Cooper & Hunter
COMFORT INNOVATIONS

———PCC-16-A

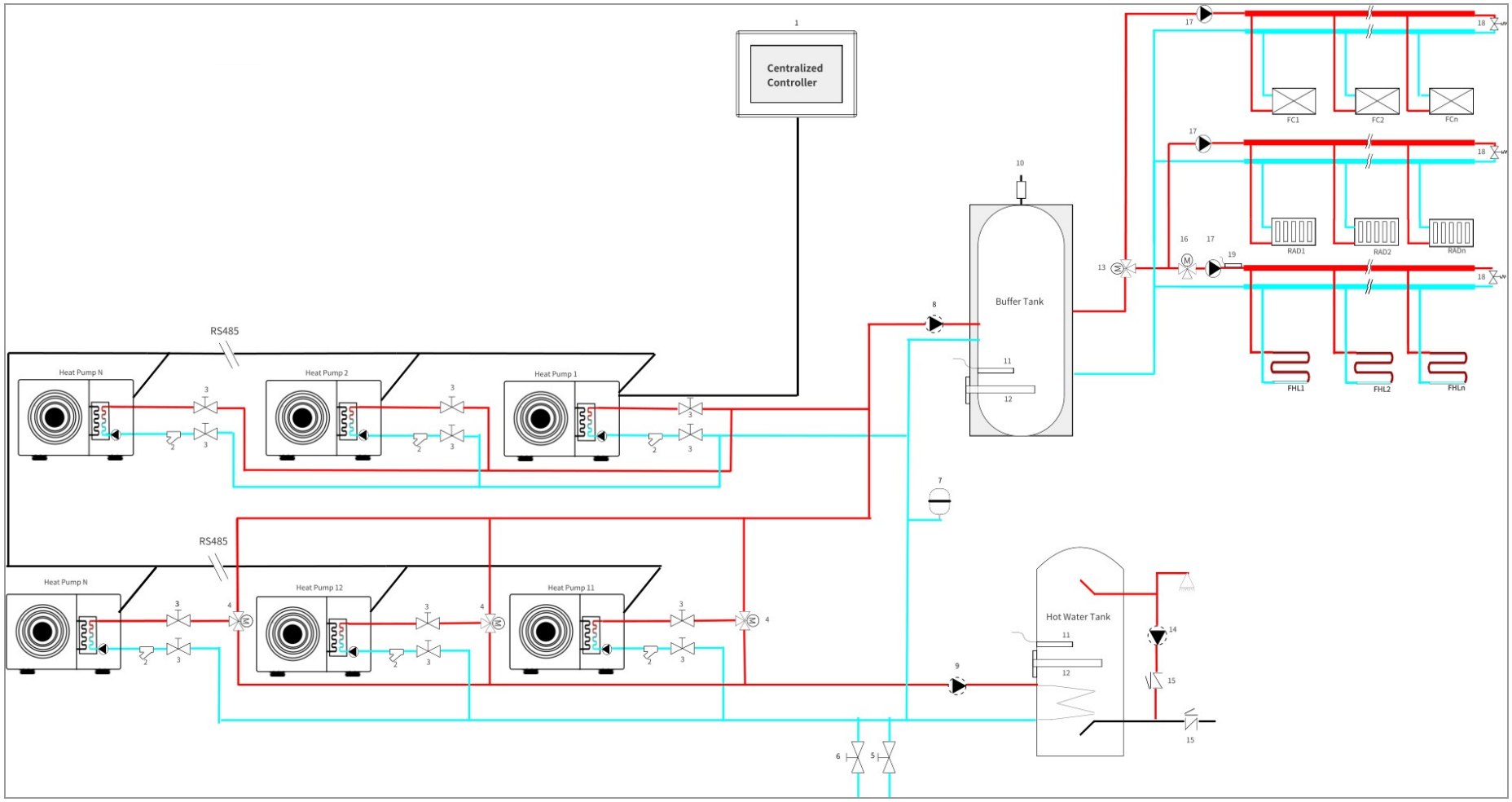
7-inch color touch screen, to achieve simultaneous linkage control of 16 units, flexible and convenient.

Catalog

1. Specification

Power Supply (V)	4.5-30
Operating Temperature (℃)	-2~+70
Relative Humidity	5~95%
Max. Number of Controlled Unit	16
Communication Protocol	RS-485
Display	7-inch Color Touch Display
Standard Cable Length (m)	10
Communication Cable Type	4-core Shielded Cable
Unit Dimension(L/H/W) (mm)	210.0 X 149.8 X 24.0
Operating Power Consumption (W)	
Sleep Mode (W)	0.4
Dimmest Backlight, No Speaker Mode (W)	0.8
Dimmest Backlight and Horn Mode (W)	1.9
Brightest Backlight, No Speaker Mode (W)	2.2
Brightest Backlight and Speaker Mode (W)	3.3

2. Application



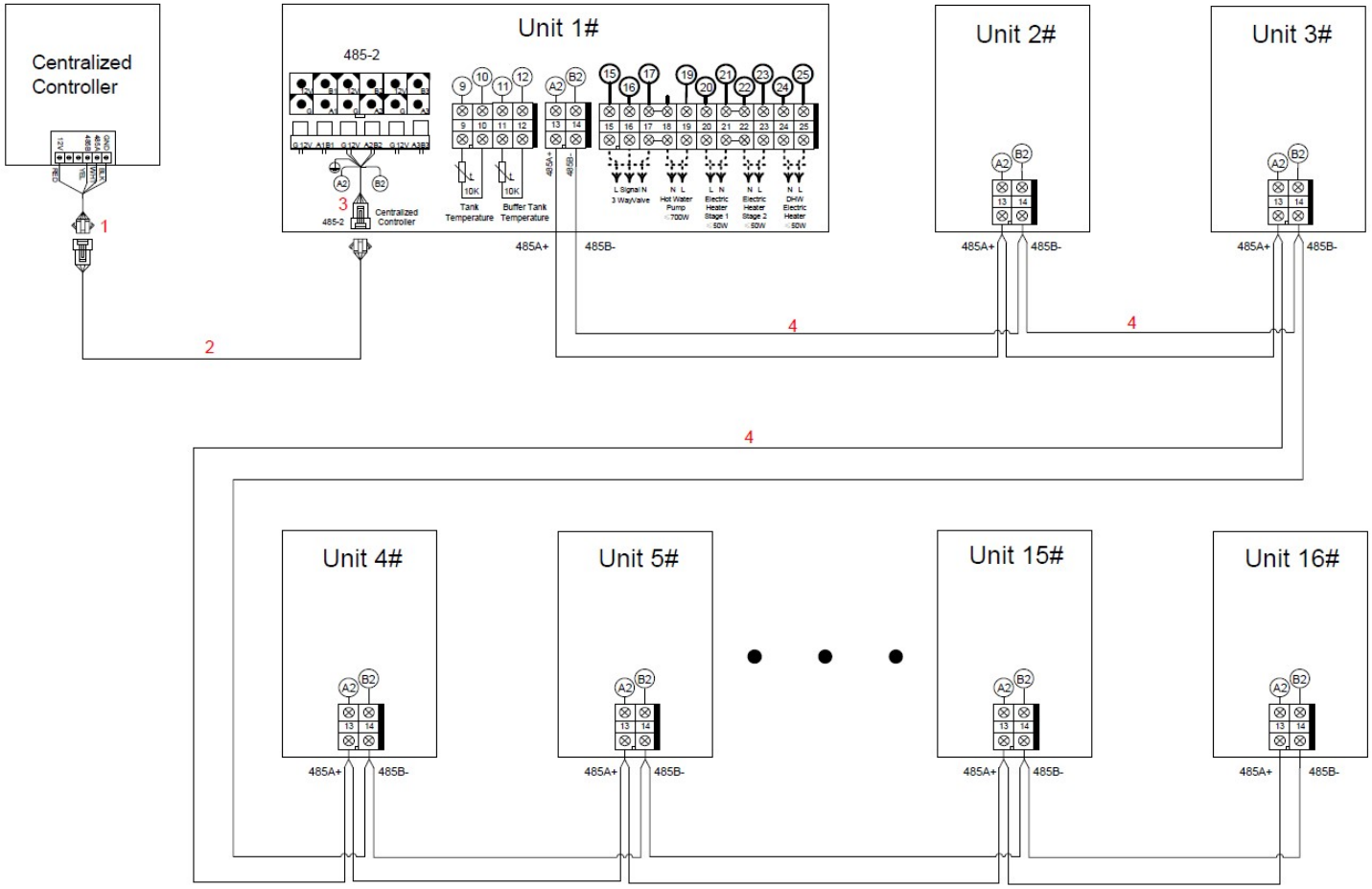
1	Centralized Controller	8	Water Pump for Heating	15	One-way Valve
2	Y-type filter	9	Hot Water Pump	16	Mixing Valve
3	Stop Valve	10	Vent Valve	17	Water Pump
4	Three-way Valve	11	Sensor	18	Differential Pressure Bypass Valve
5	Water Fill Valve	12	Electrical heater	19	Mixing water outlet temperature sensor
6	Drain Valve	13	Cooling Three-way Valve		
7	Expansion Tank	14	Warm Water Cir. Pump		

- Remark: If the units are not equipped with water pumps, **water pump 8 and 9 should be connected to the unit No.1.**
- Part 4,8,9,11,12,13,14,16,17 and 19 can be connected to the heat pump. If you need to connect them to heat pump, **please make sure they will be connected to unit #1,** but the heat pump only can control 2 zones.
- Unit #1 cannot be shut down manually, because all parts in the circuit are connected to it.
- If the installation is as shown above, then unit #1 can only be a heating unit; please do not enable the hot water mode, otherwise, the heating water pump 8 will always be on.
- If the installation is as shown above, which means that the 1~N units connected to the buffer tank are used for heating only, **so please disable the hot water mode of the 1~N units.**

3. Wring Connection

3.1 For Inverter Units

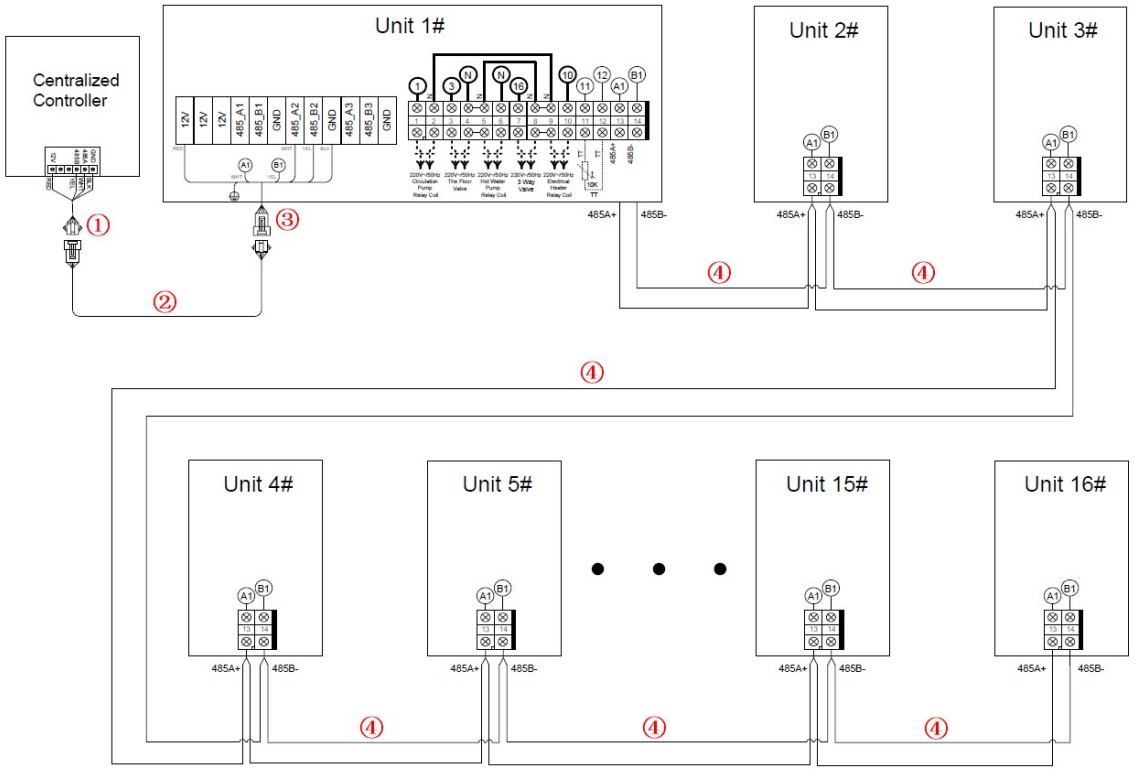
- Note:For reference only, please refer to the description below the terminal, do not refer to the terminal serial number.



1	Connection cable (To the unit)	2	10m connection cable(In the centralized controller box)
3	Connection cable (To the centralized controller)	4	Connection cables between the units (Need to be prepared by yourself, please consider anti-interference measures)

3.2 For On/Off Units

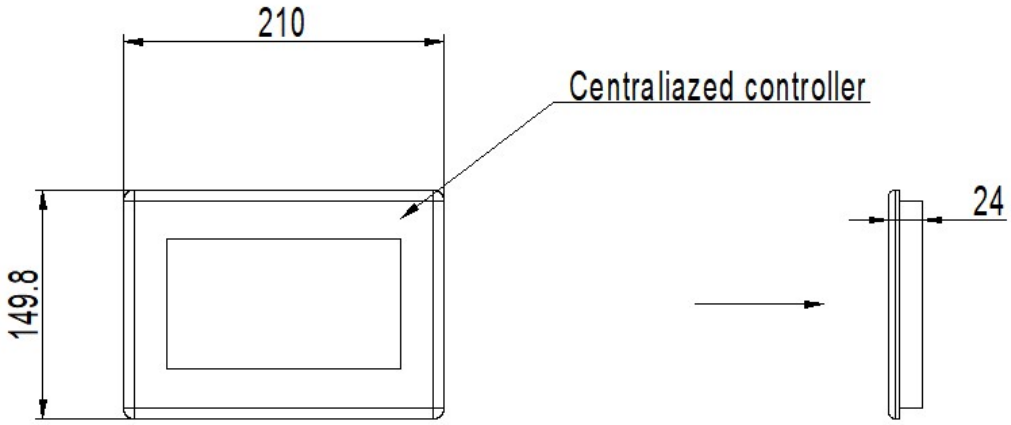
➢ Note:For reference only, please refer to the description below the terminal, do not refer to the terminal serial number.



1	Connection cable (To the unit)	2	10m connection cable(In the centralized controller box)
3	Connection cable (To the centralized controller)	4	Connection cables between the units (Need to be prepared by yourself, please consider anti-interference measures)

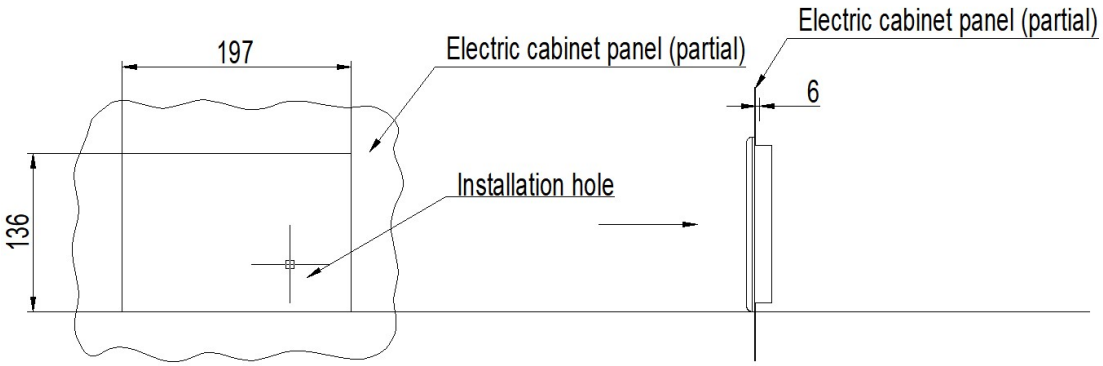
4. Installation

4.1 Size of Centralized Controller

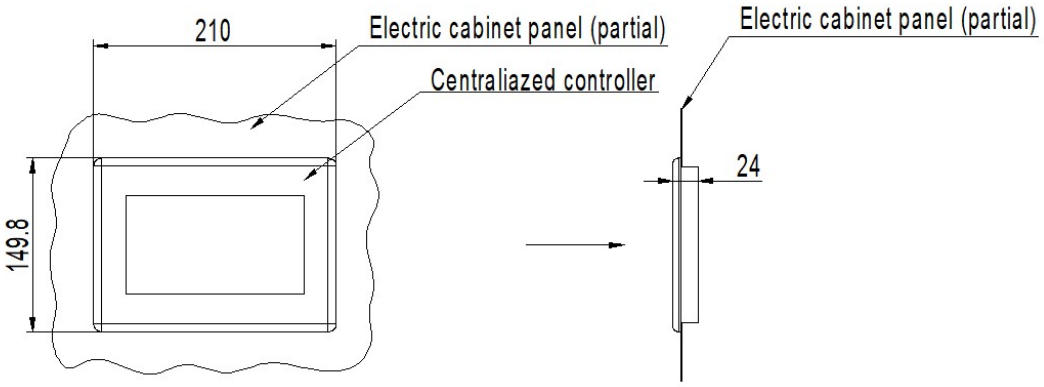


4.2 Installation Instruction

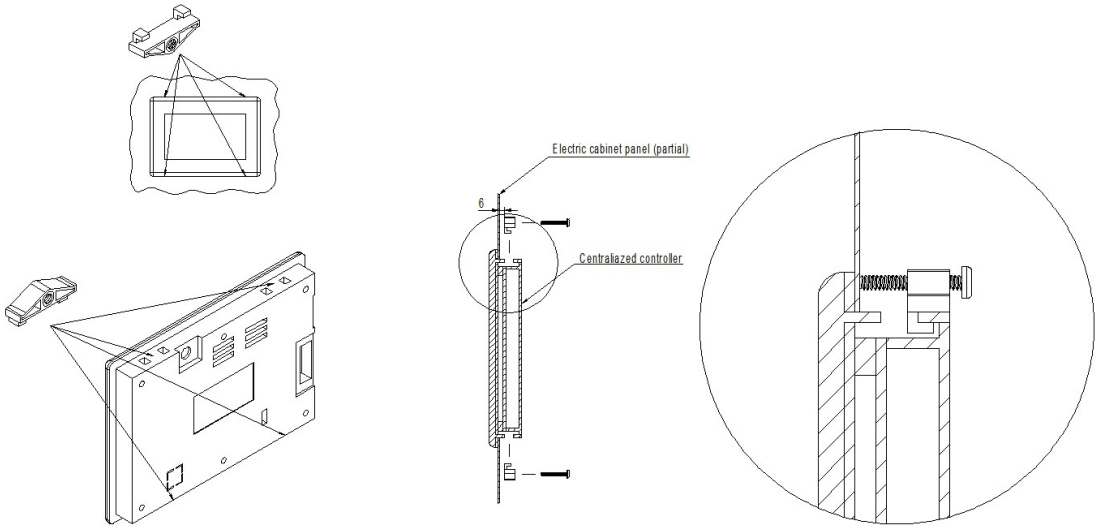
1) Make installation holes on the electric cabinet panel with a 197mm length x 136mm width and depth of less than 6mm.



2) Embed the centralized controller into the installation hole.



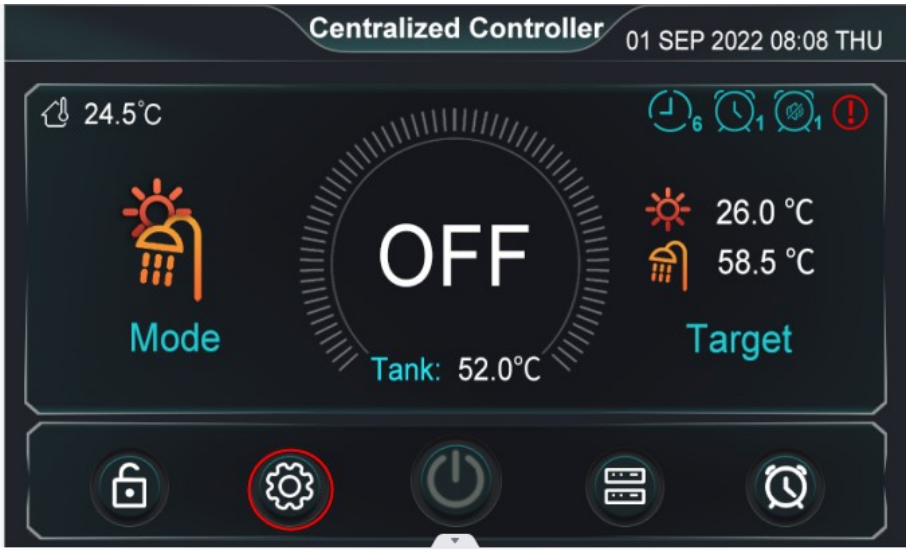
3) Use the attached clips to hook the controller from the back of the centralized controller and tighten the screws to hold the controller.



5. Project Setup

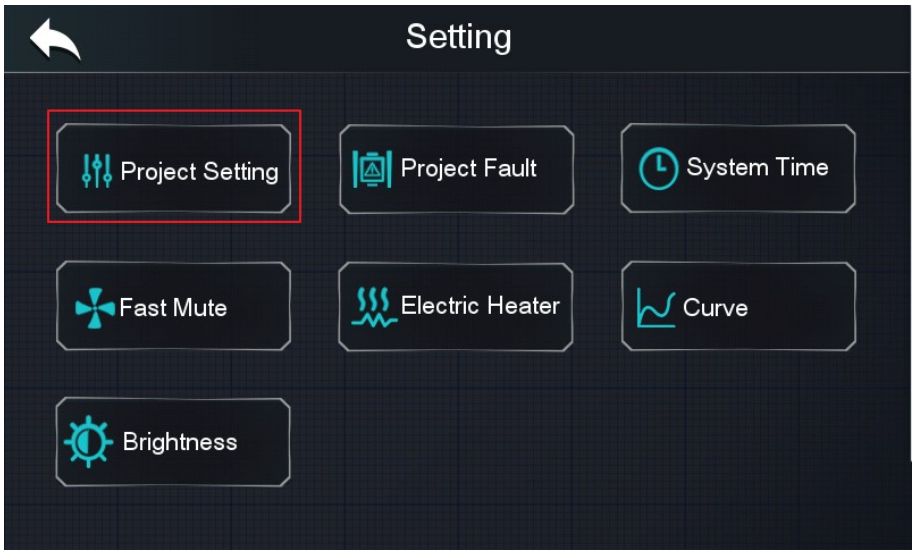
5.1 Setting Unit Quantity

a. Press “  ” on main interface

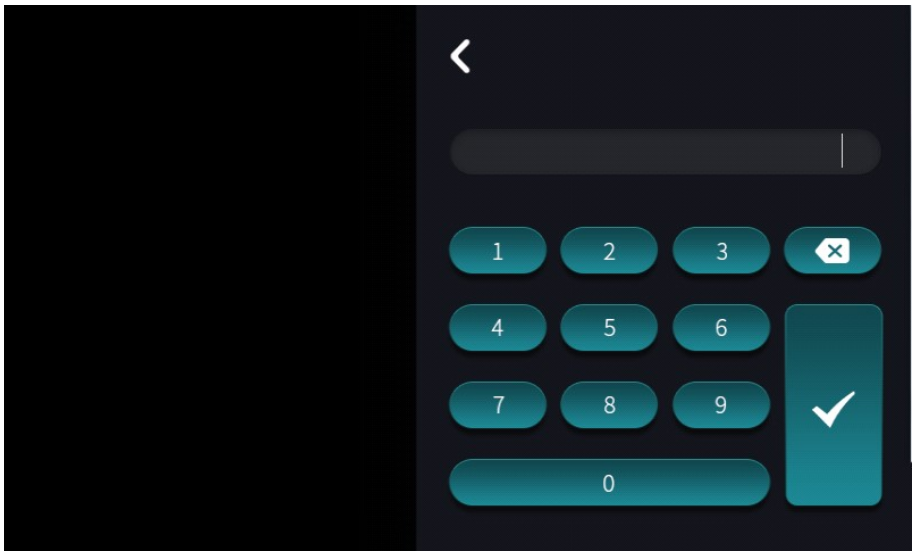


b. Press ” 

”

