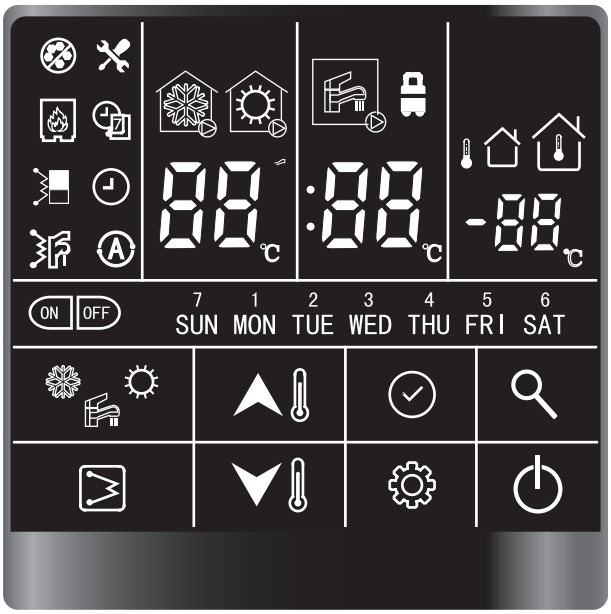
Carrier

Turn to the experts



Installation and operation manual

--R32 Air-to-water Monobloc Wired controller

Contents

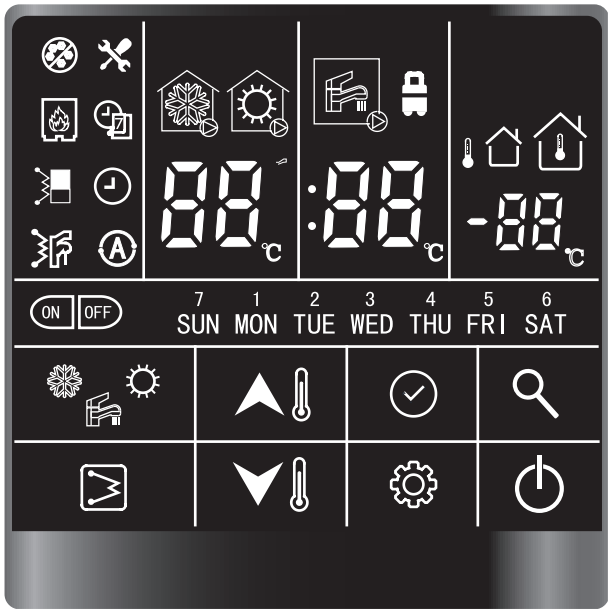
Acronyms	
IDU	Indoor unit
ODU	Outdoor unit
DHW	Domestic hot water
EH	Electrical heater
IAT	Indoor ambient temperature
OAT	Outdoor ambient temperature
LWT	Leaving water temperature
EWT	Entering water temperature
Tw-in	Entering water temperature of BPHE
Tw-out	Leaving water temperature of BPHE
BPHE	Brazed Plate Heat Exchanger

1. Presentation

This wired controller is used to control the operation of the unit and configuration of the system. It can also be used to check the system running parameter and display the status of system via the LCD screen.

The wired controller communicates with the IDU (Indoor unit) board with certain protocols and detect the communication status in real time. The IDU board will activate the communication fault alarm once it loses communication. However, it will not send the alarm if you do not connect the wired controller to the IDU board with the system power on. Hence, if the wired controller is not necessary, please do not connect it before the system is powered on.

The wired controller will shut down its screen for saving energy without needing to press for 35s (except the technical parameter configuration), and will wake up if you press any button.



Application of the wired controller:

① Power supply: Take power supply from IDU board (12V power supply);

② Working temperature range: -30^0~50^0

③ Working humidity range: RH10%~95%

Wired controller can be installed inside your home or on the unit itself for split types. This manual provides guidelines on how to use this interface effectively.

If you have any questions regarding the display and its configuration, please contact your installer for more information.

Caution:

- Do not press the button of wired controller for 5s after power on.

