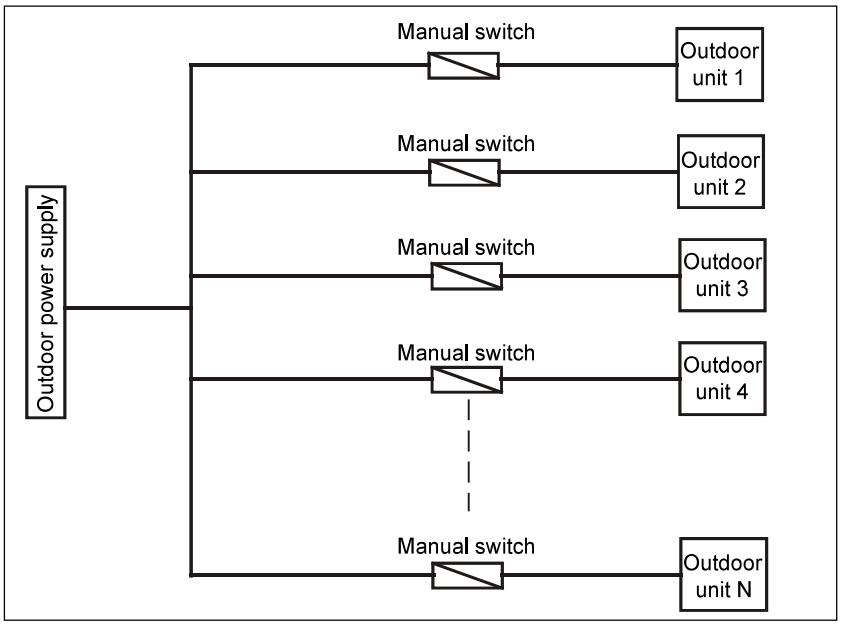
4.1 Precautions:

- - The air conditioner must use a dedicated power supply, with voltage matching the rated voltage.
- - Wiring installation must be performed by qualified technicians, following the labels on the circuit diagram.
- - Only use electrical components specified by our company, and ensure installation and technical services are provided by the manufacturer or an authorized dealer. Improper wiring may result in controller failure, electric shock, or other hazards.
- - Connected fixed wiring must include full disconnection devices with at least 3mm contact separation.
- - Install leakage protection devices in accordance with national technical standards for electrical equipment.
- - After completing all wiring, carefully inspect it before connecting the power supply.
- - Thoroughly read all labels on the electric cabinet.
- - Users are prohibited from attempting to repair the controller, as improper repairs can cause electric shock or damage to the controller. For repairs, please contact the maintenance center.

4.2 Requirements of Wiring Connection

- - No additional control components (such as relays) should be placed in the electric cabinet, and any power or control wires not directly connected to the electric cabinet should not pass through it. Otherwise, electromagnetic interference may cause unit failure, control component malfunction, or damage, potentially leading to protective failure.
- - All cables entering the electric box should be independently supported but connected only through the electric box.
- - Strong current wires generally pass through the electric box, with 220-240V AC potentially flowing to the control board. Wiring should follow the principle of separating strong and weak currents, maintaining at least 100mm of distance between power supply and control wires.
- - Use only the rated power supply for the unit, with a maximum allowable voltage range of 380V to 415V.
- - All wiring must comply with local standards. Cables should connect to the power supply terminal via wiring holes at the bottom of the electric cabinet. Per Chinese standards, the user is responsible for providing appropriate voltage and current protection for the unit's input power supply.
- - All power supplies connected to the unit must pass through a manual switch to ensure that voltage across all nodes of the unit’s circuit is discharged when the switch is off.
- - Use cables of the correct specifications to power the unit. It requires an independent power supply, and should not share a power source with other devices to avoid overload risk. The power supply’s fuse or manual switch should match the unit’s operating voltage and current. For parallel module connections, refer to the following figure for wiring connection modes and configuration parameters.
- - Some ports in the electric box are for switch signals requiring user-supplied power, with a rated voltage of 380-415V AC. Users should ensure that all power supplies pass through power circuit breakers (provided by the user) so that voltage is discharged from all nodes of the supplied circuit when the breakers are off.

- - All inductive components provided by the user (e.g., contactor and relay coils) must be equipped with standard resistance-capacitance suppressors to prevent electromagnetic interference, which could lead to unit or controller failure and potential damage.
- - All low-voltage wires entering the electric box must be shielded cables with grounding wires. Shield wires and power supply wires should be routed separately to minimize electromagnetic interference.
- - The unit must have dedicated grounding wires that are not connected to grounding for gas pipelines, water pipes, lightning rods, or telephone lines. Improper grounding may cause electric shock; therefore, regularly check that the unit's ground connection is secure.



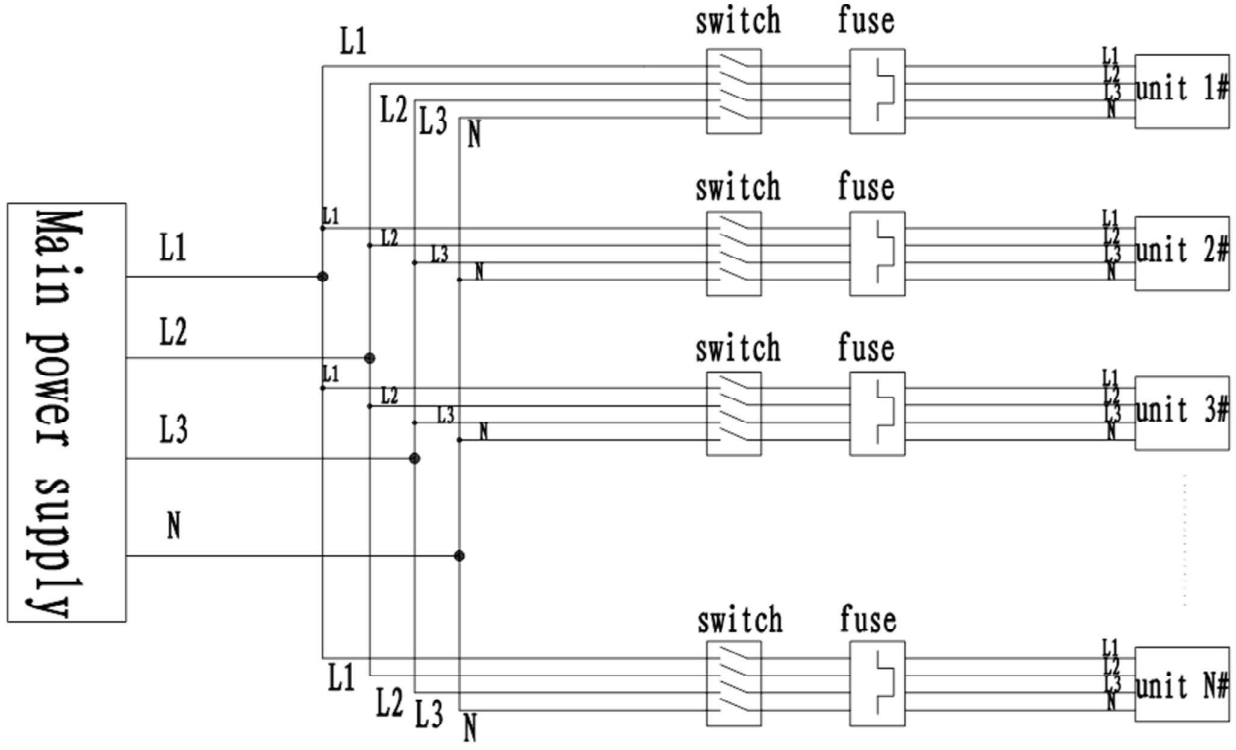
Notes:

- ACMP010H7A-GCC030GF module only 32 modular units can be combined at most.
- ACMP020H7A-GCC065GF module only 32 modular units can be combined at most.
- ACMP040H7A-GCC130GF module only 16 modular units can be combined at most.

4.3 Wiring Steps

Step	Content
1	Check the unit and ensure that it is connected with grounding wires correctly, to avoid leakage, and the grounding devices should be mounted in strict accordance with the requirements of electrical engineering rules. The grounding wires can prevent electric shock.
2	The control box of the main power switch must be mounted in a proper position.
3	Wiring connection holes of the main power should be provided with glue cushion.
4	The main power and neutral wires and grounding wires of power supply are led into the electric box of the unit.
5	The wires of the main power must pass the bonding clamp.
6	Wires should be connected firmly to the connection terminals L1, L2, L3 , N.
7	Phase sequences must be consistent when the wires of the main power.
8	The main power should be located out of easy reach of non-professional maintenance personnel, to avoid mal-operation and improve safety.

4.4 Field wiring



5. Trial Operation

5.1 Points for Attention Prior to Trial Run

After flushing the water system pipeline several times, ensure that water purity meets the specified requirements. Refill the system with water, drain it, start the pump, and confirm that both the water flow and outlet pressure meet the required standards.

Connect the unit to the main power supply 12 hours before startup to power the heating belt and pre-heat the compressor. Insufficient pre-heating may damage the compressor.

Set up the wired controller as outlined in the manual, which includes basic settings such as cooling and heating modes, manual and automatic adjustment modes, and pump mode. Generally, parameters should be set close to standard operating conditions for the trial run, avoiding extreme conditions whenever possible.

Carefully adjust the target flow controller on the water system or the unit's inlet stop valve to achieve 90% of the specified water flow as indicated in the table below.

5.2 Check Items Table After Installation

Checking Items	Description	Yes	No
Whether Installing Site Is Meet for Requirement	Units are fixed mounting on level base.		
	Ventilating space for heat exchanger at the air side is meeting for requirement.		
	Maintenance space is meeting for requirement.		
	Noise and vibration is meeting for requirement.		
	Sun radiation and rain for snow proof measures are meeting for requirement.		
	External physical is meeting for requirement.		
Whether Water System Is Meeting for Requirements	Pipe diameter is meeting for requirement.		
	The length of system is meeting for requirement.		
	Water discharge is meeting for requirement.		
	Water quality control is meeting for requirement.		
	Flexible tube's interface is meeting for requirement.		
	Pressure control is meeting for requirement.		
	Terminal insulation is meeting for requirement.		
	Wire capacity is meeting for requirement.		
	Switch capacity is meeting for requirement.		
	Fuse capacity is meeting for requirement.		
	Voltage and frequency are meeting for requirement.		
Whether Electrical Wiring System Is Meeting for Requirement.	Connecting tightly between wires.		
	Operation control device is meeting for requirement.		
	Safety device is meeting for requirement.		
	Chained control is meeting for requirement.		
	Phase sequence of power supply is meeting for requirement.		

5.3 Trial Operation

- Start the controller and check if the unit displays any fault codes. If a fault is detected, resolve it before starting the unit according to the instructions in the "Unit Control Manual," ensuring that the unit is free of faults.
- Run a trial operation for 30 minutes. Once the inlet and outlet temperatures stabilize, adjust the water flow to the nominal value to ensure the unit operates normally.
- After shutting down the unit, wait at least 10 minutes before restarting it to prevent frequent start-ups.
Finally, verify that the unit meets the specified requirements as outlined in the table above.

CAUTION

- - The unit has control over its own startup and shutdown, so when flushing the water system, the pump should not be controlled by the unit.
- - Do not start the unit until the water system has been fully drained.
- - Ensure the target flow controller is installed correctly, with wiring connected according to the electric control schematic. Any faults caused by water interruption during operation will be the user's responsibility.
- - Avoid restarting the unit within 10 minutes after shutdown during a trial run.
- - When the unit is in frequent use, do not disconnect the power supply after shutdown; otherwise, the compressor will not be pre-heated, risking damage.
- - If the unit will be out of service for an extended period and power must be disconnected, reconnect the power at least 12 hours before restarting to allow for compressor pre-heating.

Trail run and operation data

Temperature The table below contains the measurable temperatures.

Measurement	Value
Inlet water temperature	Standard cooling :9~25ºC Standard heating:26~46ºC
Outdoor temperature	Standard cooling:15~48ºC（-15-48 for 65kW） Standard heating:-15~30 ºC

Voltage Current The table below contains the measurable voltage.

Measurement	Value
Power supply voltage	Within ±10% of the rated voltage.
Phase imbalance	Within ±2% of the rated voltage.
Control circuit voltage	380V AC for main electromagnetic switches,

Current The table below contains the currents and fuses.