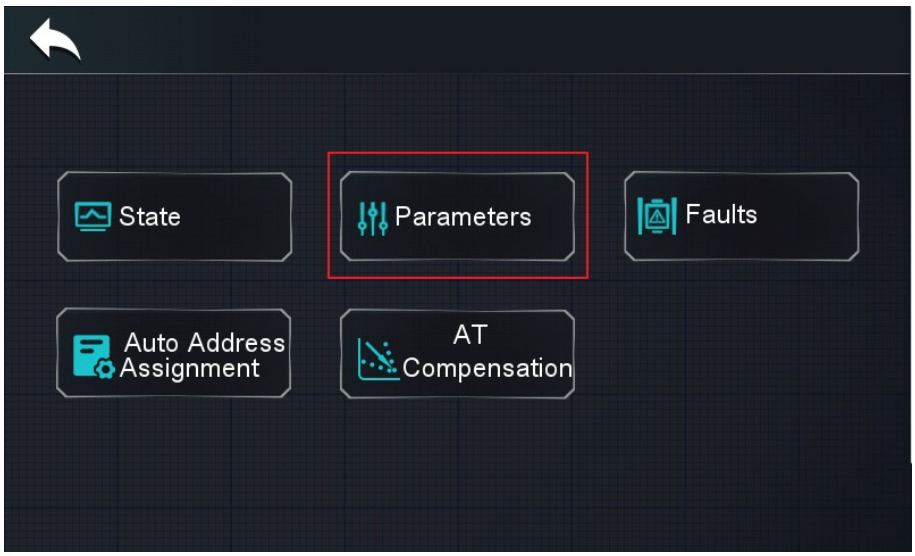


c. Enter “22”

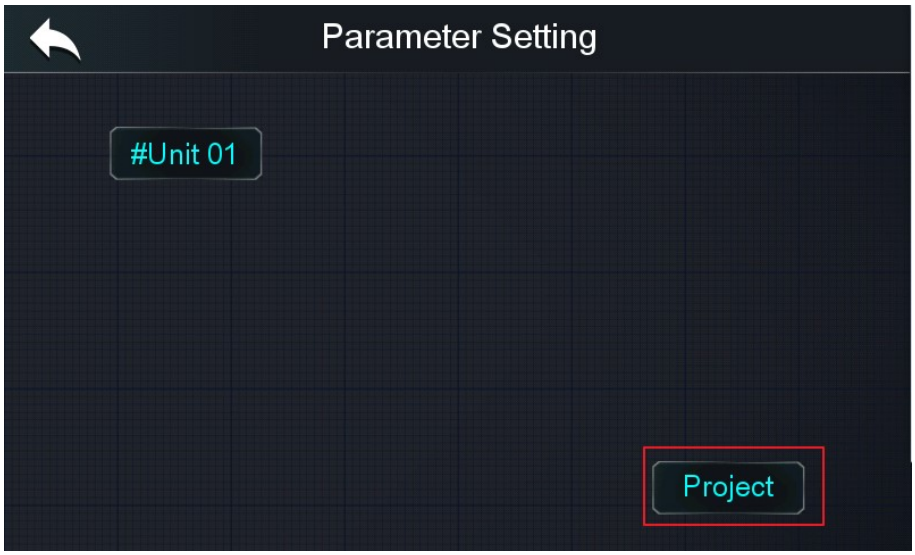


d. Press “ 

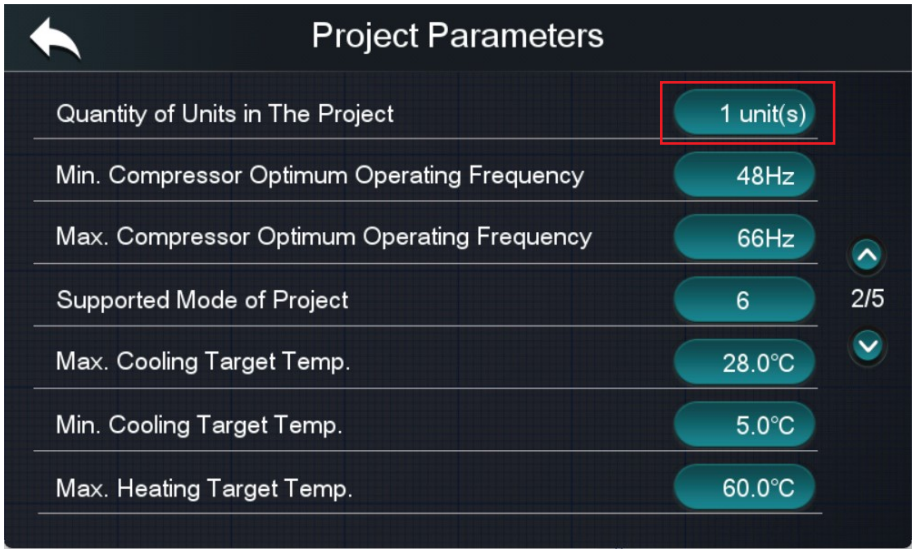
”



e. Press “Project”



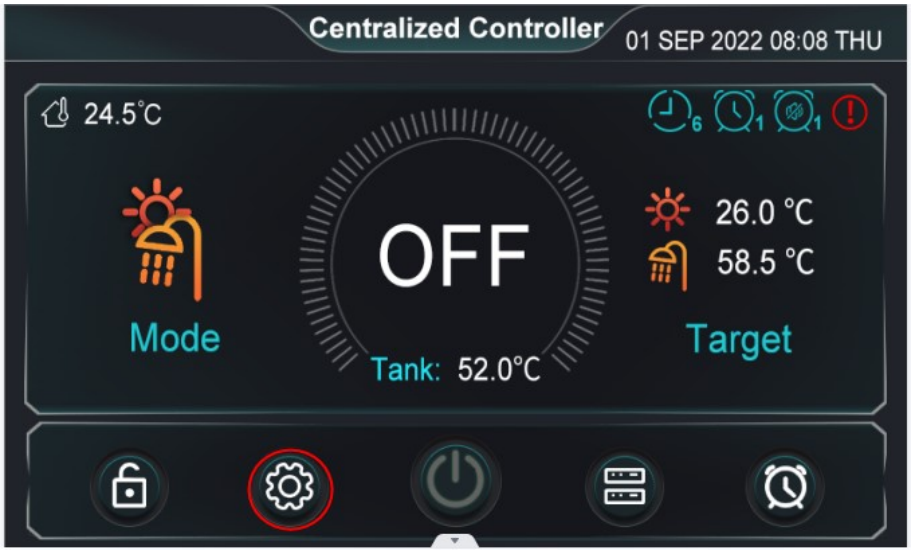
f. Set the quantity of units for this project.



5.2 Setting Unit Address

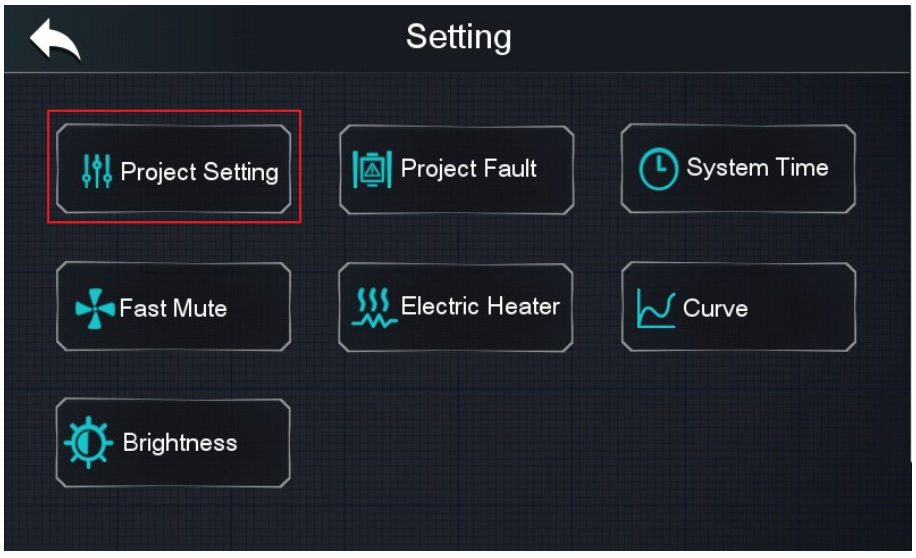
5.2.1 Automatic Address Assignment by Centralized Controller

a. Press “  ” on main interface.

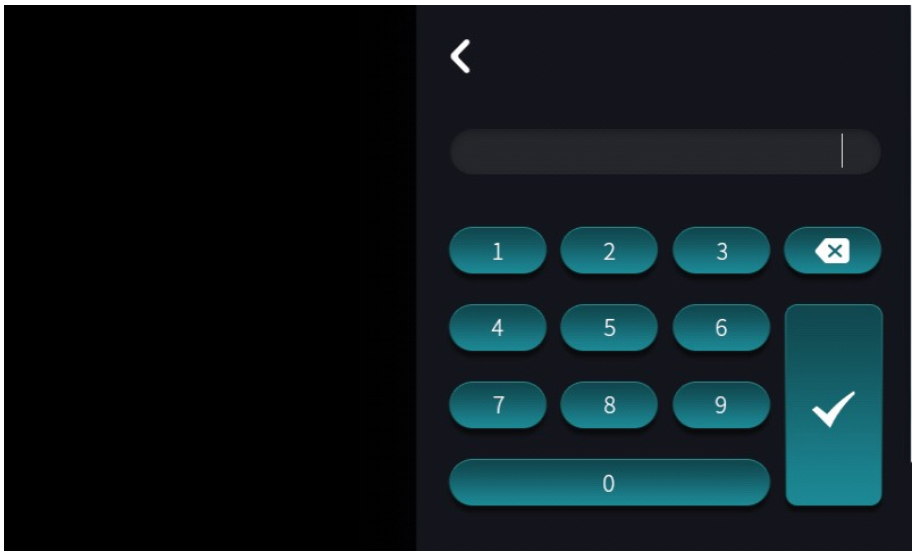


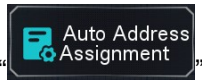
b. Press ” 

”.



c. Enter “22”.

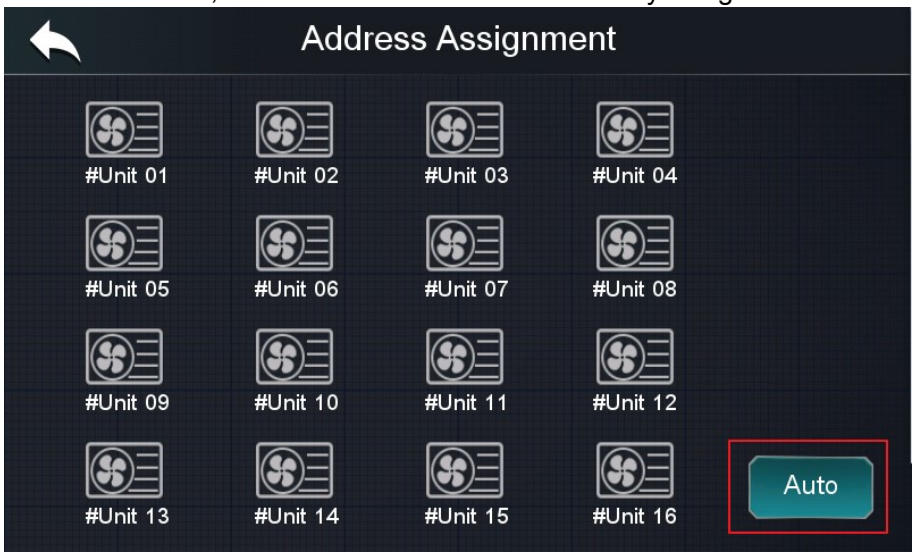


d. Press “ 

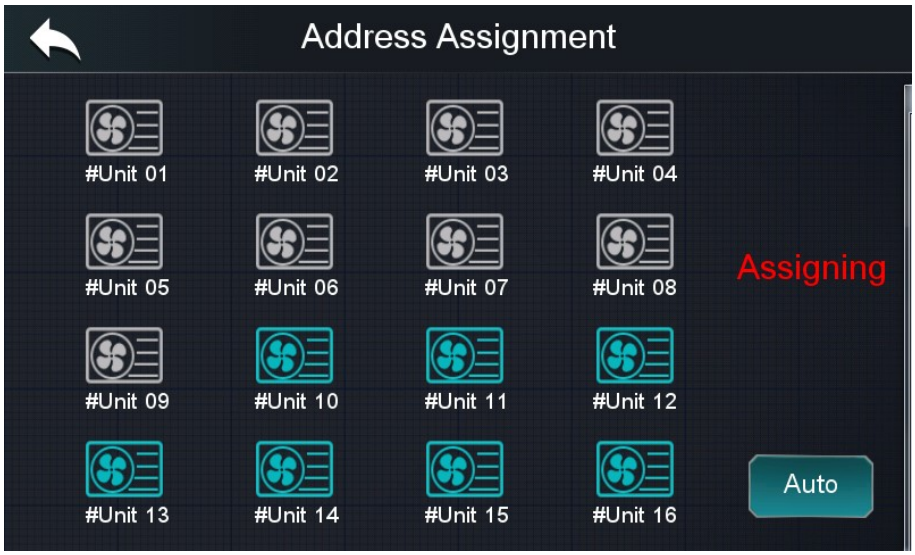
”.

e. Press “ 

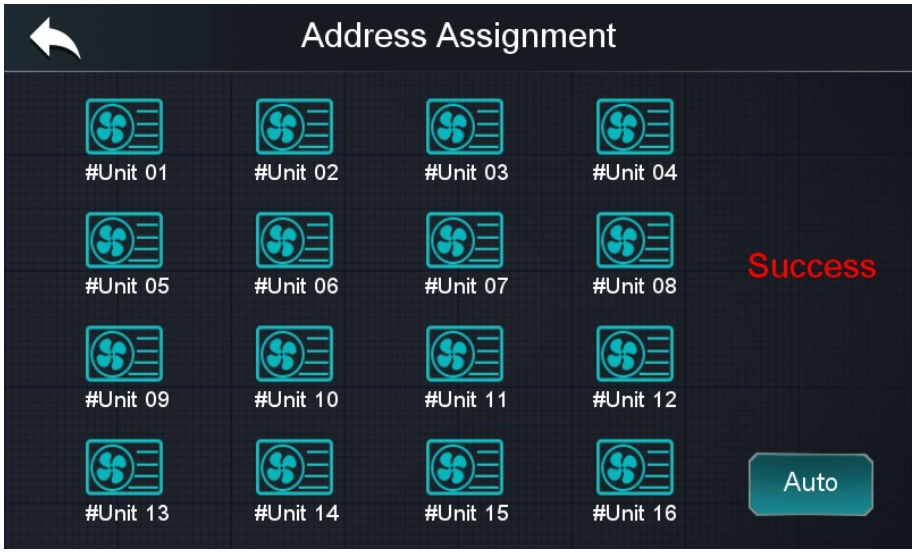
”, and the controller will automatically assign the address to the units.



g. The units are assigned in order from last to first, and each successful unit icon lights up.



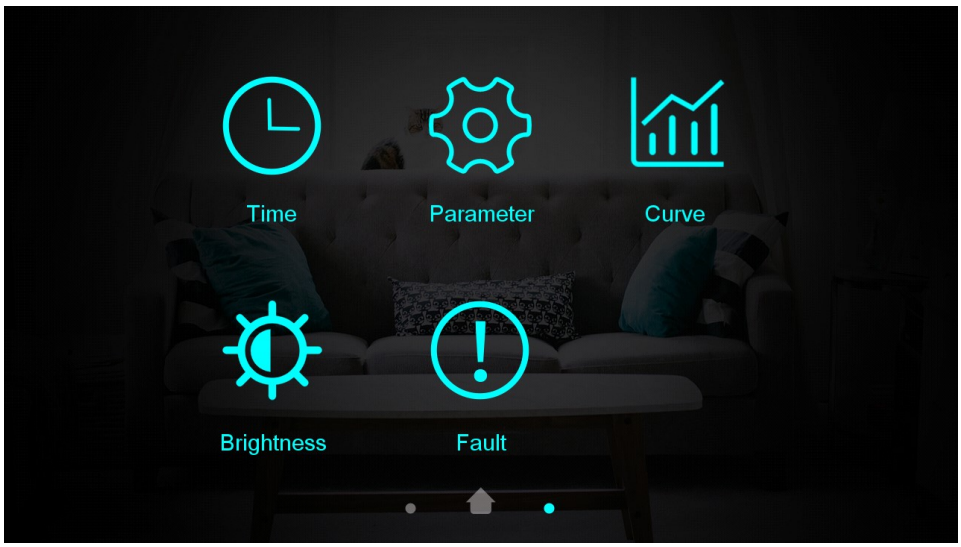
h. After the assignment is completed, the display is as follows.



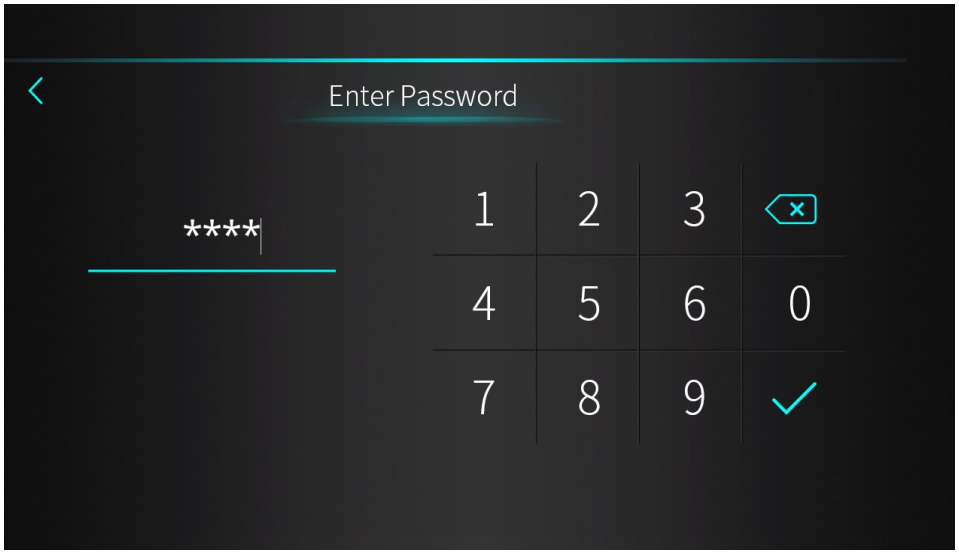
5.2.2 Manual Address Assignment by Unit's Display

a. Press " 

".

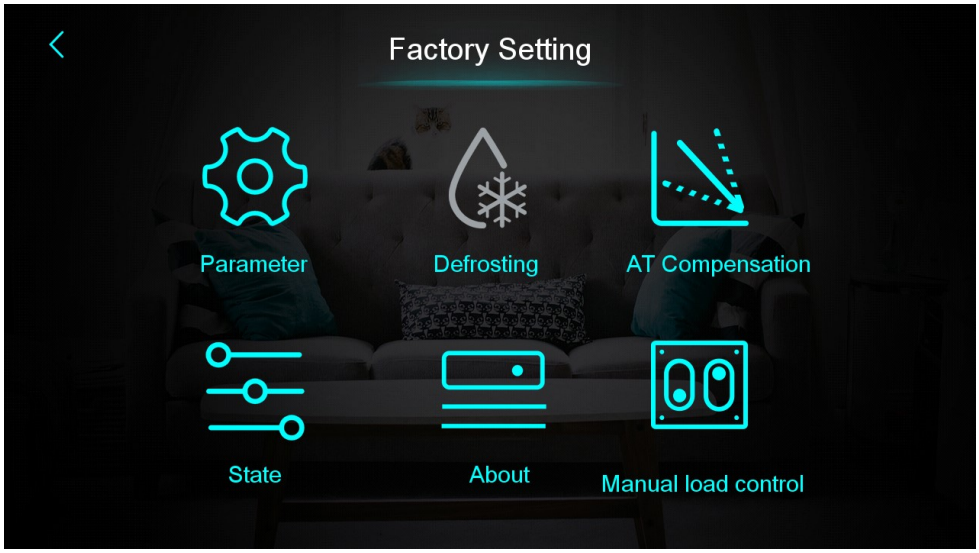


b. Enter "22".

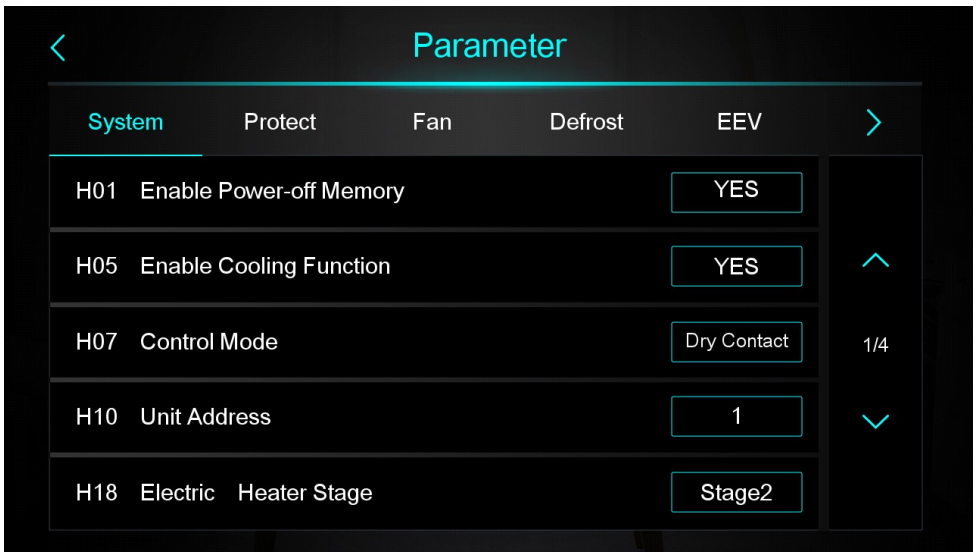


c. Press “ 

”.



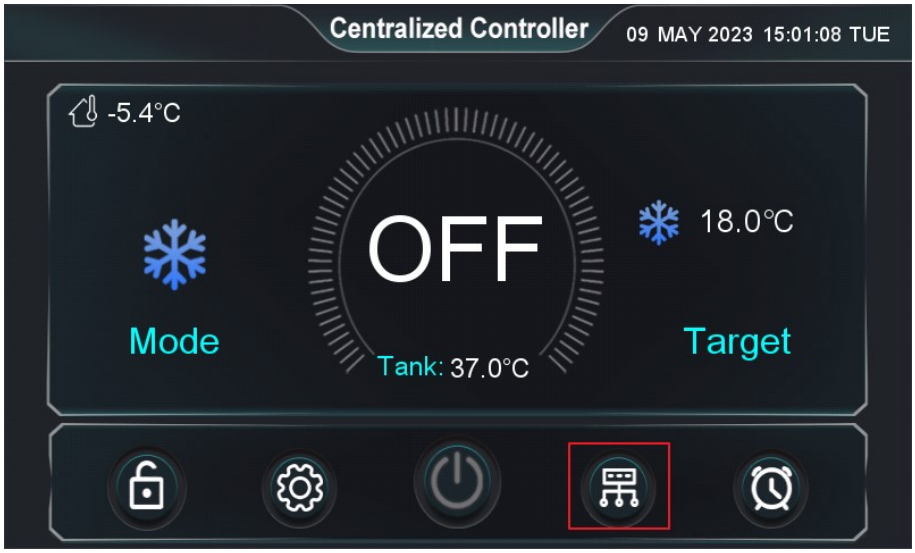
d. Set “H10” for each unit.



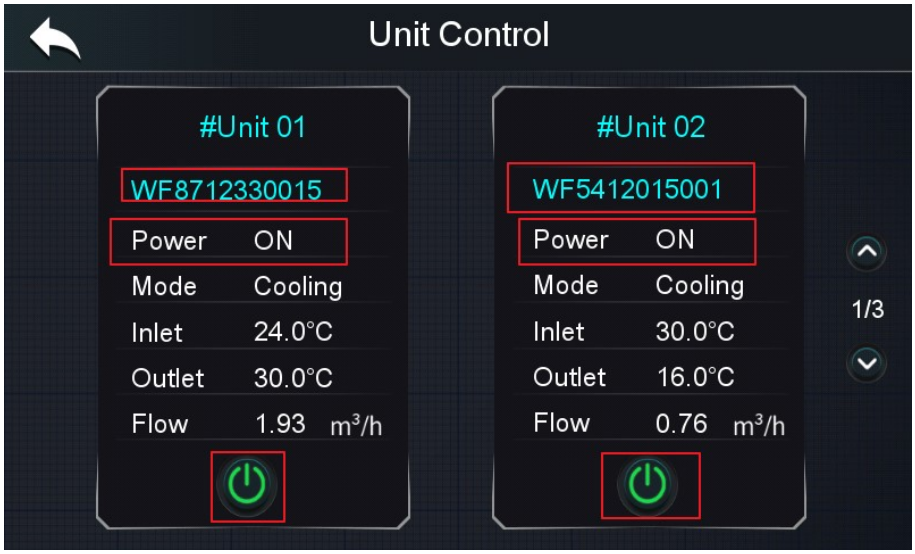
- Note 1. The address of each unit needs to be different, otherwise communication failure will occur.
- Note 2. The range of unit address modification is 1~16.

5.2.3 Check Unit Address.

a. Press “  ”.



