Parameter setting:
P48=0 disable DHW tank temperature sensor (default)
L12=1 disable high temperature sterilization (default)
P164 is used to control cascade. Please refer to Chapter 2.7.7 for specific setting methods.
Refer to Section 2.5.5.7 for wiring.
Refer to Chapter 1.3.5.1 to set slave unit.

No.	Name	No.	Name
1	Air Vent Valve (Built-in)	P_a	Built-in Water Pump (Built-in)
2	Water Flow Switch (Built-in)	P_b	Heating/Cooling Water Pump (Field Supply)
3	Safety Valves (Built-in)	P_c[1]	Auxiliary Water Pump (Field Supply)
4	Expansion Tank (Built-in)	EH2	Electric Heater (Field Supply)
5	Ball Valves (Field Supply)	SV2	3-Way Valve (Field Supply)
6	Filter (Field Supply)	T15	Water Outlet Temp. Sensor (Built-in)
7	Non-Return Valves (Field Supply)	T8	Water Inlet Temp. Sensor (Built-in)
8	Bypass Valves (Field Supply)	T10[2]	Buffer Tank Temp. Sensor (Built-in)
9	Buffer Tank (Field Supply)	T9	Total Water Outlet Temp. Sensor (Built-in)
10	Underfloor Heating (Field Supply)		
11	Fan Coil (Field Supply)		
12[3]	Heat Pump Cascade		

1. If the unit is too far away from the buffer tank or the domestic water tank coil is too long, it is necessary to increase the installation of this pump to auxiliary circulation.
2. This sensor needs to be enabled when opening the dual-temperature zone control.
***NOTE：** The installation diagram is for reference only and installation is subject to actual conditions.*

2.7 Unit Operation

This section only introduces the setting parameters and operation introduction of common modes and some parts, for more parameters, please refer to section 4.3.

2.7.1 Running Mode

It mainly introduces the operation mode and setting parameters of several operation modes of the unit.

2.7.1.1 Silent Mode

When running this mode, the unit will reduce the compressor frequency and fan frequency to make the unit less noisy. The maximum compressor frequency and fan frequency will be limited to P88 and P89.

Parameter	Default Value/Range/Unit	Description
P88	50（20-70）/Hz	Max. compressor operating frequency
P89	40（20-60）/Hz	Max. fan operating frequency **(RPM=Hz*15)**
NOTE: *Lower frequency leads to lower unit capacity* ***Example:*** *Turn on the silent mode, the maximum operating frequency of the compressor will be limited to 50Hz, and the maximum operating frequency of the fan will be limited to 40Hz.*		

2.7.1.2 Powerful Mode

To run this mode, the unit will operate by increasing the compressor ramp-up speed and maximum operating frequency, which is then controlled by P179 and P180.

Parameter	Default Value/Range/Unit	Description
P179	15（0-40）/Hz	Power mode frequency increase
P180	5（0-40）/Hz	Power mode frequency limit increase
Example: *Turning on the Power Mode increases the compressor frequency by 15 Hz each time, and the maximum frequency will be increased by 5 Hz from the original maximum compressor operating frequency.*		

2.7.1.3 Sterilization Mode

When the unit is enabled for hot water mode, you can choose to enable the sterilization mode, and the sterilization mode parameters are set according to the following parameters.

Parameter		Default Value/Range/Unit	Description	Note
L12=2	/	/	Manually enter sterilization mode	Refer to sections 3.1.3.1 and 3.2.3.1 for entry method.
L12=1	/	/	Disable sterilization mode	
L12=0	L13	7 (5-30）/Day	Days between sterilizations	Sterilization cycle
	L14	23:00 (0-24）	Sterilization start-up time	Sterilization mode start time point
	L15	10 (0-50）/Min	Sterilization running time	Sterilization mode continuous running time

Parameter		Default Value/Range/Unit	Description	Note
	L16	70 (50-80）/℃	Sterilization temp setting	Sterilization mode water temperature
NOTE: *When the unit is enabled for electric heater, the sterilizing mode will be turned on demand.* ***Example:*** *When the sterilization mode is enabled, the unit will run sterilization once at 23:00 and 7 days interval, the sterilization will continue to run at 70℃ water temperature for 10Min and then exit; the next time it will be turned on will be at 23:00 after 7 days.*				

2.7.1.4 Quick Heating Mode

The unit will turn on the electric heater and auxiliary heat source to achieve rapid heating, please refer to 2.7.2 for specific operation.

2.7.2 Electric Heater/AHS

Explanation of the operation and parameters of electric heaters for different locations.

The following parameters and conditions control the switching on and off electric heater:

Electric Heater Type	Turn On	Turn Off
EH2	Ambient Temperature≤P22 And Water Inlet Temperature<Setting Temperature-P26	Ambient Temperature≥P22+3 Or Reach Setting Temperature
EH1	Ambient Temperature≤P22 And DHW Tank Temperature<Setting Temperature-P96	DHW Tank Temperature ≥ Setting Temperature
NOTE: ***P22=-7℃(Default);P26=5℃(Default);P96=5℃(Default)***		

2.7.2.1 Electric Heater of Buffer Tank（EH2）/ Electric Heater of DHW Tank（EH1）/AHS

If the tank is installed with electric heater and parameters P139/P140 are used for electric heater or auxiliary heat source turn on, then the parameters need to be configured as follows, for wiring please refer to section 2.5.1.