Unit	Maximum current(A)	Fuse
30kW	30A	60
65kW	51A	100
130kW	106A	205

Part 3. Maintenance

1. For Maintenance

1.1 Maintenance for main components：

Pay close attention to the discharge and suction pressure during operation. If any abnormality is detected, identify the cause and address the issue promptly.

Ensure control and protection of the equipment, and avoid making random adjustments to set points on-site. Regularly inspect for loose electrical connections and check for poor contact at connection points due to oxidation or debris, taking corrective actions as needed. Frequently monitor working voltage, current, and phase balance.

Check the reliability of electrical components regularly, and replace any ineffective or unreliable elements promptly.

1.2 Water quality inspection and dirt remove

Inspect the water quality regularly based on local conditions. We recommend performing this inspection every six months and replacing the circulating water every two years.

After prolonged operation, calcium oxide or other mineral deposits may accumulate on the heat transfer surface of the water-side heat exchanger. Excessive scaling on this surface reduces heat transfer efficiency, leading to higher electricity consumption and potentially causing elevated discharge pressure or low suction pressure. Organic acids, such as formic acid, citric acid, and acetic acid, can be used to clean the scale. However, never use cleaning agents containing hydrochloric or hydrofluoric acid, as the heat exchanger is made of stainless steel and can be easily corroded, resulting in refrigerant leakage.

During the cleaning and descaling process, pay careful attention to the following aspects:

- - The water-side heat exchanger should only be cleaned by professionals.
- - After using a cleaning agent, rinse the pipes and heat exchanger thoroughly with clean water. Conduct water treatment to prevent corrosion in the water system and to avoid re-deposit of scale.
- - When using a cleaning agent, adjust the concentration, cleaning duration, and temperature based on the level of scale buildup.
- - Once pickling is completed, perform neutralization treatment on the waste liquid. Contact a specialized company for proper disposal of the treated waste liquid.
- - Use protective equipment, such as goggles, gloves, masks, and protective footwear, during the cleaning process to avoid inhalation or contact with the cleaning or neutralizing agents, as these substances are corrosive to the eyes, skin, and nasal mucosa.

1.3 Winter shutdown

For winter shutdown, clean and dry the exterior and interior surfaces of the unit. Cover the unit to protect it from dust. Open the discharge water valve to drain any stored water from the clean water system to prevent freezing; ideally, inject antifreeze into the pipes for additional protection.

1.4 Replacing parts

Parts to be replaced should be the ones provided by our company. Never replace any part with different part.
First startup after shutdown
The following preparations should be made for re-startup of unit after long-time shutdown:

- Thoroughly check and clean the unit.
- Clean water pipe system.
- Check pump, control valve and other equipments of water pipe system.
- Fix connections of all wires.
- It is a must to electrify the machine before startup.

1.5 Refrigeration system

To determine if additional refrigerant is needed, check the suction and discharge pressure values and inspect for any leakage. If a leak is detected or part of the refrigerant system is replaced, conduct an air-tightness test. Follow these procedures based on the extent of refrigerant loss:
1.5.1 Total Leakage of Refrigerant: In this case, perform a leak detection test on the system using pressurized nitrogen. If repair welding is necessary, ensure that all gas is discharged from the system before welding. Prior to injecting refrigerant, the entire refrigeration system must be thoroughly dried and vacuum-pumped.

- -Total Refrigerant Leakage: In this situation, perform leak detection using pressurized nitrogen on the system. If repair welding is required, ensure all gas is discharged before welding. The refrigeration system must be completely dry and vacuum-pumped before refrigerant injection.
- -Air Removal: Use a vacuum pump to evacuate air from the system pipes, maintaining vacuum pumping for over 3 hours. Confirm that the pressure indicated on the dial gauge is within the specified range.
- -Refrigerant Injection Once the required vacuum level is reached, inject refrigerant into the system using a refrigerant bottle. The recommended refrigerant amount is listed on the nameplate and in the main technical parameters table. Refrigerant should be injected from the low-pressure side of the system.
- -Ambient Temperature Adjustment: The required refrigerant amount may vary with ambient temperature. If the target amount has not been reached but no further injection is possible, circulate the chilled water and start the unit to continue the injection process. If needed, temporarily short-circuit the low-pressure switch to facilitate this step.

1.5.2 Refrigerant supplement. Connect refrigerant injection bottle on the fluoride nozzle at low-pressure side and connect pressure gauge at low pressure side.

- Make chilled water circulate and start up unit, and make the low pressure control switch short circuit if necessary.
- Inject refrigerant slowly into the system and check suction and discharge pressure.

⚠CAUTION

- Connection must be renewed after injection is completed.
- Never inject oxygen, acetylene or other flammable or poisonous gas to the refrigeration system at leakage detection and air tight test. Only pressurized nitrogen or refrigerant can be used.

1.6 Disassembling compressor

Follow the following procedures if compressor needs to be disassembled:

- Cut off the power supply of unit.
- Remove power source connection wire of compressor.
- Remove suction and discharge pipes of compressor.
- Remove fastening screw of compressor.
- Move the compressor.

1.7 Auxiliary electric heater

When the ambient temperature drops below 2℃, the heating efficiency of the air-cooled heat pump decreases with the outdoor temperature. To ensure stable operation in colder regions and compensate for heat lost during defrosting, users in areas where winter temperatures range from 0℃ to 10℃ may consider using an auxiliary electric heater. Consult a qualified professional to determine the appropriate power rating for the auxiliary heater.

1.8 System anti-freezing

If freezing occurs within the water-side heat exchanger channels, it may lead to severe damage, including broken heat exchange and leakage. This type of frost crack damage is not covered under warranty, so careful attention must be given to anti-freezing measures.

1.8.1 If the unit is shut down and in standby mode in environments with outdoor temperatures below 0℃, drain the water from the system.

1.8.2 Water pipes are at risk of freezing if the chilled water target flow controller or anti-freeze temperature sensor fails during operation. Ensure the target flow controller is connected according to the connection diagram.

1.8.3 During maintenance, frost cracks may occur in the water-side heat exchanger if refrigerant is injected or discharged, particularly if refrigerant pressure drops below 0.4 MPa. To prevent pipe freezing, ensure water in the heat exchanger is either continuously flowing or completely drained.