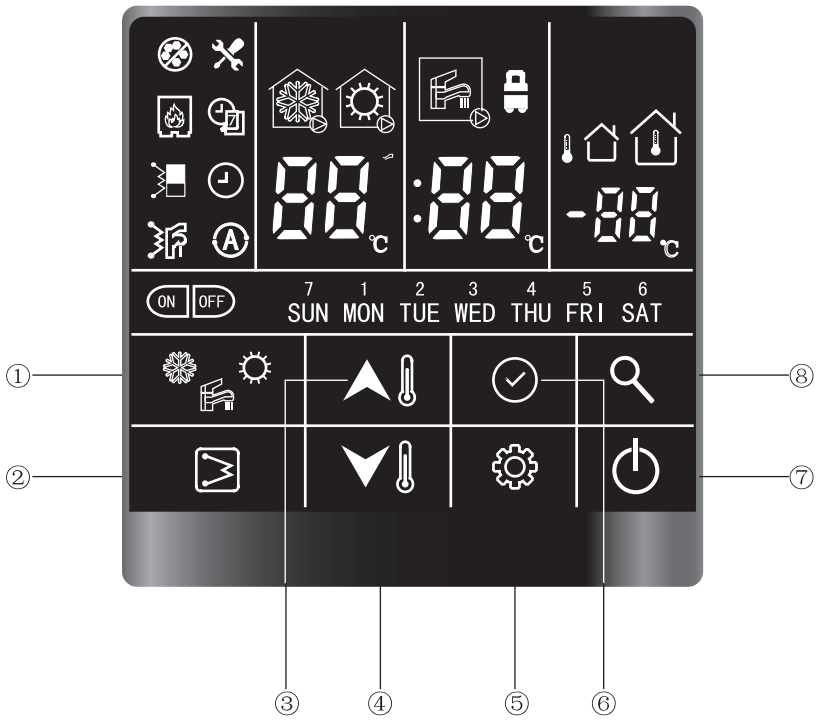
If you have any questions regarding the display and its configuration, please contact your installer for more information.

English

1. Presentation

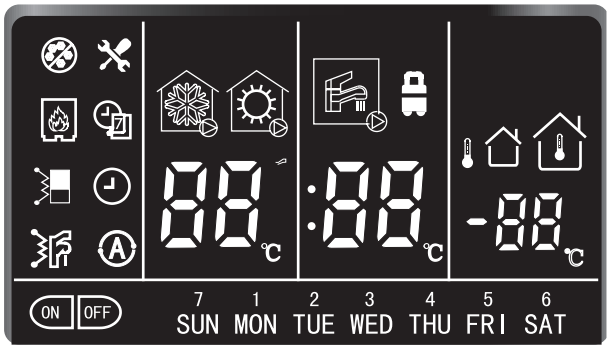
1.1. Interface introduction

1.1.1 Button Overview



Definition	Description
① Mode button	Used to change the running mode
② Electric heater button	Used to manually switch on/off the DHW EHs
③ Up button	Used to change the value of the parameter or turn the page during system configuration or commissioning
④ Down button	Used to change the value of the parameter or turn the page during system configuration or commissioning
⑤ Setting button	Used to set user / technical parameter configuration
⑥ Confirm button	Used to confirm the current setting
⑦ ON/OFF button	Used to turn on/off the unit
⑧ Query button	Used to query the operation parameter or configuration parameter

1.1.2 Overview of Icons



	Non-operating cooling mode		Non-operating heating mode		Non-operating DHW mode
	Operating cooling mode		Operating heating mode		Operating DHW mode
	Anti-frozen protection		Main water loop EHs		DHW EHs
	External heat source (boiler)		Weekly timer		Clock
ON	Timer on	OFF	Timer off		Alarm
	Air purge mode		OTA (water setpoint control)		IAT (air setpoint control)
LED display (Left)	LWT/time display (hour)/alarm	LED display (Middle)	DHW temp./time display (minute)	LED display (Right)	IAT/OAT (OAT is reserved)
SUN MON TUE WED THU FRI SAT	Days of week		Constant light: Eco mode Flash: Away mode		

Please note that the home screen display may vary depending on unit configuration and screen settings.