Parameter	Setting Value	Description
P139	0 (Default)	Enable buffer tank electric heater
	1	Disable buffer tank electric heater
	2	Enable auxiliary heat source for heating
P140	0 (Default)	Enable DHW tank electric heater
	1	Disable DHW tank electric heater
	2	Enable auxiliary heat source for DHW

2.7.2.2 Electric Heater of Water Pipes

If electrical pipe heater is added to the installation, then the P182 parameter needs to be set as shown in the table.

Parameter	Setting Value	Description
P182	0	Enable pipe electric heater(3kW+6kW)
	1	Disable pipe electric heater(3kW)
	2	Disable pipe electric heater(6kW)
	3	Disable pipe electric heater
	4	Forced enable pipe electric heater

2.7.3 Water Pump

This section explains how each water pump in the system operates.

2.7.3.1 Built-in Water Pump (P_a)

The operation of the unit's built-in circulating water pump is controlled by parameter P28, the settings of which are shown in the table below:

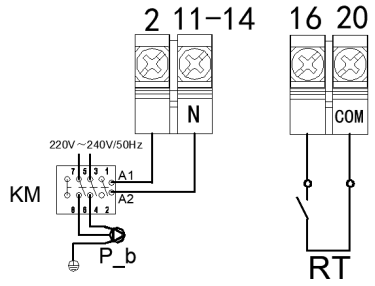
Parameter	Setting Value	Description	Note
P28	0	Water pump run continuously after the unit reaches the target temperature	
	1 （Default）	After the unit reaches the target temperature, water pump runs at a cycle of 2Min every 10Min.	
	2	In cooling mode, the water pump runs continuously after the unit reaches the target temperature.	For cooling mode only, other modes operate as P28=1.
	3	In cooling and heating mode, the water pump runs continuously after the unit reaches the target temperature.	For cooling/heating mode only, other modes are operated according to P28=1.
	4	In heating mode, the pump runs continuously after the floor heating reaches the target water temperature	For underfloor heating water temperature only, other modes operate as P28=1

In addition, P_a water pumps use different brands and models of water pumps, the corresponding P146 parameters are not the same, if the maintenance of the replacement of different brands of water pumps, you need to follow the table corresponding to the model and parameter settings.

Water Pump		Unit	P146
Brand	Model		
SHIMGE	APM25-9-130	HH-C1-6 HH-C1-8 HH-C3-8 HH-C1-12 HH-C3-12	66
	APF25-12-130EFPWM1	HH-C1-18 HH-C3-18	62
GRUNDFOS	UPM3K/25-75/130	HH-C1-6	66
	UPML/25-105/130	HH-C1-8 HH-C3-8 HH-C1-12 HH-C3-12	66
	UPMXL/25-125/130	HH-C1-18 HH-C3-18	62
NOTE: *P146 is set correctly for correct flow feedback from water pumps.*			

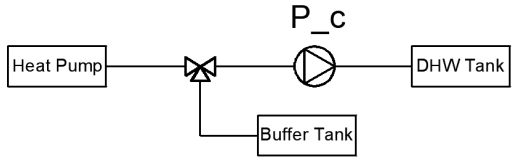
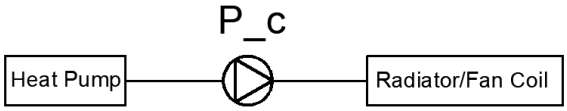
2.7.3.2 Heating/Cooling Water Pump (P_b)

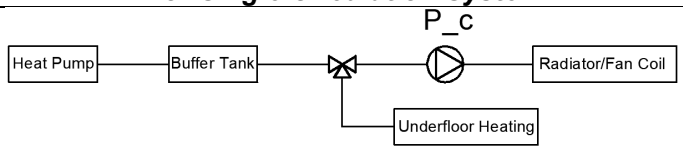
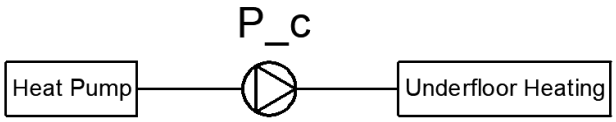
The water pump is used as a circulating water pump in the heating circuit and the mode of operation is controlled by parameter P150, the settings of which are shown in the table below:

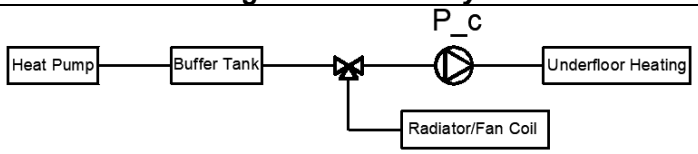
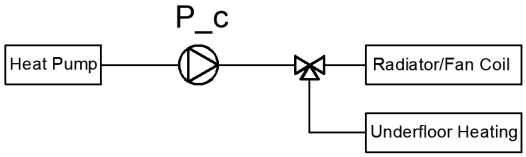
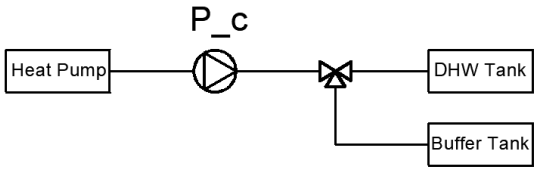
Parameter	Setting Value	Description	Note
P150	1	The water pump starts when the unit is turned on or when it reaches temperature and stops.	
	2 (Default)	The water pump is controlled via room thermostat	***When P150=2, it is necessary to connect the room thermostat*** 
	3	The water pump is controlled via the wired controller	Wired controller with built-in temperature sensor for use as a room thermostat

2.7.3.3 Auxiliary Water Pump (P_c)

Since the head of the built-in circulating water pump is fixed, if you need to add additional pumps to meet the system demand in the actual installation, you can set different parameters for the installation position of the auxiliary pump, please refer to section 2.5.1 for the wiring.