2. Periodical check

Electrical checks

Inspection checks and actions	Remark
Check that all electrical wiring is properly connected and securely tightened.	/
Check the electrical components for damage or loss.	/
Check if the power supply corresponds with the identification label of the unit.	/
Check the operation of the circuit breaker and the earth leak detector of the local supply panel.	/
Check the operation of the safety devices.	No operation can cause damage of the unit.

Refrigerant checks

Inspection checks and actions	Remark
Check the refrigerant system. If the unit leaks, please contact your supplier.	/

Water checks

Inspection checks and actions	Remark
Check the water condition. Drain the water from the air release plug. If the water is dirty, please replace all water in the system.	Dirty water causes a cooling capacity drop as well as corrosion of the water heat exchanger and pipe.
Check the water connection.	/
Check the water velocity.	/
Check the function of the flow switch.	The evaporator probably freezes up if the flow switch cannot operate.
Make sure that there is no air mixed in water pipes.	Even if air is removed at the beginning, sometimes air can enter later.
Check the water filter.	If dirty and is stopped.

Noise checks

Inspection checks and actions	Remark
Check for any abnormal noise. Locate the noise producing section and search the cause.	If the cause of the noise cannot be located, contact your supplier.

Part 4. Wired Controller: ACMCC-G16

INTRODUCTION OF WIRE CONTROLLER

I: Overview

Basic operating conditions of wired controller

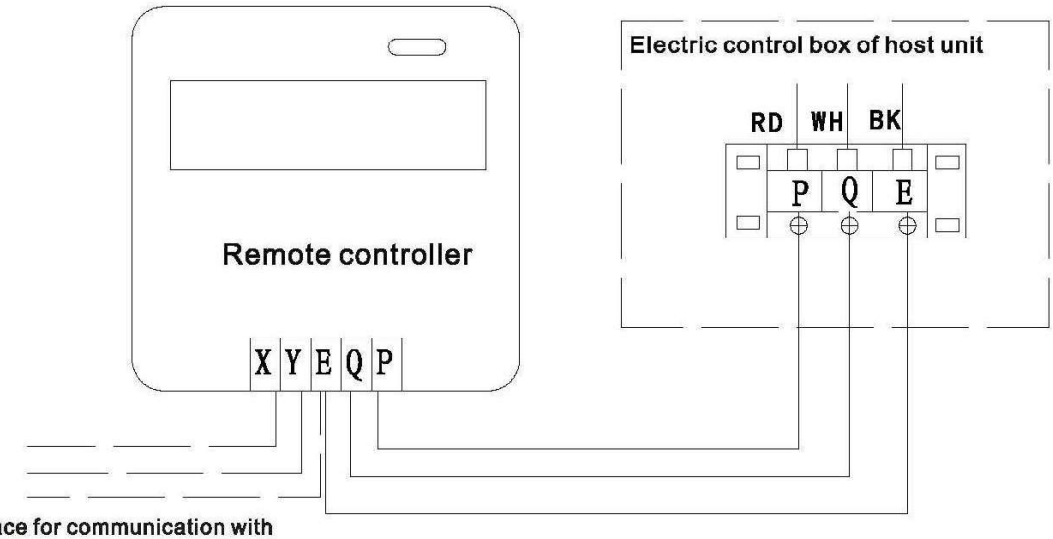
1) Applicable voltage range: AC 220V±10%, from a power adapter (AC220V/AC9.5V).
2) Ambient temperature for operating: -15℃æ+43℃æ
3) Ambient humidity for operating: RH40% - Rh90%.
4) Electric control safety in compliance with GB4706.32-2004 and GB/T7725-2004.

Features: The wired controller mainly has the following features:

1) It is connected with the master unit via the terminals P, Q and E, and is connected with host computer via the terminals X, Y and E;
2) It is operated via buttons and allows for setting of working mode;
3) It has liquid crystal display;

Installation:

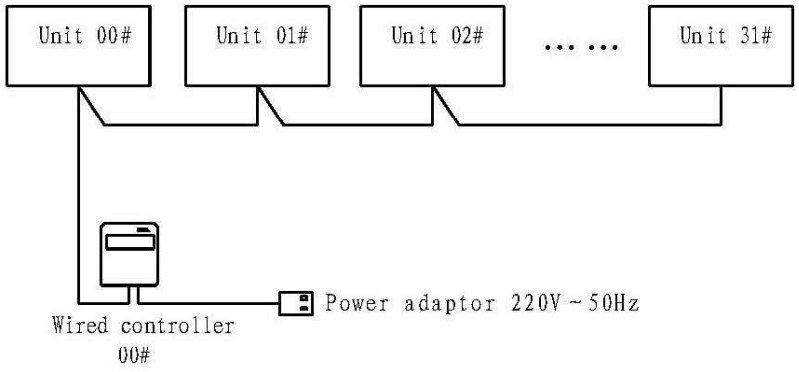
When installing the wired controller, connect it with P, Q and E on the master unit. At the same time, connect the power adaptor in accessories with the black plug at the bottom of wired controller.



Interface for communication with host computer. No connection is required in absence of host computer

The cables used here are shielded twisted pair with earthing wires, with length determined based on the concrete conditions during installation