English

1.2. Button introduction

This wired controller has 8 buttons for the setpoint control, configuration, parameter check, etc. Details of each button are given in the table below:

 ON/OFF	1. Press this button to turn the unit on and off.
 Confirm	1. Press this button to confirm the setting to exit the interface of parameter setting or query.
 Mode	1. Press this button to change the mode: cooling-heating-cooling. 2. Press and hold this button to activate the anti-legionella mode manually.
 Query	1. Press this button to check the configuration and running parameters. 2. Refer to section 3, parameter and status check, for details.
 EHs	1. While operating in heating mode, press this button to activate/deactivate the main water loop EHs manually. 2. While operating in DHW mode, press this button to activate/deactivate the DHW EHs manually. 3. Press and hold this button to start force-defrosting, and the wired controller will display “dF” for 5s.
 Up	1. Temperature setting ① While in standby mode, for the first time, press this button to change the setting value of LWT; press the confirm button or wait for 5s without pressing any button for DHW temperature setting. ② While operating in cooling/heating mode, for the first time, press this button to change the setting value of LWT; press the confirm button or wait for 5s without pressing any button for DHW temperature setting. ③ While operating DHW mode, for first time, press this button to change the setting temperature of DHW; press the confirm button or wait for 5s without pressing any button for setting the value of LWT. 2. Time correction and timer setting ① Refer to details for configuration.
 Down	
 Setting	1. User parameter configuration: please refer to the configuration section. 2. Technical parameter configuration: please refer to the configuration section.

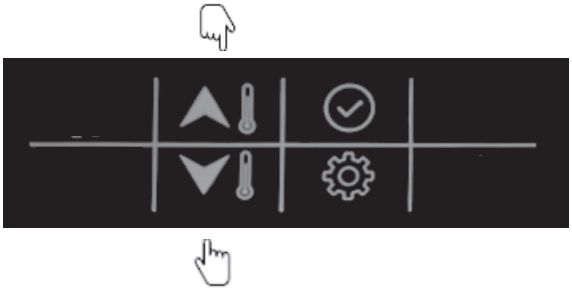
2. User operation

2.1. Clock setting

Before usage, it is necessary to set the time and date of the wired controller. Please follow the steps below to set the clock accurately:

1. Press the “setting” button, then press “confirm” button to enter day settings; the date will flash at this moment.

2. Next, press the “up” or “down” button to change the date, if necessary;

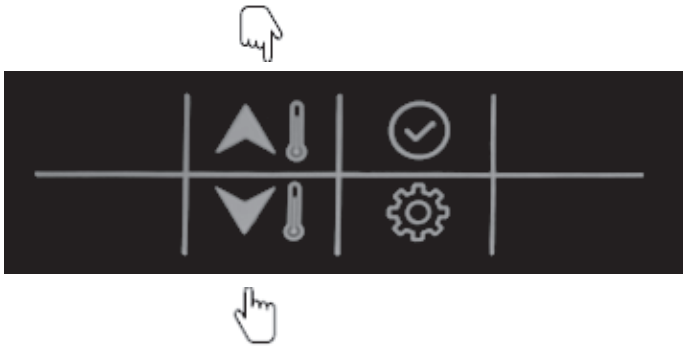


3. After setting the date, press the “confirm” button to enter time settings. The hour will flash at this moment.

4. Next, press the “up” or “down” button to set the correct time in hours;

5. After setting the hour, press the “minutes” setting; the minutes will flash at this moment.

6. Next, press the “up” or “down” button to set the correct time in minutes;

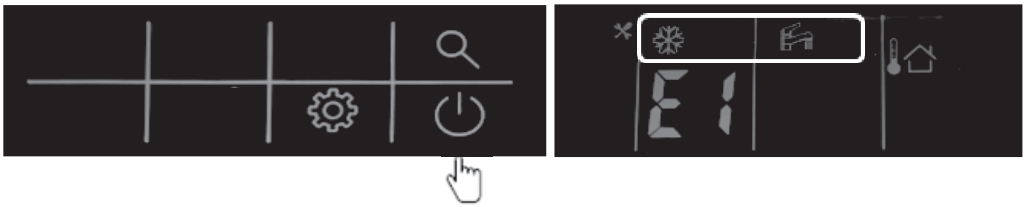


7. Press the “confirm” button to confirm and exit clock settings. You can also press the “settings” button to go to the next parameter. (Refer to the user parameter configuration for the full details on parameters setting)