<table>
<tr><th>Parameter</th><th>Setting Value</th><th>Description</th><th>Diagram</th></tr>
<tr><td rowspan="6">P161</td><td>0 (Default)</td><td>Auxiliary pumps for DHW</td><td> 
</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Auxiliary pumps for cooling/heating circuits</td><td> 

For Single Circulation System</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Auxiliary pumps for underfloor heating</td><td> 

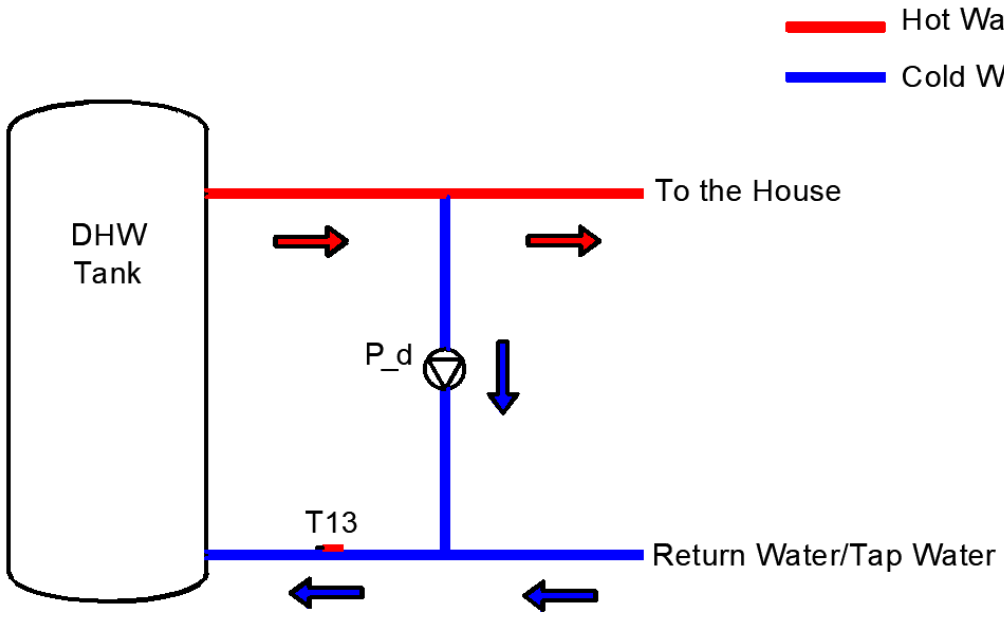
For Single Circulation System</td></tr>
<tr><td> 
</td></tr>
<tr><td>3</td><td>Auxiliary pumps for cooling/heating and underfloor heating circuits</td><td> 
</td></tr>
<tr><td>4</td><td>Auxiliary pumps for unit circulation</td><td> 
</td></tr>
<tr><td colspan="4">NOTE: When running the corresponding mode, when the main unit circulation pump starts, the unit auxiliary pump starts at the same time.</td></tr>
</table>

2.7.3.4 DHW Return Water Pump (P_d)

The water pump is used for domestic water tank and user use side, can make the domestic hot water temperature in the house to maintain the temperature of the temperature, the control parameters are controlled by L22, the parameters of the temperature of the circulating return water are controlled by L23 and L24, and the cycle and time of the return water are controlled by L25 and L26, the specific setup and mode of operation are shown in the following table:

Parameter	Setting Value	Description	Note
L22	0 （Default）	Disable DHW return water function	
	1	Enable the water return function and keep the water pump on	
	2	Enable the water return function and control the water return function according to the cycle. Currently, the water pump runs L26 after every L25	L25：Default 30Min(3-90Min) L26: Default 5Min(1-30Min)
	3	Enable the water return function and control the water return function according to the temperature difference. At this time, if the return water temperature L23 ≤ L23-L24, then enable the water return function, and stop after reaching the temperature	L23：Default 40℃(20-65℃) L24: Default 5℃(1-15℃)

Example:
When L22=2, the pump will run for 5 Min every 30 Min to maintain the water temperature in the water pipes in the house.
When L22=3 and the set return temperature is 40℃, the return function will be enabled when the temperature in the water pipe is lower than 40-5=35℃, and will be turned off when the water temperature reaches 40℃.



2.7.3.5 AHS Water Pump (P_e)

When the system is connected to solar water heater, the unit starts the solar water heater by controlling this water pump. The water pump is controlled by parameters P151 and P152, which are set in the following table:

Parameter	Default Value/Range/Unit	Description	Note
P151	10（0-40）/℃	DHW tank heat source return temperature	When the solar water heater water pump is used in the hot water tank
P152	10（0-40）/℃	Buffer tank heat source return temperature	When the solar water heater water pump is used in the buffer tank
NOTE: *Turn on: Hot water/buffer side heat source temperature > hot water/buffer tank temperature + P151/P152* *Turn off: Hot water/buffer side tank temperature < hot water set temperature*			

2.7.4 Three-Way Valve

This section explains how the three-way valve operates in the system.