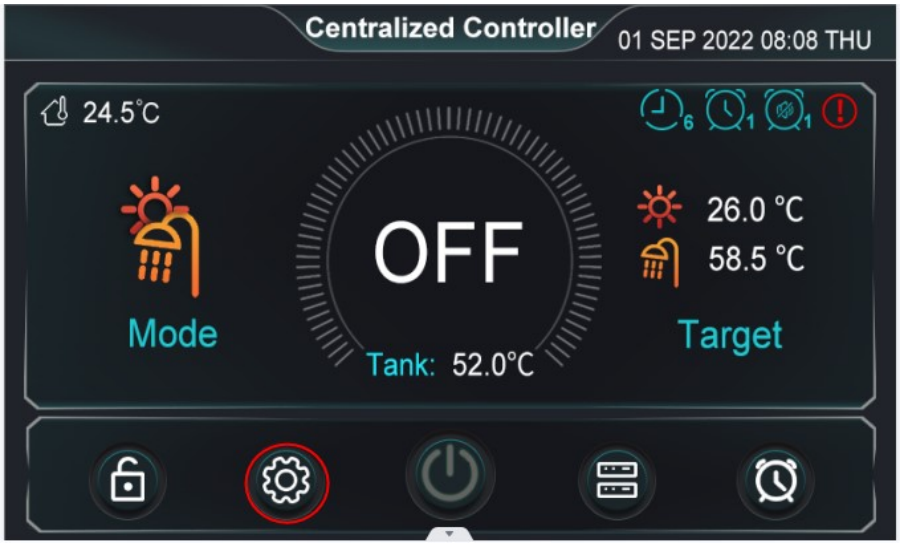
b. Check the information of each unit and turn on/off each unit to confirm whether the communication is normal.



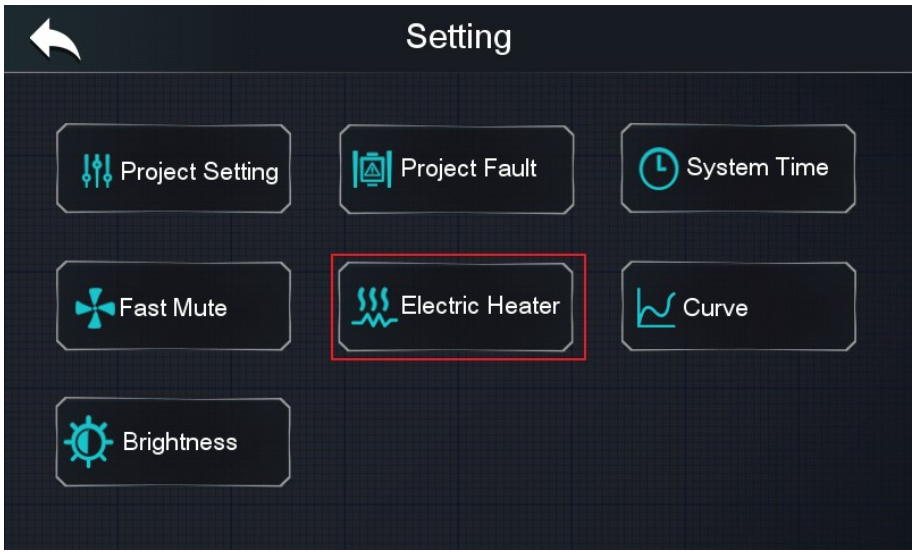
6. Project Commissioning

6.1 Electric Heater.

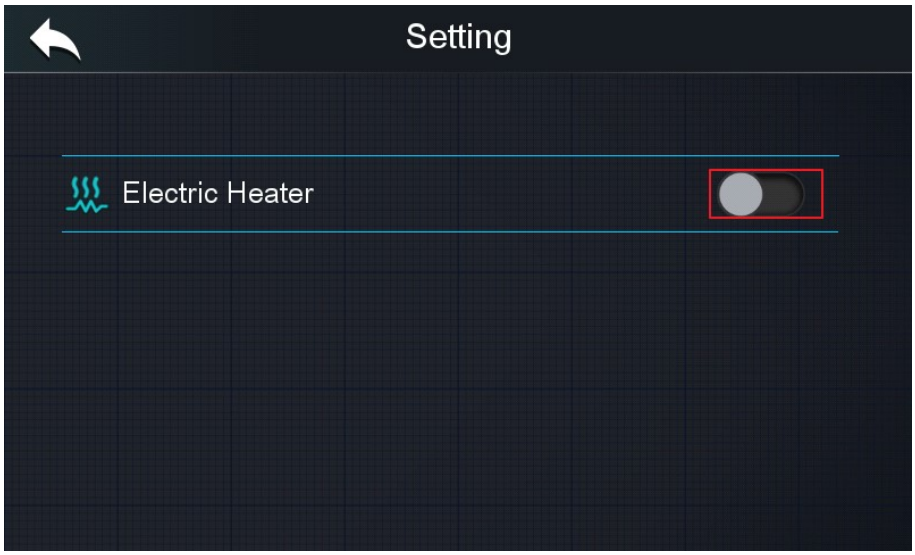
a. Press “  ” on main interface.



b. Press “Electric Heater”.

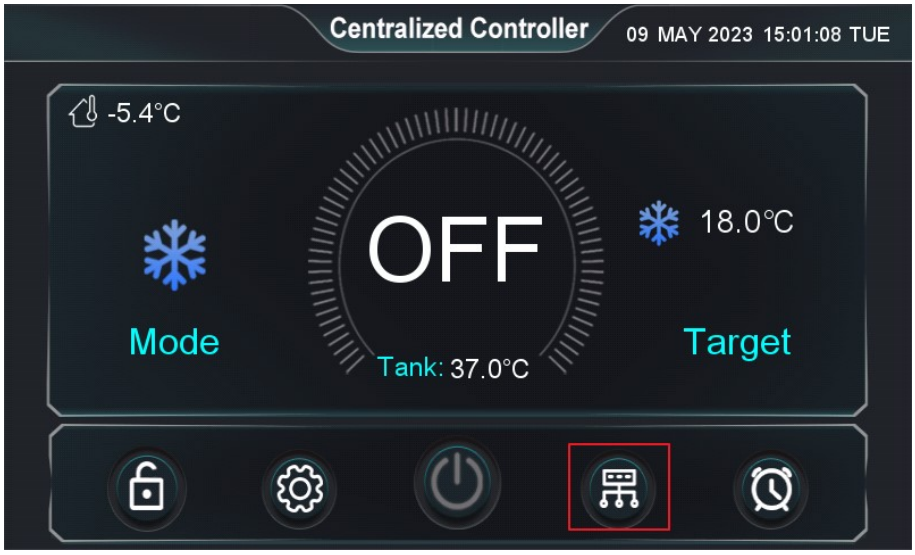


c. Enable button to turn on the electric heater immediately.

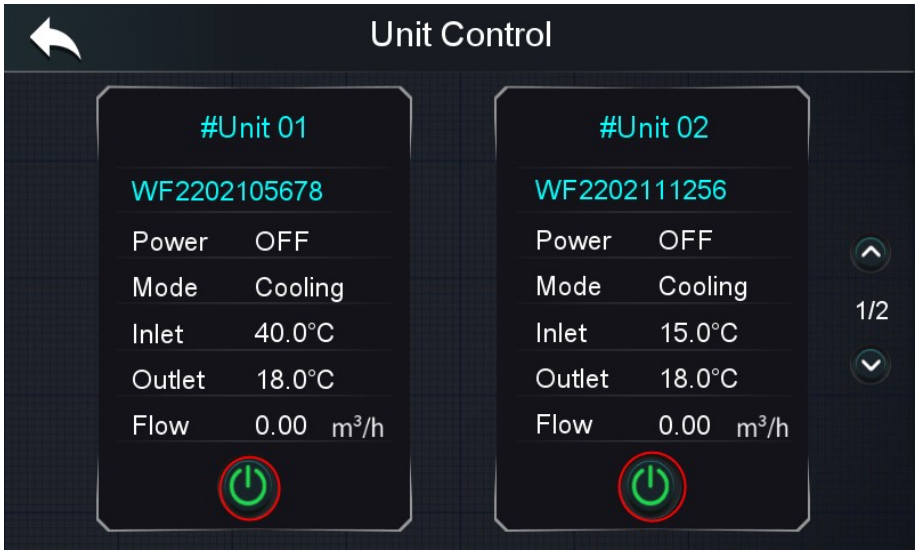


6.2 Heating Water Pump.

a. Press “  ” on the main screen.



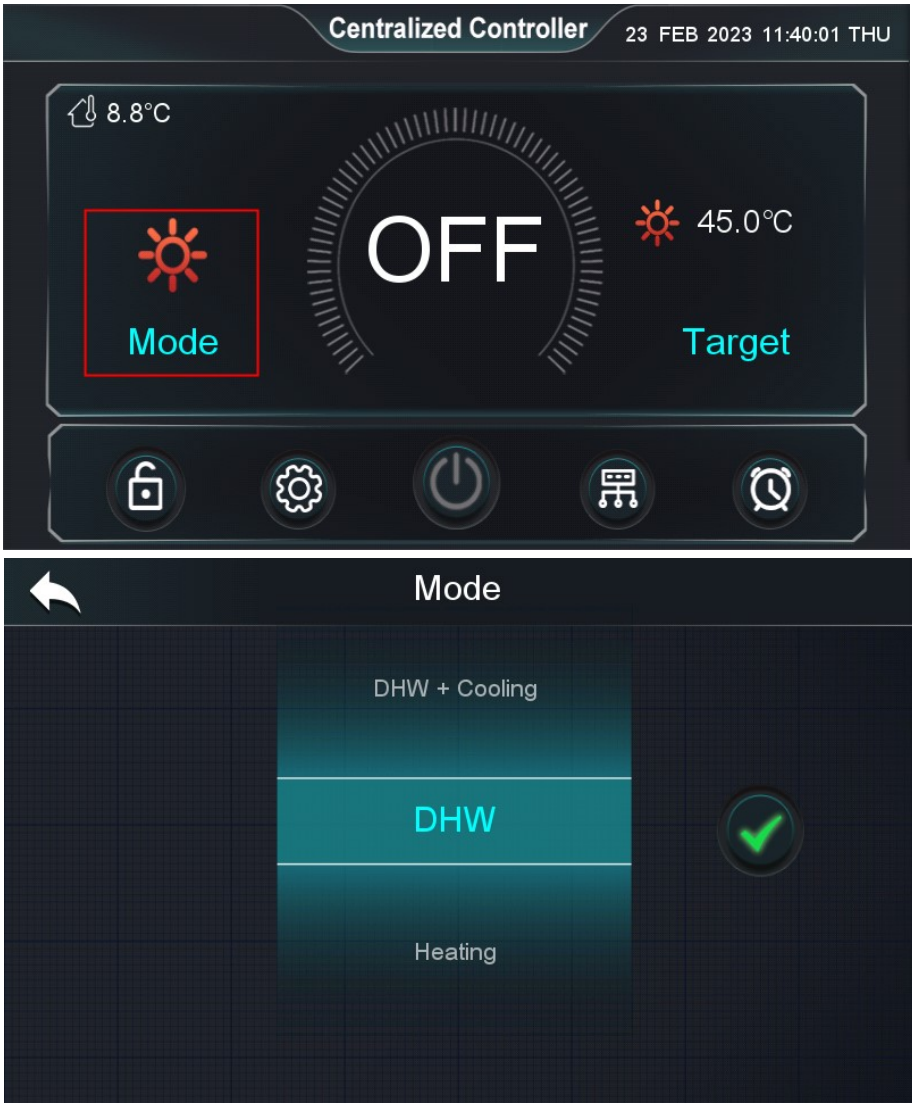
b. Press “  ” to turn on each unit to start the water pump.



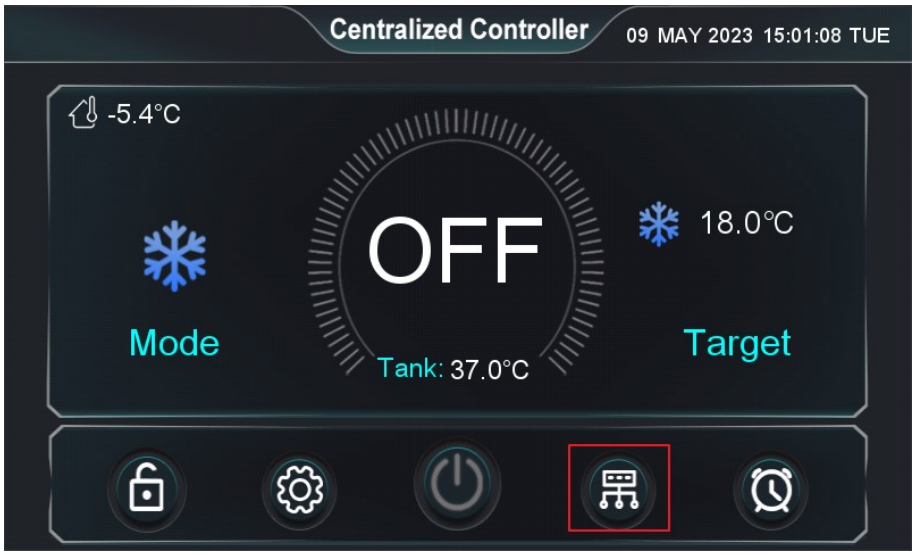
➢ Remark: If the central controller detects that any unit needs to be turned on, the pump 8 will be turned on regardless of whether or not there is a pump inside the unit and regardless of the mode.

6.3 Hot Water Pump

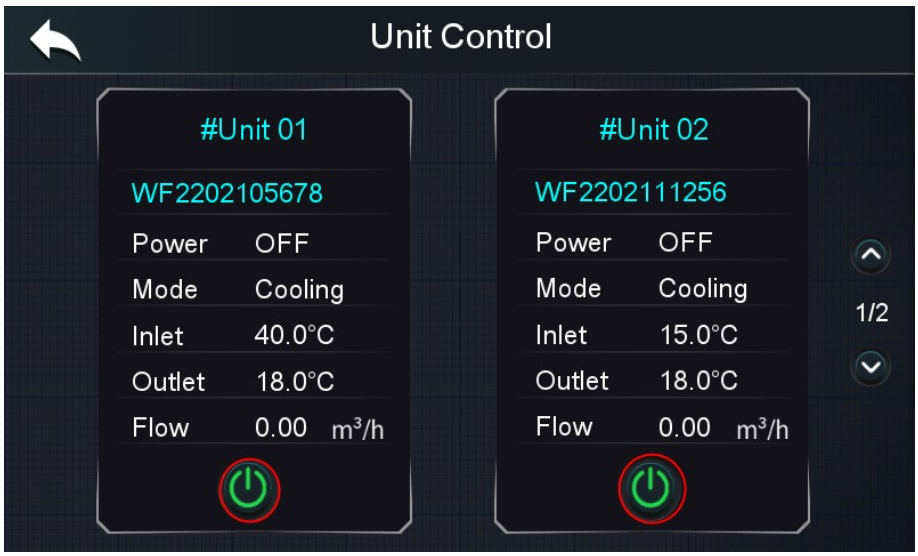
a. Set the mode to “DHW”.



b. Press “  ” on the main screen.

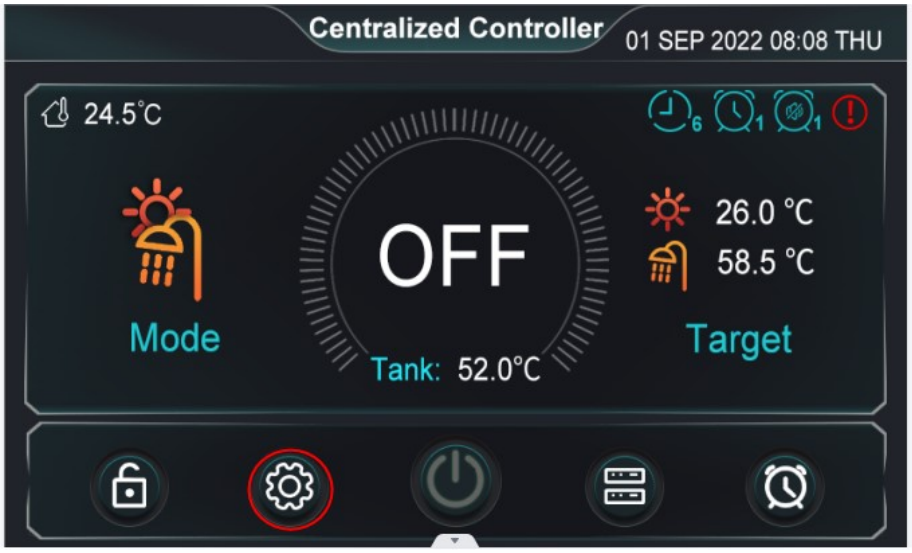


c. Press “  ” to turn on each unit to start the water pump.



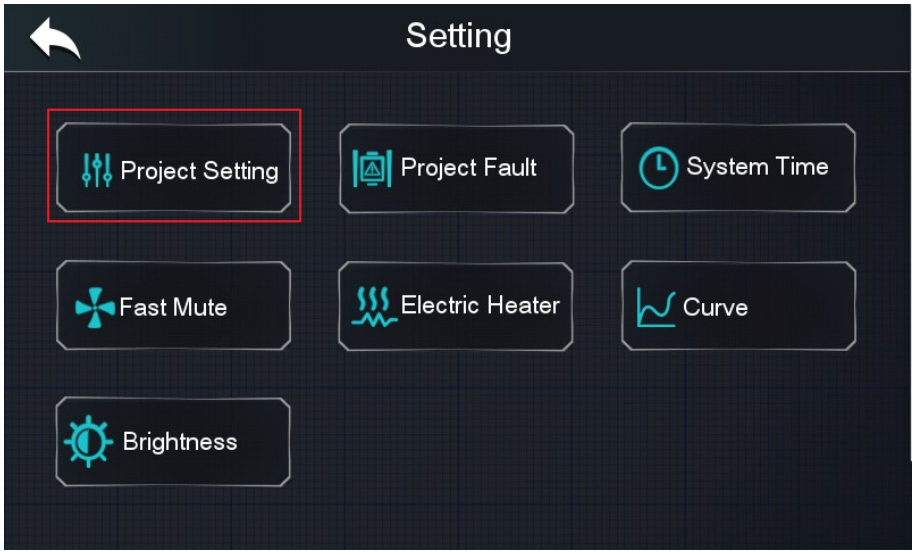
6.4 Water Flow Switch

a. Press “  ” on main interface.



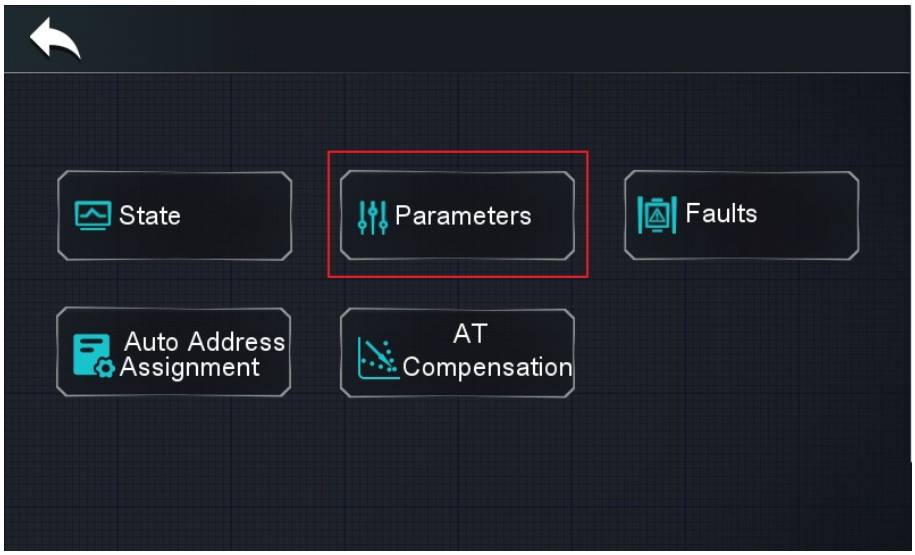
b. Press ” 

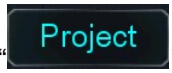
” and enter “22”.



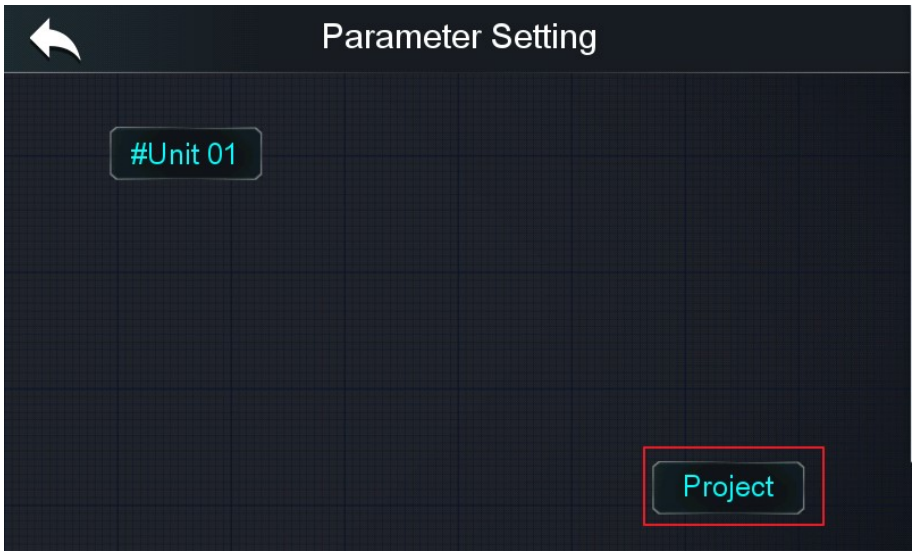
c. Press “ 

”.

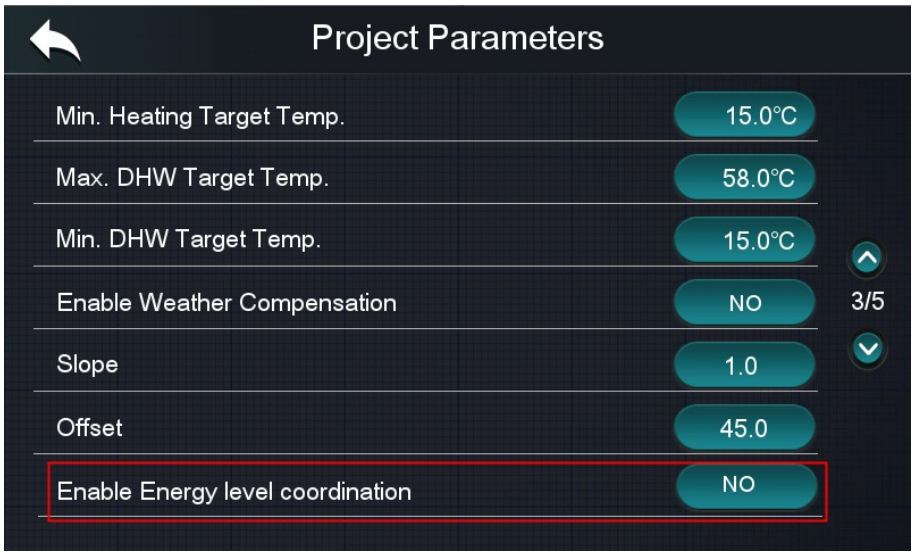


e. Press “ 

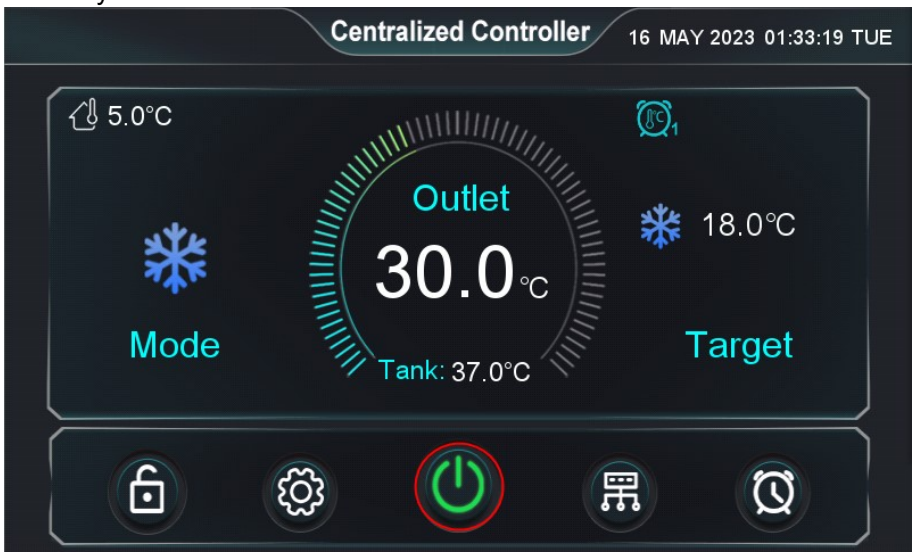
”.