Example: Friday, 3:05:31

2.2. ON-OFF setting

1. Press this button to turn the unit on and off. The mode icon will light up at this moment.



2.3. Mode setting

1. Press this button to change the mode: cooling-heating-cooling.

Example:

Mode	Cooling	Mode	Heating
Occupancy	Home	Occupancy	Home
Temp. control	Water setpoint control	Temp. control	Water setpoint control
Setpoint of LWT	17^{0}C	Setpoint of LWT	18^{0}C
Setpoint of DHW	25^{0}C		25^{0}C

English

2.4. Current setpoint setting

Here are two setpoint controls: (Refer to the technical parameter configuration, item 1 for detailed settings)

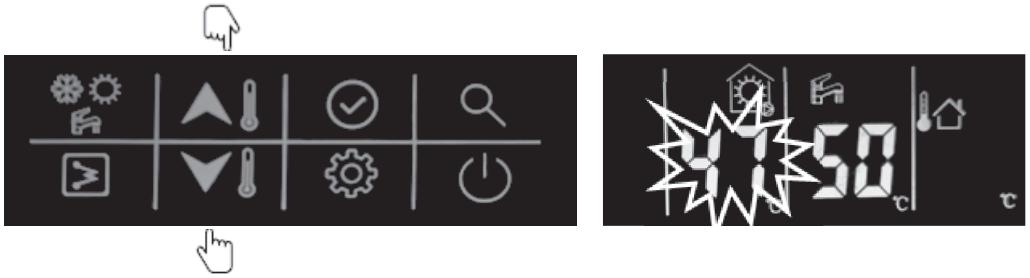
① Water setpoint control; the unit is controlled by water setpoint;

② Air setpoint control: the unit is controlled by the air setpoint, and it requests to install the wired controller in the room.

There is an IAT sensor built inside the wired controller to detect the room temperature. Here are the steps to change the water setpoint control:

① While in standby mode or operating cooling/heating mode:

i. First press “up” or “down” button to change the setting of LWT;



ii. Then press the confirm button or wait for 5s without pressing any button to DHW temperature setting. Next, press the “up” or “down” button to change the setting of DHW.

② While operating in DHW mode:

i. First press the “up” or “down” button to change the temperature of DHW;

ii. Press the confirm button ait for 5s without pressing any button to enter the setting value of LWT. Next, press the “up” or “down” button to change the setting of LWT.

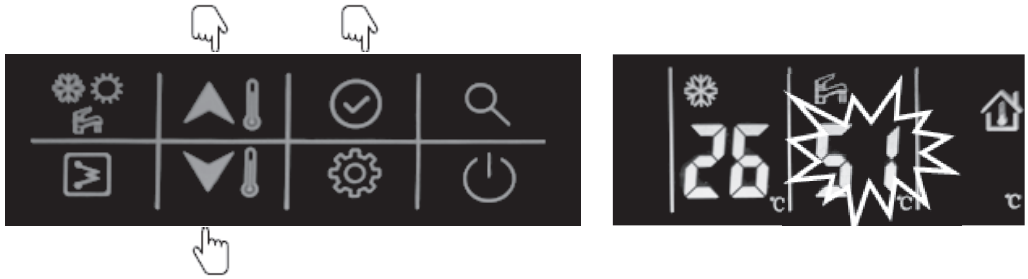
2. User operation

Here are the steps to change the air setpoint control:

① While in standby mode or operating in cooling/heating mode:

i. First press the “up” or “down” button to change the air setpoint;

ii. Next, press the confirm button or wait for 5s without pressing any button to change the DHW temperature setting. Next, press the “up” or “down” button to change the DHW.



② While operating in DHW mode:

i. First press the “up” or “down” button to change the temperature of DHW;

ii. Press the confirm button or wait for 5s without pressing any button to enter the setting value of LWT. Next, press the “up” or “down” button to change the air setpoint.

English

2.5. Home/away/eco setting

To optimize the energy efficiency of the building, you can select the occupancy mode manually according to the following steps. Each occupancy mode is associated with a pre-defined temperature range.