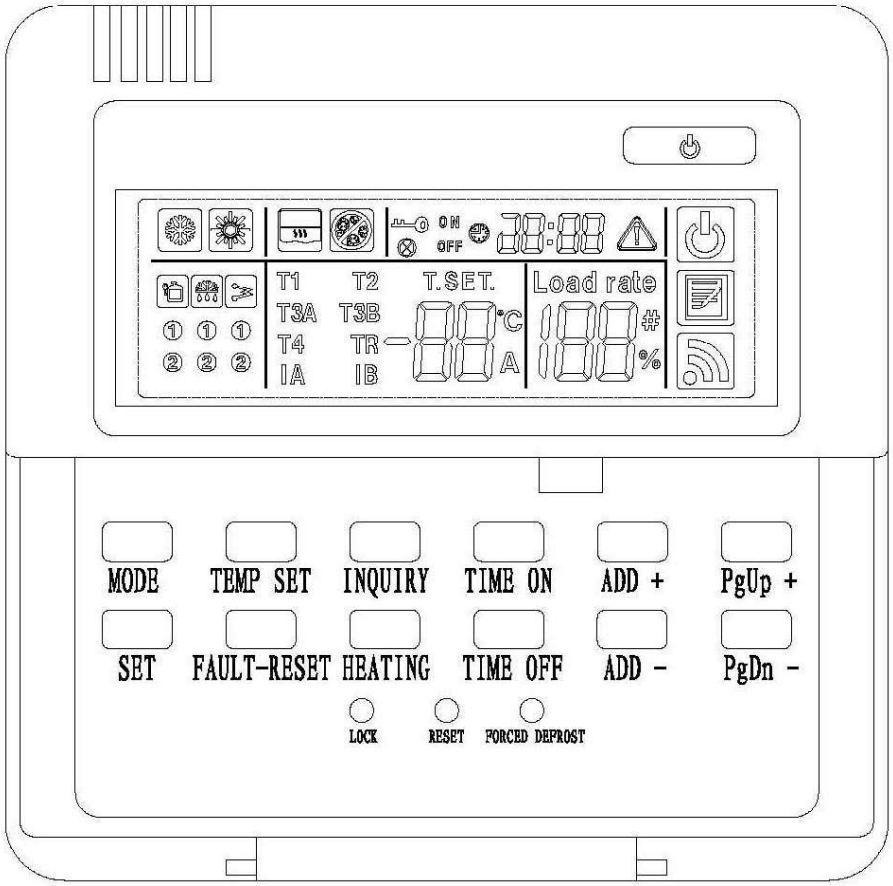
The installation diagram is shown as follows:



Explanations of contents on LCD of wired controller and buttons:

	Cooling mode		Heating mode		Water heater mode
	Anti-freezing mode		Operating state: It turns on during normal running, and turns off when shutdown		Inquiry state
	Host computer communication		Fault	ON OFF 88:88	ON/OFF Timer
❶ ❷	Running state of compressor	❶ ❷	Defrosting state (during heating)	❶ ❷	Flashing: The unit is being preheated Always on: The numbers indicate the startup state of electric heater
	Key invalid		Key locked	Load rate 188# 188%	Unit address and load rate
T.SET. -88 °C A	Inquiry data and temperature setting	T1 T2 T3A T3B T4 TR IA IB	T1:System water outlet temperature T2:Unit water outlet temperature T3A: Temperature of fin in System A T3A: Temperature of fin in System B T4: Ambient temperature TR: Temperature of return water of living hot water IA: Current of compressor in System A IB: Current of compressor in System B		

Explanations of contents on LCD of wired controller and buttons



II.Definitions of buttons on wired controller

There are ON/OFF, MODE, INQUIRY, TIME ON/TIME OFF, TEMP SET, SET, HEATING,FAULT-RESET, ADD+/ADD -, PgUp + / PgDn - (for temperature increase/decrease),RESET (concealed), LOCK (concealed), PARA SET (concealed).

A. ON/OFF

With the lamp slowly flashing in the standby state, press ON/OFF switch, then the power on lamp will stay on and the wired controller will enter the state of power-on.

The current temperature of return water, timer setting and so on will be displayed at the same time. When the wired controller is in the state of power-on, press ON/OFF switch, the lamp will disappear and simultaneously, a message of power-off will be sent. The lamp will flash quickly when unit failt occurs or when it is under protection state.

B. MODE

It is used for selecting the operating mode in standby state. There are cooling and heating modes available. Mode checking shall be done in the state of power-on. This button becomes invalid in normal operating state.

C. INQUIRY

Pressing this button allows to inquire the addresses of 0-31# modules (0# state by default). After entering the inquiry state, press "ADD +" or "ADD -" to inquire the message of former or latter module.

After selecting a master unit for inquiry, pressing "PgUp +" and "PgDn -" to inquire the state message of selected master unit. The inquiry sequence is: total water outlet temperature T1→ unit water outlet temperature T2→outdoor pipe temperature of System A T3A→outdoor pipe temperature of System B T3B→ambient temperature T4→return water temperature of hot water and living water pump (in case the system has heat recovery function) TR→ current of compressor in System A IA→current of compressor in System B IB→ fault → protection → total water outlet temperatureT1...

There are many fault protection codes of master unit. During enquiry of fault protection message, the wired controller only displays the fault message of the largest code and one protection message.

D. TIME ON/OFF

Press "TIME ON" only in standby state can set automatic power-on. At this time, hour set will flash at 2Hz frequency. Adjust hour set by pressing "PgUp +" and "PgDn -". Press "TIME ON" again to adjust minute set. Minute set will flash at 2Hz frequency. Press "PgUp +" and "PgDn -" to adjust minute set. If there is no action within 10 seconds after entering the time setting status, the setting will be exited.

Automatic power-off setting is available by pressing "TIME OFF" in power-on state. Set power-off time as mentined above Automatic power-on is invalid when the unit is running, and automatic power-off is invalid in standby state. Cycle timing is unavailable.

E. TEMP SET

Total return water temperature setting is available in cooling and heating modes, and temperature setting of water tank or pool is available in water heating mode. Press TEMP SET to enter the control temperature setting interface  . The nixie tube will show the current temperature setting and flash continuously.

Press "PgUp +" and "PgDn-" to adjust the setting of control temperature.

F. SET

After completion of setting, press SET. The wired controller will immediately send the command to the master unit and return to the home page. Press SET in inquiry state to return to the home page directly.

G. HEATING (reserved function)

Press HEATING in heating mode to enable forced startup of electric heating, and the icon  on the LCD will turn on. Press HEATING again to disable electric heating, and  will disappear. HEATING is unavailable in other modes. Such function is invalid to the air cooled unit.

H. FAULT-RESET

When the unit suffers from a failure of automatic reset or requiring power-on again,press FAULT-RESET to clear the fault, and the unit will start working again.

I. ADD +

Press "ADD +" in enquiry state, select the next unit to display the operating state of such unit. 00# will be selected after pressing "ADD +" if 31# unit has been reached.

Press "ADD +" when setting the address of wired controller, follow the method as mentioned above.

J. ADD-

Press "ADD-" in enquiry state to select the former unit to display the operating state of such unit. 31# will be selected after pressing "ADD-" if 00# unit has been reached.

Press "ADD-" when setting the address of wired controller; follow the method as mentioned above.

