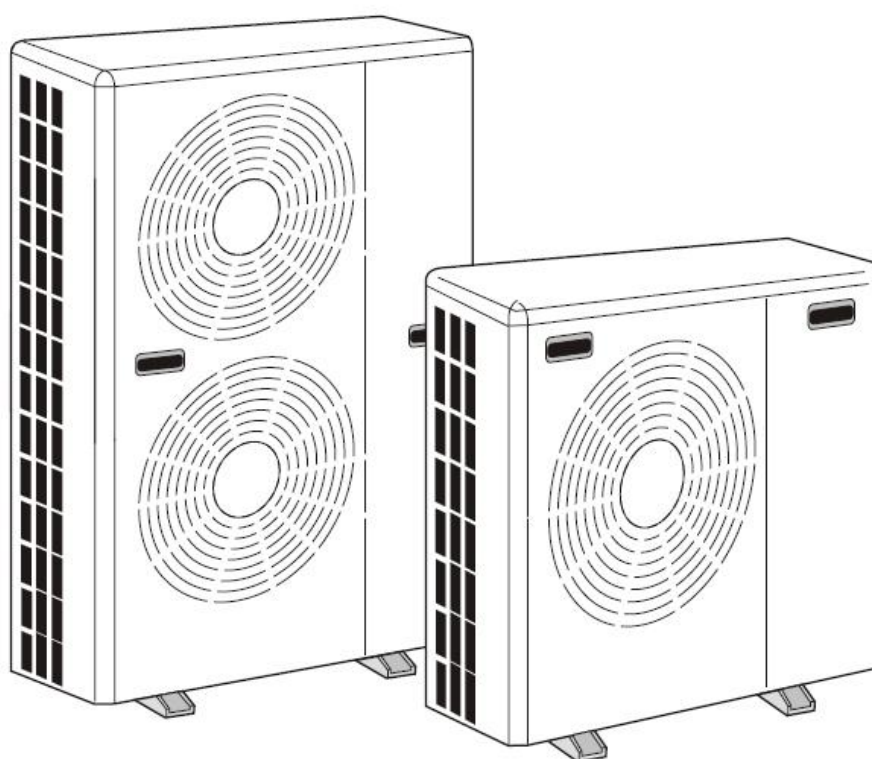


DC INVERTER AIR TO WATER HEAT PUMP

User Manual



Model: GAG-08DC/12DC/16DC

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1 GENERAL

The unit is an air source heat pump for space heating and sanitary water heater for houses, apartment blocks and small industrial premises. Outdoor air is used as a heat source creating free energy to heat your home.

2 SYSTEM DESCRIPTION

The unit is a monoblock (single unit) air/water heat pump, specially designed for the colder climate. There is no need for bore holes and usually the system can be installed within 1 day.

The unit can both heat hot water effectively at high outdoor temperatures and give a high output to the heating system at low outdoor temperatures. If the outdoor temperature drops to a level lower than minus 0°C (factory setting), the auxiliary heater switches on to ensure the heat pump unit works normally. The unit is also capable of cooling in the summer. The heat pump controller is an intelligent wired system.

The unit is rated as 8KW/12KW/16KW. The Material/components are chosen to provide a long service life and to fully withstand harsh outdoor conditions.

The unit has two different installation options:

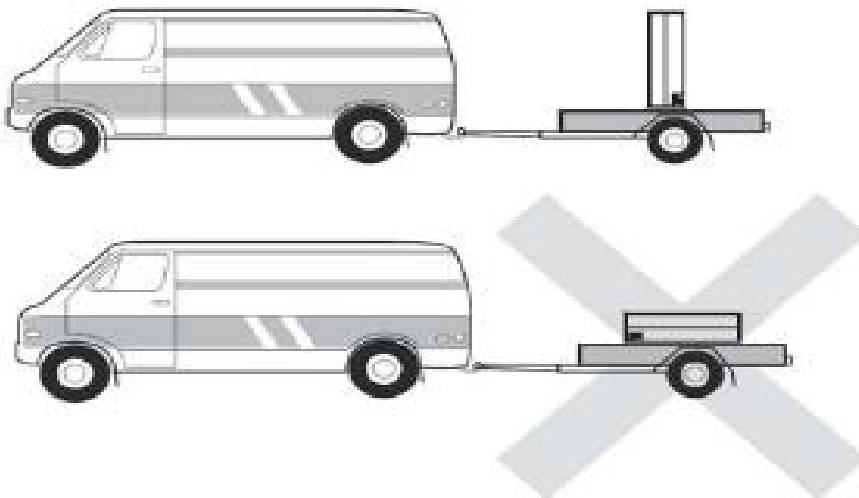
- 1). Space heating/cooling + DHW (Domestic hot water)
- 2). Space heating/cooling only or DHW only

3 INSTALLATION

3.1 General points for installation engineer

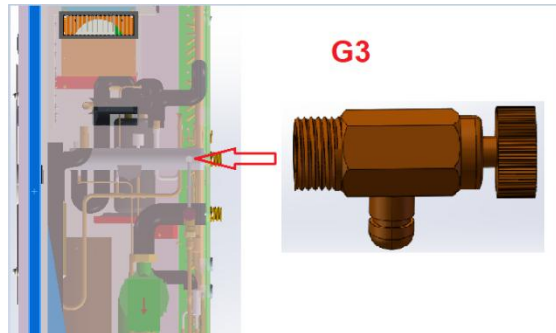
3.1-1 Transport and storage

The unit should be transported and stored vertically.



3.1-2 Inspection of the installation

Current regulations require the heating installation to be inspected before it is commissioned . The inspection must be carried out by a suitably qualified person and should be documented. If the heat pump is replaced, the installation must be inspected again. In the event of installation with unvented (closed) heating systems, G3 unvented guidelines must be followed during the install. It should be noted that the heat pump provides the first measure of defense against high pressure/temperatures. A further 2 must be installed to comply with the G3 unvented procedures.

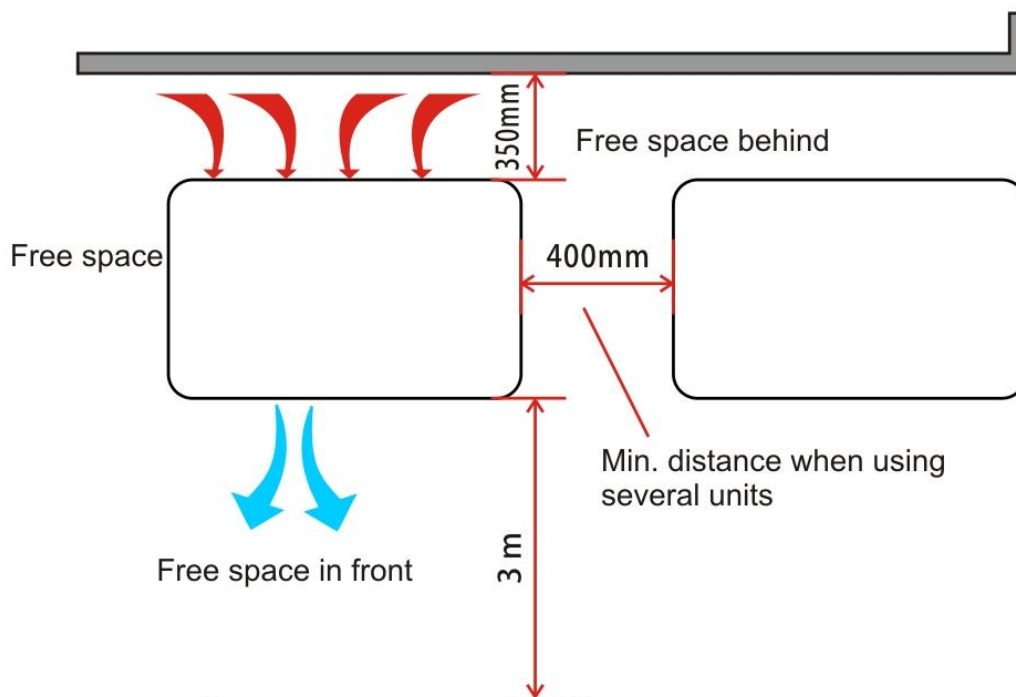


3.1-3 Sitting the heat pump

The unit is placed (securely fixed) outdoors on a firm base, preferably a concrete foundation. It should not be positioned next to sensitive walls, for example, next to a bedroom. Also ensure that the placement does not inconvenience any neighbors'.

Large amounts of condensation water as well as de-icing water from defrosting can be produced. You must provide good drainage at the installation area and make sure the water cannot run out onto paths or the like during periods that ice can form. Ideally, condensation water is led off to a water drain or a suitable soak away. The distance between the unit and the exterior wall must be at least 350 mm. The free space above must be at least one meter. The unit must not be placed in a position so that air can re-circulate thus lowering the COP.

Care must be exercised so that the heat pump is not scratched during installation.



3.1-4 Controller

The unit is equipped with an external electronic controller that handles all functions necessary for heat pump operations. Defrosting, stop at max/min temperature, connection of the compressor heater as well as enabling the aux electrical heater, monitoring of motor protection and pressure switches are all controlled.

The number of starts and the operating time can also be read.

The controller is set during installation and can be used during a service.

Under normal operating conditions the home owner does not need to have access to the controller.

The unit has an integrated electronic outlet water temperature sensor that limits the outlet temperature up to 60°C.

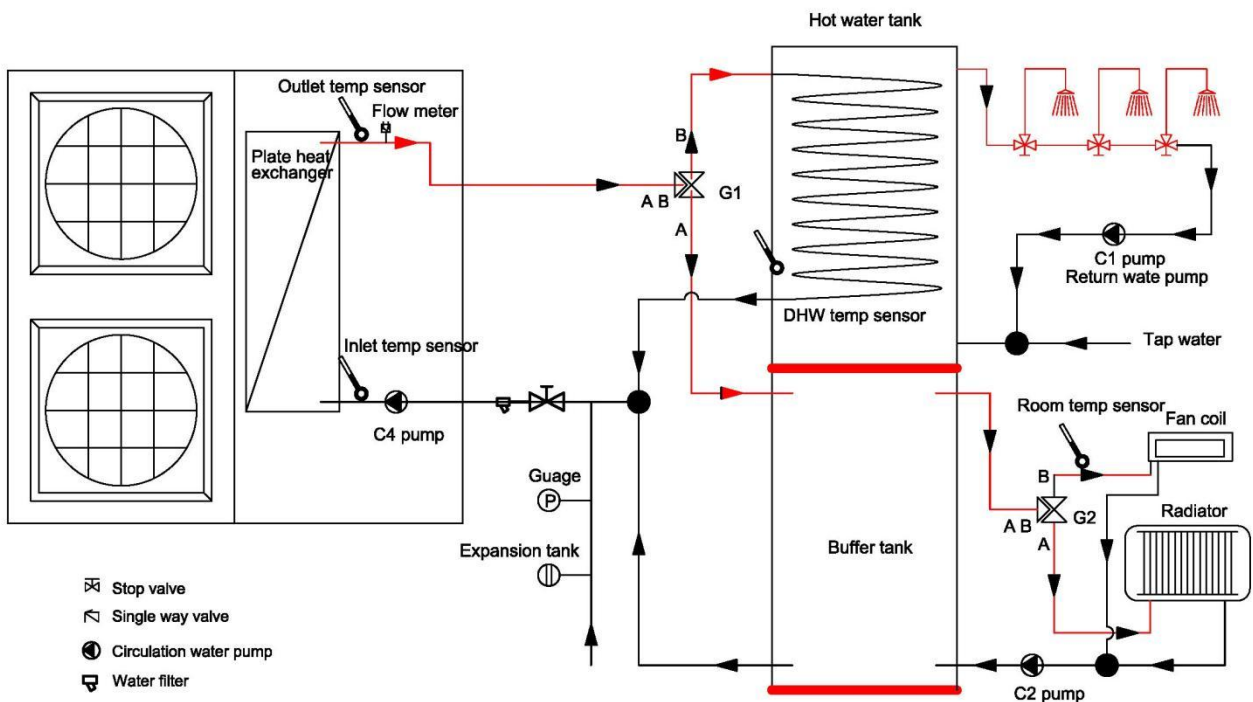
3.2 Installation design

The unit can be installed in several different ways.