① Press the “setting” button to item 5: Select Occupancy mode

② Press the “up” or “down” button to change the value. (0-Home; 1-Eco; 2-Away)

③ Next, press “confirm” to confirm and exit user setting or you can also press the “setting” button to go to the next item. (Refer to the user parameter configuration for the full parameter setting details)

Example: Eco mode:

This icon lights up on selecting eco mode.

2.6. DHW schedule setting

This schedule is used to set the operating of DHW mode automatically according to the timed schedule. Please follow the steps below to set the DHW schedule:

① Press the “setting” button to item 1: DHW schedule setting.

② Press and hold the “confirm” button; the icon “on” will flash, then press the “confirm” button to confirm, the icon “on” will light up constantly;

③ Press and hold the “down” button to enter the date settings, then press “up” or “down” to select the day, press “confirm” to confirm day settings, after that, the icon of that day will light up constantly;

④ Press and hold the “down” button to enter the hour settings, then press “up” or “down” to select the time in hours; press “confirm”.

English

⑤ Press and hold the “down” button to enter minute settings, then press “up” or “down” button to select the time in minutes and press “confirm”.

⑥ Press and hold the “down” button to set the timer off, then press the “down” button to enter hour settings. Press the “up” or “down” button to select the time in hours and press “confirm”.

⑦ Press and hold “down” button to enter minute settings, then press “up” or “down” to select the time in minutes and press “confirm”.

⑧ Press and hold “confirm” button to confirm and exit user settings. You can also press “settings” button to go to the next item.

(Refer to the user parameter configuration for all parameter settings).

Example:

The unit will operate the DHW mode at 22:00 from Monday to Friday and will exit the DHW mode automatically at 6:00 from Tuesday to Saturday.

Schedule of DHW mode							
Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	√	√	√	√	√	×	×
Time on	22:00	22:00	22:00	22:00	22:00	22:00	22:00
Time off	6:00	6:00	6:00	6:00	6:00	6:00	6:00

2.7. Button lock settings

Used to lock the button of wired controller in case of touching by mistake; double press the “settings” button to unlock.

① Press the “setting” button to go to item 9: wired controller button lock.

② Press the “up” or “down” button to set the value (0-unlock; 1-lock)

③ Next, press “confirm” button to confirm and exit user setting or you can also press “settings” button to go to next item.

(Refer to the user parameter configuration for all parameter settings)

English

3. Configuration

This wired controller can be used to configure the system setting during installation and operation. Here follow two configuration sections: user parameters configuration and technical parameters configuration, please check the details in 3.1 & 3.2.

3.1. User parameter configuration

Press the “settings” button to enter the user parameters configuration interface and press this button to page down the setting items from 0-9 as circuit. Use the “up” or “down” button to change the value of each item.

Details of the user parameters configuration table are given below:
(The No. in the table below will be displayed in the left LED tube except “0”)

No.	Item	Description
0	Clock settings	① Press the “settings” button and then press “confirm” to enter date settings and then press “up” or “down” button to change the date if necessary; ② Next, press “confirm” to enter hour settings, press “up” or “down” to set the correct time in hours; ③ Next, press “confirm” to enter minute settings and press “up” or “down” button to set the correct time in minutes. ④ Press “confirm” to confirm and exit clock settings. You can also press “settings” button to go to the next parameter.
1	Schedule of DHW	① Press and hold the “confirm” button, the icon “on” will flash, then press “confirm”, and the “on” icon will light up constantly; ② Press and hold the “down” button to enter day settings, then press “up” or “down” button to select the day, press “confirm”, and the icon will remain lit up; ③ Press and hold the “down” button to enter hour settings, then press “up” or “down” to select the time in hours, press “confirm”. ④ Press and hold the “down” button to enter minute settings, then press “up” or “down” to select the time in minutes and press “confirm”. ⑤ Press and hold the “down” button to set the timer off, then press the “down” button to enter hour settings, then press “up” or “down” button to select the time in hours, and press “confirm”. ⑥ Press and hold “down” button to enter minute settings, then press “up” or “down” to select the time in minutes, press the “confirm” button to confirm; ⑦ Press and hold “confirm” to confirm and exit user settings. You can also press the “settings” button to go to the next item.
2	Power memory setting	This is used to record the settings if power is shutdown, and the system will recover the previous status once power is back. ① Press “up” or “down” button to set the value; 0- With power memory (default); 1- Without power memory
3	WIFI Status	Reserved
4	Air purge mode	① Press the “up” or “down” button to set the value; 0- Do not start air purge mode 1- Start air purge mode If choosing 0, then press the “settings” button to go to the next item;