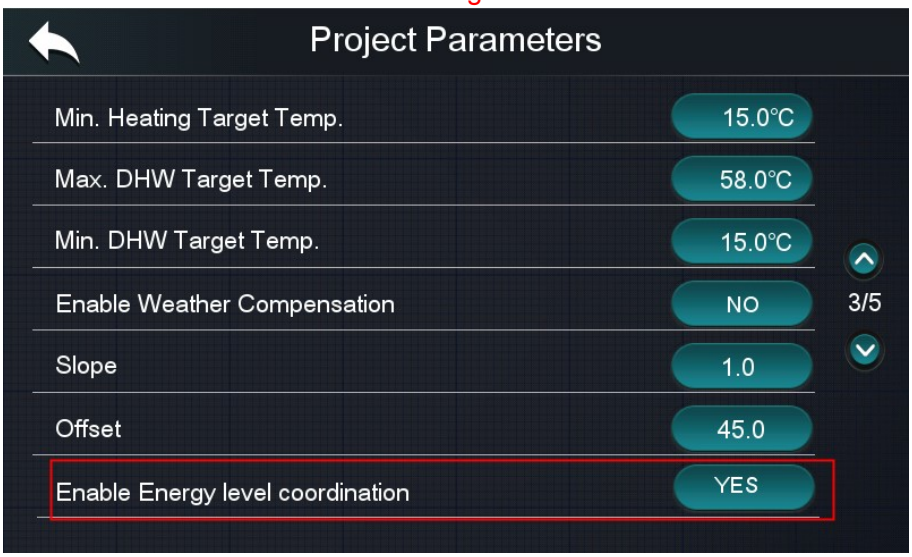
f. Set the parameter “**Enable Energy level coordination**” to 0-NO.



g. Back to the main screen and press “ ” to check whether all units can operate normally.



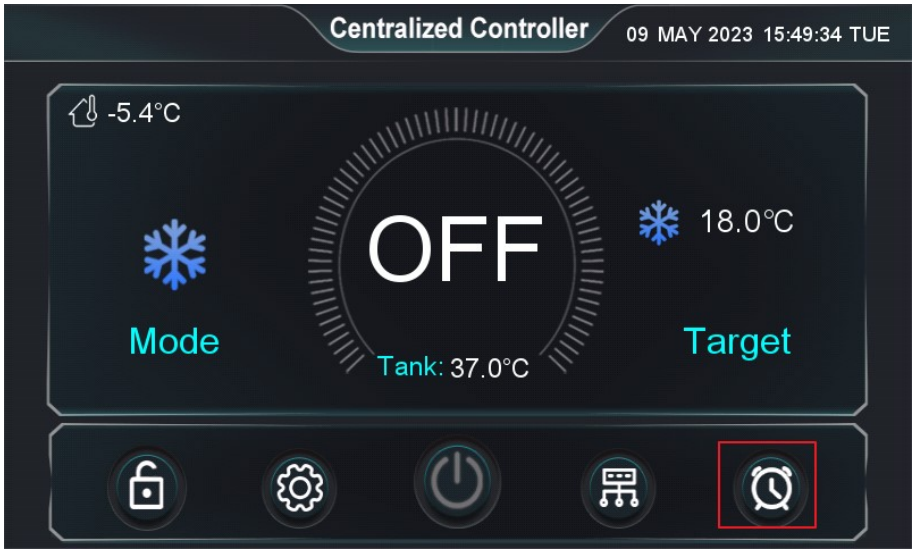
h. Notice: After commissioning the project, the parameter "Enable energy level coordination" should be set to “Yes” again.

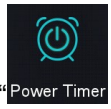


7. Function

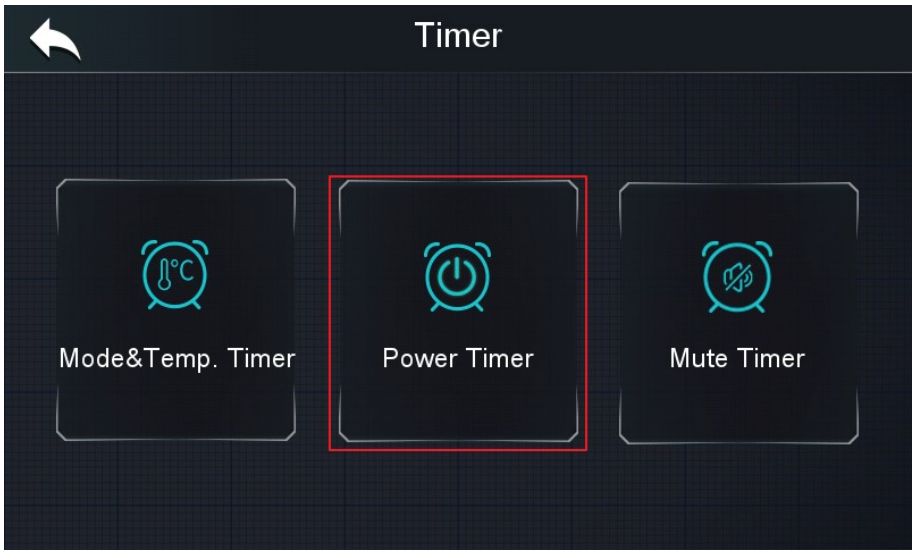
7.1 ON/OFF Timer

a. Press “  ”.

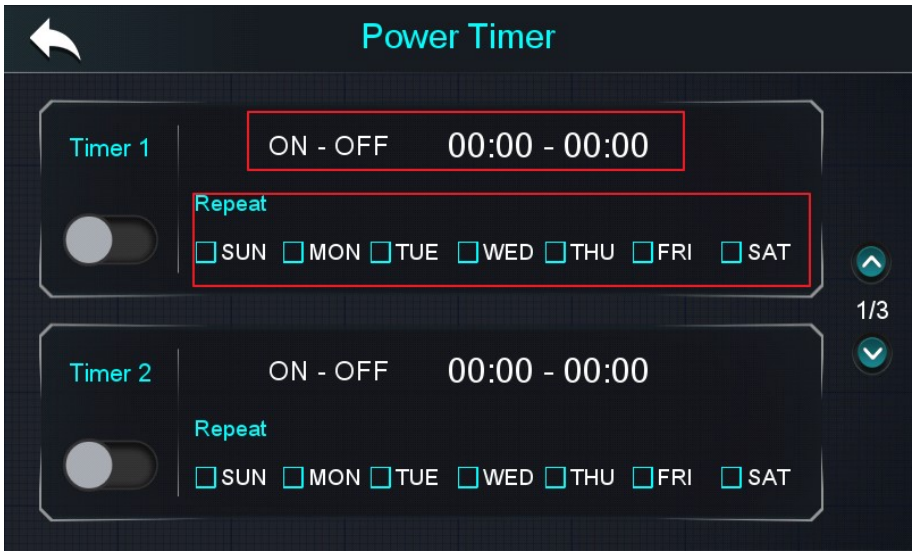


b. Press “ 

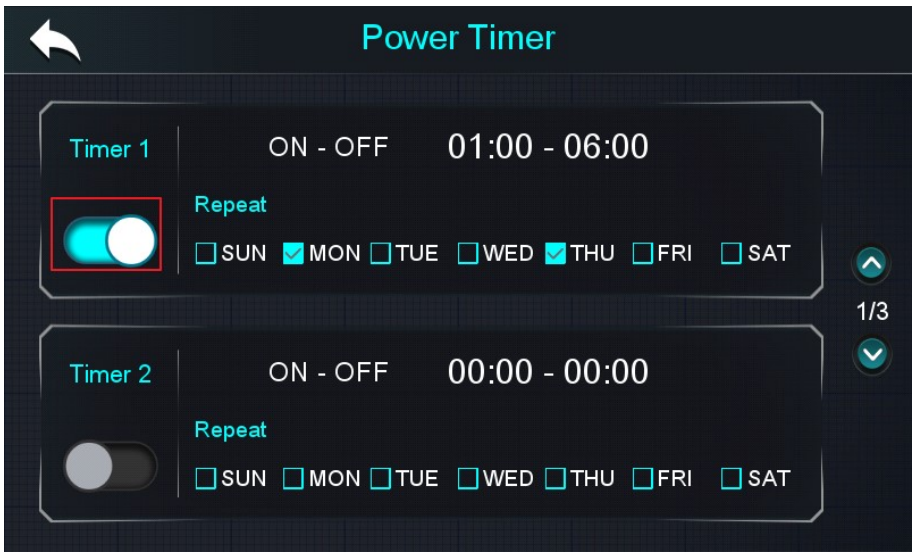
”.



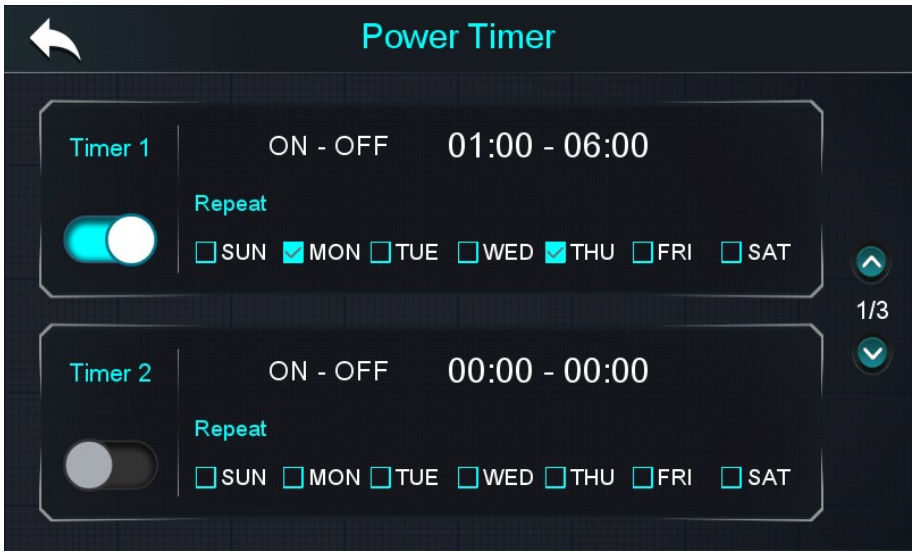
c. Setting the time period.



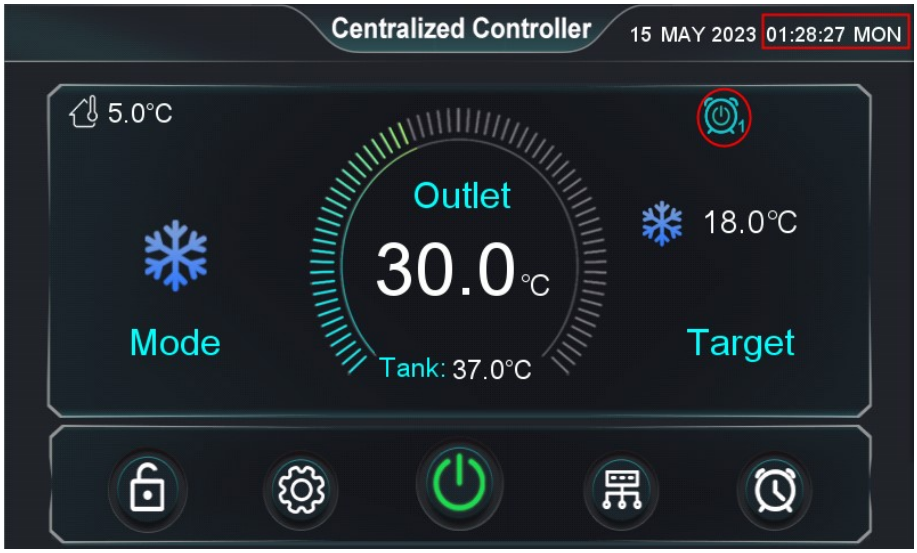
d. Enable the timer you need.



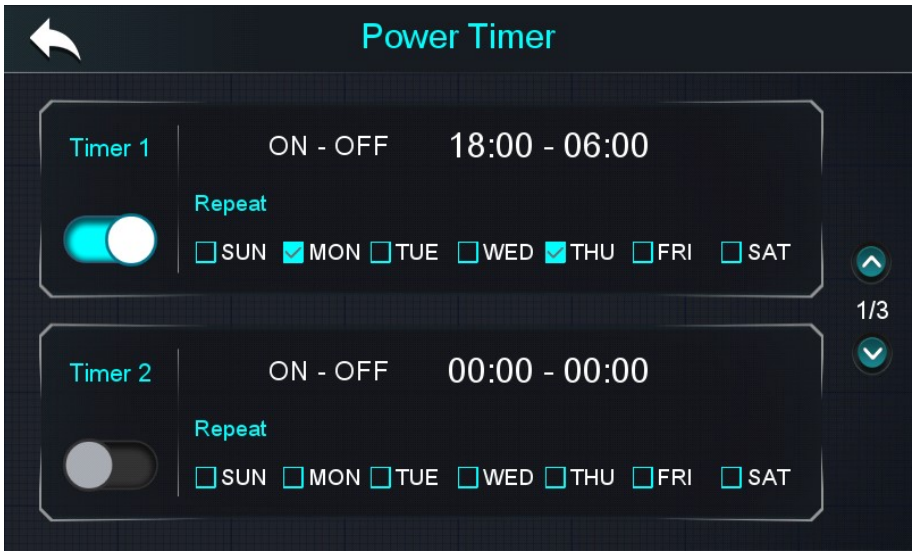
- Example 1: Centralized controller starts at 1:00 and ends at 6:00 every Monday and Thursday.



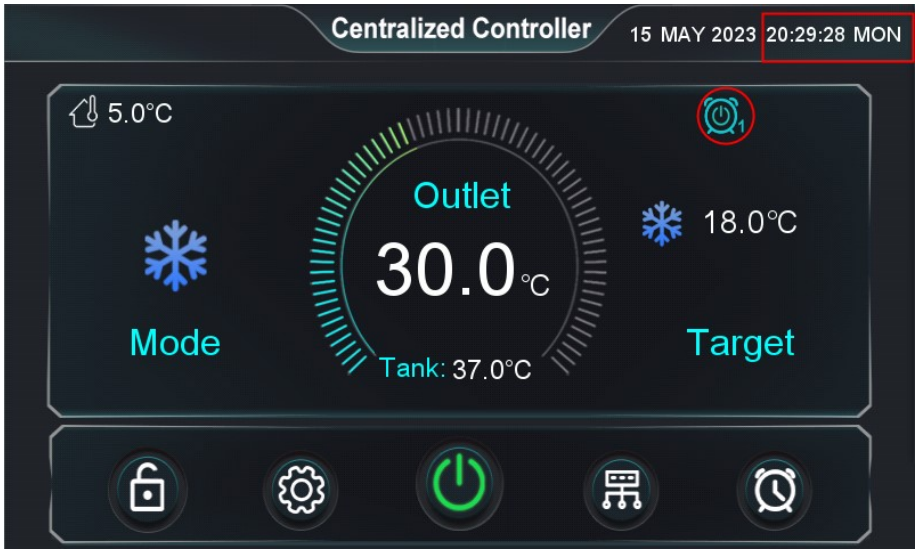
After entering the timing, the main interface will show the power on/off icon as below.



➢ Example 2: Centralized controller starts at 18:00 every Monday and Thursday and shuts down at 6:00 every Tuesday and Friday.

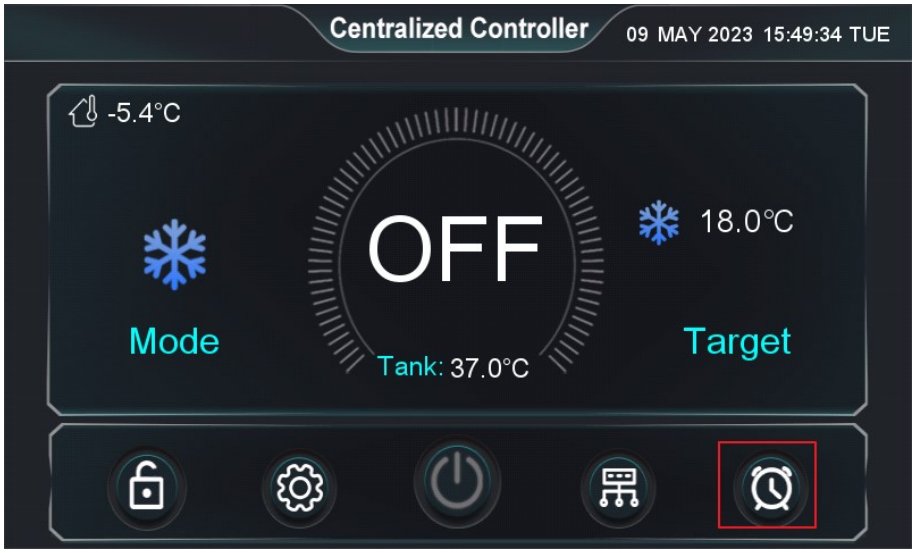


After entering the timing, the main interface will show the power on/off icon as below.

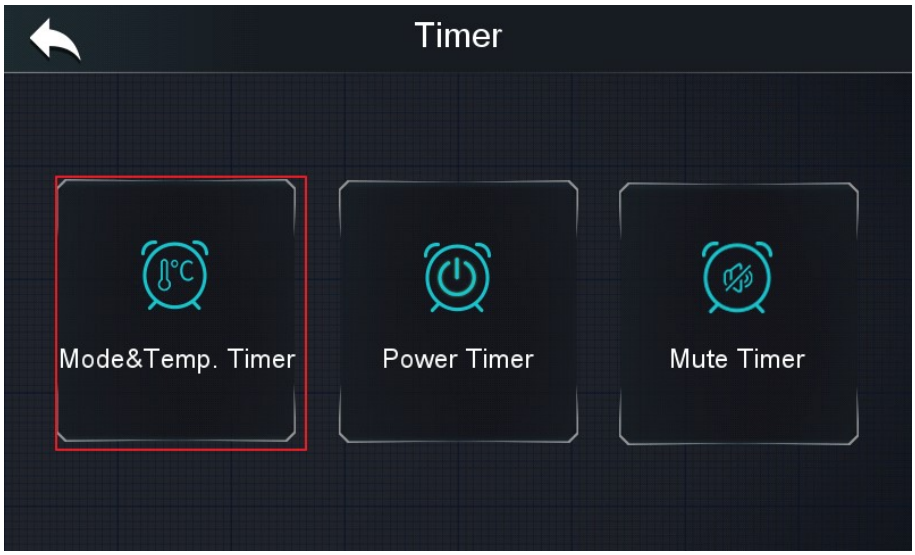


7.2 Mode&Temp. Timer.

a. Press “ ”.

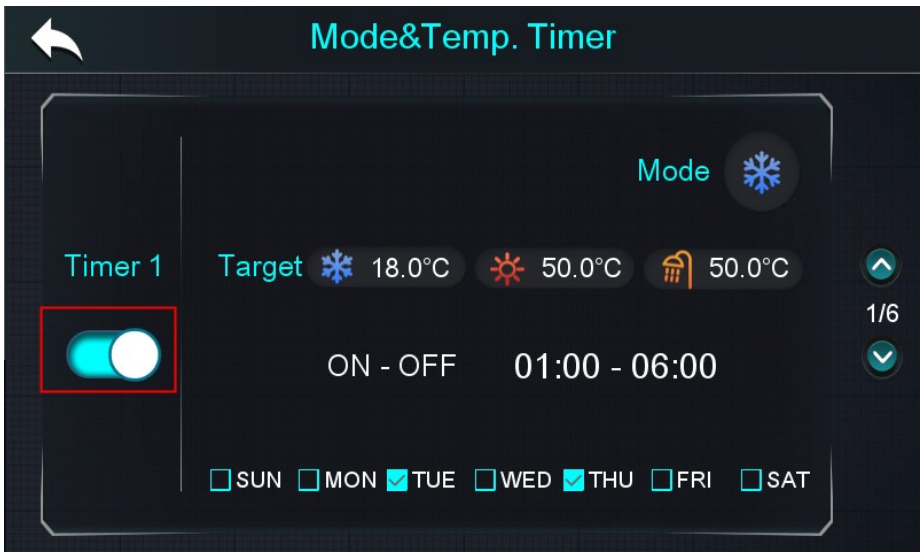


b. Press “Mode&Temp. Timer”.

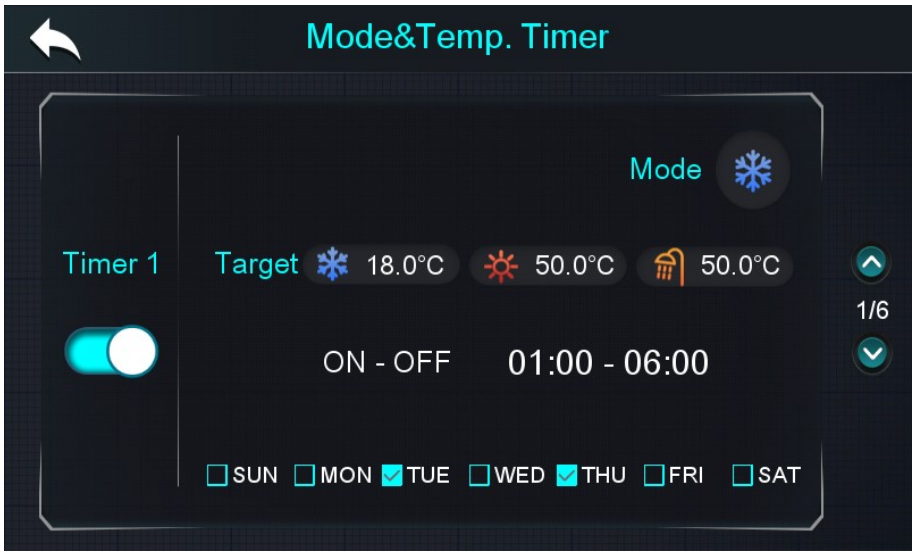


c. Setting the mode, target temperature and time period.

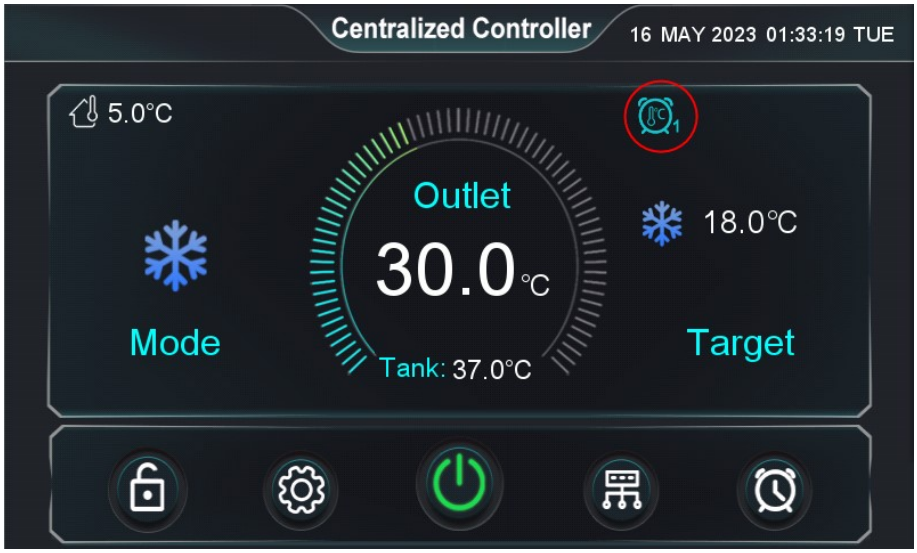
d. Enable this timer.



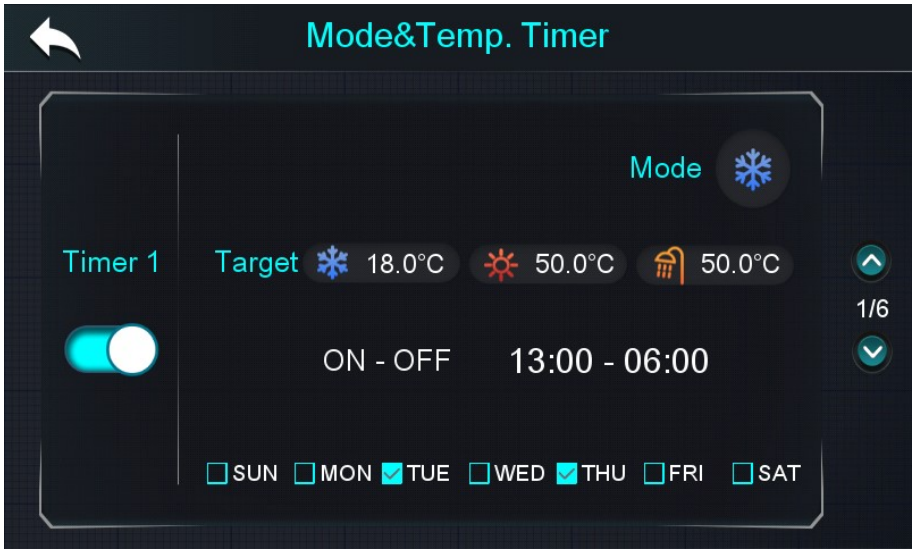
➢ Example 1: The centralized controller sets the cooling mode, 18℃ target temperature at 1:00 ~ 6:00 every Tuesday and Thursday.