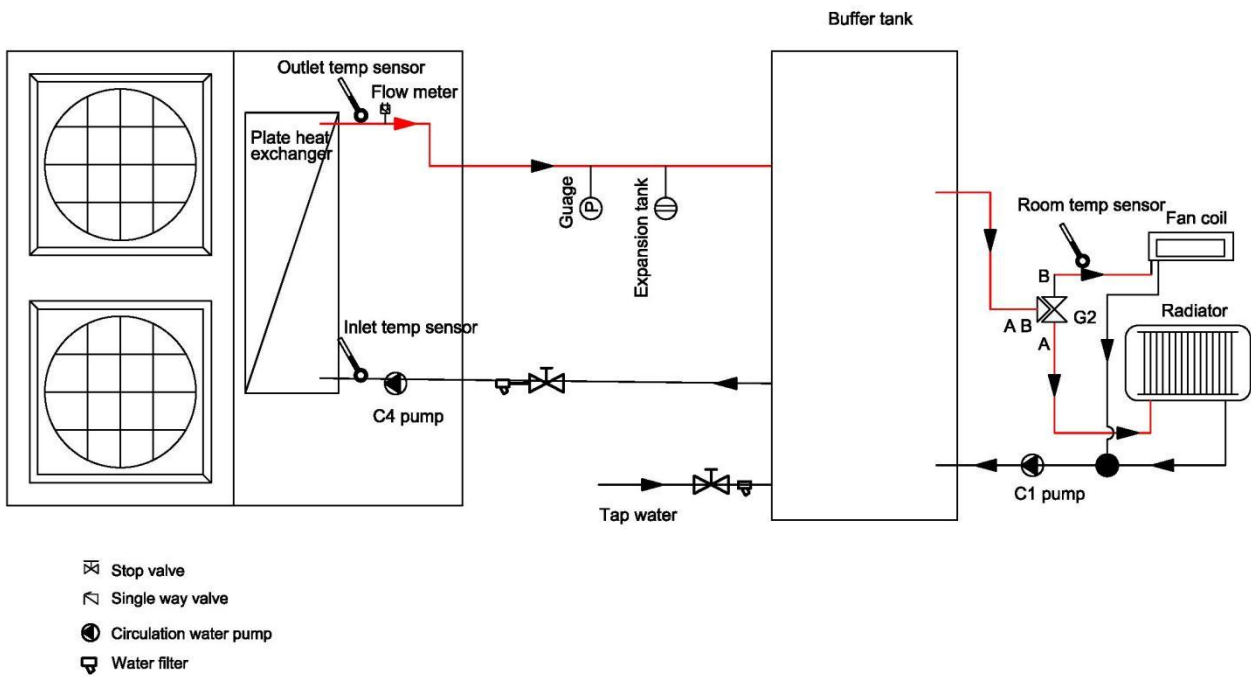
The safety equipment must be installed in accordance with current regulations for all installation options.

When connecting with the unit, the total water volume in the heat pump pipe system and buffer tank must be at least 10 liters per KW of output.

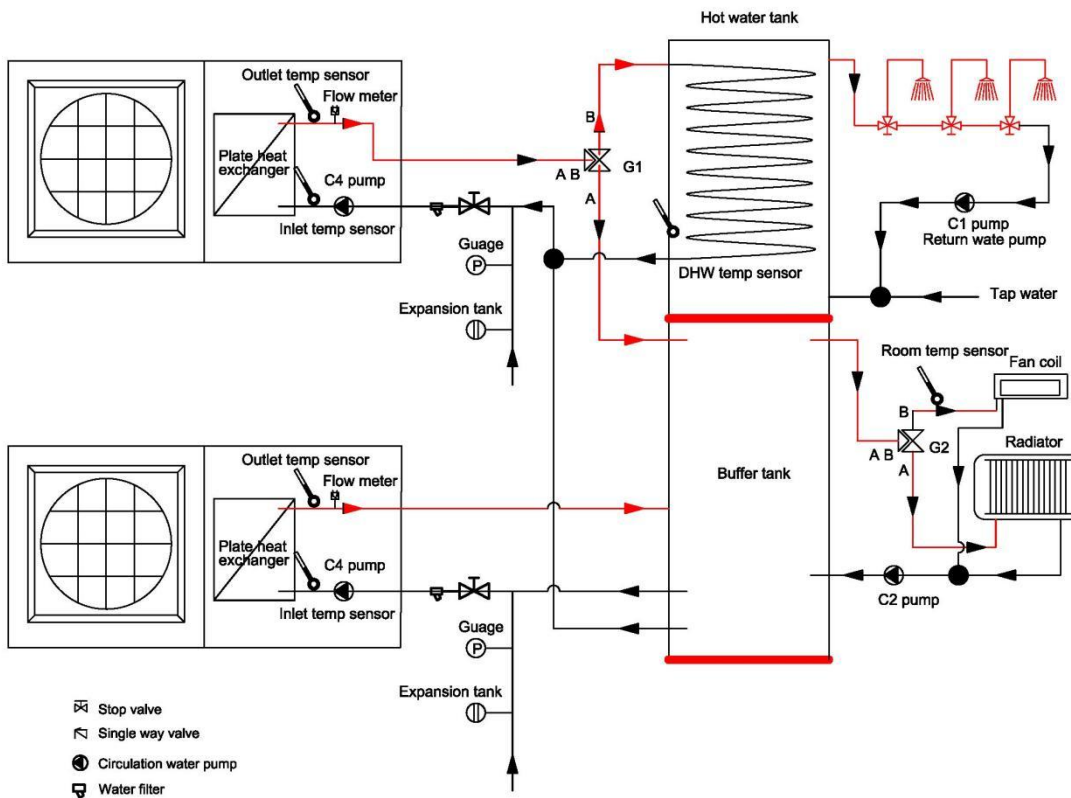
A) Space Heating/Cooling + DHW



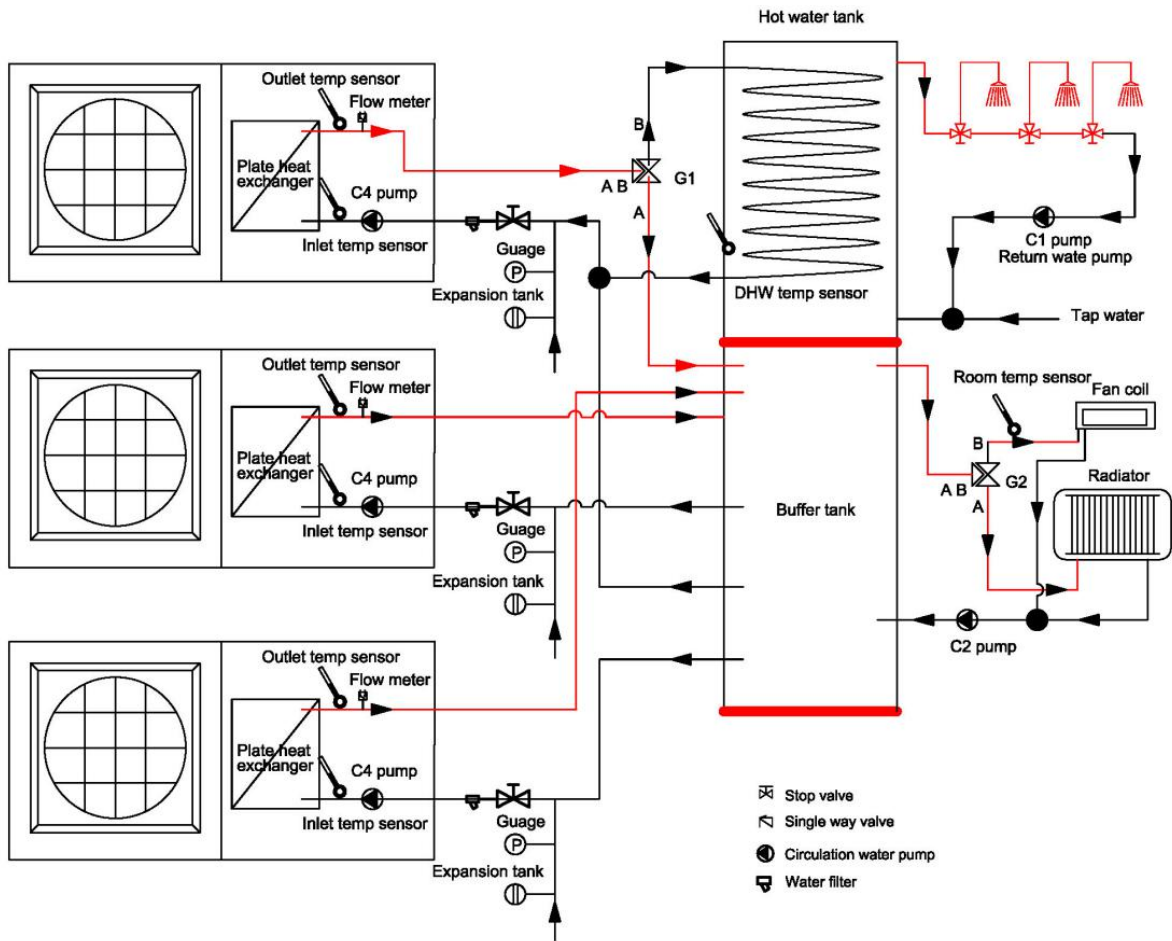
B) Space Heating/Cooling Mode Only



C) 2x8/12/16 Installation. Space Heating/Cooling + DHW

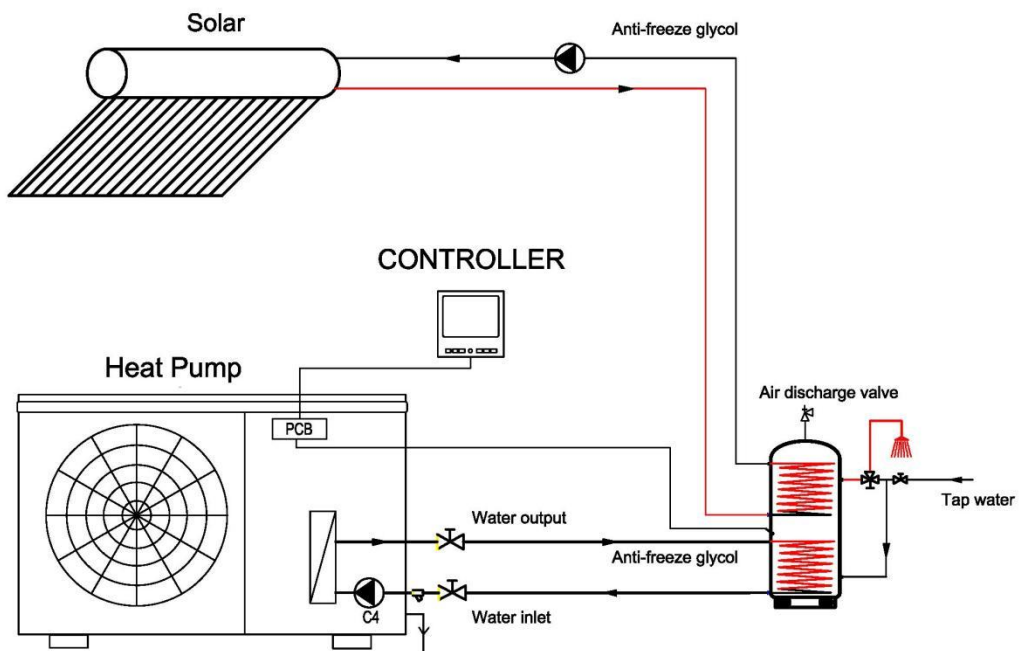


D) 3x8/12/16 Installation. Space Heating/Cooling + DHW.