		If choosing 1, then press the “confirm” button to exit the settings and unit will start the air purge mode; during the air purge mode, wired controller will be displayed “PA”, and only the “ON/OFF” button are valid to exit this mode.
5	Occupancy mode setting	① Press “up” or “down” button to set the value; ② Then press “confirm” button to confirm and exit user settings or you can also press “settings” button to go to the next item. 0- Home; 1- Eco; 2- Away
6	Night mode setting	This is used to set up night mode for low noise during the night-time. Press “up” or “down” button to set the value: 0- Without night mode 1- With night mode If choosing 0, press “confirm” and exit user settings or you can also press “settings” button to go to the next item; If choosing 1, then follow the steps below: ① Press “confirm” button to set the start timer setting, then press “up” or “down” button to set the time in hours; ② Press “confirm” to enter minute setting, then press “up” or “down” button to set the time in minutes; ③ Press the “confirm” button to enter the stop timer setting, then press “up” or “down” button to set the time in hours; ④ Press “confirm” button to enter minute settings, then press “up” or “down” button to set the time in minutes; ⑤ Next, press “confirm” to confirm and exit user settings or you can also press the “settings” button to go to the next item.
7	Anti-legionella temperature setting	Press the “up” or “down” button to set the value; Temperature range: 60-70^{0}C, default as 60^{0}C.
8	Anti-legionella timer starts	① Press and hold “confirm” button to enter day settings, press “down” button to set the day, then press the “confirm” button to confirm, after which the icon of the day will remain lit up. ② Press and hold the “down” button to enter hour settings, then press “up” or “down” button to select the time in hour, press the “confirm” button to confirm. ③ Press and hold the “down” button to enter minute settings, then press “up” or “down” button to select the time in minutes and press “confirm”. ④ Press and hold the “confirm” button to confirm and exit user settings or you can also press “settings” button to go to the next item.
9	Lock of wired controller	Used to lock the button of wired controller in case children touch by mistake; double press the “settings” button to unlock. ① Press the “up” or “down” button to set the value; ② Next, press the “confirm” button to confirm and exit user settings or you can also press the “settings” button to go to the next item. 0- Without lock 1- With lock

3.2. Technical parameter configuration

Press and hold the “setting” button to enter the technical parameter configuration interface and press the “setting” button to turn down the setting items from 0-25. You can use “up” or “down” button to change the value of each item.

Details of the user parameter configuration are given below:

No.	Item	Description
0	Control setpoint type	0- Water setpoint control 1- Air setpoint control
1	Controller selection	0- Wired controller 1- Dry contact
2	Back up function	0- Main water loop EHs + DHW EHs + boiler 1- Main water loop EHs + DHW EHs 2- DHW EHs + boiler 3- Main water loop EHs + boiler 4- DHW EHs only 5- Boiler only 6- Main water loop EHs only 7- Non back up
3	Climate curve selection	0- Non climate curve 1- Climate curve After setting 1 with climate curve, please follow the below steps: ① After choosing 1, enter heating climate setting, press “up” or “down” to choose from climate curves 1-13, if choosing between 1-12, press “confirm” and then go to step ③; if choosing 13, press “confirm” and then go to step ②;. ② Customized heating curve value input: a. Press “up” or “down” to set the value of MinOAT; b. Press “confirm” button to set MaxOAT, press “up” or “down” to set the value of MaxOAT;. c. Press “confirm” to set MinWSP, press “up” or “down” to set the value of MinWSP; d. Press “confirm” to set MaxWSP, press “up” or “down” to set the value of MaxWSP; e. Press “confirm” to go to step ③. ③ Press the “up” or “down” button to set the heating climate offset from -5~5^0**C**, default as 0^0**C**; then press “confirm” to go to step p ⑥ ④ Enter cooling climate settings; press the “up” or “down” button to choose between climate curves 1-3, if choosing 1-2, press “confirm”, then go to step ⑥ ; if choosing 3, press “confirm” to go to step ⑤. ⑤ Customized heating curve value input: a. Press “up” or “down” to set the value of MinOAT;. b. Press “confirm” to set MaxOAT, press “up” or “down” to set the value of MaxOAT;