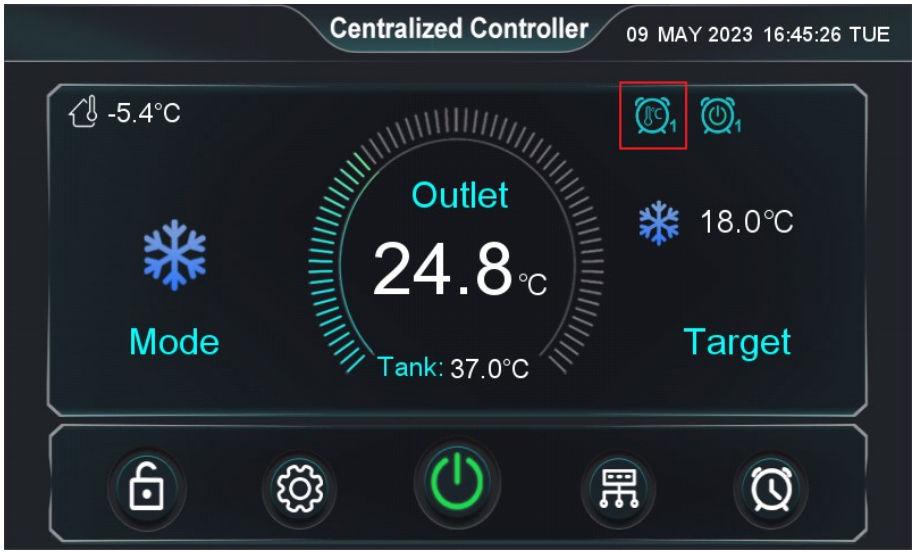
When entering the timing, the following icon will be shown on the main screen.



➢ Example 2: The centralized controller sets the cooling mode, 18℃ target temperature at 13:00 every Tuesday and Thursday and the units resume to the mode and target temperature set by centralized controller at 6:00 every Wednesday and Friday.



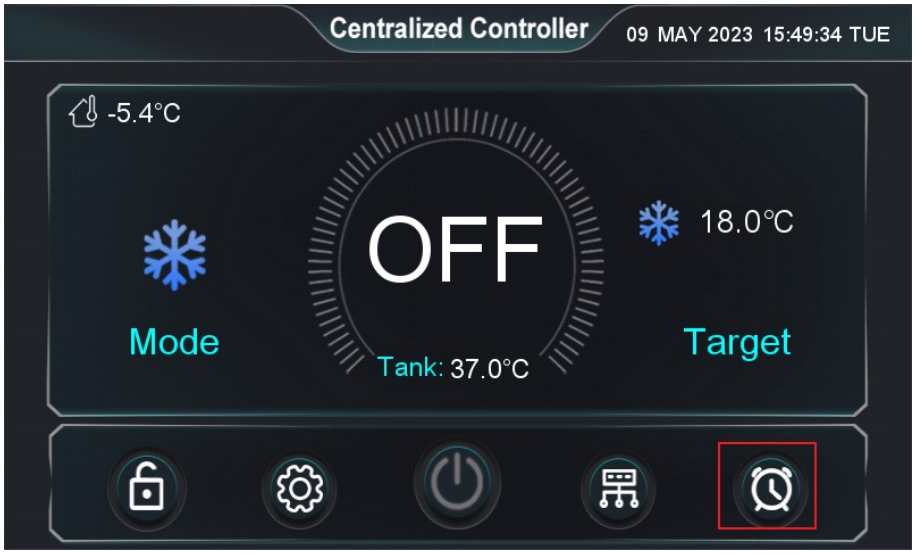
After entering the timing, the following icon will be shown on the main screen.

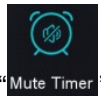


7.3 Mute Function

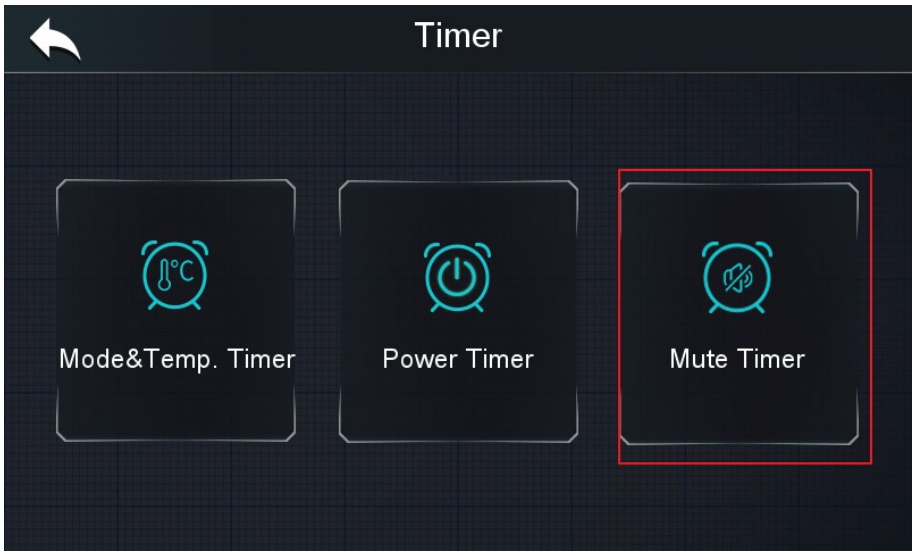
7.3.1 Timed Mute

a. Press “  ”.

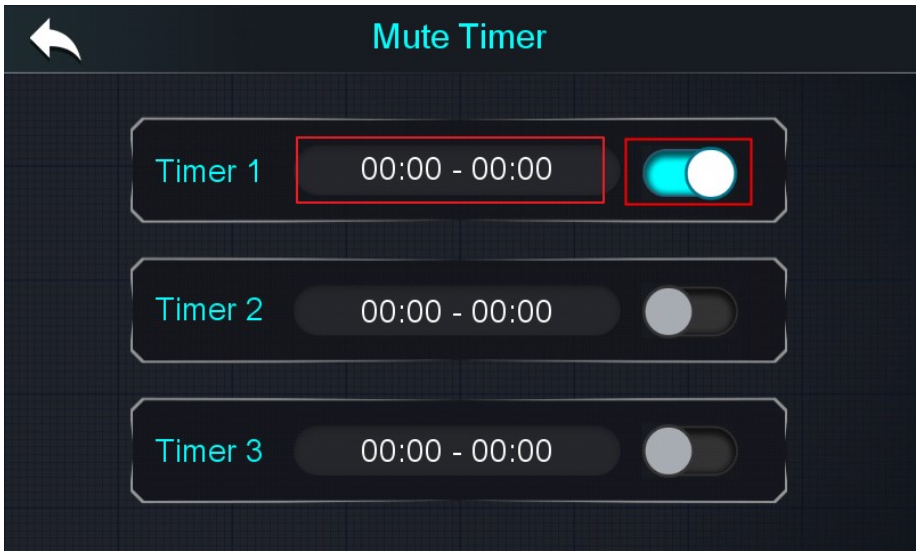


b. Press “ 

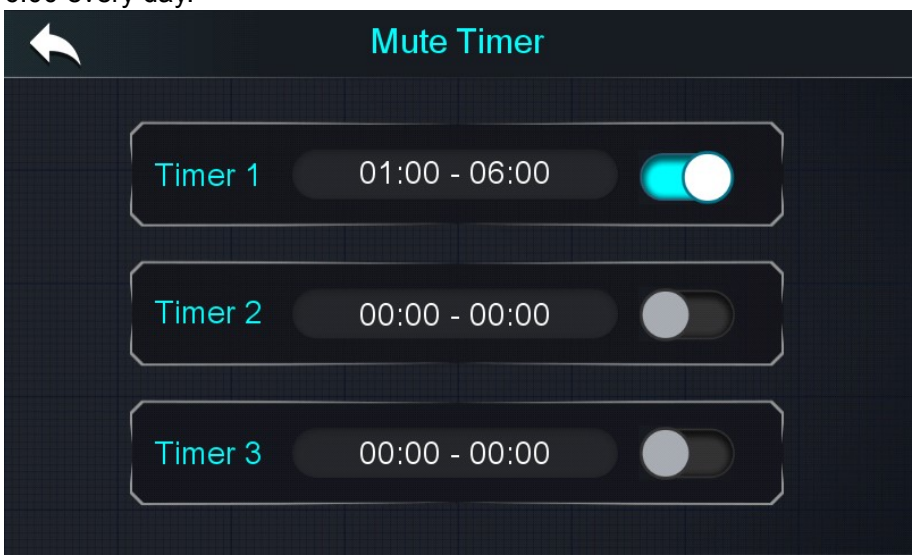
”.



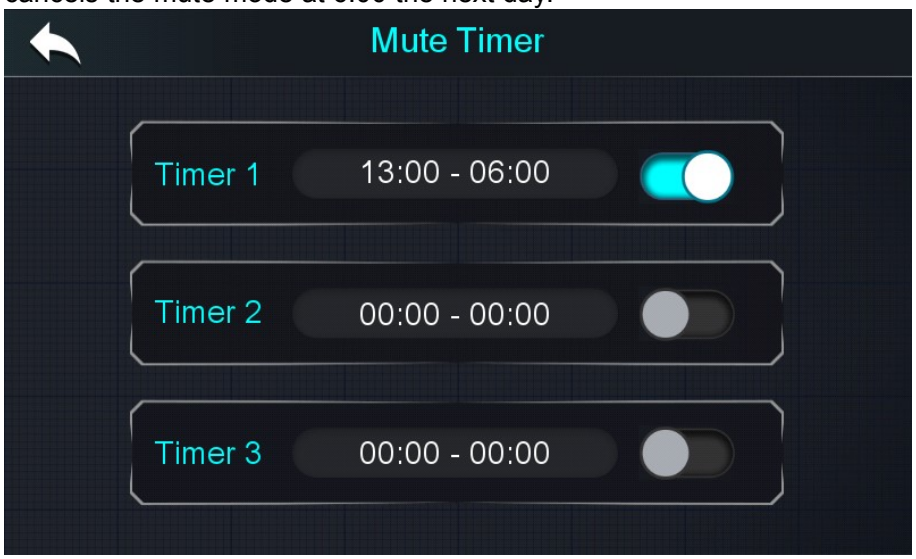
c. Set the time period and enable the timer.



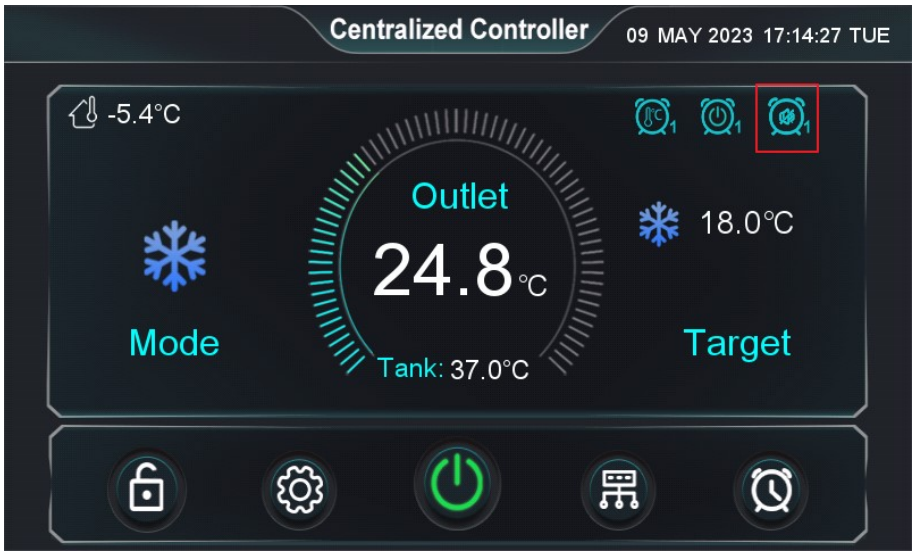
➢ Example 1: The centralized controller sets the mute mode for the units from 1:00 to 6:00 every day.



➢ Example 2: The centralized controller sets the mute mode for the units at 13:00, and cancels the mute mode at 6:00 the next day.

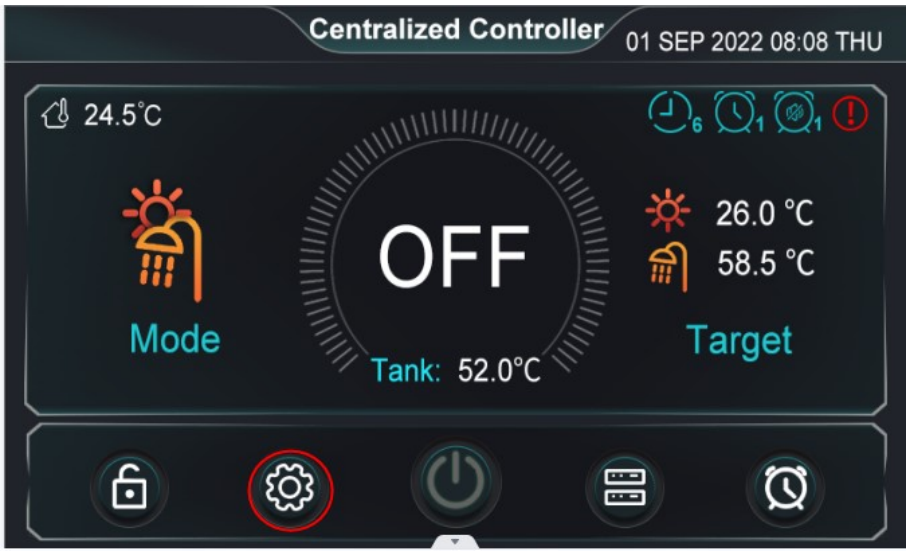


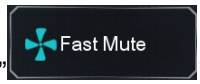
➢ After entering the timing, the following icon will show on the main screen.



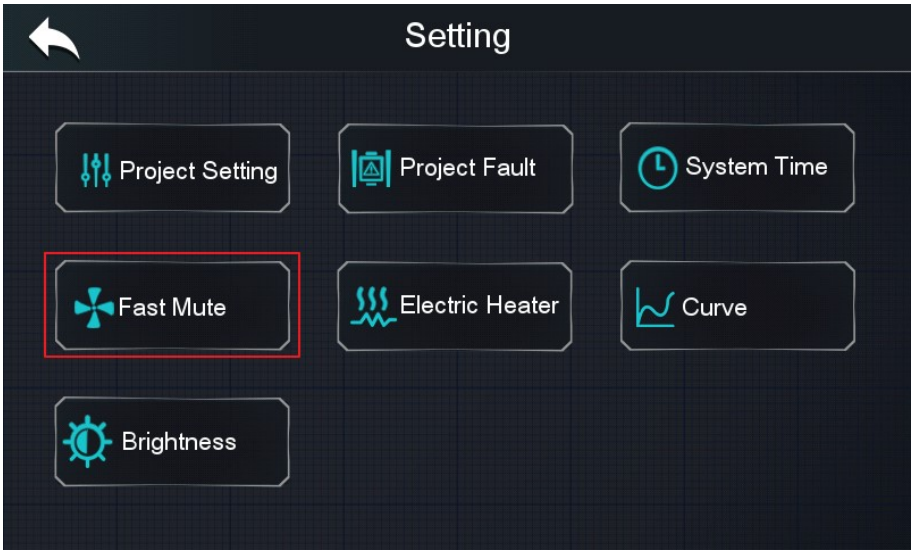
7.3.2 Fast Mute

a. Press “  ” on main interface.

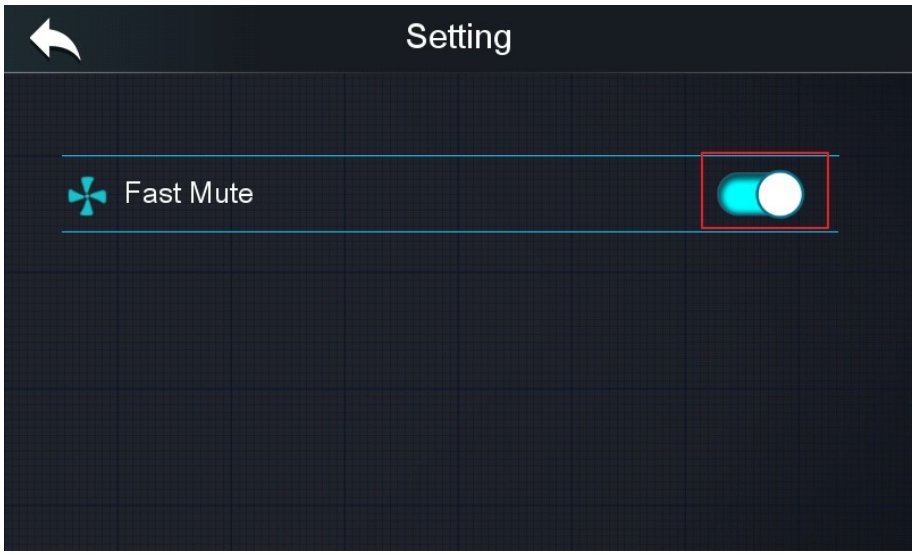


b. Press ” 

”



c. Enable the “Fast Mute”, then all units will enter the mute mode.

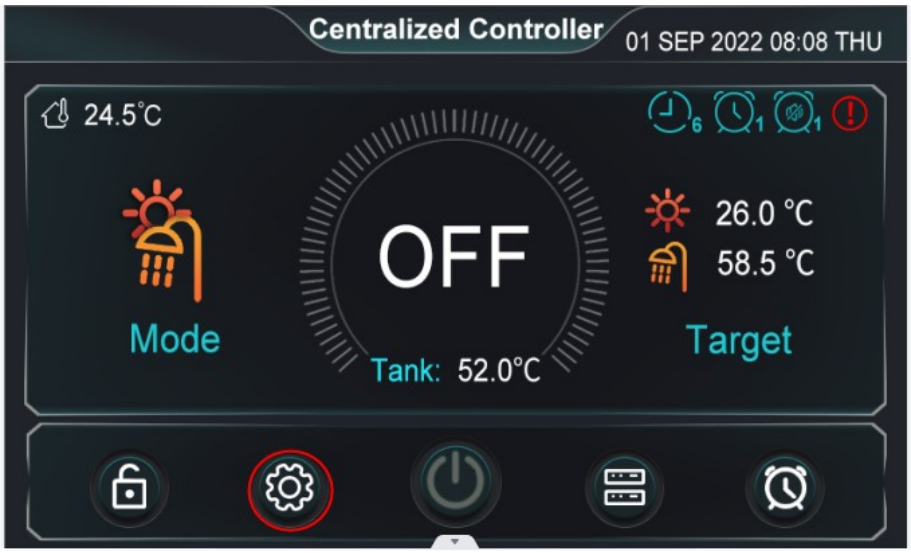


- Remark: After entering the fast silent mode, it will automatically exit the fast mute mode after 8 hours.

7.4 Water Pump Settings

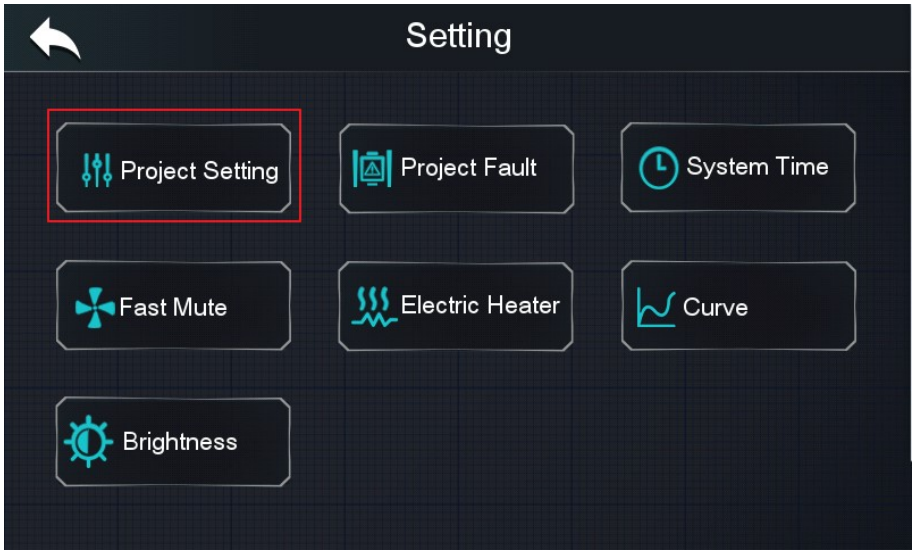
Control the pump operation logic by setting the pump parameters within the engineering parameters (when such parameters are modified, this parameter setting is synchronized to all units)

a. Press “  ” on main interface.



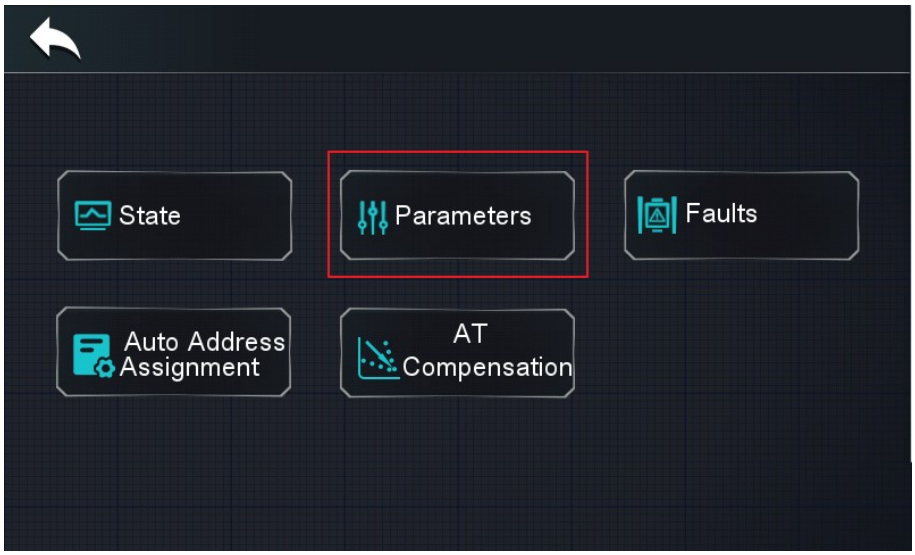
b. Press ” 

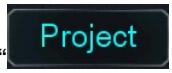
” and enter “22”.



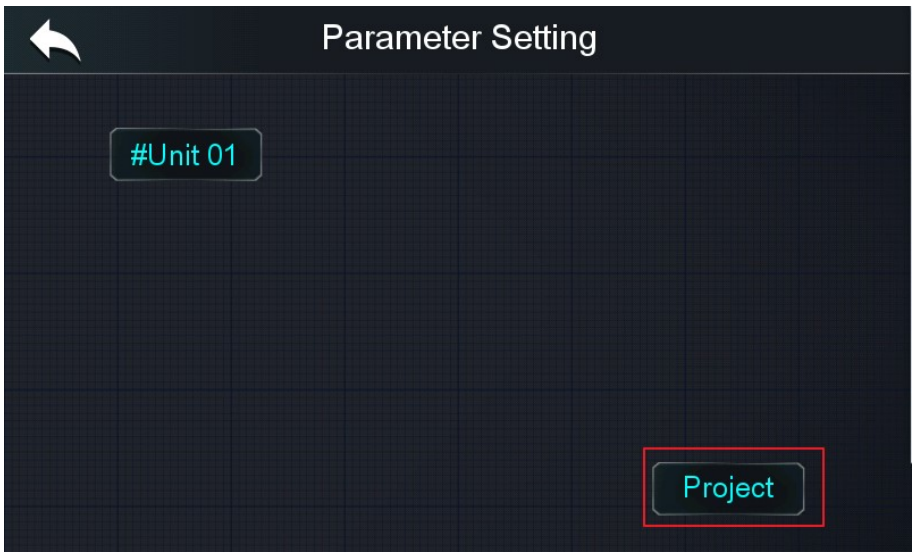
c. Press “ 

”.

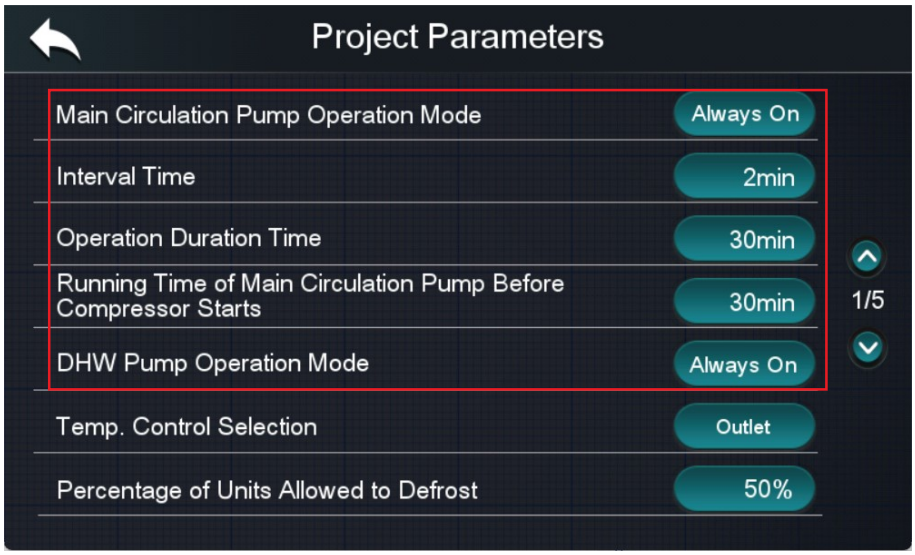


d. Press “ 

”.