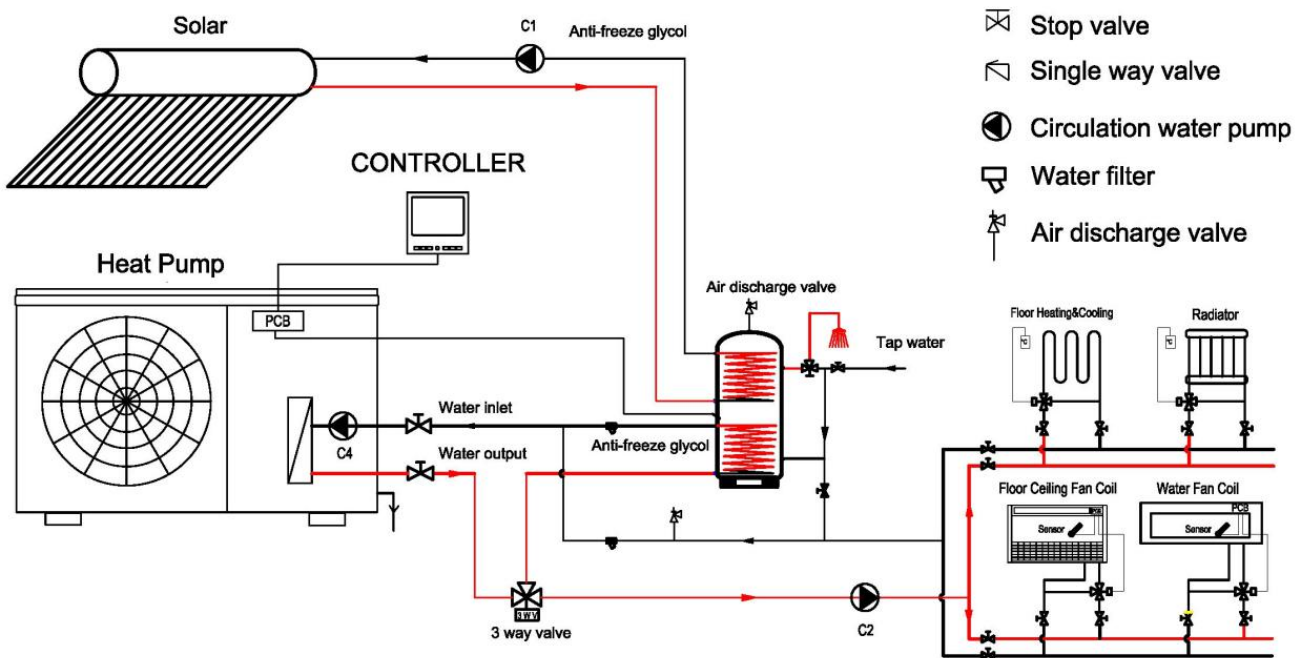
Solar Application 1

DHW with solar heating



Solar Application 2

Multifunctional heat pump application with solar room assistant DHW



3.3 Pipe Connection

28mm pipe is recommended.

The pipe work must be flushed before the heat pump is connected, so that any contaminants do not damage the components parts.

The heating/cooling water inlet and outlet direction must be connected according to the marked areas on the heat pump.

All outdoor pipes must be thermally insulated with at least 19 mm thick pipe insulation. The insulation must also be vapor resistant.

The water circulation pump must at all times be operational (even if unit is not running) to prevent any possible damage due to freezing. Even when in standby mode, the circulation pump is controlled directly from the unit, which takes the outdoor temperature and temperature in pipe into consideration to decide whether to circulate water within the system.

Shut-off valves and drain valves are fitted so that unit can be emptied in the event of prolonged power failures.

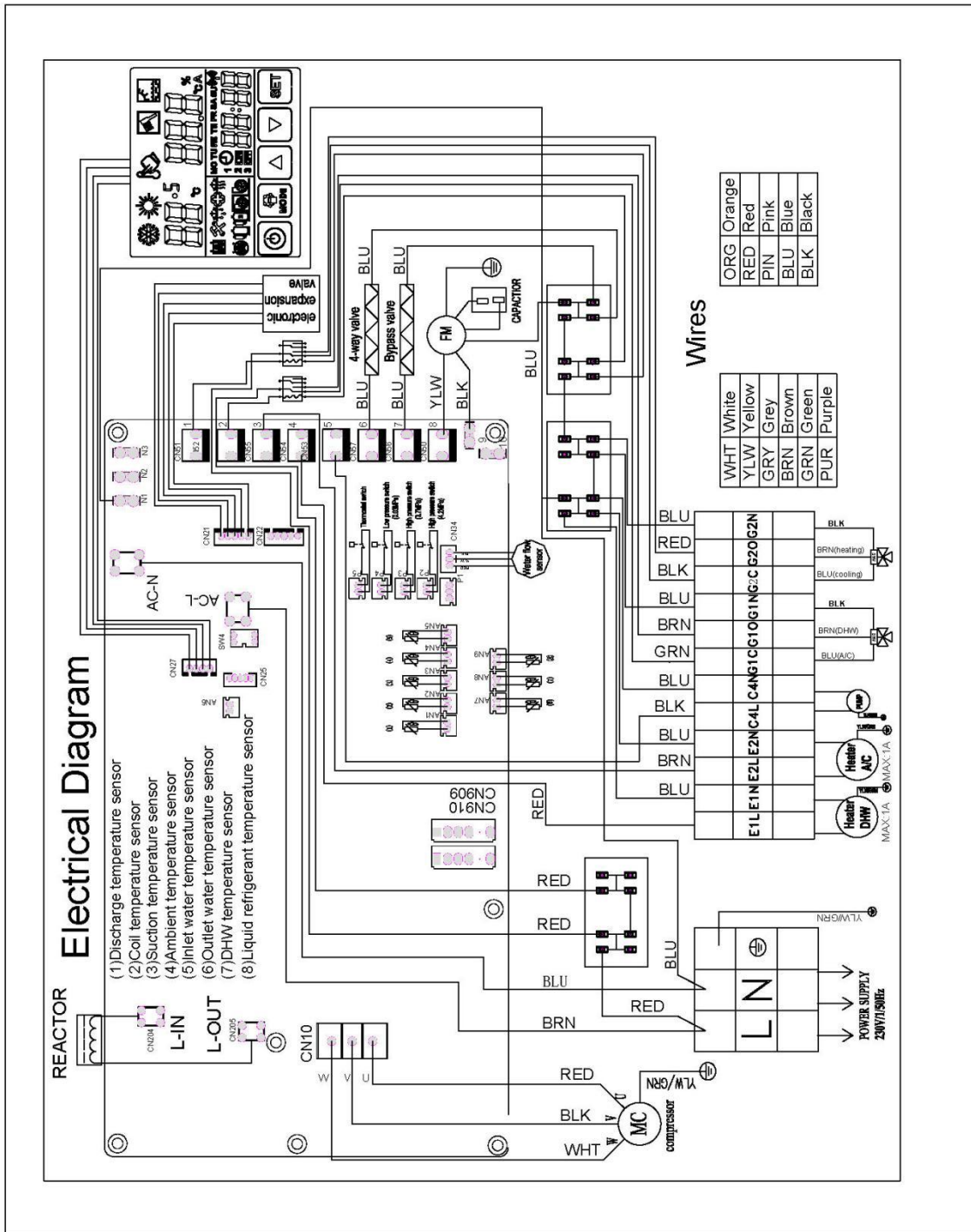
The supplied flexible hoses act as vibration dampers. The flexible hoses are fitted so a slight bend is created, thus acting as vibration dampening.

Important: Even though the unit has anti-freeze protection, if the circulation pump fails or there is a problem with the power supply, there is still a risk of damage due to freezing. **During the installation Anti-freeze (Ethylene Glycol) is strongly recommended. If the air temp is ever lower than 0c, it must use enough glycol.**

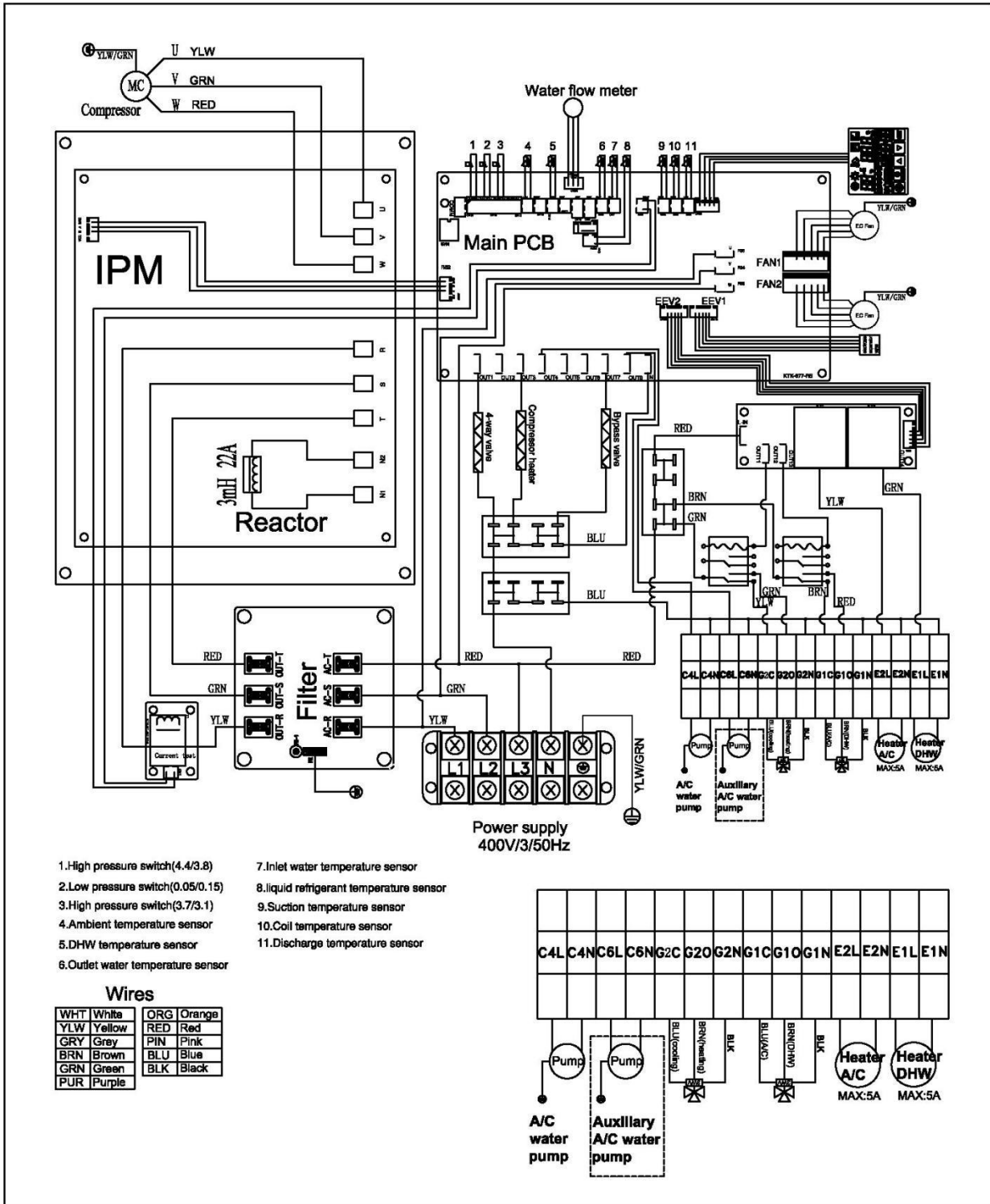
3.4 Electrical Connection

Electrical installation and service must be carried out under the supervision of a qualified electrician. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

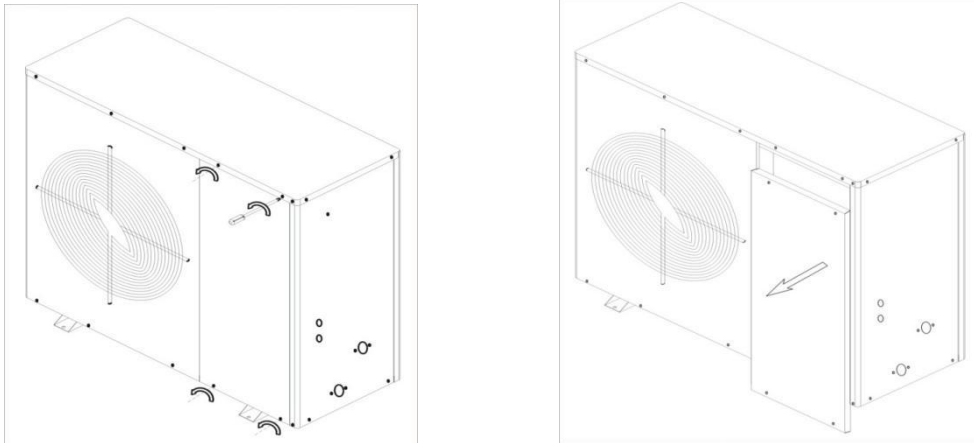
Wiring Diagram GAG-08DC/12DC



Wiring Diagram:GAG-16DC



3.4-1 Installation Drawing



3.4-2 Important: You need to install a separate circuit breaker in all installations.