K. PgUp + and PgDn - (temperature increase/decrease)

On the home page, pressing "INQUIRY" and PgUp + and PgDn allows to inquire the operating parameters of each address module.

On the temperature setting page, pressing PgUp + and PgDn - allows to increase and decrease temperature. While setting automatic power-on/power-off, press PgUp + and PgDn - to adjust the time setting of automatic power-on/power-off.

L. RESET (concealed)

Pressing RESET with a small round bar with diameter of 1mm will cancel the current setting, and the wired controller will enter the reset mode to recover the default setting.

M. FORCED DEFROST (concealed)

Press FORCED DEFROST with a small round bar with diameter of 1mm, select the address of unit to defrost, and press "SET". The corresponding unit will start defrosting. Exit of forced defrosting is the same as that of normal defrosting.

Forced defrosting can be enabled by pressing FORCED DEFROST only in heating and water heating modes. It is invalid in cooling mode.

N. LOCK (conceal)

Pressing LOCK with a small round bar with diameter of 1mm will lock the buttons of wired controller, will display on LCD, and no operation is effective in this mode. Pressing LOCK again to unlock, will disappear and normal operation of wired controller is available.

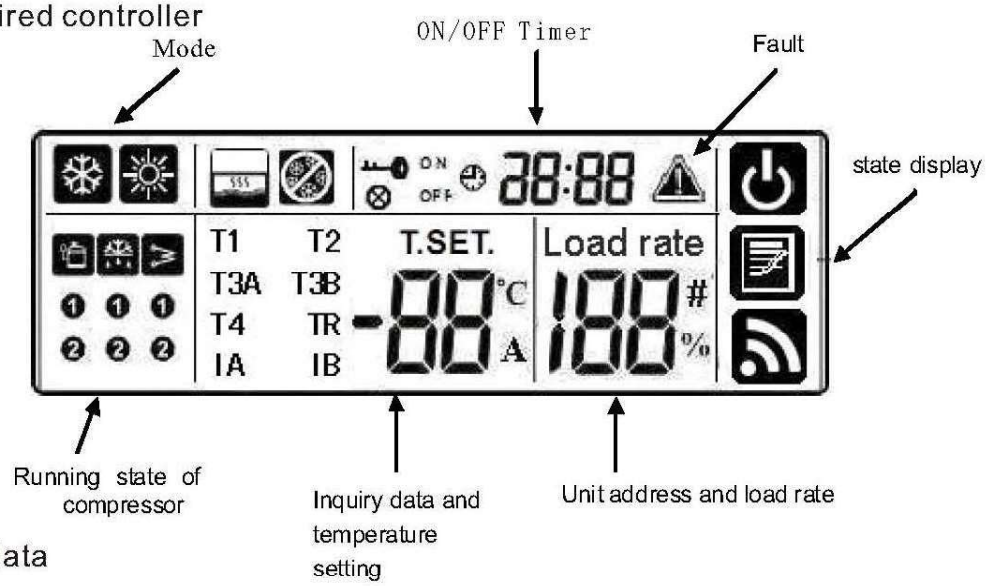
O. Memory function switch

1 and 2 contacts of DIP switch on wired controller are at OFF position by default. The wired controller has no memory function by default, and the parameters will recover to the default setting in power-on state every time. When applied as a wired controlle of conventional air-cooled heat pump unit, standby state, cooling mode, and setting temperature - 12℃ will be displayed.

When both 1 and 2 contacts of this DIP switch are at ON position, the memory function of wired controller will be enabled, and the wired controller will recover the state before powerdown.

III.Display figure 1 of wired controller:

1. LCD of wired controller



2.General data

1).General data display on all pages.

2).Whether or not to choose memory function shall be decided upon the selection of DIP switch. The memory function is disabled when both DIP switches are at OFF position. The default data displayed in power-on state every time include standby state, cooling mode and setting temperature - 45℃; the memory function is enabled when both DIP switches are at ON position. Once powered on, the unit will work under the operating mode, setting temperature and other settings set before powerdown.

3).If the unit system is in operating state, namely there are more than one unit in operating state, will display; if the unit system is in power-off state, nothing will display.

4). The startup load rate of compressor, i.e. Load rate 100%, will display on LCD once turned on.

5). will display in case the host computer network is in control state. Otherwise, it will disappear.

6) Will show when the wired controller is locked or the buttons are locked, and it will disappear when the controller or buttons are unlocked.

3.Data processing

The data display region is divided into two parts at middle and lower part of the screen, and the data shall display on 2 pieces and a half 7-segment LED nixie tubes respectively.

1).Temperature display

This part is used to display the return water temperature of hot water and living water pump, ambient temperature T4, outdoor pipe temperature T3A of System A, outdoor pipe temperature T3B of System B, unit water outlet temperature T1, total return water temperature and setting temperature TS."--" will display and "C" will turn on simultaneously in absence of valid data. The temperature of water tank is displayed on the home page by default.

2).Current display

This part is used to display the compressor current IA of unit system A or the compressor current IB of unit system B. "--" will display and "A" will turn on simultaneously in absence of valid data.

3).Fault display

This part is used to display the general fault alarm data of the unit or the fault alarm data of unit. "E-" will display when no fault is present.

4).Protection display

This part is used to display the general system protection data of the unit or the system protection data of unit. "P-" will display when no fault is present.

5).Unit No. display

This part is used to display the address No. of unit selected currently, from 0 to 31. At the same time, "#" turns on.

4.Inquiry display

1).When entering the inquiry page for the first time, 0# unit is selected by default, and the 1st page of state data is displayed.

2).Pressing "PgUp +" or "PgDn -" will show the contents of the other pages.

3).The 1st page to the 8th page at the left region of data display show the total water outlet temperature T1, unit water outlet temperature T2, outdoor pipe temperature T3A of System A, outdoor pipe temperature T3B of System B, ambient temperature T4, return water temperature of hot water and living water pump (in case the system has heat recovery function) TR, compressor current IA of System A, and compressor current IB of System B respectively.

4).The 1st page at the right region of data display shows the unit No.

5).The fault code of current unit is displayed from the 9th page at the right region of data display. Pressing "PgUp +" allows display of fault code at the next priority level at most, and the code after the second one will not show. In absence of a fault, "E-" will display and the next page will show the protection code.