		c. Press “confirm” to set MinWSP, press “up” or “down” to set the value of MinWSP; d. Press “confirm” \to set MaxWSP, and press “up” or “down” to set the value of MaxWSP; e. Press “confirm” to go to step ⑥. ⑥ Press the “up” or “down” button to set the heating climate offset from -5~5^{0}C, default as 0^{0}C; then press “confirm” to confirm and exit or “setting” button to go to the next item.
4	Capacity test setting	Reserved
5	3-way valve type select	0- Normal open 1- Normal closed
6	DI1	0- Disable 1- Power limitation (night mode) 2- Load-shed 3- DHW request 4- Anti-legionella request 5- HDW priority
7	DI2	
8	DI3	
9	DI4	
10	DO1	0- Disable 1- Unit in alarm 2- Unit in standby 3- Unit running 4- Unit in cooling 5- Unit in heating 6- Unit in DHW 7- Unit in defrost 8- Unit controlled by Modbus
11	DO2	
12	DO3	
13	Eco mode cooling setpoint offset	If air setpoint is chosen, it is air setpoint offset, otherwise, it is water setpoint offset 0~10^0**C**, default as 2^0**C**
14	Away mode cooling setpoint offset	If air setpoint is chosen, it is air setpoint offset, otherwise, it is water setpoint offset 0~10^0**C**,, default as 4^0**C**15
15	Eco mode heating setpoint offset	If air setpoint is chosen, it is air setpoint offset, otherwise it is water setpoint offset -20~0^0**C**, default as -2^0**C**
16	Away mode heating setpoint offset	If air setpoint is chosen, it is air setpoint offset, otherwise, it is water setpoint offset -20~0^0**C**, default as -4^0**C**
17	Eco mode DHW setpoint offset	-10~0^0**C**, default as -5^0**C**
18	Minimum OAT for heating	-26~10^0**C**, default as -26^0**C**
19	Booster OAT Threshold	-10~0^0**C**, default as -5^0**C**
20	Heat pump warmup time	0~120min, default 60min
21	Booster Delta temperature	1~20^0**C**, default 10^0**C**
22	Second zone setting	0 – No bi-zone function 1- Bi-zone function for heating mode only 2-Bi zone function for both cooling and heating modes

English

3. Configuration

No.	Item	Description
23	Water pump ΔT control setting	ΔT default as 5^0**C**, can be adjusted from 3.5^0**C**~8^0**C**, with precision 0.5^0**C**
24	Water pump control type setting	0- ΔT control 1-Force to on 2- Force to off
25	Water pump speed setting	If the item 24 (last setting item) is set to 1 – force to on, then you can set this item 25, in this case you can choose the value from 0-99, which means the water pump speed is from 1%-100% 0- 1% speed 1- 2% speed … 99 - 100% speed

NOTE:
DI: Customized input, dry contact;
DO: Customized output, 230V contact;
All the settings will be changed only by resetting and never by repowering.

4. Parameter and status checking

This wired controller can be used to check the system status and running parameters. Press the “query” button to enter the parameter query interface, and press “confirm” or don’t press any button for more than 10s to exit the parameter query interface.

After going into query interface, press “up” or “down” to check the parameters or status as given in the table below:

No.	Definition	Description
1	Setting temp.: Ts1	Display Ts1 during standby/cool/heat mode
2	Setting temp.: Ts2	Display Ts2 during DHW mode
3	Setting temp.: Ts3	Display Ts3 when it chooses the air setpoint control
4	Capacity of unit	HP*10, example: 10 means that unit is at 1HP capacity
5	Target frequency	
6	Running frequency	
7	Water flow rate	m3/h, feedback from inverter water pump
8	Capacity output	=1.163* (water flow rate) * [Tw_out – Tw_in] (kW)
9	T3 value	ODU coil temp.
10	T4 value	OAT
11	TP value	Discharged temp.
12	T7 value	Temp. of refrigerant for PCB cool
13	EVX opening degree	Actual value
14	ODU fan motor speed	
15	AC current	
16	AC voltage	
17	IPM temp. (T9)	Compressor module temp.
18	Limitation reason of compressor frequency	0: no limitation; 1: T3B temp. limitation (reserved); 2: OAT limitation; 4: Discharged temp. limitation; 8: Voltage limitation 16: Current limitation 32: IPM temp’ limitation 64: Night mode limitation 128: LWT limitation If multi limitation occurs, display value=sum of all limitation values
19	Limitation reason for compressor frequency	0: no limitation; 1: Limitation of different values between EWT & LWT
20	Tw_in value	EWT
21	Tw_out value	LWT of BPHE
22	T1 value	LWT of unit (after the EHs inside the unit)
23	T6 value	IAT, the sensor built inside the wired controller

English

24	T5 value	DHW value
25	Tw-2 value	Second zone EWT value when this function is set (reserved)
26	T1B value	External heat source (boiler) LWT value
27	Capacity demand	
28	Inv. Pump speed	
29	Last alarm	
30	Penultimate alarm	
31	Antepenultimate alarm	
32	Current protection	P0-P3: check the details in the alarm table
33	Detail of P6 alarm in function board	L-: no alarm; L0: IPM or IGBT over current; L1: lack of phase L2: Compressor losing speed fault; L3: DC voltage is too low to protect L4: Fan motor over current protection L5: Fan motor lack of phase; L6: Fan motor zero speed fault L7: PFC fault L8: DC voltage is too high to protect L9: Compressor zero speed fault LA: PWM synchronization fault Lb: MCE fault Lc: Compressor over current protection Ld: EEPROM data is wrong LE: Compressor fails to start; LF: fan motor losing speed fault
34	SV2 statue of water loop	This is a 2-way valve which is used to cut off the heating terminal water loop once the unit is running cooling mode (OFF- 0; ON- 1)
35	SV3 statue of water loop	DHW 3-way valve
36	Main water loop EHs statue	Standard equipment with one EH; the other two are field supplies (OFF-0; ON-1)
37	DHW EHs	OFF-0; ON-1
38	External heat source statue	OFF-0; ON-1
39	P_m	External main water loop pump (OFF-0; ON-1)
40	P_p	Second zone water loop pump (OFF-0; ON-1)
41	P_o	First zone water loop pump (OFF-0; ON-1)
42	Anti-frozen heater statue	OFF-0; ON-1
43	Chassis heater statue	OFF-0; ON-1
44	Crank heater statue	OFF-0; ON-1
45	SV2 statue of refrigerant system	FCU water loop valve, to cut off water supply to radiator/space heater coil in cool mode (OFF-0; ON-1)

5. Error code

This wired controller also functions as the detector to display the unit alarm as outlined in the following table:

Example: E1

This icon will light up once the alarm sounds.

Alarm code	Description
E0	Water flow switch fault
E1	Communication fault between IDU board and ODU board
E2	LWT of unit sensor (T1 sensor) fault
E3	Gas refrigerant temp sensor (T2 sensor) fault (reserved)
E4	Liquid refrigerant temp sensor (T2B sensor) fault (reserved)
E5	ODU (module part) alarm
E6	DHW sensor (T7 sensor) fault
E7	LWT sensor (T_in sensor) fault
E8	LWT of BPHE sensor (T_out sensor) fault
E9	Communication fault between wired controller and function board
EA	Second zone LWT sensor (Tw_2 sensor) fault (Only valid after setting second zone function, reserved)
Eb	External heat source LWT sensor (T1B sensor) fault (Only valid after setting the external heat source – boiler)
Ec	Water pump fault
Ed	Reserved
EE	Reserved
EF	Mode conflict (reserved)
P0	EEPROM fault
P1	Protection from huge different values between EWT and LWT
P2	Protection from lack of water
P3	Protection from abnormal different values between EWT and LWT
P6	Protection from standard electrical heater overheat

Note:

1. When it displays the E5-ODU alarm, check the alarm on the IDU PCB for more details.
2. P0-P3 will only be displayed after it occurs thrice in one hour and cannot resume unless the system is repowered.

English

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CR-SA-XKQENG12-2

Carrier

Turn to the experts

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