3.4-3 Anti-freeze Function

DHW anti-freeze

When DHW water tank(AN8) temperature $\leq 4^{\circ}\text{C}$, system starts hot water antifreeze, start domestic hot water mode and compressor, When hot water temperature is 12°C or higher, withdraw DHW antifreeze. If the compressor starts over 30 minutes, withdraw DHW antifreeze.

AC anti-freeze

Air conditioning inlet (AN5) or outlet (AN7) water temperature is 4°C or lower, system starts AC antifreeze, water pump C1 start.

When the input water temperature $\geq 12^{\circ}\text{C}$ or compressor operates over 30 minutes , withdraw AC antifreeze.

3.5 Commissioning

3.5.1 Preparations

Before commissioning, make sure compressor heater has already pre-heated for 3-10 minutes.

1) Compressor Heater

As mentioned above, if the temperature is lower than 10°C , it is important that the compressor heater can heat the compressor before the first start up. In order to ensure this happens, please follow the instructions below:

- Disconnect the power connection of compressor, aux electric heater, circulation pump. (Due to anti-freeze protection, the compressor, aux electric heater and circulation pump could start in stand-by status.
- Switch on the outside Isolator and power connection of the unit.
- After 3-10 minutes, switch off the outside Isolator and re-connect the power connection of compressor, aux electric heater and circulation pump.

2) Filling and Venting

Fill the system slowly ensuring bleed valves are open (if not automatic).

3.5.2 Inspection before Start up

1) Mechanical Inspection:

- a. Check the cabinet and inside pipe system for possible damage during transportation.
- b. Check that the heating water circuit is filled and well vented. Check the pipe system for leaks.
- c. Check the Fan making sure it can move freely.

2) Electric System Inspection

- a. Check the power supply (voltage/frequency) matches the rating label and specification.
- b. Check all the electrical connections for loose or damaged wires due to transportation.

3) Pipe Inspection

- a. Check all the valves, and water flow directions.
- b. Check for any possible leaks inside or outside of unit.
- c. Check the insulation of all the pipes.

3.5.3 Start up and Commissioning

- a. After the system inspection is finished, startup can begin.
- b. Connect the power supply; switch on the isolator to turn on the heat pump.
- c. The circulation pumps starts immediately. After 30 seconds, the fan motor starts. After another 10 seconds, compressor starts.
- d. Air is initially released from the hot water and venting may be necessary. If bubbling sounds can be heard from the heat pump, the circulation pump or radiators the entire system will require further venting. When the system is stable (correct pressure and all air eliminated) the automatic heating control system can be set as required.
- e. Check heating water inlet/outlet temperature difference after the system is stable.
- f. Check the compressor exhaust and suction temperature.
- g. Adjust the parameters according to different weather conditions and user requirements.

4 CONTROLLER MANUAL

4.1 Electric Parts Control Program working theory

a) Compressor

- After the compressor is shut down, it has a minimum interval of 3 minutes before the next start up
- The initial "power-up" does not require the protection of three minutes;
- During defrost, compress on/off interval is based on the defrost parameters.

b) Start up / Shut down Cycle

- When the heat pump switches on, the water circulation pump and the fan will start 60 seconds before compressor
- When the heat pump switches off, the water circulation pump shuts down 30 seconds after the compressor. The fan switches off 5 seconds after the compressor
- During defrost, the water circulation pump does not stop running;

c) DHW Auxiliary Electric Heater E1

F08=0, E1 is not valid ; F08=1, E1 is valid.

E1 turns on as set out in the conditions below:

- Ambient temperature \leq set value (parameter F09, -20°C ~ 30°C, default 0°C);

- Compressor's working time \geq set value (parameter F10, 10 ~ 30min, default 15min);
- DHW water tank temperature $<$ setting temperature;

When DHW anti-freeze, E1 is on, when DH>15°C, E1 off.

When some error cause compressor stop, if DHW required, E1 will be on.

d) A/C Auxiliary Electric Heater E2

F05=0; E2 is not valid; F05=1, E2 is valid.

A, E2 turns on as set out in the conditions below:

- The heat pump is running heating;
- Ambient temperature \leq set value (parameter F06, -20°C ~ 20°C, default 0°C);
- Compressor's working time \geq 15minutes;
- AC water inlet temperature $<$ setting temperature;

B, When start defrost at AC heating mode, if inlet water temperature \leq 39°C, **E2** turns on. When Ac inlet temp>45°C, E2 off.

C, During anti-freezing, the auxiliary electric heater **E2** turns on.

D, If inlet or outlet temperature sensor breakdown, the auxiliary electric heater **E2** turns on.

e) Motorized 3 way Valve G1

In DHW mode, the motorized 3 way valve is power on. In any other mode, it is power off.

4.2 Operating Mode Principle

1) Space Cooling Mode

Temperature setting range is 10-25°C, the factory setting is 12°C;

2) Space Heating Mode

Temperature setting range is 10-55°C, the factory setting is 45°C;

3) Hot Water Mode

Temperature setting range is 10-60°C (50~60°C is increased by electric heater), the factory setting is 50°C;

4) Defrost Cycle

Auto Defrost mode (normal defrosting)

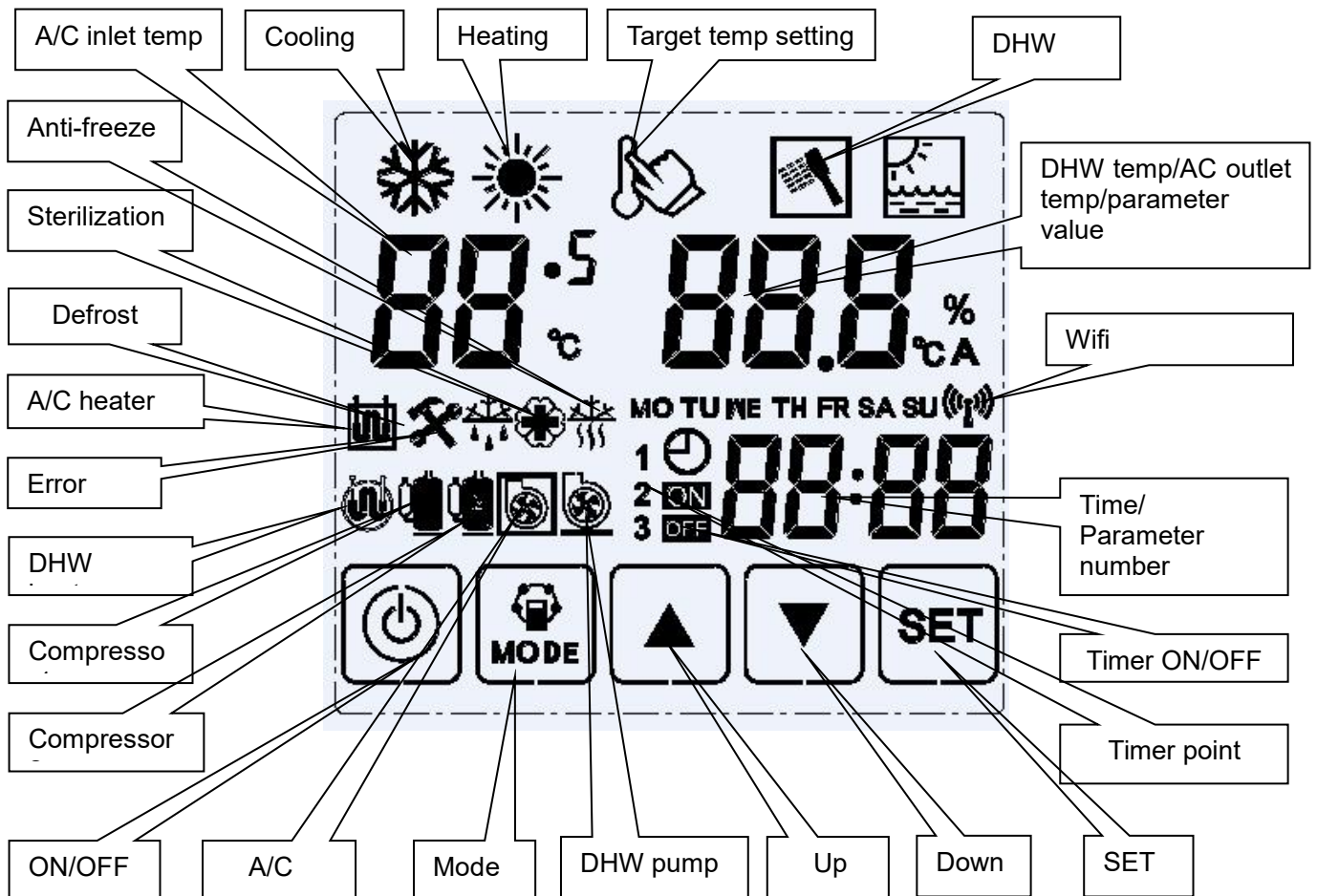
All heat pumps are fitted with intelligent defrost controls. A number of parameters are taken into account before defrost begins and ends. The parameters should be set as per factory settings or otherwise set out by an engineer. The defrost time will vary depending upon the conditions the heat pump is working in. The length between defrosts will either extend or contract depending upon the parameters set.

4.3 Wire controller






4.3.1 Controller



There are 5 keys for operation. Auto restart function, weekly timer.



4.3.2 Buttons definition

- (1)  SET key: confirm the setting or check/set the parameter or manual defrost
- (2)  down key: reduce
- (3)  up key: increase
- (4)  mode key: change the mode or adjust time or timer setting
- (5)  On/Off key: Turn on or off heat pump or return the main window

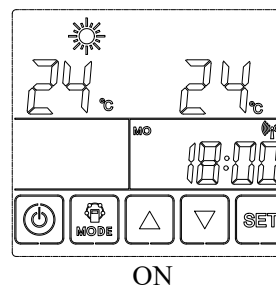
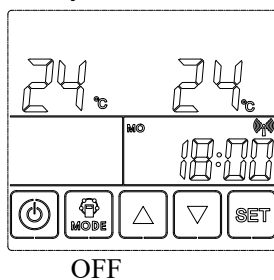
4.4 keys operation

4.4.1 Unlock screen


When the screen's light is off, the screen is locked. Touch any key, the screen is unlocked and the light on.

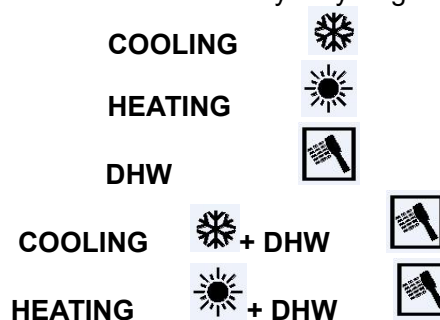
4.4.2 Turn on / off

Touch  key.



4.4.3 Change mode (5 modes)

A, press the  key repeatedly, the mode icons will flash by recycling.



B, When selected cooling or heating plus DHW, DHW will be priority.



C, When selected DHW mode, only DHW operation, no cooling and heating.

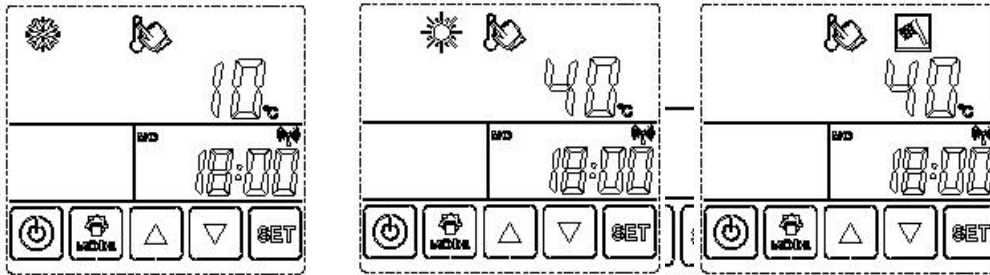
D, Healthy sterilization is an independent automatic operation mode, if necessary, modify the parameters individually.

4.4.4 Modify the setting parameters

A, When the selected mode is running, the unit will run in accordance with the factory set default values or the last modification of the temperature.

B, Set the target temperature

- Touch ▲ or ▼ key, the target temp setting  appears.
- Touch  key, choose the mode that you need to modify the target temperature.



Cooling mode

Heating mode



DHW mode

- Touch ▲ or ▼ key to adjust the target temperature.