6).The protection code will show in the left region of data display after all the fault codes have been displayed. Pressing "PgUp +" allows display of protection code at the next priority level at most, and the code after the second one will not display. In absence of protection, "P-" will display and the next page will show the contents of the first page.

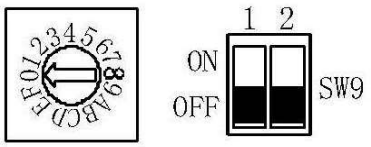
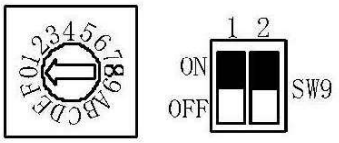
7).When all pages of inquiry data have been displayed, pressing "PgUp +" will return to contents of the first page; pressing "PgDn -" on the first page will display the contents of the final page.

8).Pressing "ADD +" or "ADD -" allows selection of unit addresses for inquiry of operating states of different units.

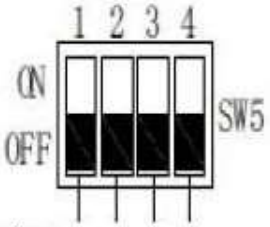
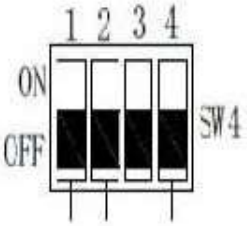
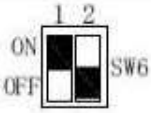
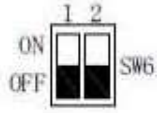
9).Wait for the wired controller to receive the latest data of unit at any time when entering the inquiry page to display or modify the selected unit. Before the data is received, only "--" shows at the left region of data display, the unit address No. shows at the right region, "PgUp+" and "PgDn-" are disabled, until the wired controller receives the communication data of this unit.

IV.Overview of main board functions

Description of address DIP switch

When the address DIP switches are at OFF position at the same time, the module address setting range is 0 0 # - 1 5 # (the black color denotes 2 DIP switch entities)		When the address DIP switches are at ON at the same time, the module address setting range is 16# - 31# (the black color denotes 2 DIP switch entities)	
			
SR1	Description	SR1	Description
0	Master unit (Unit 00#)	0	Auxiliary unit (Unit 16#)
1	Auxiliary unit (Unit 01#)	1	Auxiliary unit (Unit 17#)
2	Auxiliary unit (Unit 02#)	2	Auxiliary unit (Unit18#)
3	Auxiliary unit (Unit 03#)	3	Auxiliary unit (Unit19#)
4	Auxiliary unit (Unit 04#)	4	Auxiliary unit (Unit 20#)
5	Auxiliary unit (Unit 05#)	5	Auxiliary unit (Unit 21#)
6	Auxiliary unit (Unit 06#)	6	Auxiliary unit (Unit 22#)
7	Auxiliary unit (Unit 07#)	7	Auxiliary unit (Unit 23#)
8	Auxiliary unit (Unit 08#)	8	Auxiliary unit (Unit 24#)
9	Auxiliary unit (Unit 09#)	9	Auxiliary unit (Unit 25#)
A	Auxiliary unit (Unit 10#)	A	Auxiliary unit (Unit 26#)
B	Auxiliary unit (Unit 11#)	B	Auxiliary unit (Unit 27#)
C	Auxiliary unit (Unit 12#)	C	Auxiliary unit (Unit 28#)
D	Auxiliary unit (Unit 13#)	D	Auxiliary unit (Unit 29#)
E	Auxiliary unit (Unit 14#)	E	Auxiliary unit (Unit 30#)
F	Auxiliary unit (Unit 15#)	F	Auxiliary unit (Unit 31#)

V.Description of DIP switch (only tested at the beginning of power-on)

<table>
<tr><td>DIP switch for capacity regulation (the black color denotes the DIP switch entity)</td><td colspan="2">1-Loading deviation:
ON:+4° C
OFF: +2° C
2-Control period:
ON: 30s
OFF: 60s
3-Opening of electronic expansion valve:
ON:480 steps
OFF:Normal regulation
4-Reserved
  </td></tr>
<tr><td>DIP switch for model selection(the black color denotes the DIP switch entity)</td><td colspan="2">1-Heat recovery selection:
ON: Unit with heat recovery
OFF: Unit without heat recovery
2-Reserved
3-Refrigerant selection:
ON: R410A
OFF: R22
4-Model selection:
ON: Unit at Class 2 energy efficiency
OFF: Normal unit
  </td></tr>
<tr><td rowspan="4">DIP switch for defrosting interval SW6 (the black color denotes the DIP switch entity)</td><td>  </td><td>Defrosting interval of 20 mins</td></tr>
<tr><td>  </td><td>Defrosting interval of 25 mins</td></tr>
<tr><td>  </td><td>Defrosting interval of 30 mins</td></tr>
<tr><td>  </td><td>Defrosting interval of 35 mins</td></tr>
</table>

VI.Protection function (refer to "Service and Maintenance" for detail codes)

1).Power supply protection

Phase loss and dislocation of 3 phase power supply (only detected during power-on).

The related unit will be stopped when power supply protection is active.

2).Water pump overload protection

All the units will be stopped when water pump overload protection is detected;

3).Insufficient water flow protection

Detection of insufficient water flow will begin after the water pump is started for 30s; when the switch is disconnected for 15s continuously, an alarm "insufficient water flow of air conditioner" will occur. All the units will be stopped in case of an alarm of insufficient water flow;

4).Compressor running protection

A time delay of 180s is needed for restart of the compressor. The running time shall reach 180s for unloading of compressor (not required for shutdown).

5).Communication fault

When the main board and the wired controller fail to communicate with each other continuously for 2 mins, the side that is unavailable for communication will trigger an alarm L4 "communication fault between master unit and wired controller", and all the units will be stopped until the main board and wired controller can communicate with each other and then automatic startup will be enabled.

In order to avoid communication interference when possible, the communication cables shall be 0.5mm2 2-core shielded cables. When the unit is far away from the wired controller, 120Ω matching resistor may be connected with P and Q at the side of main board in parallel.