2.7.4.1 SV1#Three-Way Valve

This three-way valve is used to switch between DHW-buffer tank. When switching heating/hot water modes, use the three-way valve to switch the water line, see the following table for specific operation:

Running Mode	Terminal Block No.	Status	Control Type
Hot Water	7#	230V	Type 1
	8#	0V	
Heating/Cooling (Buffer Tank)	7#	0V	
	8#	230V	
NOTE: When repairing, you can use a multimeter to detect whether the heat pump has normal voltage output to the three-way valve			

2.7.4.2 SV2#Three-Way Valve

This three-way valve is used to switch fan coil- underfloor heating, when switching working mode, the three-way valve is used to switch the water circuit, the specific operation is shown in the following table:

Running Mode	Terminal Block No.	Status	Control Type
Underfloor Heating	9#	230V	Type 1
	10#	0V	
Fan Coil (Heating/Cooling)	9#	0V	
	10#	230V	
NOTE: When repairing, you can use a multimeter to detect whether the heat pump has normal voltage output to the three-way valve			

2.7.4.3 SV3#Three-Way Valve (Mixing Valve)

When the dual zone temperature control is enabled for underfloor heating mixing, see the table below for specific operation:

Three-Way Valve Status	Terminal Block No.	Status	Control Type
Close	A3#	230V	Type 1
	A4#	0V	
Open	A3#	0V	
	A4#	230V	
NOTE: When repairing, you can use a multimeter to detect whether the heat pump has normal voltage output to the three-way valve			

2.7.5 Linkage Switch

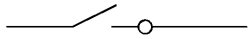
The linkage switch is a dry contact signal, indicating both open and closed states.

Terminal Block No.	Description	Operating Principle	Note
15-20	Forced Cooling Switch	When closed, the unit running cooling mode, typically used to connect thermostats that can switch between operating modes	Open by default, no parameter setting required
16-20	Linkage Switch (External Water Pump)	Used to connect room thermostat to control the P_b Water Pump turn ON/OFF	
17-20	Forced Heating Switch	When closed, the unit running heating mode, typically used to connect thermostats that can switch between operating modes	
18-20	Linkage Switch (Heat Source of DHW)	Usually used to connect solar water heater	
19-20	Linkage Switch	Used to connect room thermostat, to control the unit, setup parameters refer to section 2.7.5.1	Controlled by parameter P05
NOTE: There is no voltage output from the linkage switch, it is just a passive signal.			

2.7.5.1 Room Thermostat

Connect the room thermostat and use the room temperature to control the unit on and off.

Parameter	Setting Value	Description	Example
P05	0 (Default)	**Enable** the linkage switch Closed: Turn on Opened: Turn off (DHW included)	When the linkage switch is closed, the heat pump will turn on when there is a demand to turn on the heat pump. When the linkage switch is opened, the heat pump will not turn on, and will not turn on when there is a demand for DHW
	1	**Disable** the linkage switch	**Disable** the linkage switch

	2	**Enable** the linkage switch Closed: Turn on Opened: Unit enter the standby mode	When the linkage switch is closed, the heat pump will turn on when there is a demand to turn on the heat pump. When the linkage switch is opened, the heat pump enters standby mode, but the water pump operates in the mode that has been set.
	3	**Enable** the linkage switch Closed: Turn on Opened: Turn off (DHW not included)	When the linkage switch is closed, the heat pump will turn on when there is a demand to turn on the heat pump. When the linkage switch is opened, the heat pump will not turn on, but when there is a demand for DHW, it will switch to DHW mode operation
Opened 		Closed	

2.7.6 Dual Temperature Zone

When the house at the same time using the radiator and floor heating, need to set different water temperature, this time you need to turn on the unit's dual-temperature zone function, the unit through the control of the mixing valve and mixing pump to achieve the floor heating temperature regulation. Currently, the parameter settings refer to the following table:

Parameter	Setting Value	Description	Note
P257	0	Enable dual temperature zones when the unit is turned on	Corresponds to the temperature sensor: T11: Enable temperature zone 2 temperature. T10: Enable buffer tank temperature
	1	Enable dual temperature zones on demand	
	2 （Default）	Disable dual temperature zones	
P258	/	Mixing valve adjustment cycle	Factory parameter adjustment is recommended to consult the manufacturer
P259	/	Mixing valve closure duration	
P265	/	Mixing valve single adjustment percentage	

2.7.7 Cascade

If more than one unit needs to be installed at the same time, it is necessary to turn on the cascade function for unit control, refer to section 1.3.5.1 for the dialing method, and refer to section 2.6.4 for wiring and installation. For specific parameter settings, please refer to the following table:

Parameter	Setting Value	Description	Note
P164	0	Enable cascade intelligent control mode	Parameters P165-P170 take effect when enabled
	3 （Default）	Disable cascade intelligent control mode	
P165	3℃	Loaded unit return temperature	Controls whether to turn on the next unit
P166	2℃	Derating unit return temperature	Controls whether to turn off the next unit

P167	3℃	Emergency stops return temperature	Controls whether to turn off the unit
P168	50%	Hot water mode unit activation ratio	Limit the total number of starting units
P169	100%	Heating/Cooling mode unit activation ratio	Limit the total number of starting units
P170	7Min	Load unit cycle	Time to activate the next unit
NOTE: *Factory parameter adjustment is recommended to consult the manufacturer*			

2.7.8 SG Ready

If the unit is connected to the smart grid, this function can be enabled via parameter P255, refer to section 2.5.4 for wiring, and the unit will run in different modes according to the signals received:

Parameter	Status (0:Open 1:Close)		Running Mode	Description
	EVU	SG		
P255=0	1	1	Running DHW Mode	1. Set the hot water temperature to the sterilization temperature. 2. Turn on electric heater
	1	0	Running DHW Mode	1. Set the hot water temperature to the sterilization temperature. 2. Turn on electric heater
	0	1	Running current mode	
	0	0	Turn off hot water mode and enter ECO mode	1. Turn off the hot water mode, turn off the electric heater 2.Turn off after running P256 Min (default 3Min)
P255=1 (Default)	Disable			