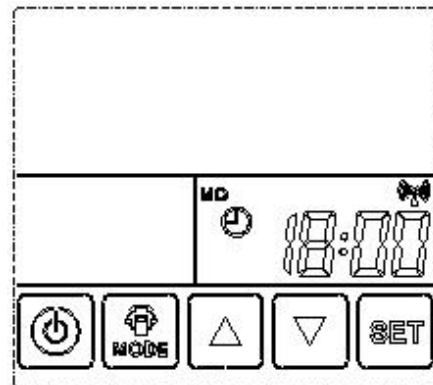
C, The detailed settings in the table below

Item	Meaning	Setting range	Default	Change setting date
1	AC cooling	10°C~25°C	12°C	
2	AC heating	10°C~55°C	45°C	
3	Hot water	10°C~60°C	50°C	
4	Antibacterial	60°C~70°C	65°C	



4.4.5 Clock setting


Press  key for 6 seconds, clock icon  flashes :

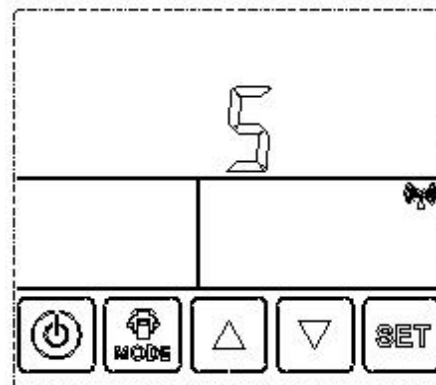
Touch ▲ or ▼ key to adjust the time.



4.4.6 Timer setting

Press  key for 6 seconds, clock icon  flashes,

Press  key for 6 seconds again, then 'S' or 'C' appears on the screen.



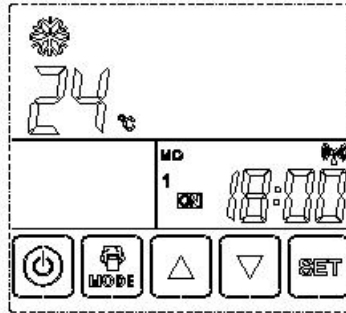
S: once validity

C:cyclic validity

Touch ▲ or ▼ key to choose 'S' or 'C', then touch SET to confirm, and enter to adjust time window.

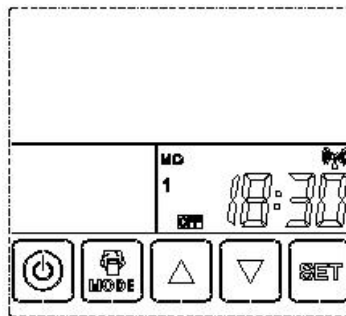
A) One day can set 3 points for on.

Touch SET key to the day of week, then the timer No and the time data flash,



Touch ▲ or ▼ key to adjust the time of timer. Then choose the working mode and adjust the target temperature. Touch MODE key, ON and mode icon will flash, touch ▲ or ▼ key to choose the mode you need. Then change the target temperature, touch MODE key again, ON and a hand icon will flash, touch ▲ or ▼ key to change the target temperature. Touch SET key to confirm.

B) One day can set 3 points for on, 3 points for off .
When timer point 1 ON is finished, point 1 OFF flash.



Touch ▲ or ▼ key to adjust the time of timer, touch SET key to confirm.

C) If some points don't need to be set, touch SET key to jump.

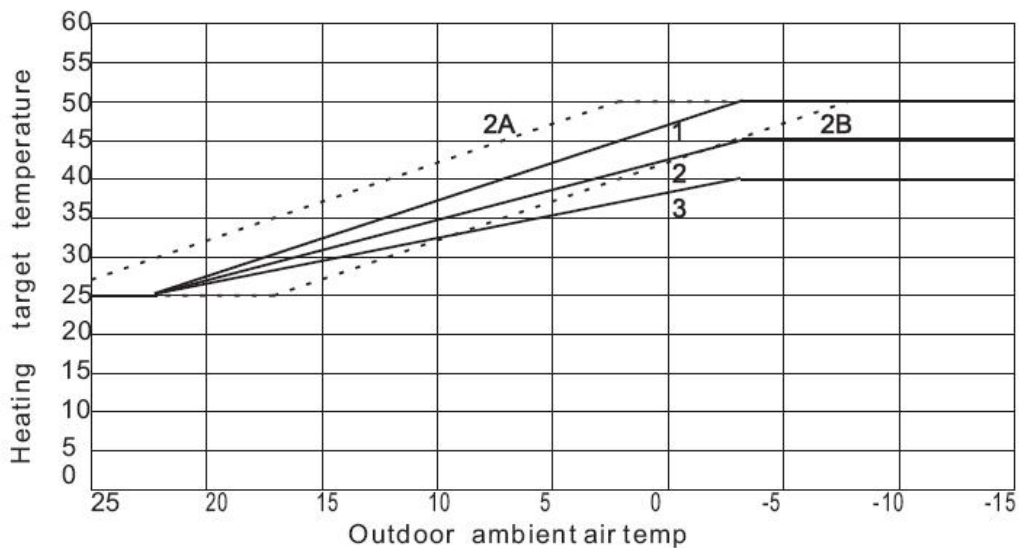
D) Press MODE key for 6 seconds, clock icon flashes, Press MODE key for 6 seconds again, then 'S' or 'C' appears on the screen. Touch ▲ or ▼ key to choose 'S' or 'C', then touch SET to confirm, and enter to adjust time window. Touch SET key to choose the timer point that need to be cancel. Touch ▲ or ▼ key to adjust the time to --:--, touch SET key, this timer point will be cancel.

4.4.7 Night mode

(1) Night mode valid or not is up to parameter F21. If the data is set 0, means off, 1 means on. The night mode starting time is decided by data F22. Ending time is decided by data F23.

(2) With night mode, hot water mode will run with the current setting temp +3° C, room heating run with current setting -2°C. Room cooling run with current setting +2°C. Outdoor fan run at low speed.

4.4.8 Auto heat curve




- A. AU curve translate is decided by parameter(F14) , positive value means move up, negative value means move down. (-15~15)
- B. AC AU heat curve highest temp is decided by parameter (F13), from 30~50, default 45. When the parameter is 45, the AU highest target temp is 45°C.

4.4.9 Communication with LCD controller

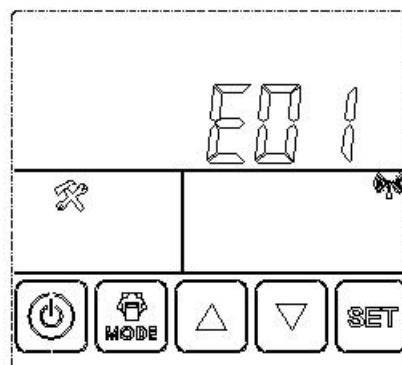
LCD controlled is connected with heat pump CN27 by 4 wires,(must in order) max 100m.

4.5 System Protection and Error Codes

If error, The icon  displays on the screen ,

touch  key, the error code displays.

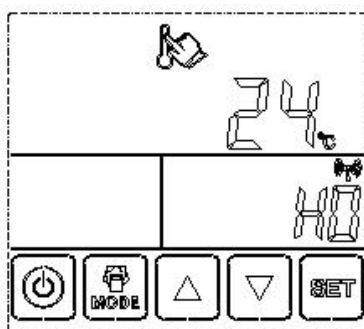
For example: E01



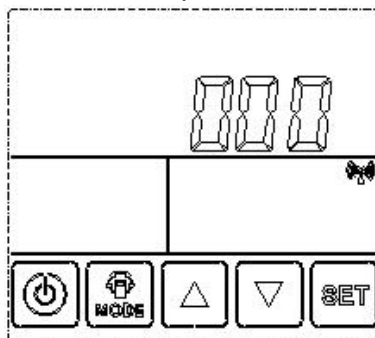
Code	Meaning	Remark
E01/HP	High pressure switch off	1.Refrigerant volume too much 2.throtting part error 3. pressure switch fault.
E02	High pressure protection	1.Refrigerant volume too much 2.throtting part error 3. High pressure switch fault.
E03/LP	Low pressure switch off	1.Refrigerant volume too little 2.throtting part error 3. pressure switch fault.
E04	Low pressure protection	1.Refrigerant volume too little 2.throtting part error 3. Low pressure switch fault.
E06	Over current protection	Compressor current is too high
E08	High discharge temperature protection	1.Refrigerant volume too little 2.throtting part error 3.discharge temperature sensor fault.
E09	Discharge sensor error	Temp sensor open circuit or short circuit
E10	Suction temperature sensor error	Temp sensor open circuit or short circuit
E11	Coil temperature sensor error	Temp sensor open circuit or short circuit
E12	Outdoor air temp sensor error	Outdoor air temp sensor open circuit or short circuit
E14	Inlet water temp sensor error	Temp sensor open circuit or short circuit
E15	DHW temp sensor error	Temp sensor open circuit or short circuit
E16	Outlet water temp sensor error	Temp sensor open circuit or short circuit
E17/FLO	Water flow error	1.Water flow volume too small 2. Water flow switch error
E18	Ambient temp too low	1.Outdoor air temp too low 2.temp sensor error
En	Communication error	Communication wire open or PCB error
E20	Miss/Wrong phase	Power supply error
E22	Password valid	
E23	Memorizer error	PCB fault
E38	Temperature difference too high	Temperature difference between inlet and outlet water is too high
E84	voltage protection	Voltage is too high or too low, heat pump will recover when voltage be normal (165~265VAC)
E85	Voltage too high	Voltage \geq 265VAC
E86	Voltage too low	Voltage \leq 165 VAC
E97	DC Voltage too high	DC Voltage \geq VDC
E98	DC Voltage too low	Voltage \leq VDC
E99	Phase current too high	Phase current \geq A
E100	DC motor out of step	DC motor out of step
E101/E102	Compressor Miss phase	Compressor connection line fault
E103/E103	IPM Error	IPM fault
E108	IPM temperature abnormity	IPM temperature sensor fault
E111	IPM doesn't match compressor	IPM fault
E113/E114	PFC error	IPM fault
E116	PFC over current	IPM fault
E117	DC voltage abnormity	DC Voltage
E118	AC voltage too low	Voltage \leq 165 VAC

4.6 System Adjustable Parameter Table

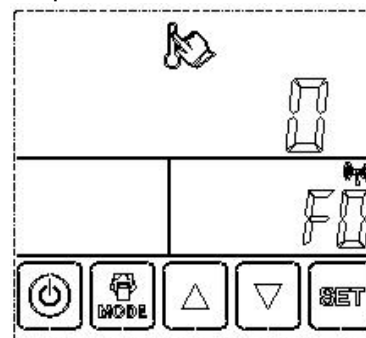
Press **SET** key for 6 seconds, the screen will show Hxx.



Press **SET** key for 6 seconds again, then enter the password window.



Press **SET** key, enter the parameter check window.




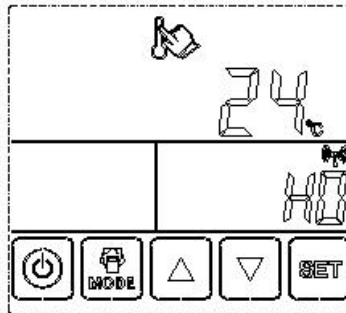
Press **▲** or **▼** key to check different parameter.