When the main board fails to communicate with the auxiliary unit continuously for 2 mins, the auxiliary unit will trigger an alarm "communication fault between modules", and the slave suffering from a communication fault will be stopped. When the main board detects that the number of connected machines decreases, an alarm L2 "the number of modules decreases" will be triggered, and the auxiliary unit failing to communicate with the master unit will be stopped.When the main board detects that the maximum number of address equals or is larger than the number of connected machines, the unit can control and run normally, but an alarm L3 "Address fault" will occur.

6).High pressure/overload protection

If "High pressure/overload of compressor" is detected during running of the compressor, the switch will be disconnected for 3s continuously; for the system under defrosting, the related compressor will be stopped; in other conditions, an alarm "High pressure/overload of compressor" will be triggered, and the related system will be stopped. (The rule of simultaneous startup and shutdown applies to the fan).

7).Low pressure protection and medium pressure protection

Detection of "low pressure of compressor" and "medium pressure of compressor" will be started after the compressor has been started for 60s. After the switch has been disconnected for a period: If the compressor is in mode of defrosting, no alarm will be triggered. Re-detection of the low pressure switch will be started after a time delay of 60s after defrosting is exited. If the compressor is not in mode of defrosting, an alarm of "Low pressure of compressor" or "Medium pressure of compressor" will be triggered, and the related system will be stopped. (The rule of simultaneous startup and shutdown applies to the fan) When confirming the low pressure and medium pressure alarms, the low pressure switch and medium pressure switch will be disconnected for a certain period. In case of cooling mode, they will be disconnected for 5s continuously, and an alarm will occur. Once disconnected for 30s in heating mode, an alarm will occur;

8).Over temperature protection of fin

In the cooling mode and with the fin temperature probe at normal state, detect the temperature of fin after the unit is powered on: when the temperature of fin is >65℃, an alarm of over temperature will occur;when the temperature of fin is ≤55℃,the over temperature protection of fin will be disabled. The related system will be stopped when over temperature protection of fin is active. (The rule of simultaneous startup and shutdown applies to the fan) An alarm will occur after 3s elimination of jitter.

An alarm will occur after 3s elimination of jitter;

9).Module water outlet temperature protection

Start detection after the module is selected to run for the first time: when the module water outlet temperature is ≥65℃, an alarm will occur to warn that the water outlet temperature of related module is too high; when the module water outlet temperature is ≤55℃, the module water outlet over temperature protection will be disabled; the related module will be stopped when supercooling (overheating) protection is active. The module will be allowed to work again after resetting. An alarm will occur after 3s elimination of jitter;

10).Current protection

I: Measured current; IP: Compressor protection current, set at 28A;

When the measured current I of a system is ≥ the protection current IP, the related system will be stopped (the rule of simultaneous startup and shutdown applies to the fan), and an alarm will occur for over-current protection.

VII.Enquiry of main board

Normal display contents of nixie tube:

1).The number of connected machines will be displayed in standby state. 0 displays before the compressor is started, and the compressor startup load rate of this module will show after the compressor is started.

2).The number of started machines will be displayed after the system is started.

The chip of outdoor system is equipped with a button for enquiry, which allows observation of running state of the outdoor system. It also facilitates maintenance for the engineering technicians. Displayed contents of enquiry: Mode (1 Cooling, 2 Heating, 8 Standby, 4 Water heating)→ Number of machines connected →Total water outlet temperature T1→Water outlet temperature of this unit T2→Ambient temperature T4→Total water outlet temperature TB→Return water temperature of hot water and living water TR→Fin temperature of System A T3A→Current of System A IA→Opening of electronic expansion valve in System A EVEA→Fin temperature of System B T3B→Current of System B IB→Opening of electronic expansion valve in System B EVEB→Fault →Protection (Only the largest fault and protection codes will be shown) →Number of machines connected →---(it indicates ending)→Mode→(...)

Appendix

1. Accessories

Item	Name of accessory	Type	Qty	Shape	Usage
1	Installation and owner's manual	---	1		Installation and using instruction.
3	Wired controller		1		Control the system.

2. Temperature-Resistance Characteristic Sheet

Suiting for pipe temperature sensor，ambient temperature sensor，inlet water temperature sensor and outlet water temperature sensor.

Sensor characteristic sheet **Unit**：Temp:℃, Resistance :KΩ

Temp.	Resistance	Temp.	Resistance	Temp.	Resistance	Temp.	Resistance
-20	106.732	12	18.646	44	4.387	76	1.321
-19	100.552	13	17.743	45	4.213	77	1.276
-18	94.769	14	16.888	46	4.046	78	1.233
-17	89.353	15	16.079	47	3.887	79	1.191
-16	84.278	16	15.313	48	3.735	80	1.151
-15	79.521	17	14.588	49	3.59	81	1.113
-14	75.059	18	13.902	50	3.451	82	1.076
-13	70.873	19	13.251	51	3.318	83	1.041
-12	66.943	20	12.635	52	3.191	84	1.007
-11	63.252	21	12.05	53	3.069	85	0.974
-10	59.784	22	11.496	54	2.952	86	0.942
-9	56.524	23	10.971	55	2.841	87	0.912
-8	53.458	24	10.473	56	2.734	88	0.883
-7	50.575	25	10	57	2.632	89	0.855
-6	47.862	26	9.551	58	2.534	90	0.828
-5	45.308	27	9.125	59	2.44	91	0.802
-4	42.903	28	8.721	60	2.35	92	0.777
-3	40.638	29	8.337	61	2.264	93	0.753
-2	38.504	30	7.972	62	2.181	94	0.73
-1	36.492	31	7.625	63	2.102	95	0.708
0	34.596	32	7.296	64	2.026	96	0.686
1	32.807	33	6.982	65	1.953	97	0.666
2	31.12	34	6.684	66	1.883	98	0.646
3	29.528	35	6.401	67	1.816	99	0.627
4	28.026	36	6.131	68	1.752	100	0.609
5	26.608	37	5.874	69	1.69	101	0.591
6	25.268	38	5.63	70	1.631	102	0.574
7	24.003	39	5.397	71	1.574	103	0.558
8	22.808	40	5.175	72	1.519	104	0.542
9	21.678	41	4.964	73	1.466	105	0.527
10	20.61	42	4.763	74	1.416		
11	19.601	43	4.571	75	1.367		

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