2.7.9 Anti-Freeze Protection

In cold weather in winter, to protect the unit and water pipes, the unit will automatically enter the anti-freeze protection mode according to the ambient temperature and the water outlet temperature. The parameter of the unit is as follows:

Parameter	Setting Value	Description
P117	5℃(0℃-10℃)	Ambient temperature for antifreeze protection
P118	3℃(0℃-20℃)	Water outlet temperature for anti-freeze protection
P29	2min(0min-20min)	Water pump runtime with freeze protection

The heat pump will judge whether to enter the anti-freeze protection according to the ambient temperature and water temperature under standby condition, and the unit has two levels of anti-freeze protection, which correspond to different operation modes. When the hot water function is turned on, it will increase the domestic hot water tank temperature determination. Please refer to the following table for detail:

Anti-Freeze Level	Type	Entry Condition	Exit Condition	Unit Operate in Anti-Freeze Protection
I	Heating	Ambient Temp. ≤P117	Ambient Temp. ≥P117+3℃	P_a pumps every 10 minutes then run P29 minutes
II	Heating	Ambient Temp. ≤P117 **and** Water Outlet Temp. ≤P118	Ambient Temp. ≥P117+3℃ **or** Water Outlet Temp. ≥15℃	Running heating mode and turn on electric heater
	Heating + DHW	Ambient Temp. ≤P117 **and** DHW Water Tank Temp. ≤P118	Ambient Temp. ≥P117+3℃ **or** Water Outlet Temp. ≥P118+12℃	Running heating mode and turn on electric heater

** Please note that if the unit is running in standby mode, it is possible that it has entered the freeze protection mode.*

2.8 Basic Running Logic & Setting

This chapter mainly explains the basic operation logic of the unit, including the heating mode of the unit, the startup and shutdown conditions of the cooling mode and hot water mode, the operation mode of the unit after it reaches the set temperature, and the water temperature control mode of the unit, etc. The following will be an explanation of some of the terms and parameters used, so that the corresponding parameters can be better understood and set.

Parameter	Description	Explanation
P26	*Temperature difference of heating and cooling(ΔT_{P26})	It is used to control the on/off parameter in heating mode or cooling mode, when the current water temperature of the unit is greater than the sum of the set water temperature and the parameter or less than the difference between the set water temperature and the parameter, the unit will be on/off.
P27	*Temperature difference of underfloor heating(ΔT_{P27})	It is used to control the on/off parameter in floor heating mode, when the current water temperature of the unit is greater than the sum of the set water temperature and this parameter or less than the difference between the set water temperature and this parameter, it will enter on/off.
P37	When the unit reaches the set temperature, choose to control the operation mode of the compressor	0: The unit will not shut down immediately after reaching the set temperature, and it needs to be determined whether to shut down or not according to the running frequency and length of the compressor.
		1: Shutdown after reaching the target water temperature, the unit will shut down immediately after reaching the set temperature.
		2: The unit will enter the intelligent shutdown mode when running the cooling mode and will enter the temperature shutdown when running the heating mode.
P96	*Temperature difference of DHW(ΔT_{P96})	It is used to control the on/off parameter in DHW mode
P116	Unit temperature control mode	1: The unit is controlled by the water **OUTLET** temperature, at this time the real-time temperature displayed on the wired controller is the water temperature at the water outlet of the unit.
		0: The unit is controlled by the **INLET** water temperature, at this time the real-time temperature displayed on the wired controller is the water temperature at the inlet of the unit.
** Temperature Difference: To prevent the unit from frequent off and on, this parameter is set to regulate the unit off and on.* *Note：* ***P26=0℃（Default）;P27=0℃（Default）;P96=5℃（Default）;P116=1（Default）***		

2.8.1 Temperature Difference Setting (ΔT)

In general, this parameter is not recommended to be changed, and this section describes the basic settings of the temperature difference. The following is expressed using ΔT.

When running hot water mode, the temperature differential setting is parameter P96.

When running the heating mode, the temperature differential setting is parameter P26. At this time, when P26 ≠ 0, the unit's temperature differential is set according to P26; when P26 = 0, the unit's temperature differential value is calculated by the following formula:

$$\Delta T_{P26} = \frac{Water\ Inlet\ Temperature}{10}$$

ΔT_{P26} calculated then take 2°C-5°C

For example, if current water inlet temperature is 46°C, then ΔT_{P26}=4.6°C=4°C

When running the cooling mode, the temperature difference is set with parameter P26, at this time, when P26 ≠ 0, the temperature difference of the unit is set according to P26; when P26 = 0, the value of the temperature difference of the unit is calculated by the following equation：

$$\Delta T_{P26} = 5 - \frac{Water\ Inlet\ Temperature}{10}$$

ΔT_{P26} calculated then take 2°C-5°C

For example, if current water inlet temperature is 15°C, then ΔT_{P26}=1.5°C=1°C

When running the underfloor heating mode, the temperature difference is set with parameter P27, at this time, when P27 ≠ 0, the temperature difference of the unit is set according to P27; when P27 = 0, the value of the temperature difference of the unit is calculated by the following equation：

$$\Delta T_{P27} = \frac{Water\ Inlet\ Temperature}{10}$$

ΔT_{P27} calculated then take 2°C-5°C

For example, if current water inlet temperature is 36°C, then ΔT_{P27}=3.6°C=3°C

Parameter P26/P27 is factory set to 0℃, so the temperature difference of the unit is calculated according to the inlet water temperature.