Code	Name	Range	Default
F00	Parameter's value return to default	0~255 : 10(return)	0
F01	Auto restart	0:off, 1:on	1
F02	Functional parameter	0: only heating 1: Cooling+heating 2: only cooling 3: DHW+(C+H)	3
F03	AC temp difference	1~30°C, minus difference	2°C
F04	DHW temp difference	1~30°C, minus difference	3°C
F05	AC auxiliary electric heater E2 validation	0: Invalid; 1:valid	0
F06	Ambient temperature to activate E2	-20~30°C	7°C
F07	The time of delayed to active E2	1~99 minutes	20
F08	DHW auxiliary electric heater E1 validation	0: Invalid; 1:valid	0
F09	Ambient temperature to activate E1	-20~30°C	7°C
F10	The time of delayed to active E1	1~99 minutes	20
F11	Water pump working mode	0(no stop),1(stop when reach temp) 2(running 1 minute every (15=F12)minutes)	
F12	Water pump mode 2 interval time(F11=2)	1~99 minutes	15
F13	AC AU curve max temp value	30~50°C	45°C
F14	AC AU curve offset value	-10~10°C	0°C
F15	Auto remove error	0: no remove; 1~255minutes	30
F16	Sterilization temperature	40~80°C	65°C
F17	Sterilization interval time	0:sterilization invalid; 1~99 days	7
F18	Sterilization duration	1~99minutes	10
F21	Night mode validation (night mode: DHW increase 3C, AC temp reduce 2C)	0:invalid; 1:valid	0
F22	Night mode starting point	0-23(time)	21
F23	Night mode ending point	0-23(time)	6
F24	Compressor and Motor speed's output ratio for night mode	0-100	80
F30	Defrost interval time	10~200 minutes	50
F31	Defrost time(defrost action lasting max time,will stop defrost if longer than this value)	5~20 minutes	8
F32	Coil temp to active defrost	-30~15°C	-5°C
F33	Coil copper pipe temp to stop defrost	10~35°C	25°C
F34	Ambient temperature to active defrost	0~55°C	15°C
F35	Difference between ambient and coil temperature to active defrost(Ambient temp lower than -7°C)	0~25°C	8°C

F36	Difference between ambient and coil temperature to active defrost($-7^{\circ}\text{C} \leq \text{Ambient temp} \leq 3^{\circ}\text{C}$)	0~25°C	6°C
F37	Compressor discharge air protection temp (higher than the setting, it will protect)	90~130°C	115°C
F38	Compressor protection current	3-35A	12A
F39	Compressor 0 A current test	0: no test ;1: test	0
F40	Limited frequency current		
F42	Ambient temperature to active compressor heater	-20~30°C	7°C
F43	Maximum outlet water temp to stop compressor	30~100°C	75°C
F44	Minimum outlet water temp to stop compressor	-40~35°C	3°C
F45	Difference between inlet and outlet water temp to stop compressor	0: no stop;1~25 :stop	0
F53	Ambient temperature to stop heat pump	-40~40°C	-40°C
F54	AC maximum temperature	25~100°C	55°C
F55	AC minimum temperature	3~25°C	10°C
F56	DHW maximum temperature	0~80°C	50°C
F58	EC motor speed (80=maximum speed X80%;0=maximum speedX40%)	0-10	80
F59	How many compressors	0-255	0
F60	Maximum frequency(cooling)	20-100	70
F61	Maximum frequency(heating)	20-100	75
F62	Maximum frequency(DHW)	20-100	75
F63	Minimum frequency(cooling)	20-50	30
F64	Minimum frequency(heating)	20-50	30
F65	Defrost frequency	20-100	60
F67	EEV Temp differential to stop the valve(heating)	-20~20°C for factory only	2°C
F68	EEV temp differential to stop the valve (cooling)	-20~20°C for factory only	2°C
F69	EEV control mode	0~15	12
F70	EEV minimum steps/2	0~100	35
F71	Cooling mode and Ambient temp=5°C,EEV steps	15~250	100
F72	Cooling mode and Ambient temp=15°C,EEV steps	15~250	140
F73	Cooling mode and Ambient temp=25°C,EEV steps	15~250	160
F74	Cooling mode and Ambient temp=35°C,EEV steps	15~250	180
F75	Numbers of steps of EEV per adjustment	0~10	2
F76	Heating mode and Ambient temp=0°C,EEV steps	15~250	100
F77	Heating mode and Ambient temp=10°C,EEV steps	15~250	140
F78	Heating mode and Ambient temp=20°C,EEV steps	15~250	160
F79	Heating mode and Ambient temp=30°C,EEV steps	15~250	180
F80	Numbers of steps of EEV per adjustment	0~10	2
F84	Running frequency setting	0-20(0:test mode;1:fixed frequency;2:Auto frequency)	2
F85	Running with fixed frequency (for factory testing only)	20~120 HZ	50HZ
F86	Resonance frequency (High)	0~100	0
F87	Resonance frequency (Low)	0~100	0
F92	Water flow switch type	0:water flow switch; 1:DN15 flow meter; 2:DN20 flow meter; 3:DN25 flow meter	3
F93	Minimum water flow	1-200L/min	12

4.7 Parameter check(Only checkable parameter list)

Press  key for 6 seconds, it will show Hxx to check the above parameter



Touch  or  key to check different parameter.

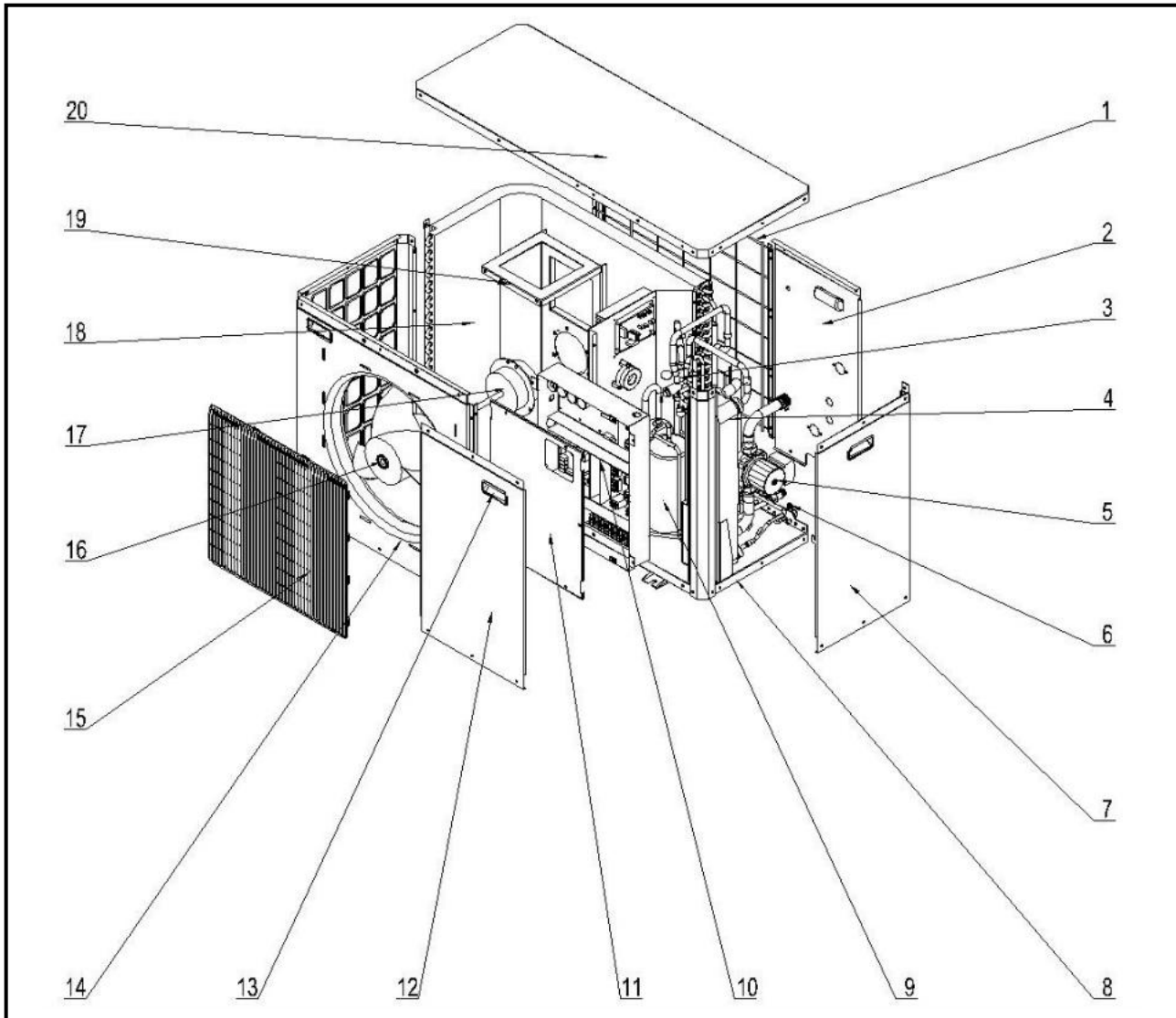
No	Name	Range / meaning	Remark
H00	Inlet water temperature	-40~97° C	
H01	Outlet water temperature	-40~97° C	
H02	DHW water temperature	-40~97° C	
H03	Ambient temp	-40~97° C	
H04	Indoor air temp	-40~97° C	reserved
H05	Compressor discharge temp	5~128° C	
H06	Suction temp	-40~97° C	
H07	Coil temperature	-40~97° C	
H08	Liquid refrigerant temperature	-40~97° C	
H09	EVI inlet temp	-40~97° C	reserved
H10	EVI outlet temp	-40~97° C	reserved
H11	Water source inlet temp	-40~97° C	reserved
H12	Water source outlet temp	-40~97° C	reserved
H13	IPM temperature	-40~97° C	
H14	Solar pipe temperature	40~97° C	reserved
H15	Running frequency		
H16	Compressor current		
H17	EEV open steps/2		
H18	EVI EEV open steps/2		reserved
H19	Water flow value	L/min	
H20	Low pressure value	MPa	reserved
H21	High pressure value	MPa	reserved
H22	EC motor 1 speed	RPM	reserved
H23	EC motor 2 speed	RPM	reserved
H24	reserved		
H25	Compressor present stop code		
H26	Compressor last time stop code		
H27	Compressor before last time stop code		
H28	Compressor before three times stop code		
H29	Cumulative running time of compressor (high 3 bits)		
H30	Cumulative running time of compressor(low 3 bits)		
H31	Defrost times		

No	Name	Range / meaning	Remark
H32	PCB code		
H33	Software code		
H34	Software version		
H35	Wired controller software code		
H36	Wired controller software version		
H37	address		
H38	Defrost interval		
H39	Defrost time		
H40	Coil temp to active defrost		
H41	Coil temp to stop defrost		
H42	Ambient temp to active defrost		
H43	Difference between ambient and coil temperature to active defrost(Ambient temp lower than -7°C)		
H44	Difference between ambient and coil temperature to active defrost(-7°C ≤Ambient temp ≤3°C)		
H45	AC AU curve validation		
H46	AC AU curve max temp value		
H47	AC AU curve offset value		
H48	Functional value		
H49	AC maximum temperature		
H50	AC minimum temperature		
H51	DHW maximum temperature		
H52	Compressor maximum target temperature		
H53	AC auxiliary electric heater E2 validation		
H54	DHW auxiliary electric heater E1 validation		
H55	Water pump working mode		
H56	Water pump mode 2 interval time(F11=2)		
H57	Auto restart		
H58	AC temp difference		
H59	DHW temp difference		
H60	Ambient temperature to activate E2		
H61	Ambient temperature to activate E1		
H62	Night mode validation		
H63	Night mode starting point		
H64	Night mode ending point		
H65	Compressor and Motor speed's output ratio for night mode		
H66	Thermostat switch validation		
H67	Current heating inlet temperature		