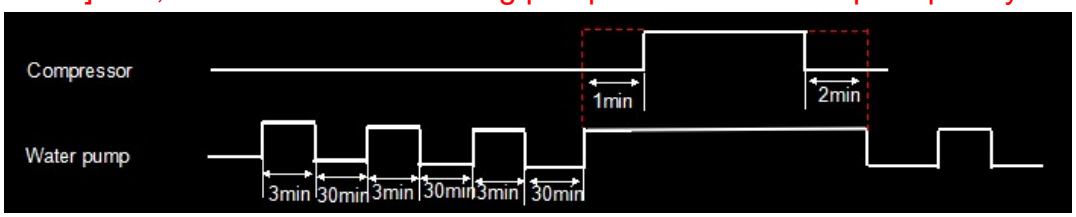


e. Set the parameters of water pump.



Parameter	Logic
Main Circulation Pump Operation Mode (0-[Always On] / 1-[Saving] / 2-[Interval])	0-[Always On]: All the water pumps continue to run after compressor stops running. 1-[Saving]: All the water pumps will stop after the compressor stop 2 minutes later. 2-[Interval]: The circulation pump will run at intervals.
Interval Time	Stopping time for the water pump interval operation (Valid only if parameter [Main Circulation Pump Operation Mode] = 2).
Operation Duration Time	Running time of the water pump interval operation (Valid only if parameter [Main Circulation Pump Operation Mode] = 2).
Running Time of Main Circulation Pump Before Compressor Starts	Water pump advance compressor on time (Only available in on/off unit).
DHW Pump Operation Mode	DHW pump operation mode, the control logic is the same as the main circulation pump.

Notice: If the parameter “Main Circulation Pump Operation Mode” is selected to 2, then the main circulation pump will run at intervals(as shown below), so the operating status of the pump may be different for each unit, and then the centralized controller will control the heating water pump 8 according to the operation status of every unit’s water pump. Based on this situation, it is not recommended to set the parameter [Main Circulation Pump Operation Mode] to 2, which will cause heating pump 8 to start and stop frequently.

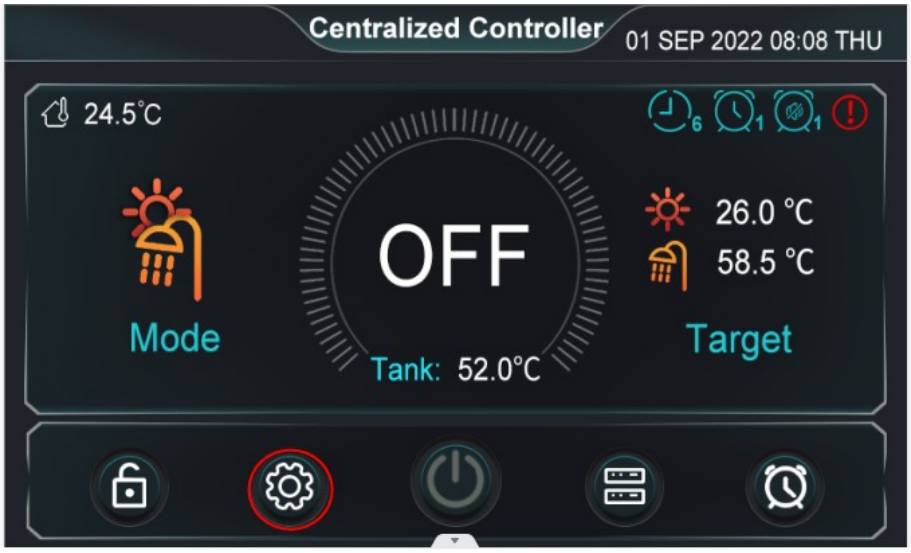


7.5 Electric heater

7.5.1 Parameter Setting

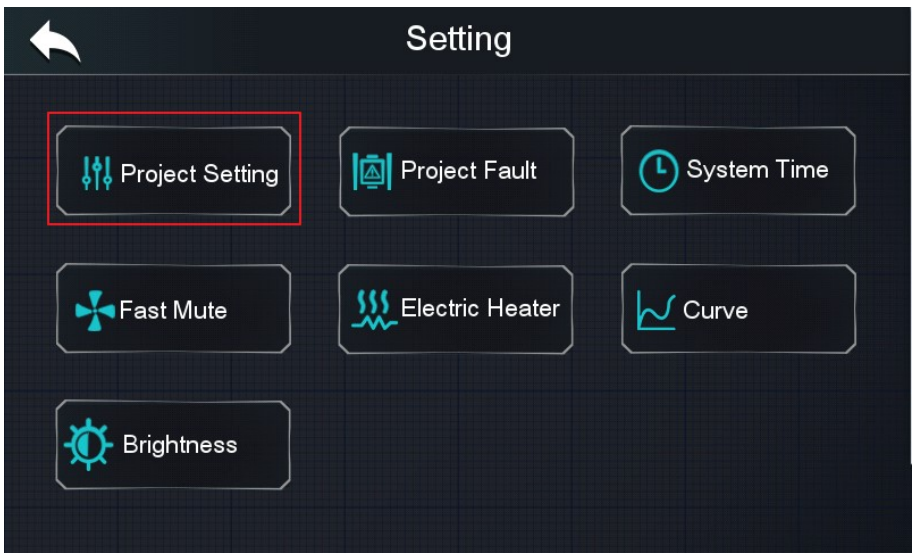
Control the electric heater operation logic by setting the parameters (when such parameters are modified, this parameter setting is synchronized to all units)

a. Press “  ” on main interface.



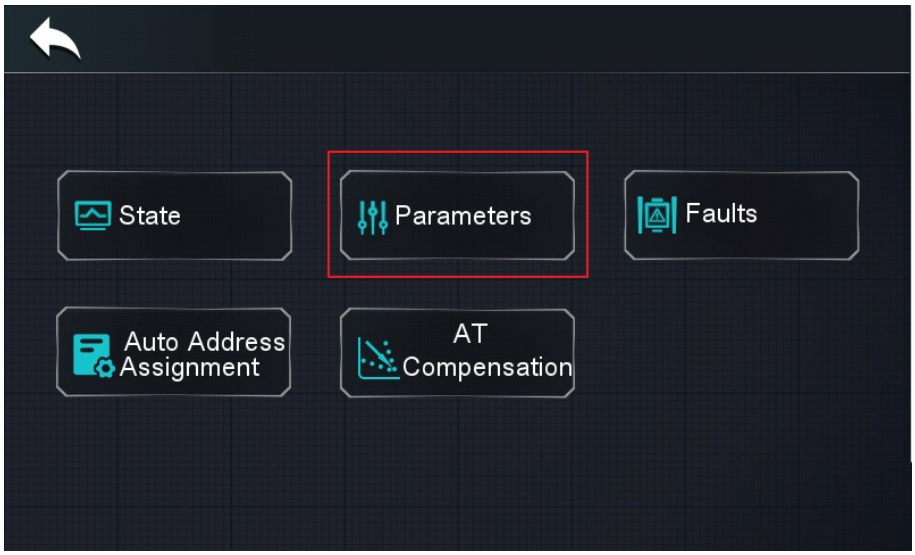
b. Press ” 

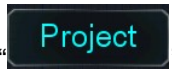
” and enter “22”.



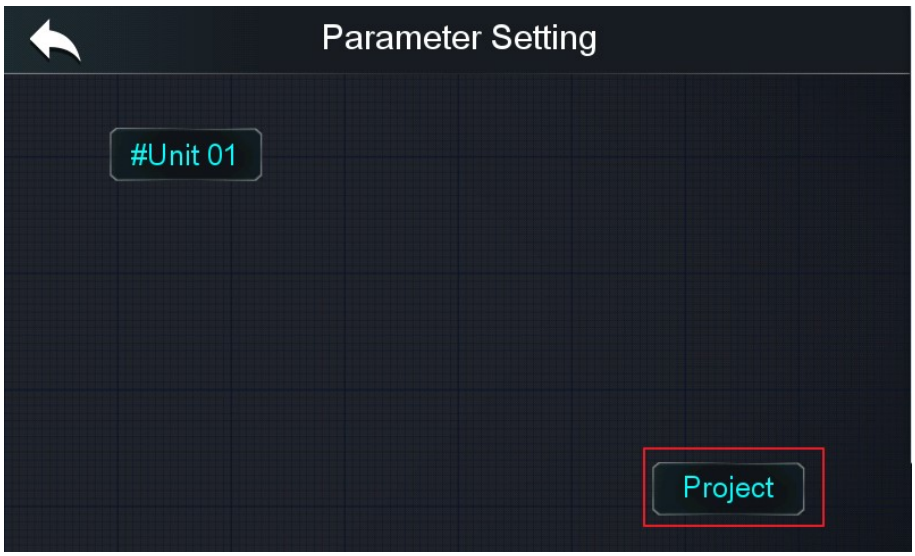
c. Press “ 

”.

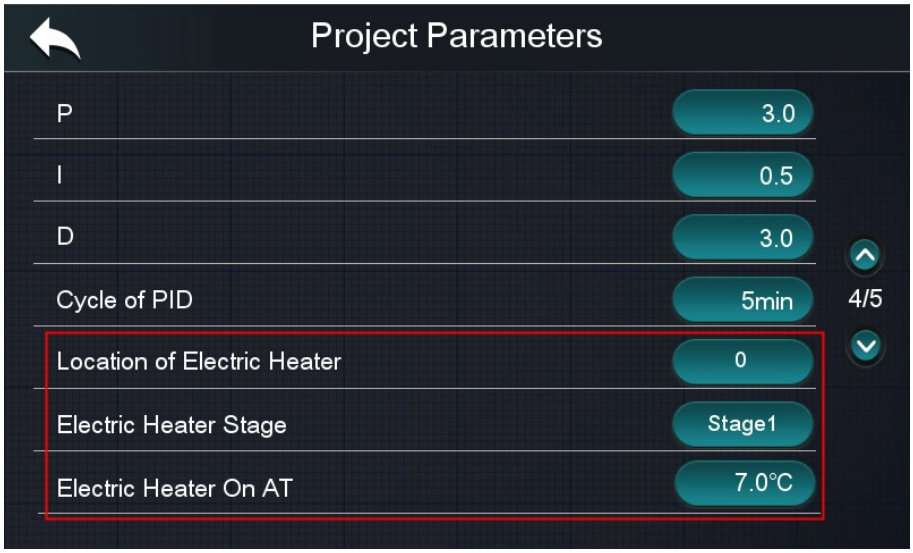


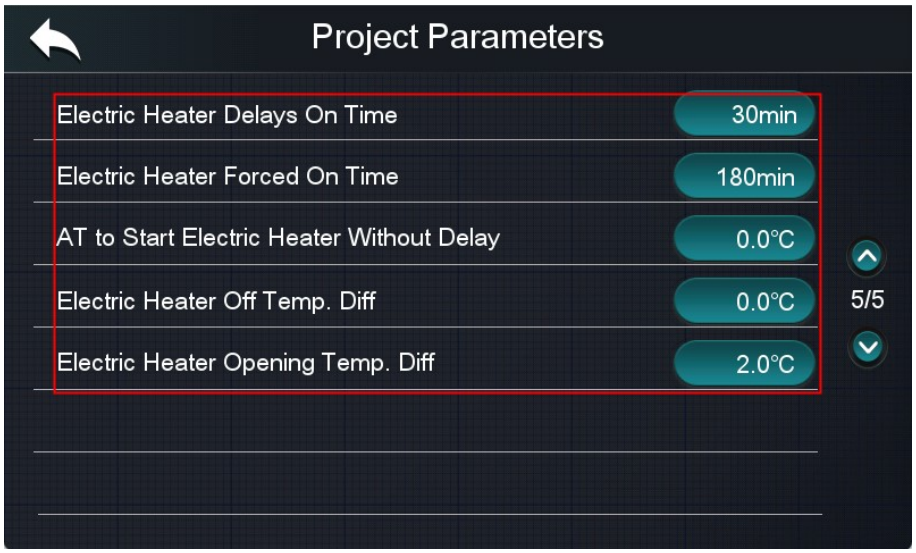
d. Press “ 

”.

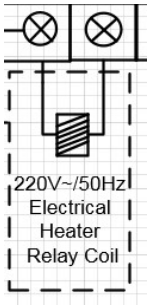
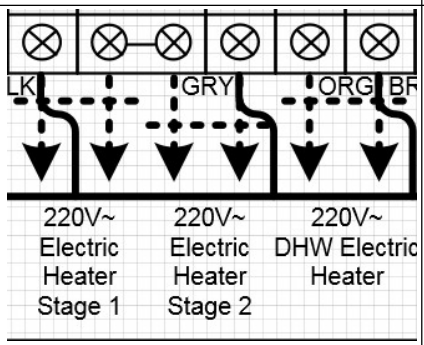


e. Set the electric heater parameters.





7.5.2 Wire Connection

Series	Wire Connection	Special settings
On/Off unit		Parameter [Location of Electric Heater] can only be set to 1 or 2. Parameter [Electric Heater Stage] can only be set to 1.
Inverter unit:		/

7.5.3 Control logic

7.5.3.1 Electric Heater Stage 1 and Stage 2.

Conditions for Turning On **Electric Heater Stage 1 and Electric Heater Stage 2**	Output Port
● When 【Location of Electric Heater】= **1-[Main Water Circuit],** outlet water temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater]= **2-[DHW Tank],** tank temperature ≤ hot water target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater]= **3-[Buffer Tank],** buffer tank temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● Actual temperature < target temperature is detected for a duration of [Electric Heater Forced On Time];	● When [Electric Heater Stage] =1, turn on **Stage 1.** ● When [Electric Heater Stage] =2, turn on **Stage 2.** ● When [Electric Heater Stage] =3, turn on **Stage 1 and Stage 2.**
● When [Location of Electric Heater] = **1-[Main Water Circuit],** outlet water temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater] = **2-[DHW Tank]**, tank temperature ≤ hot water target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater] = **3-[Buffer Tank],** buffer tank temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● When the ambient temperature ≤ the parameter [Electric Heater On AT], all the units are in the running state, and the controller will start timing from this moment, the timing time is called [Accumulated Time] in the following. The [Accumulated Time] ≥ parameter [Electric Heater Delays On Time];	Turn on **Stage 1.**
● When [Location of Electric Heater] = **1-[Main Water Circuit],** outlet water temperature ≤	● When [Electric Heater Stage] =1, turn on **Stage 1.**

heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater]= **2-[DHW Tank],** tank temperature ≤ hot water target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater] = **3-[Buffer Tank],** buffer tank temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● When the ambient temperature ≤ the parameter [Electric Heater On AT], all the units are in the running state, and the controller will start timing from this moment, the timing time is called [Accumulated Time] in the following. The [Accumulated Time] ≥ parameter [Electric Heater Delays On Time]***2**;	● When [Electric Heater Stage] =2, turn on **Stage 2, turn off Stage 1.** ● When [Electric Heater Stage] =3, turn on **Stage 1 and Stage 2.**
● When [Location of Electric Heater] = **1-[Main Water Circuit],** outlet water temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater] = **2-[DHW Tank],** tank temperature ≤ hot water target temperature - parameter [Electric Heater Off Temp. Diff]; ● When [Location of Electric Heater]= **3-[Buffer Tank],** buffer tank temperature ≤ heating target temperature - parameter [Electric Heater Off Temp. Diff]; ● Ambient temperature ≤ parameter [AT to Start Electric Heater Without Delay];	● When [Electric Heater Stage] =1, turn on **Stage 1.** ● When [Electric Heater Stage] =2, turn on **Stage 2.** ● When [Electric Heater Stage] =3, turn on **Stage 1 and Stage 2.**

Conditions for Turning Off **Electric Heater Stage 1 and Electric Heater Stage 2** (Any of the conditions)
● Turn off all the units by centralized controller
● Switch mode
● Actual temperature ≥ target temperature-parameter [Electric Heater Off Temp. Diff.]

7.5.3.2 DHW electric heater

Conditions for Turning on **DHW Electric Heater**	Output Port
● All units that support hot water mode are running. When the ambient temperature ≥ parameter [Electric Heater On AT], the centralized controller starts timing. When the timing time reaches parameter [Electric Heater Delays On Time], the DHW electric heater will turn on. Remark: ➢ During the timing period, the ambient temperature ≥ parameter [Electric Heater On AT], timing will be reset. ➢ During the timing period, if there is a unit off, but the hot water tank temperature < target temperature - parameter [Electric Heater Opening Temp.Diff], the timing is suspended; ➢ During the timing period, if there is a unit off, but the hot water tank temperature ≥ target temperature - parameter [Electric Heater Opening Temp.Diff], timing will be reset. ● Hot water tank temperature ≤ target temperature - parameter [Electric Heater Opening Temp.Diff]	Turn on DHW Electric Heater.
● Ambient temperature ≤ Parameter [Electric Heater Opening Temp.Diff]; ● All units that support hot water mode are in the running state. ● Hot water tank temperature ≤ target temperature - parameter [Electric Heater Opening Temp.Diff]	Turn on DHW Electric Heater.
● When the centralized controller is on, and the hot water tank temperature < Target temperature for parameter [Electric Heater Forced On Time], turn on the DHW Electric Heater.	Turn on DHW Electric Heater.

Conditions for turning off DHW electric heater(Any of the conditions)
● Turn off all the units by centralized controller.
● Switch mode.
● Hot water tank temperature ≥ target temperature-parameter [Electric Heater Off Temp. Diff.].

8. Auto Defrosting Assignment

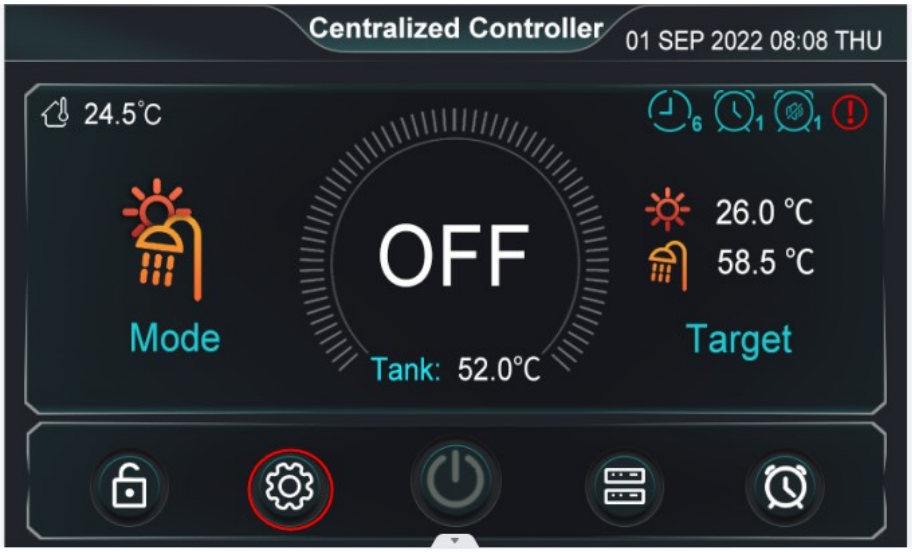
8.1 Function Introduction

Intelligent defrosting collaborative technology can control the number of simultaneous defrosting units, reducing water temperature fluctuations, and making users' experience more comfortable.

Example: If there are 10 units in the project and the parameter is set to 50%, there will be at most 5 units defrosting at the same time. If there are units applying for defrosting at this time, the central control will queue these units and wait for some units to quit defrosting before giving permission to defrost to these units.

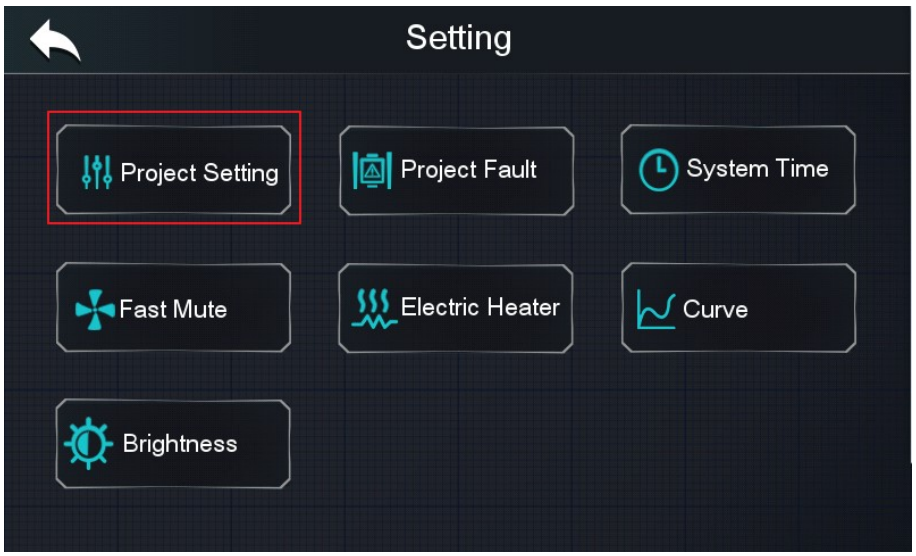
8.2 Parameter Setting

a. Press “  ” on main screen.



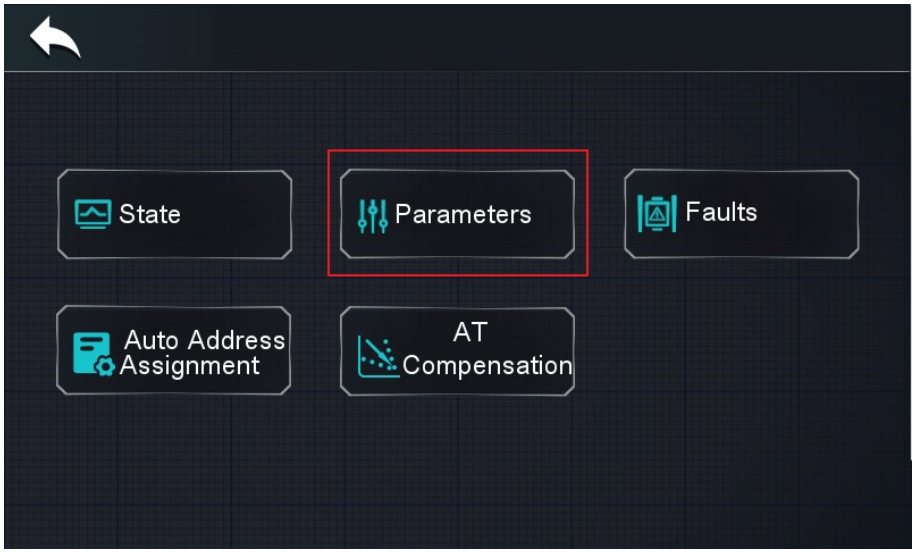
b. Press ” 

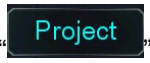
” and enter “22”.



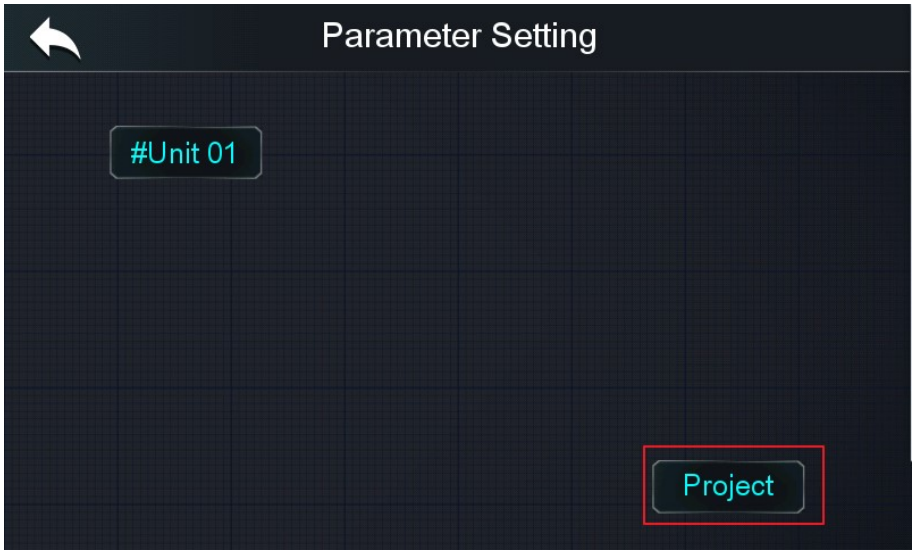
c. Press “ 

”.

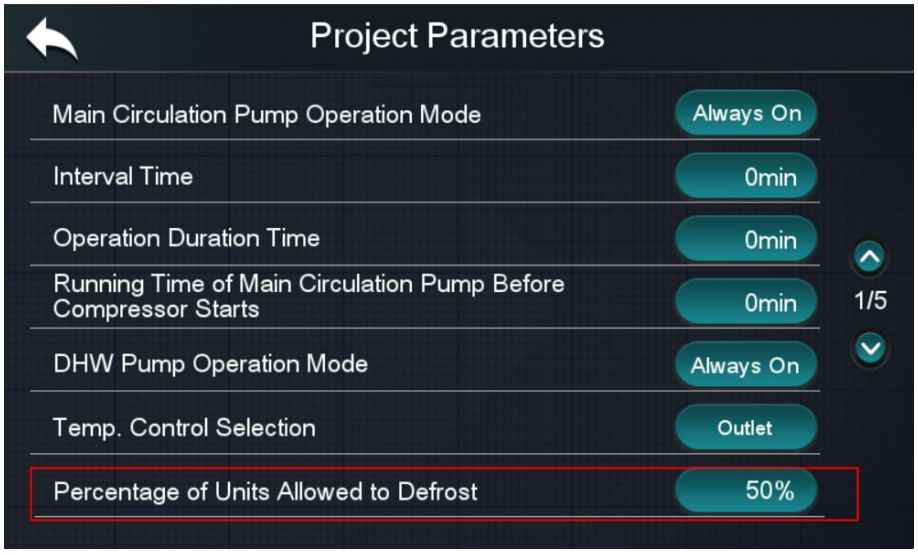


d. Press “ 

”.



e. Set the parameters “Percentage of Units Allowed to Defrost”.