2.8.2 Heating Mode

When the unit is running the heating mode, please refer to the following table for the unit's on and off conditions：

P116	P37	Turn On Condition	Turn Off Condition
1 (Default)	0 (Default)	Water Outlet Temperature < Setting Temperature - ΔT_{P26} -* ΔT **** ΔT =Water Outlet Temperature – Water Inlet Temperature (Temperature difference at heat pump shutdown)***	Water outlet temperature ≥ setting temperature and compressor at the lowest frequency (Fmin) continuous operation ≥ 5min **Or** Water outlet temperature ≥ Setting temperature +3°C
	1/2		Water outlet temperature≥Setting temperature
0	0	Water Inlet Temperature < Setting Temperature- ΔT_{P26}	Water inlet temperature ≥ setting temperature and compressor at the lowest frequency (Fmin) continuous operation ≥ 5min **Or**

			Water inlet temperature ⩾ Setting temperature +3°C
	1/2		Water inlet temperature⩾Setting temperature

2.8.3 Underfloor Heating Mode

When the unit is running the underfloor heating mode, please refer to the following table for the unit's on and off conditions：

P116	P37	Turn On Condition	Turn Off Condition
1 (Default)	0 (Default)	Water Outlet Temperature < Setting Temperature - ∆ T_{P27} -* ∆ T ***∆T =Water Outlet Temperature – Water Inlet Temperature (Temperature difference at heat pump shutdown)***	Water outlet temperature ⩾ setting temperature and compressor at the lowest frequency (Fmin) continuous operation ⩾ 5min **Or** Water outlet temperature ⩾ Setting temperature +3°C
	1/2		Water outlet temperature⩾Setting temperature
0	0	Water Inlet Temperature < Setting Temperature - ∆ T_{P27}	Water inlet temperature ⩾ Setting temperature and compressor at the lowest frequency (Fmin) continuous operation ⩾ 5min **Or** Water inlet temperature ⩾ Setting temperature +3°C
	1/2		Water inlet temperature⩾Setting temperature

2.8.4 Cooling Mode

When the unit is running cooling mode, please refer to the following table for the unit's on and off conditions:

P116	P37	Turn On Condition	Turn Off Condition
1 (Default)	0/2	Water Outlet Temperature＞ Setting Temperature +ΔT_{P26} +* ∆ T ***∆T =Water Outlet Temperature – Water Inlet Temperature (Temperature difference at heat pump shutdown)***	Water Outlet Temperature ≤ Setting temperature and compressor at the lowest frequency (Fmin) continuous operation ⩾ 5min **Or** Water Outlet Temperature ≤ Setting temperature -3℃
	1		Water Outlet Temperature ≤ Setting temperature
0	0/2	Water Inlet Temperature＞Setting Temperature + ∆ T_{P26}	Water inlet temperature⩽Setting temperature and compressor at the lowest frequency (Fmin) continuous operation ⩾ 5min **Or** Water inlet Temperature ≤ Setting temperature -3℃

	1		Water Outlet Temperature ≤ Setting temperature

2.8.5 DHW Mode

When the unit is running DHW mode, please refer to the following table for the unit's on and off conditions:

Turn On Condition	Turn Off Condition
DHW Tank Temperature＜Setting Temperature-ΔT_{P96}	DHW Tank Temperature≥Setting Temperature
**When the unit is running hot water mode together with other modes, hot water mode is given priority whenever hot water is demanded.*	

4.2 Error Code

4.2.1 Motherboard

Error Code	Error Description	Troubleshooting
E01	Wrong Phase	Power Supply Connect Wrong Phase
E02	Missing Phase	Power Supply Missing Phase
E03	Water Flow Failure	1.Check whether the circulating water pump is normal and whether the water system is blocked.
		2.Check whether the water flow switch is normal and whether the installation direction is correct.
		3.Check whether the wiring of the water flow switch is correct or not.
		4.Check whether the water pump head meets the actual requirements
		5.Check whether the water pump is reversed and installed in the wrong direction.
E04	Abnormal Communication between Motherboard and Remote Module (Reserved)	Check the communication connection between the motherboard and the remote module
E05	High Pressure Switch Failure	1.Check pressure switch for damage, wiring error
		2.Check if there is too much refrigerant in the system.
		3.Check whether the fan is working properly and whether the water flow of the unit is normal.
		4.Check whether there is air or blockage in the fluorine system.
		5.Check whether the water-side heat exchanger is seriously caked with whitewash.
E06	Low Pressure Switch Failure	1.Check pressure switch for damage, wiring error
		2.Check if there is not enough refrigerant in the system.
		3.Check whether the fan is working properly
		4.Check whether there is air or blockage in the fluorine system.
E09	Wire Controller Communication Failure	Check the communication connection between the wire controller and the main board
E10	Reserve	Reserve
E11	Out of Use Time	The free trial period has expired, enter the boot password

Error Code	Error Description	Troubleshooting
E12	Exhaust Temp. Too High	1.Fluorine system clogging
		2.Lack of refrigerant in the fluorine system or bad sensor
E14	DHW Tank Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E15	Water Inlet Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E16	Outer Coil Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E18	Exhaust Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E20	Indoor Ambient Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E21	Outdoor Ambient Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E22	DHW Return Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E23	Water Outlet Temp. Too Low in Cooling Mode	1.Check whether the water flow is too low or no water flow
		2.Check if the water outlet sensor is damaged
		3.Fluorine system clogging
E24	Antifreeze Temp. Sensor Failure (Fluorine Circuit)	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E25	Reserve	Reserve
E26	Antifreeze Temp. Sensor Failure (Water Circuit)	1. The sensor wire is loose or damaged
		2. Sensor is damaged