5 TECHNICAL SPECIFICATION

5.1 Internal View

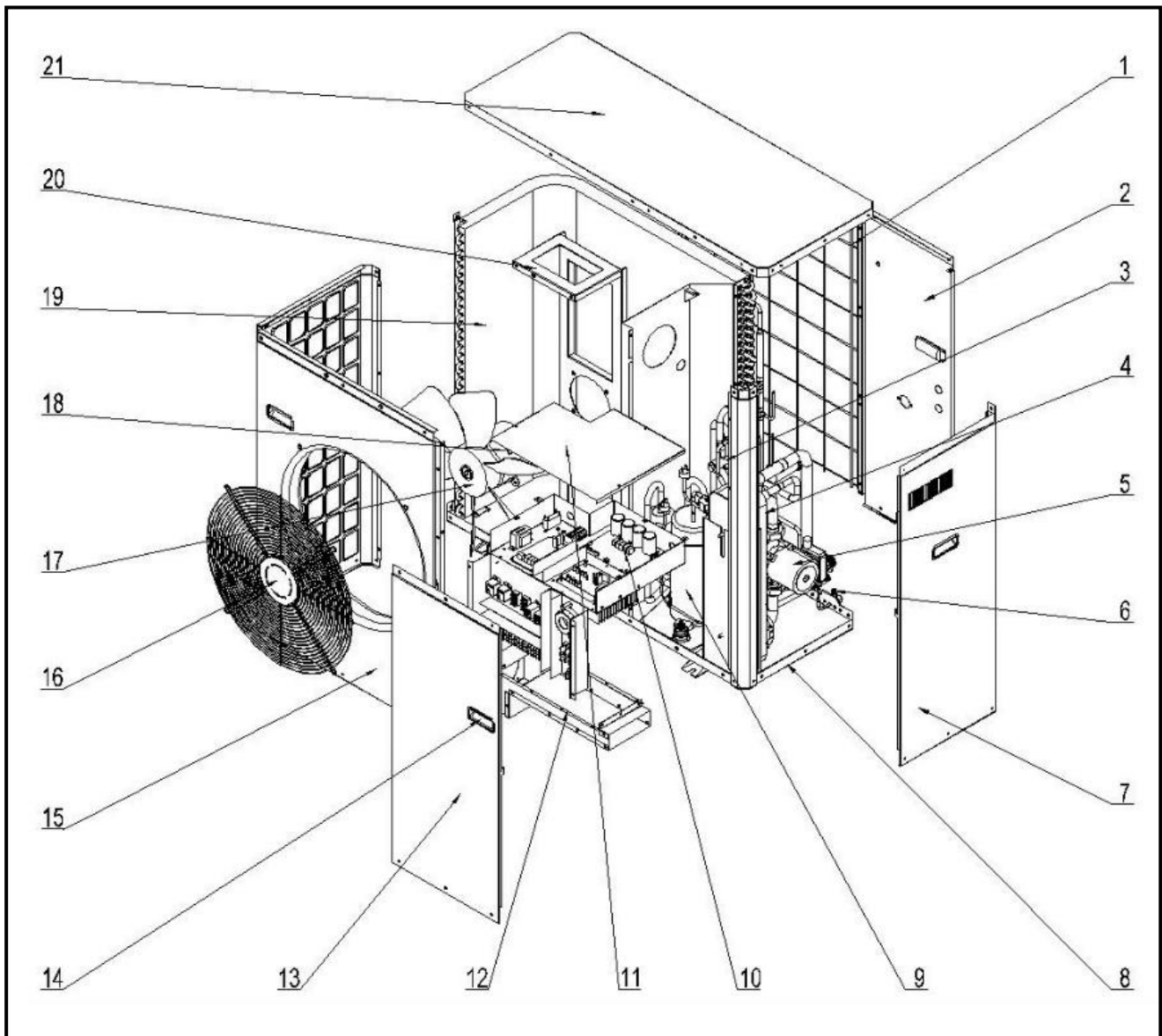
GAG-09DC



No.	Part Name
1	Back grill assembly
2	Back panel
3	4-way valve
4	Plate heat exchanger
5	Water pump
6	Service valve
7	Right side panel
8	Base panel
9	Compressor
10	Electronical box assembly

No.	Part Name
11	Electrical box cover
12	IPM heat radiating air duct
13	Service panel
14	Plastic handle
15	Front cover
16	Grill
17	Fan motor
18	Condensing assembly
19	Fan motor bracket
20	Top cover

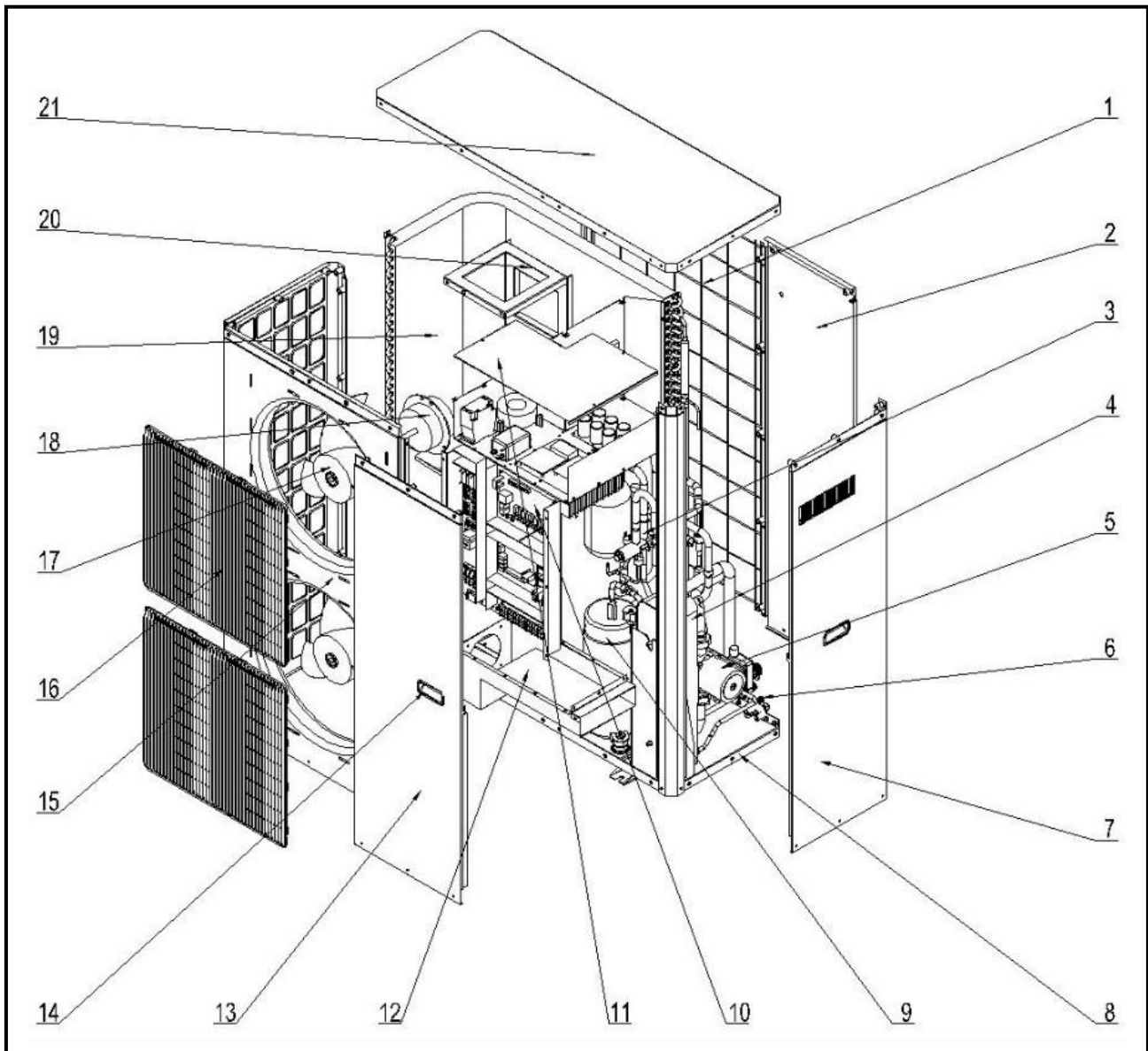
GAG-12DC



No.	Part Name
1	Back grill assembly
2	Back panel
3	4-way valve
4	Plate heat exchanger
5	Water pump
6	Service valve
7	Right side panel
8	Base panel
9	Compressor
10	Electronical box assembly
11	Electrical box cover

No.	Part Name
12	IPM heat radiating air duct
13	Service panel
14	Plastic handle
15	Front cover
16	Grill
17	Plastic fan blade
18	Fan motor
19	Condensing assembly
20	Fan motor bracket
21	Top cover

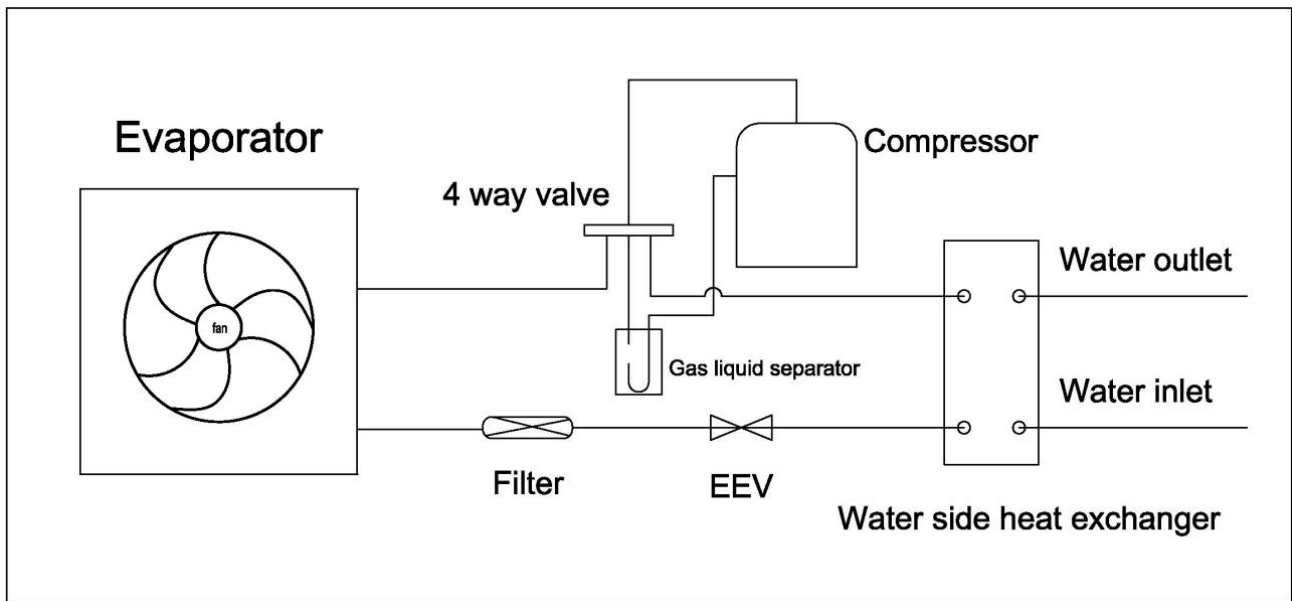
GAG-16DC



No.	Part Name
1	Back grill assembly
2	Back panel
3	4-way valve
4	Plate heat exchanger
5	Water pump
6	Service valve
7	Right side panel
8	Base panel
9	Compressor
10	Electronica box assembly
11	Electrical box cover

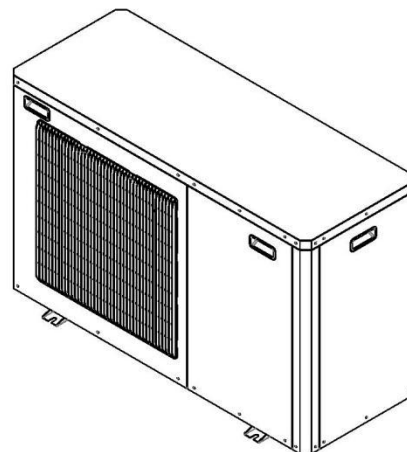
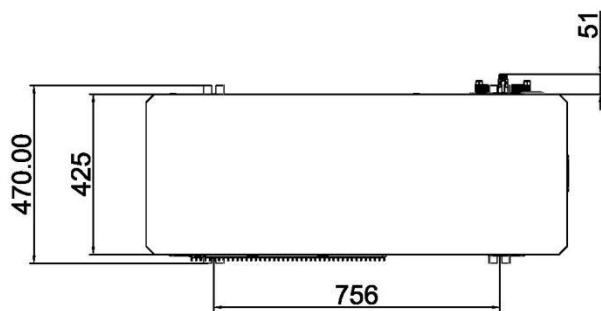
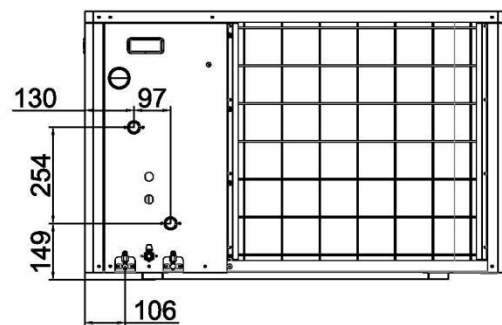
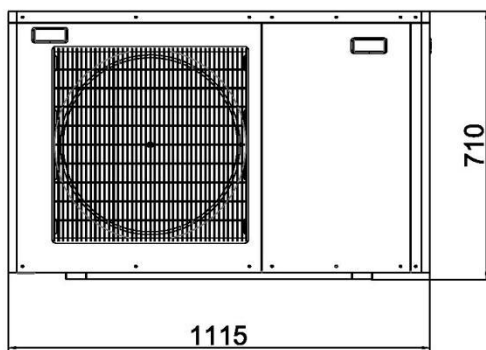
No.	Part Name
12	IPM heat radiating air duct
13	Service panel
14	Plastic handle
15	Front cover
16	Grill
17	Plastic fan blade
18	Fan motor
19	Condensing assembly
20	Fan motor bracket
21	Top cover