9. Water Temperature Control Solution

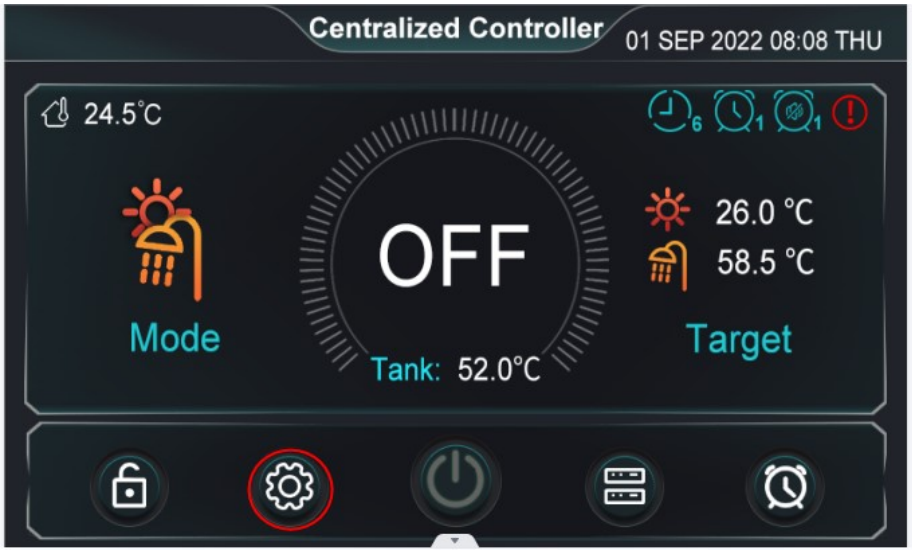
9.1 Function Introduction

The centralized controller allows to choose the different water temperature control option according to the demand.

- Inlet water temperature control: The centralized controller obtains and averages the inlet water temperature of all machines as the inlet water temperature.
- Outlet water temperature control: The centralized controller obtains and averages the outlet water temperature of all machines as the inlet water temperature.
- Buffer tank temperature control: the centralized controller will send the buffer tank temperature to all units to control the on/off. And please connect the buffer tank sensor to **#Unit 01.**

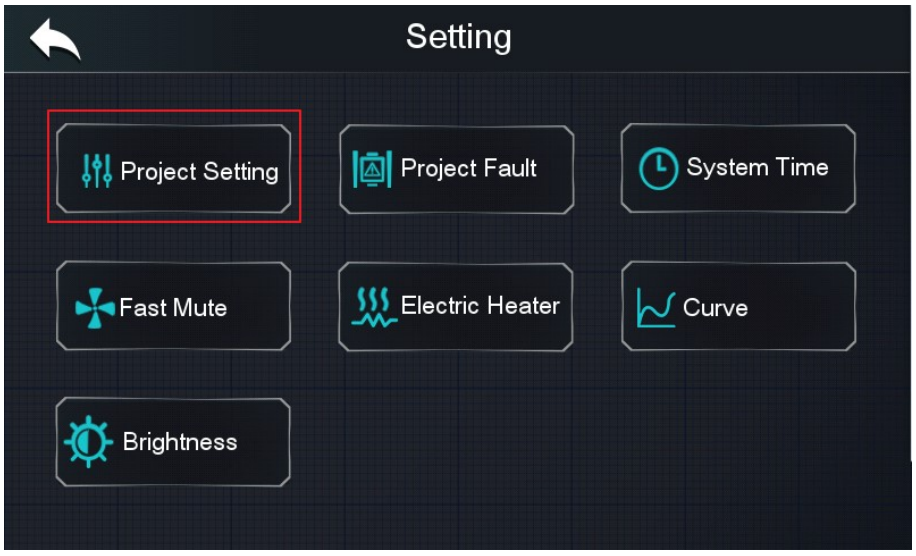
9.2 Parameter Setting

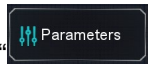
a. Press “  ” on main screen.



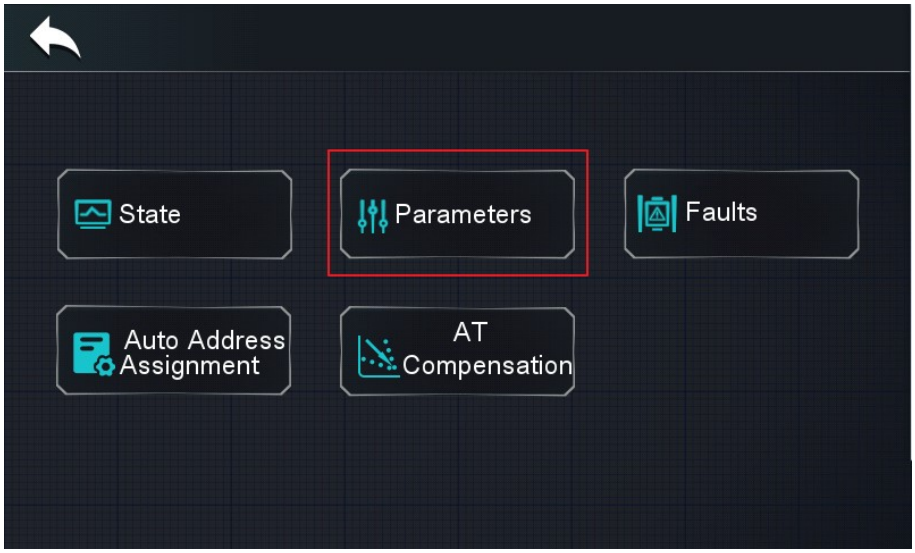
b. Press ” 

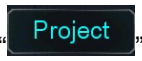
” and enter “22”.



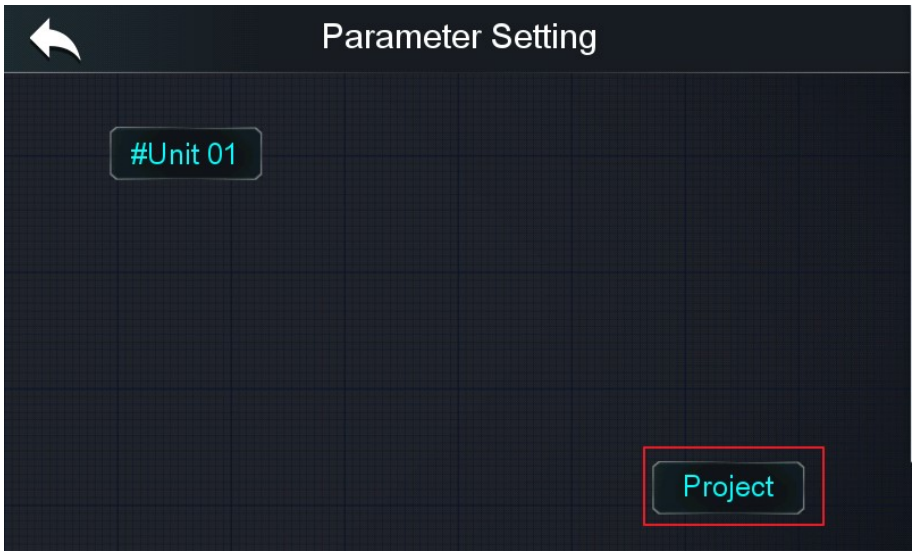
c. Press “ 

”.

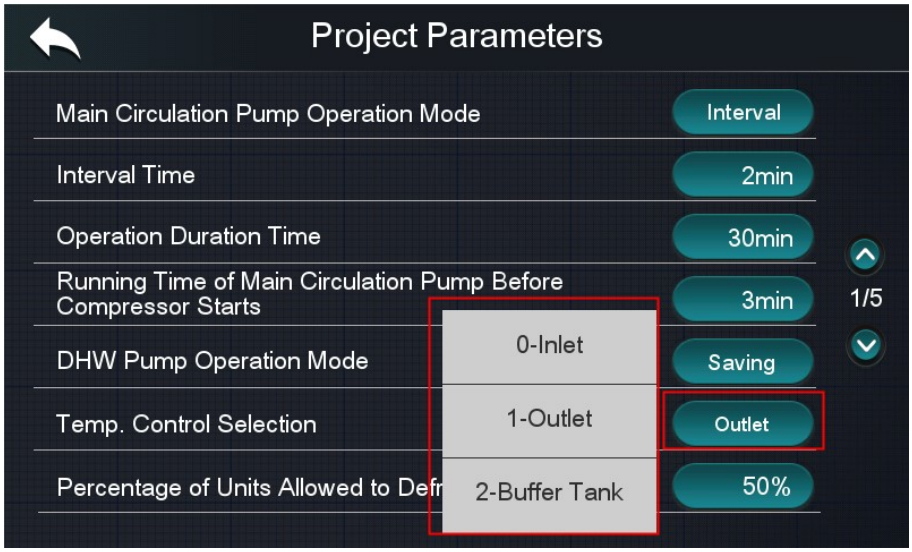


d. Press “ 

”.

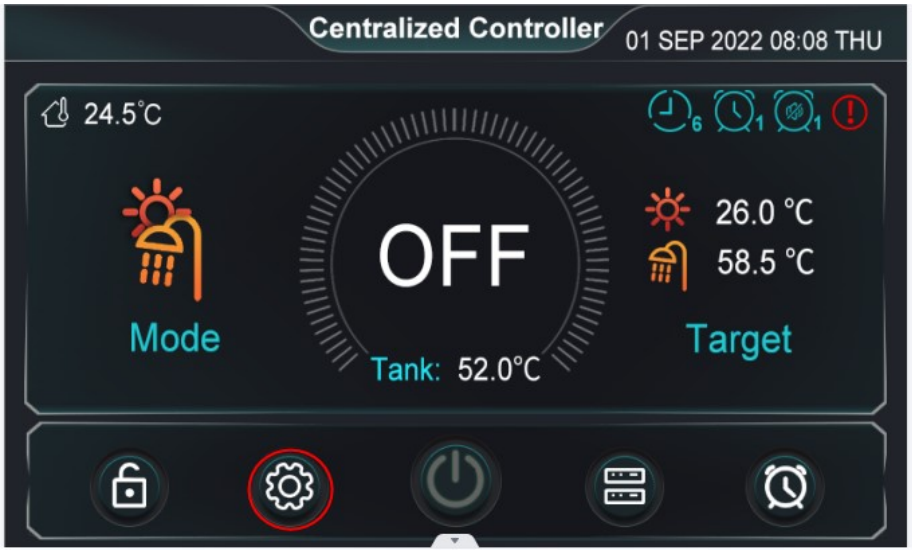


e. Set the parameters “Temp. Control Selection”.



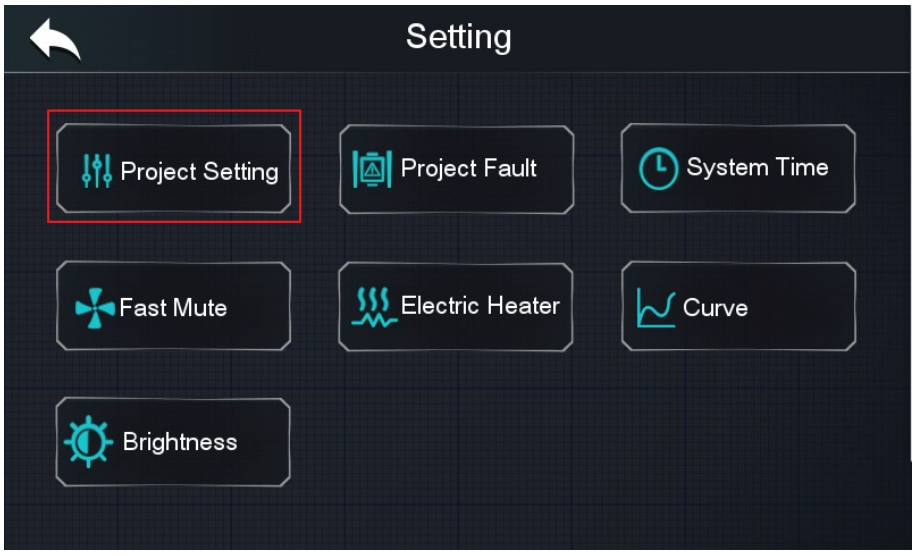
9.3 Heating Compensation Function

a. Press “  ” on main screen.

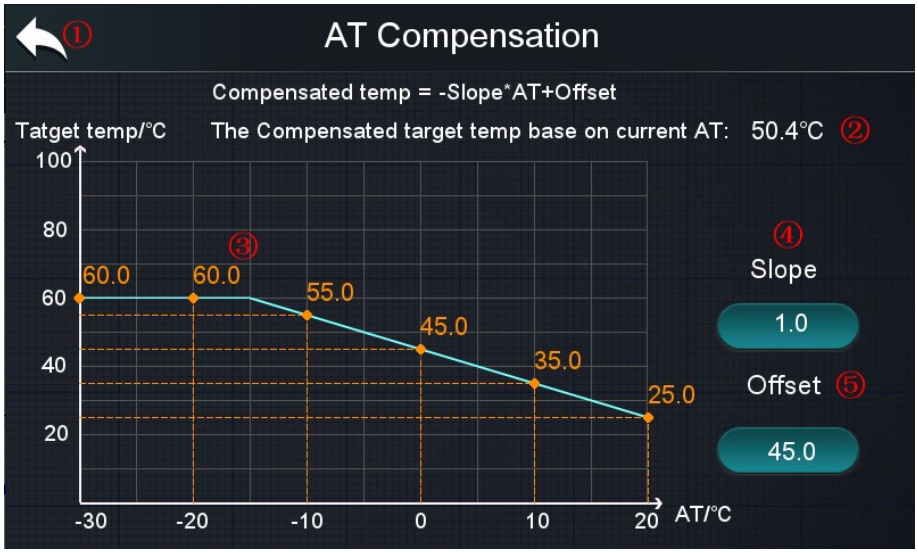


b. Press ” 

” and enter “22”.



c. Press “ AT Compensation ”.



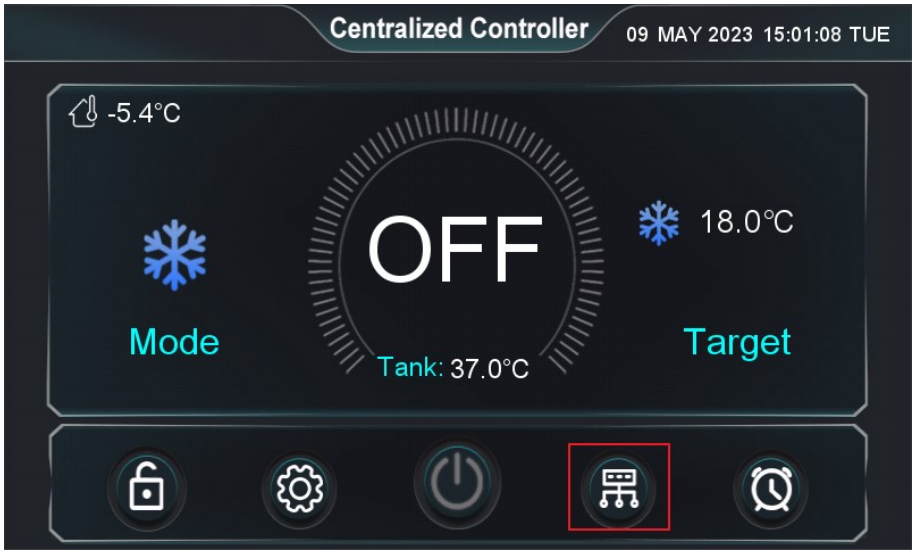
①	Click to return to the last interface.
②	The target temperature that based on current AT.It will display "---" when weather compensation is turned off.
③	The target temperature after weather compensation.
④	Slope of the compensation line. (0 ~ 3.5)
⑤	The target temperature when the ambient temperature is 0℃.(0 ~ 85)

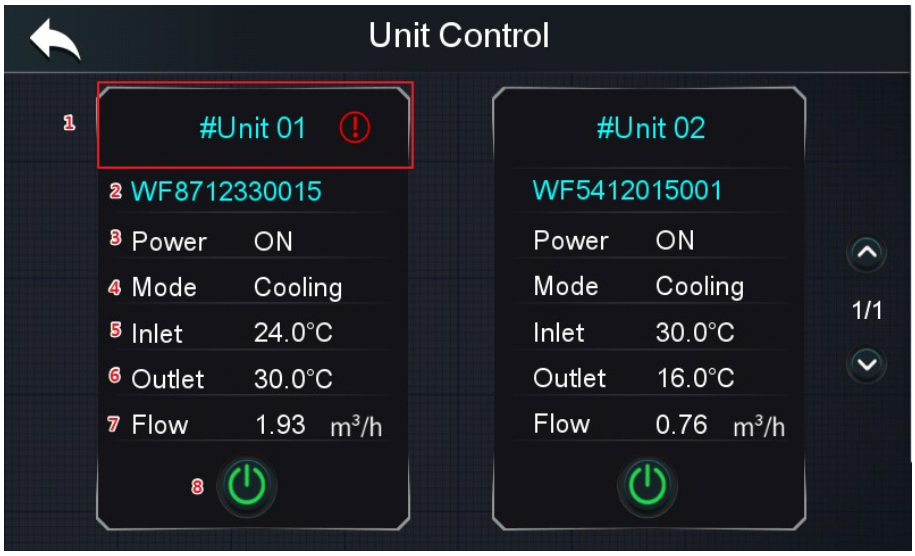
➢ Remark: Max. Heating Target Temperature ≤ The compensated target temperature ≤ Min. Heating Target Temp.

10. Status and Parameters

10.1 Unit Control

a. Press “  ” and enter the “unit control” screen.

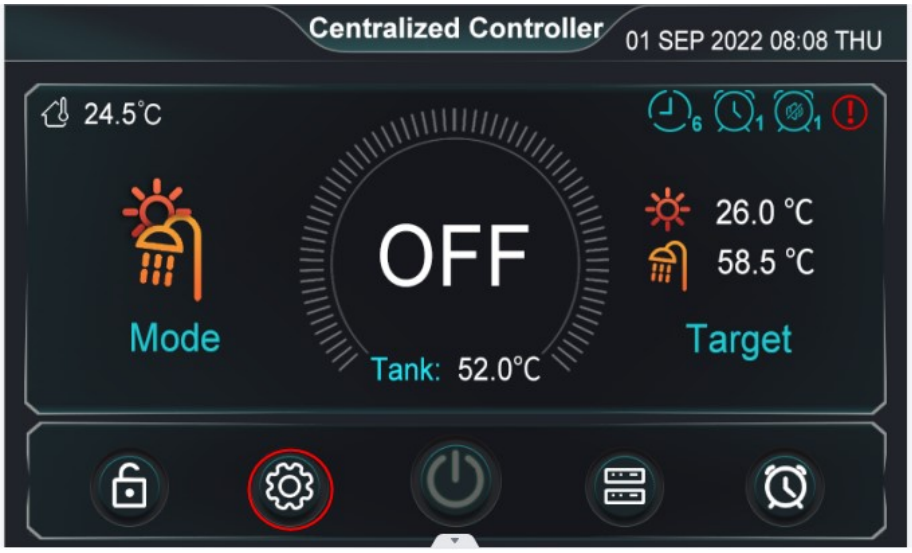




1	The fault icon is flashing; there is a fault in the machine, press to view the fault
2	Display unit WF code
3	On/Off Status
4	Operation mode
5	Inlet water temperature
6	Outlet water temperature
7	Water flow
8	Turn on/off this unit individually

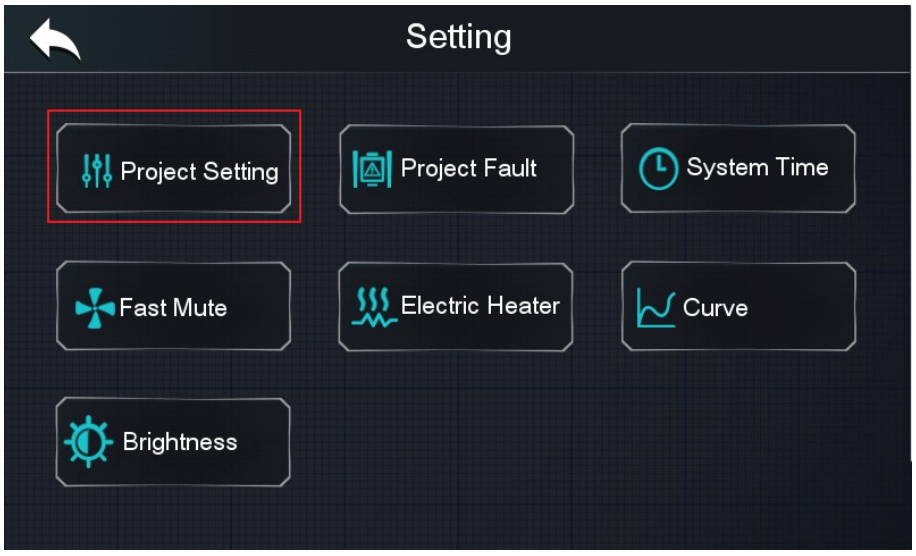
10.2 Status of Unit and Project Checking

a. Press “  ” on main interface.