Error Code	Error Description	Troubleshooting
		3. The motherboard port is damaged
E27	Water Outlet Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E29	Suction Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E30	Suction Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E31	Water Pressure Failure	1.Water pressure switch wiring error
		2.Water pressure switch failure
E32	Water Outlet Temp. Sensor T15 Failure	1.Water flow is not enough
		2.Sensor failure
E33	High Pressure Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E34	Low Pressure Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E37	Large Temp. Difference between Water Inlet and Outlet	1.The water inlet or outlet sensor is damaged
		2.Water inlet or outlet sensor not placed or in the wrong position
		3.Water flow is not enough
E38	Fan Failure	Fan driver board or motor failure
E42	Cooling Coil Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E44	Ambient Temp. Too Low	Normal protection
E47	Economizer Inlet Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
E48	Economizer Inlet Temp. Sensor	1. The sensor wire is loose or damaged

Error Code	Error Description	Troubleshooting
	Failure	2. Sensor is damaged
		3. The motherboard port is damaged
E49	Economizer Outlet Temp. Sensor Failure	Same as E47
E51	High Pressure Too High	Same as E05
E52	Low Pressure Too Low	Same as E06
E55	Expansion Board Communication Failure	1.Poor contact or broken signal wire
		2.Expansion board damage
		3.Motherboard damage
E80	Power Supply Error	Single-phase power supply unit detects a three-phase electrical signal
E88	Inverter Drive Module Protection	Compressor or compressor driver board is damaged, specific faults see 4.2.2
E94	Built-in pump over/under voltage	1. Input power supply voltage＜165V
		2. Input power supply voltage＞265V
		3. Electronic components on the pump drive board are damaged or damp
		4. Water pump failure
E96	Compressor Drive Board Communication Failure	1.Poor contact or broken signal wire
		2.Electronic components on the motherboard are damaged or damp.
		3.Compressor drive board on the electronic components are damaged or moisture
		4.Compressor drive board power supply is not powered on
E98	Fan Board Communication Failure	1.Poor contact or broken signal wire
		2.Electronic components on the motherboard are damaged or damp.
		3.Fan drive board on the electronic components are damaged or moisture
		4.Fan drive board power supply is not powered on
EA1	Cascade Model Mismatch	Different series of units are not allowed to be cascaded
EA2	Solar Water Heater Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
EA3	Zone 2 Temp. Sensor Failure	1. The sensor wire is loose or damaged

Error Code	Error Description	Troubleshooting
		2. Sensor is damaged
		3. The motherboard port is damaged
EA4	Buffer Tank Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged
EA5	Total Water Outlet Temp. Sensor Failure	1. The sensor wire is loose or damaged
		2. Sensor is damaged
		3. The motherboard port is damaged

4.2.2 Driver Board (Compressor)

Compressor Drive Error Description Table		
E88	P1	IPM Module Overheat and Shutdown
	P2	Compressor Driver Failure
	P3	Compressor Overcurrent
	P4	Input Voltage Missing Phase
	P5	IPM Supply Voltage Failure
	P6	Power Component Overheating and Shutdown
	P7	Pre-charge Circuit Voltage Failure
	P8	DC Bus Overvoltage
	P9	DC Bus Undervoltage
	P10	AC Input Undervoltage
	P11	AC Input Overvoltage
	P12	Input Voltage Sampling Failure
	P13	DSP and PFC Communication Failure
	P14	Board Radiator Temp. Sensor Failure
	P15	DSP and Communicate Board Communication Failure
	P16	Communication Failure with Motherboard
	P17	Compressor Overcurrent Alarm
	P18	Compressor Weak Magnetic Protection Alarm
	P19	IPM Overheat Alarm
	P20	PFC Overheat Alarm
	P21	AC Input Overcurrent Alarm
	P22	EEPROM Error Alarm
	P23	N/A

Compressor Drive Error Description Table		
	P24	EEPROM Refresh Complete
	P25	Temperature Sensing Failure Limit
	P26	AC Undervoltage Frequency Limit Protection Alarm；
	P27	N/A
	P28	N/A
	P29	N/A
	P30	N/A
	P31	N/A
	P32	N/A
	P33	IPM Module Overheat and Shutdown
	P34	Compressor Missing Phase
	P35	Compressor Overload
	P36	Input Current Sampling Failure
	P37	IPM Supply Voltage Failure
	P38	Pre-charge Circuit Voltage Failure
	P39	EEPROM Failure
	P40	AC Input Overvoltage Failure
	P41	Microelectronics Failure
	P42	Compressor Type Code Failure
	P43	Current Sampling Signal Overcurrent
Wire controller blinks to cycle through E88 and above codes		

4.3 Parameter & Explanation

4.3.1 Running Parameter

No.	Description	Setting Range	No.	Description	Setting Range
1	Compressor Running Frequency	0～150Hz	31	System 2 Compressor Running Frequency	
2	Fan Running Speed	0～999Hz	32	System 2 Fan Running Speed	
3	EEV Open Step	0～480P	33	System 2 EEV Open Step	
4	EVI Valve Open Step	0～480P	34	System 2 EVI Valve Open Step	
5	AC Input Voltage	0～500V	35	System 2 AC Input Voltage	
6	AC Input Current	0～50.0A	36	System 2 AC Input Current	
7	Compressor Phase Current	0～50.0A	37	System 2 Compressor Phase Current	
8	Compressor IPM Temp.	-40～140℃	38	System 2 Compressor IPM Temp.	
9	High Pressure Saturation Temp.	-50～200℃	39	System 2 High Pressure Saturation Temp.	