5.2 System Drawing

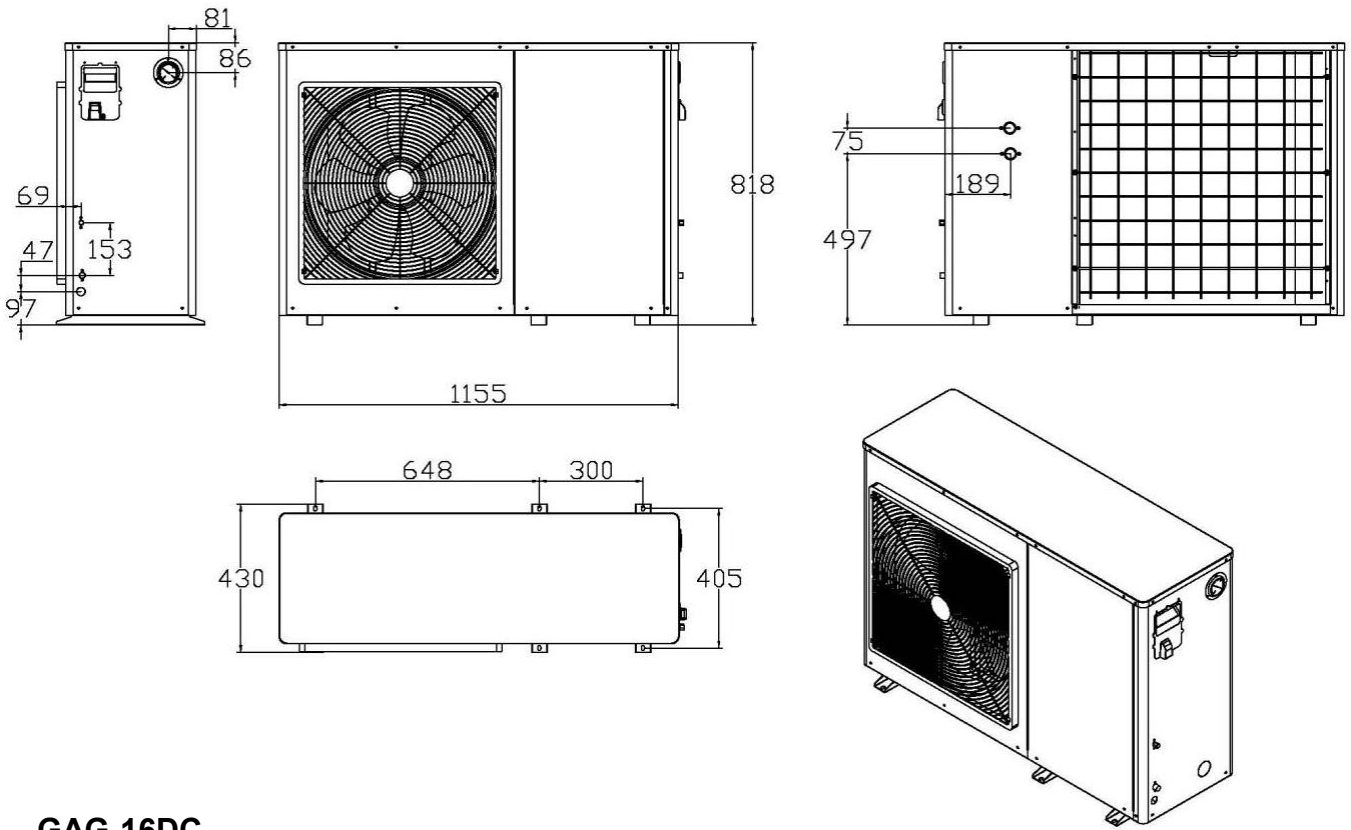


5.3 Dimensions(mm)

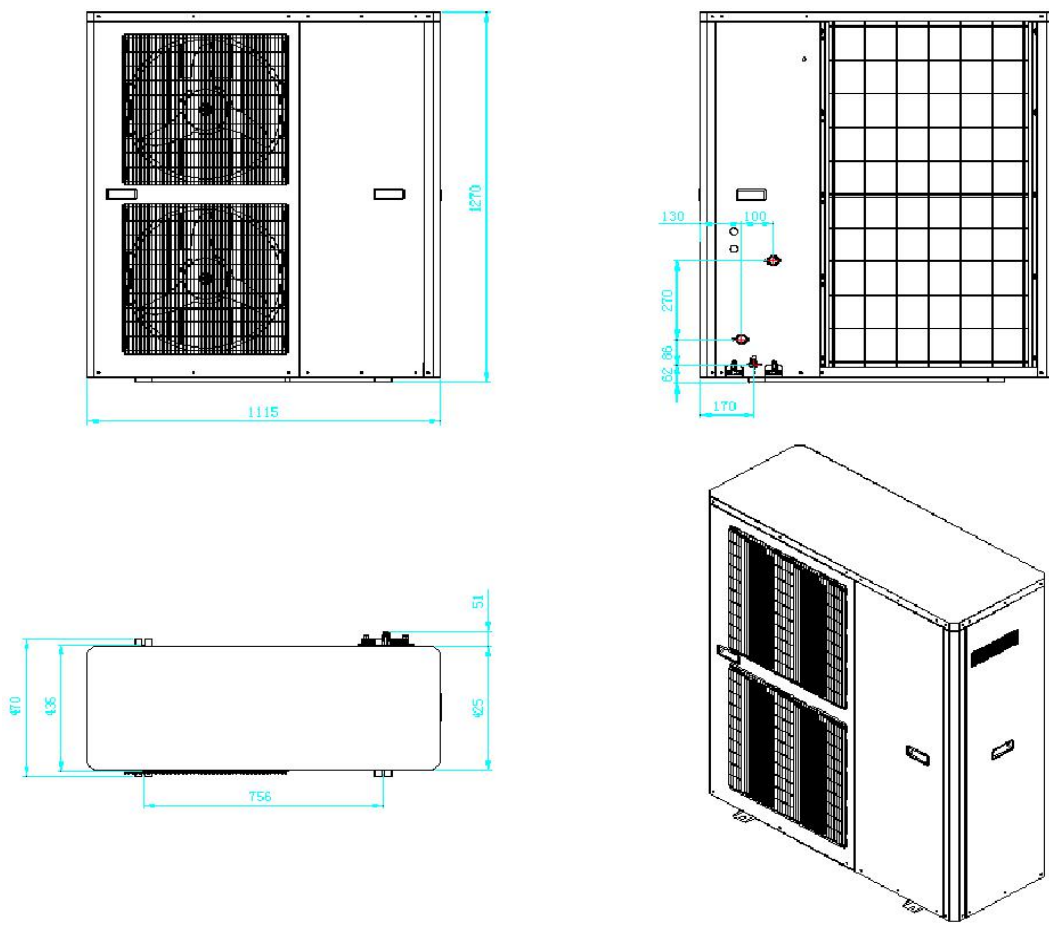
GAG-08DC



GAG-12DC



GAG-16DC



5.4 Specification

Model:		GAG-08DC	GAG-12DC	GAG-16DC
Rated Heating Capacity	kW	8.65	11.6	16.4
Rated Heating Input	kW	1.86	2.52	3.58
Rated Heating Current	A	8.15	11.2	5.16
COP	W/W	4.65	4.6	4.58
Rated Cooling Capacity	kW	8.45	11.4	16.3
Rated cooling Input	kW	2.35	3.05	4.47
Rated cooling Current	A	10.2	13.4	6.45
EER	W/W	3.6	3.7	3.65
Start Current	A	0.5	1.5	1.0
Rated voltage /Frequency	V/Hz	230/50	230/50	400/50/3P
Maximum input power	kW	2.88	3.45	6.9
Maximum input current	A	12.5	15.0	10
High pressure cut-off value	MPa	4.40		
Low pressure cut-off value	MPa	0.05		
Type of Compressor	/	Twin rotary		
Brand of EEV		Saglnomiya		
Brand of 4-way valve		Saglnomiya		
Refrigerant	/	R410a		
Refrigerant	Kg	2.3	3.3	3.90
Air flow	m ³ /h	3700	4200	7200
Waterproof grade	/	IPX4		
Noise	dB(A)	46	49	52
Max water outlet temperature	°C	60		
Diameter of water connection	/	DN 25		
Rating water flow	m ³ /H	1.50	2.15	2.9
Internal pressure drop at rating water flow	KPa	14	16	20
Color		White	White	White
Net Dimensions (L/W/H)	mm	1118/470/710	1118/470/970	1118/470/1270
Net Weight	KG	95	125	150
Rated test conditions: Heating: Ambient Temp. (DB/WB): 7°C/6°C, Water Temp. (In/Out): 30°C/35°C Cooling: Ambient Temp. (DB/WB): 35°C/24°C, Water Temp. (In/Out): 23°C/18°C				

6 Maintenance

6.1 Maintenance and Cleaning for User

It is good practice to inspect your heat pump regularly. Maintenance should be carried out at least annually to maintain a good lifespan of your heat pump.

1. Regularly clean the Y type filters every 6 months to ensure that the system is clean and to avoid blockage to the system.
2. Units should be kept clean (no leaves or dirt) and no obstructions should be placed in front of or behind the unit. Good ventilation and regular cleaning (3-6 months) of the evaporator will help maintain efficiency.
3. Ensure the unit has power in the winter whether the unit is used or not.
4. Check the power unit and electrical system.
5. Check the water system, safety valves and exhaust devices are working properly so as not to pump air into the system causing reduced circulation.
6. Check water pump is functioning properly. Make sure the water pipeline and pipe fittings are not leaking.
7. Clear evaporator of any debris.
8. Check the various components of the unit work properly. Inspect the pipe joints and valves branch have inflated oil, to ensure no leakage of the refrigerant unit.
9. Chemically flush the plate heat exchanger after every 3 years.
10. Check refrigerant gas content if necessary.
11. Check delta (water in/out) making it meets the guidelines of delta 3 to 7.

7 How To Get The Most Out Of Your Heat Pump

It is important to understand that you should operate heat pumps differently to conventional heating systems such as gas boilers. Below are some points you should be aware of:

- Since heat pumps produce water at a lower temperature (than gas boilers), it is important to remember the heat up time of your property is slower.
- The lower temperature the heat pump produces, the more efficient it is.
- The higher the ambient temperature (outside temperature), the more efficient the heat pump is.
- The heat pump has a simple job, and that is to maintain the water tanks at the set temperature.
- It's a good idea to let your heat pump maintain your water tank temperatures 24 hours a day during the winter. This will enable your central heating controller to call for heat in the home at any time. During the summer you can set the timer on the heat pump controller for your hot water requirements.

With the above in mind, you could decide between the following:

Option 1. You could decide to operate your heat pump during the day time (when temperatures are higher). At the same time you could set the water temperature lower. This will basically charge your home during the day so in the evening the home is warm and the heat pump simply maintains the heat. This is not controlled by the heat pump controller, it is controlled by your central heating controller.

Option 2. You could operate your central heating controller in a similar way to a conventional boiler. You must set the programme at least 1 hour before you need your property to be warm. The downside to this is that you may need to set the water that the heat pump produces to a higher temperature.

Option 3. You could decide to operate your home with back ground heat. This means you are always (24 hours a day) putting a trickle heat in your home. In all cases it is recommended to maintain a minimum temperature in your home (e.g. 14c to16C) during the evening. This is controlled by your central heating controller.

There is no right and wrong way to operate your heat pump. We cannot tell you which is the most efficient way to operate it since every home is different. What we can say is that you should look for the best way to heat your home that suits your lifestyle. Nowadays with low cost energy monitors, you can easily find the most cost effective way to heat your home. We hope you enjoy your Heat Pump.

Safety notice

Never perform any cleaning operations before switching off the external isolator.

Do not modify safety or control devices without consultation with the manufacturer

Do not pull, detach or twist the electrical cables coming from the unit

Do not introduce pointed objects through the grill and into the fan.

Important Notice for Antifreeze to Avoid heat pump broken

1. **Water flow switch MUST be installed** during installation for heat pump air conditioning side to ensure proper water flow.
2. **Water filter MUST be installed** before water go into PLATE HEAT EXCHANGER. The water filter need to be cleaned at least half an year.
3. **Must use enough brine(glycol) in the water system in cold area.** if the air temp is lower than -0 °C, for the safety, you must use brine(glycol) as the fluid in the heat pump water system instead of pure water.
4. **MUST keep the electricity power supply always connected even when you don't use the heat pumps.** Our heat pump has antifreeze function if with electricity connected. So If without enough glycol (antifreeze liquid) and if the electricity is cut off by accident for more than 30 minutes in winter, you need to drain out all the inside water to protect the heat pump to be frozen.