No.	Description	Setting Range	No.	Description	Setting Range
10	Low Pressure Saturation Temp.	-50～200℃	40	System 2 Low Pressure Saturation Temp.	
11	Ambient Temp. T7	-40～140℃	41	System 2 Outer Coil Temp.	
12	Outer Coil Temp. T1	-40～140℃	42	System 2 Inner Coil Temp.	
13	Inner Coil Temp. T4	-40～140℃	43	System 2 Suction Temp.	
14	Suction Temp. T2	-40～140℃	44	System 2 Exhaust Temp.	
15	Exhaust Temp. T3	0～150℃	45	System 2 Economizer Inlet Temp.	
16	Water Inlet Temp. T8	-40～140℃	46	System 2 Economizer Outlet Temp.	
17	Water Outlet Temp. T15	-40～140℃	47	Reserve	
18	Economizer Inlet Temp. T5	-40～140℃	48	Reserve	
19	Economizer Outlet Temp. T6	-40～140℃	49	Reserve	
20	Current Unit Tool Number	0～120	50	Reserve	
21	DHW Tank Temp.	-40～140℃	51	Solar Water Heater Temp.	
22	Plate Heat Exchanger Exhaust Temp.	-40～140℃	52	Zone 2 Temp.	
23	Driver Manufacturer	0～10	53	Butter Tank Temp.	
24	Water Pump Speed PWM	0～100%	54	Total Water Outlet Temp.	
25	Water Flow	3～100L/min	55	Unit B Phase Input Voltage	
26	DHW Return Water Temp.	-40～140℃	56	Unit B Phase Input Current	
27	Unit Input Voltage	0-500V	57	Unit C Phase Input Voltage	
28	Unit Input Current	0.00A-99.99A	58	Unit C Phase Input Current	
29	Unit Input Power	0.00-99.99KW	59	Smart Grid Status	
30	Unit Power Consumption	0-9999Kw.h	60	Zone 2 Mixing Valve Opening	

4.3.2 Factory Parameter

No.	Description	Default Value	Setting Range	Note
L12	Sterilization	0	0～2	
L13	Days between Sterilizations	7	5～30	
L14	Sterilization Start-up Time	23:00	00:00-24:00	
L15	Sterilization Running Time	10	0-50Min	
L16	Sterilization Temp Setting	70℃	50-80℃	
L22	DHW return water Setting	0	0～3	0-Disable / 1-Continuous return / 2-Cycle return / 3-Temperature
L23	Return Water Temp Setting	40℃	20～65℃	
L24	Return Water Return Temp Differential	5℃	1～15℃	
L25	Return Water Interval Period	30min	3～90min	
L26	Return Water Running Period	5min	1～30min	
P03	Water Flow Switch Setting	1	1~2	0-Enable/1-Disable
P05	Linkage Switch Setting		0～2	0-Enable/1-Disable/2-Thermostatic

No.	Description	Default Value	Setting Range	Note
P22	Ambient temperature value- Unit no starting	-15	-15～40	If Ambient Temp. ≤P22 then enter defrost
P24	Ambient temperature value- Allow electric heater to start	0	-10～10℃	
P25	Overprotection value- Inlet and outlet water temperature differential	0	-10～10℃	
P26	Compensation value-Return water temperature	5	0～10℃	
P27	Floor heating return differential value	5	0～10℃	
P28	Water Pump Control-Unit shutdown when reaching temperature	0	0～1	0-Running /1-Stop /2-Running in cooling mode /3-Running in cooling/heating mode /4-Running in underfloor heating mode
P29	Anti-freeze-water pump running time	2	0～10min	
P30	Defrost mode selection	0	0～2	0-Intelligent control /1-Timing control/ 2-Rapid control /3-Dew point control
P31	Defrosting - cumulative runtime	45	0～120	
P32	Defrosting - coil temperature value	-5	-30～0	
P33	Defrosting - temperature differential 1	9	0～20	
P34	Defrosting - temperature differential 2	7	0～20	
P35	Maximum defrosting time	10	0～30	
P36	Exit defrosting - coil temperature	12	0～30	
P37	Shutdown mode - Reaching target temperature	0	0～2	0-Intelligent shutdown/1-Temperature shutdown /2-Cooling intelligent
P48	Enable/Disable Hot Water Tank temperature sensor	0	0～1	0-Disable/1-Enable
P96	DHW differential value	5	0～10℃	
P99	Water pump speed regulation temperature differential	5	2～10℃	
P116	Unit temperature control mode	0	0～1	0-Water Inlet Temp./1-Water Outlet Temp.
P117	Ambient temperature - Allow access to anti-freeze	5	0～10℃	
P118	Outlet water temperature - Allow access to anti-freeze	3	0～20℃	
P139	Buffer tank electric heating	0	0/1	0-Enable/1-Disable/2-AHS
P140	DHW electric heating			0-Enable/1-Disable/2-AHS
P150	Water pump - secondary heating/cooling system	0/1/2/3	2	

No.	Description	Default Value	Setting Range	Note
P151	Return differential - Hot water heat source	0-40	0	
P152	Return differential - Heating heat source	0-40	0	
P161	Auxiliary pump selection	0/1/2/3/4	0	0-DHW/1-Cooling/2-Underfloor heating/3-Heating&Cooling/4-Above all
P162	Anti-freezing interval - Hot water pipes	**0～360**	90	If set to 0, mean disable
P181	Defrost selection - Evaporate side	0～2	0	0-Current/1-Heating/2-DHW
P182	Pipe electric heating option	0～2		0-3kW+6kW/ 1- 3kW/ 2-6kW/ 3-Disabled