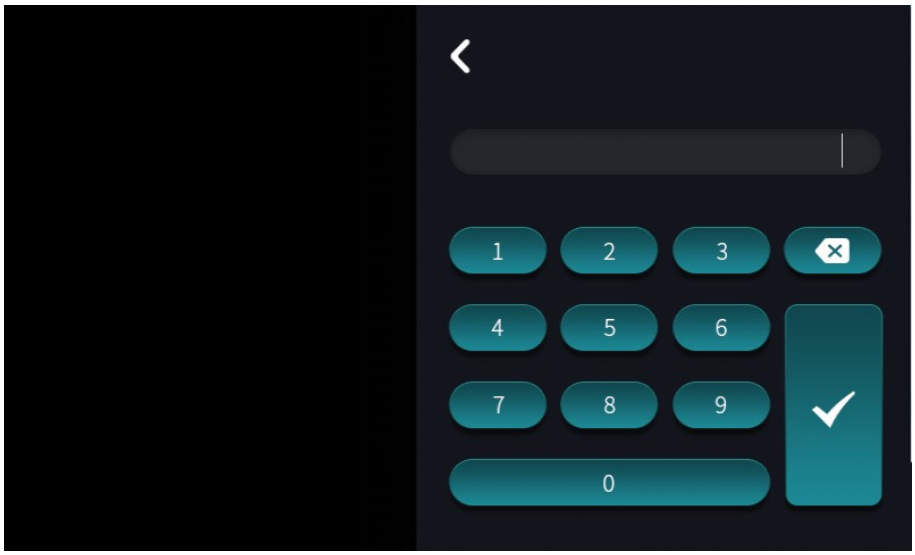


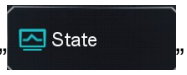
b. Press ” 

”

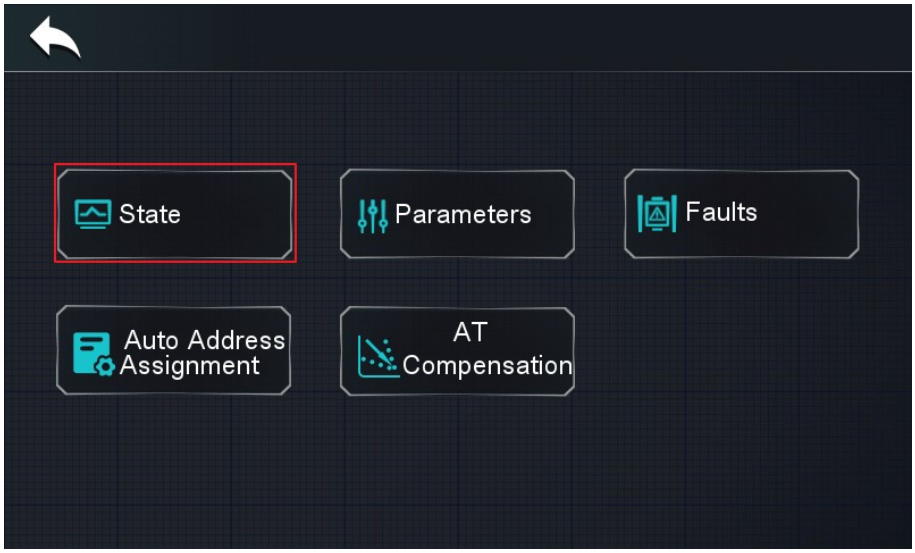


c. Enter “22”

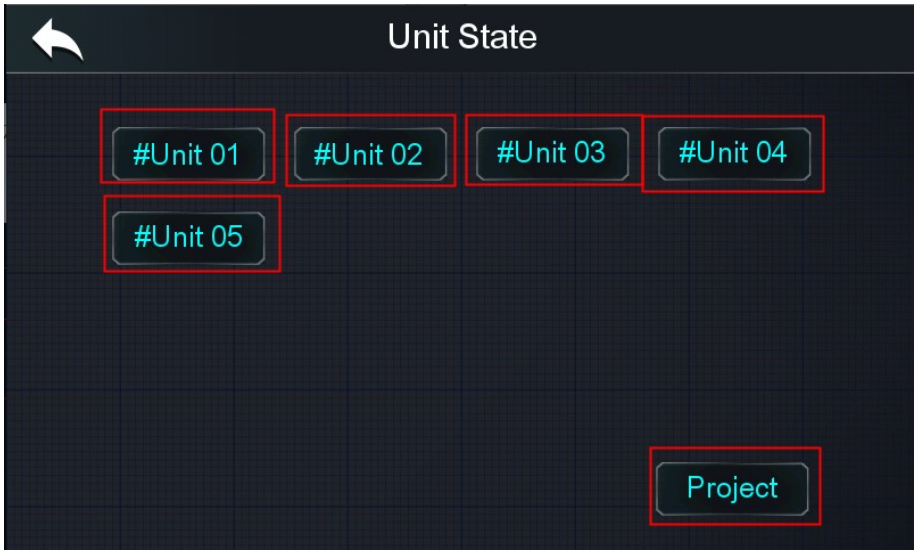


d. Press” 

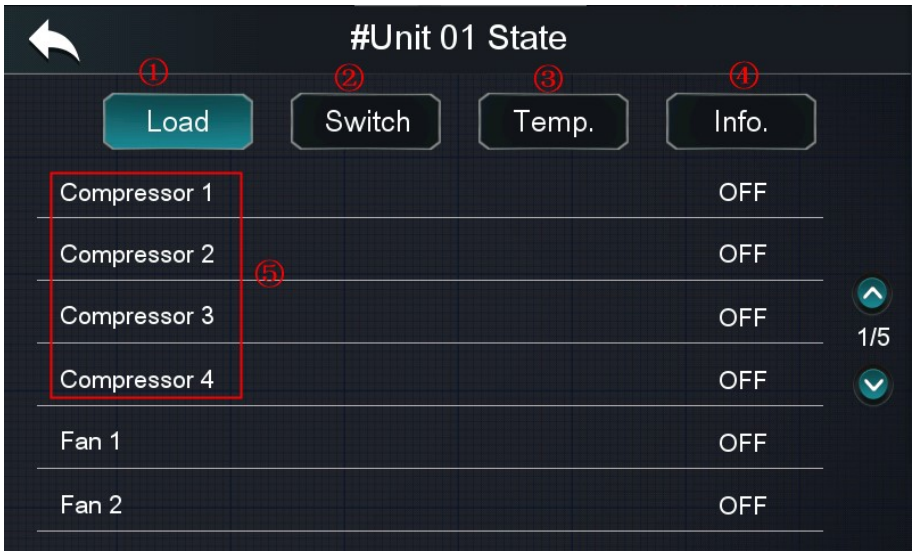
”



e. Press “#Unit 0X” or “Project” to check operating status of each unit or project.

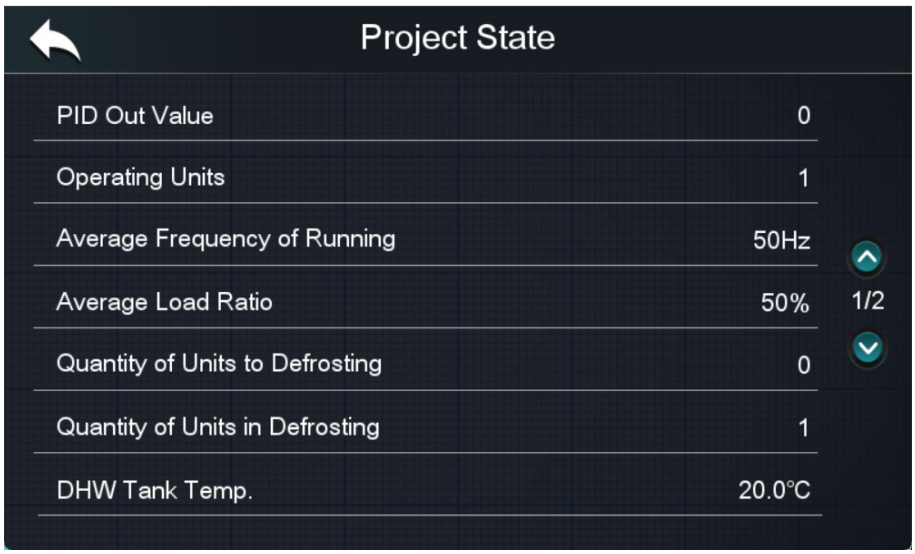


f. Unit State



①	Load Status List
②	Switch Status List
③	Temperature Status List
④	Unit Information
⑤	4 reserved parameters are used to adapt multi-system unit; when the unit is single system and single compressor, the corresponding status will be displayed in "Load 1" (such as Compressor 1)

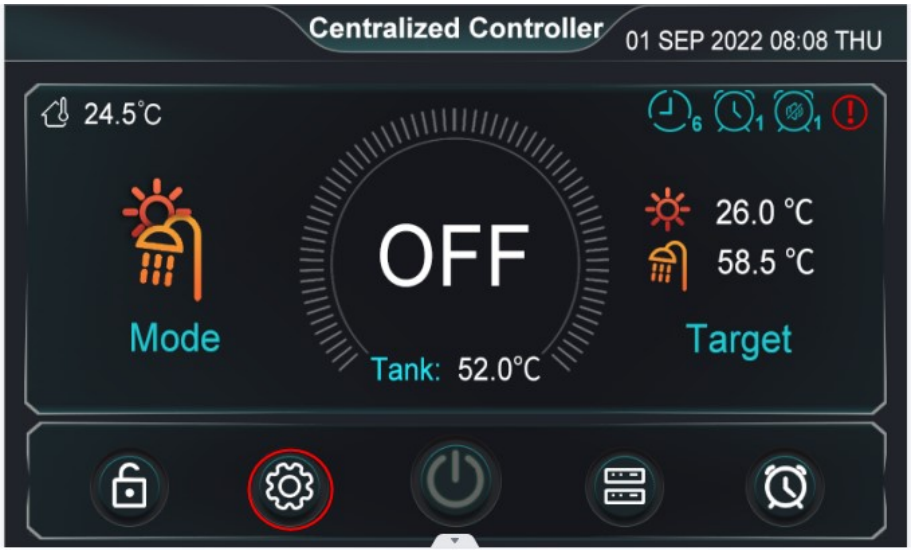
g. Project State



10.3 Fault Checking

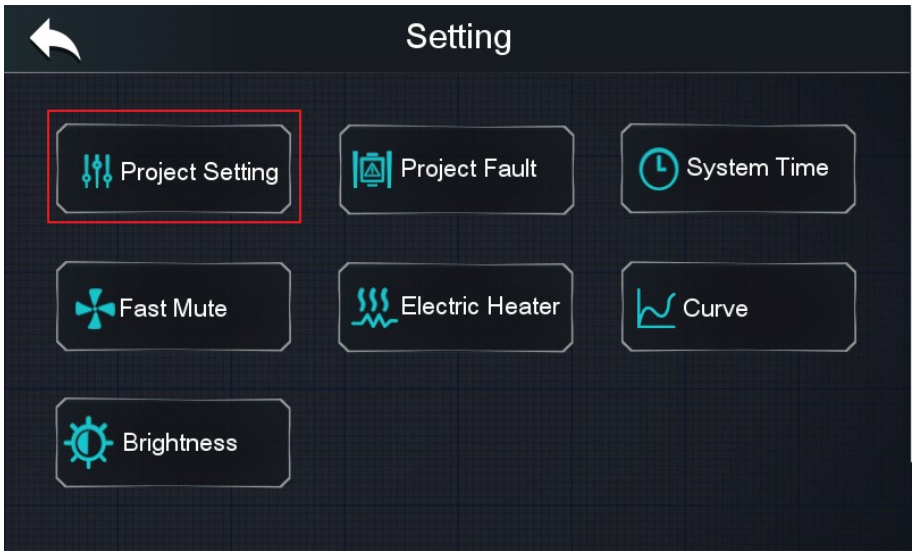
10.3.1 History Fault Checking

a. Press “  ” on main interface.



b. Press ” 

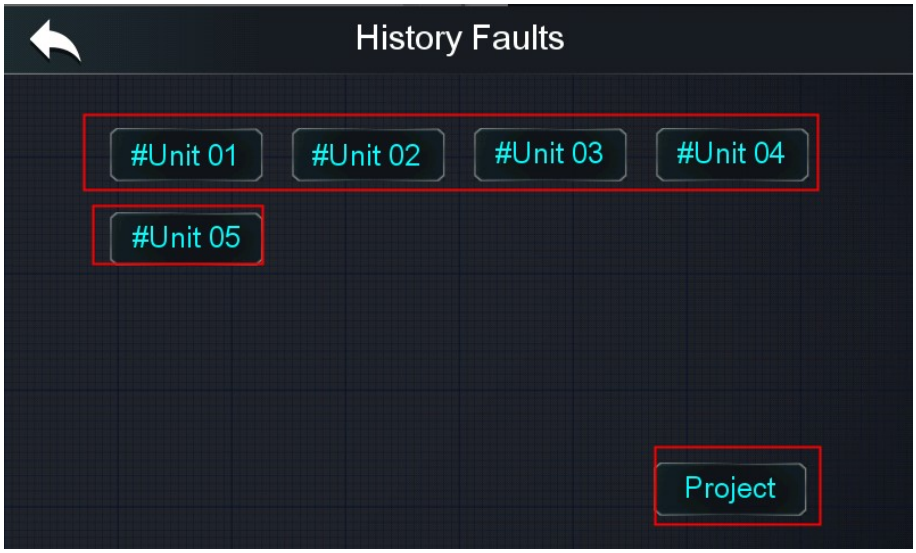
” and enter “22”.



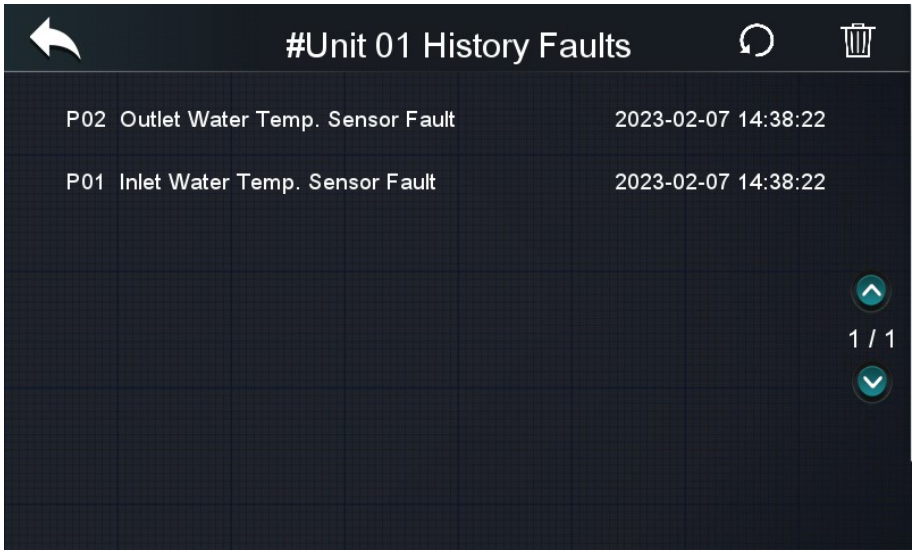
c. Press “ 

”.

d. Press “#Unit 0X” or Project to check history faults of each unit or project.



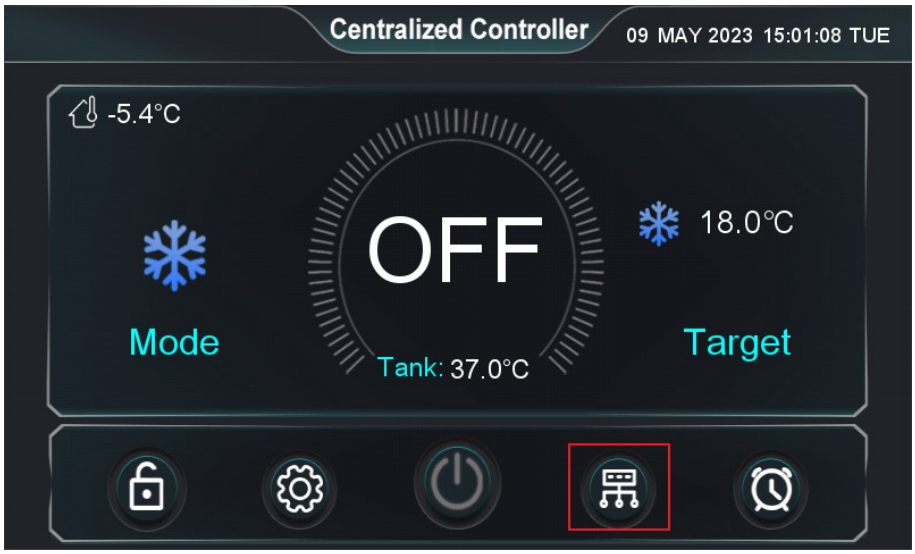
e. Unit history faults



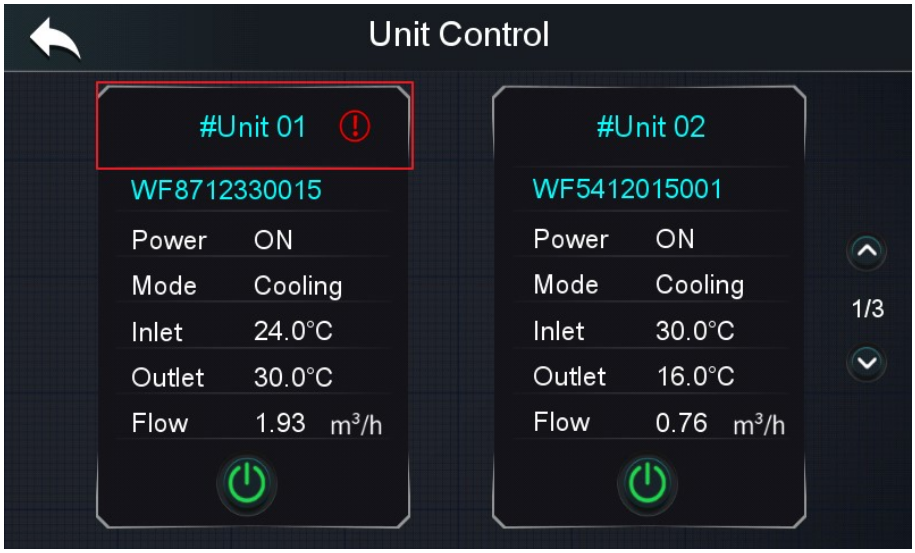
f. Project history faults

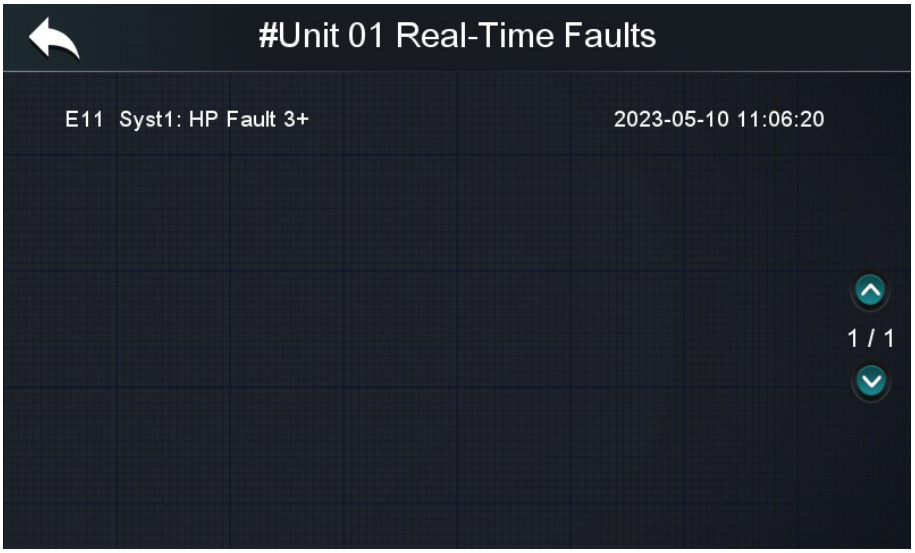
10.3.2 Unit real-time Fault Checking

a. Press “  ” on the main screen.



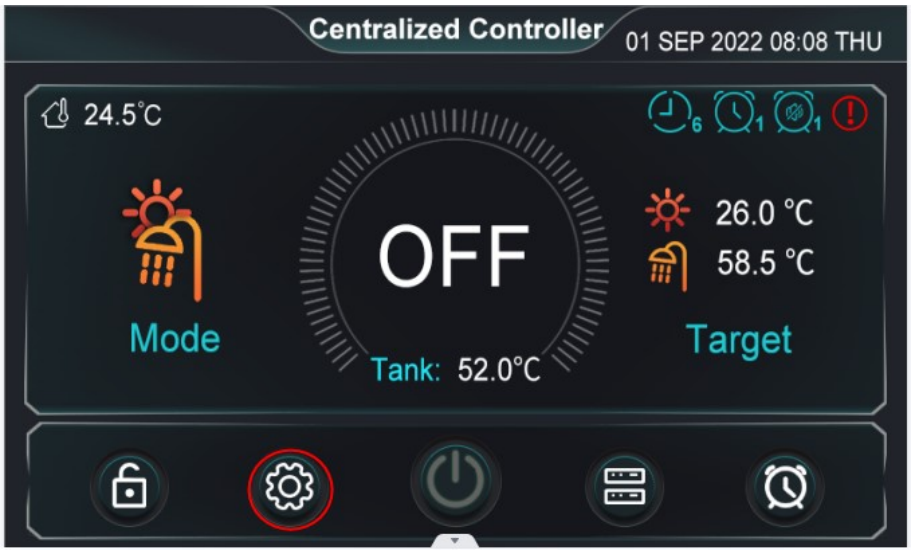
b. Press the red box to enter the faults list.





10.3.3 Project Real-time Fault Checking

a. Press “  ” on main interface.

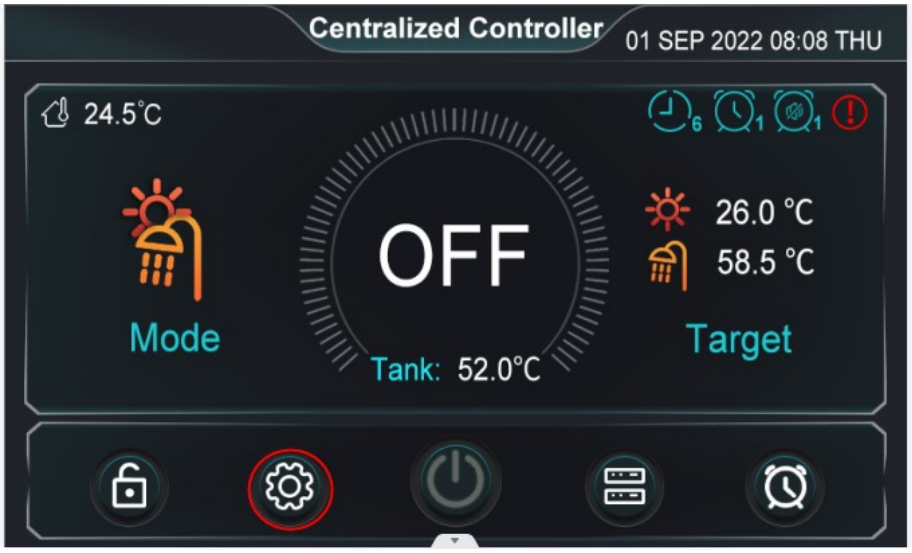


b. Press “ 

”

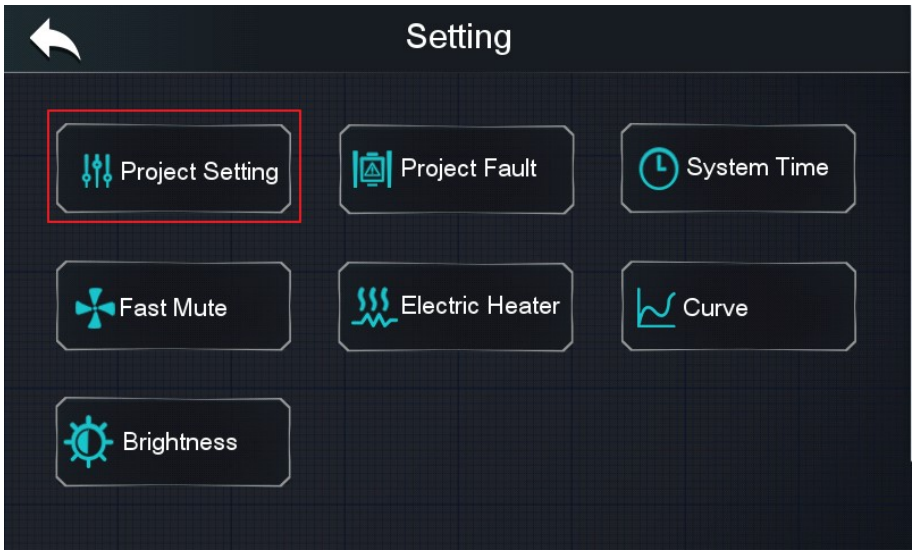
10.4 Parameter Setting

a. Press “  ” on main interface.

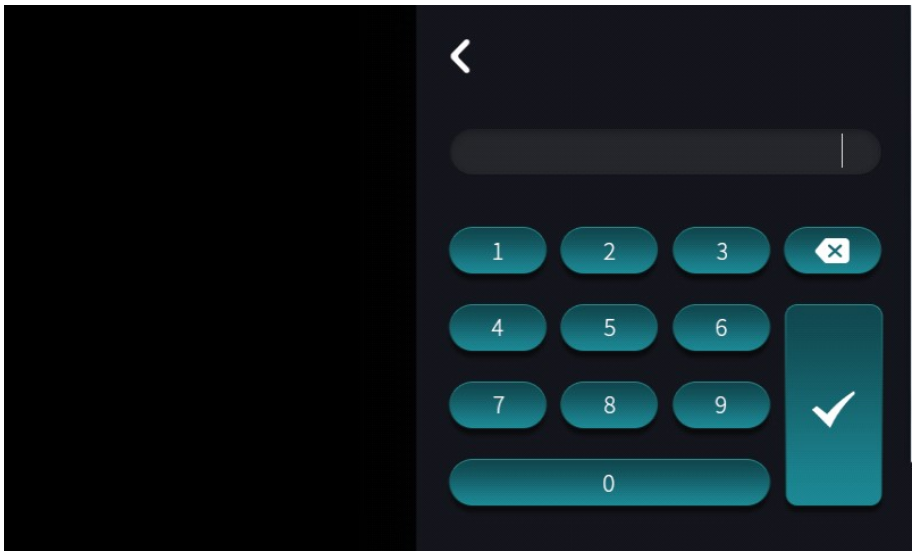


b. Press ” 

”.

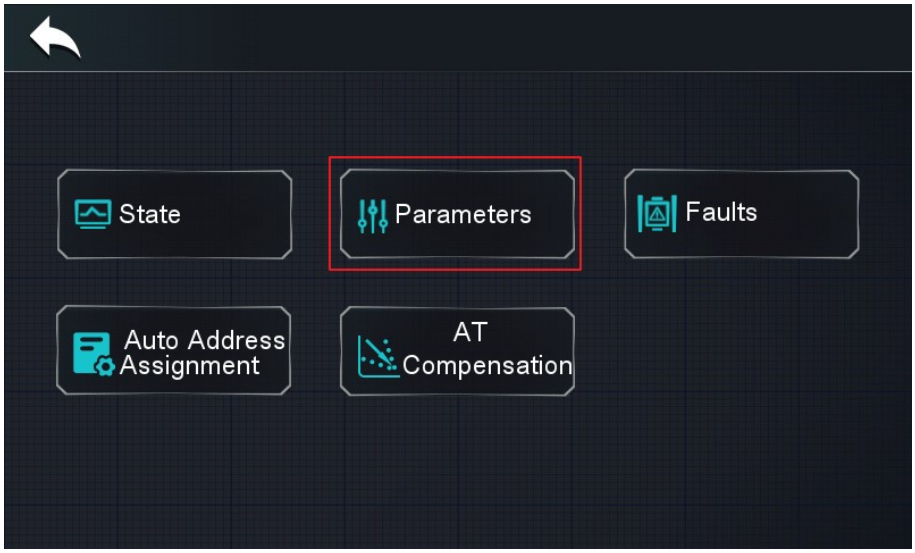


c. Enter “22”

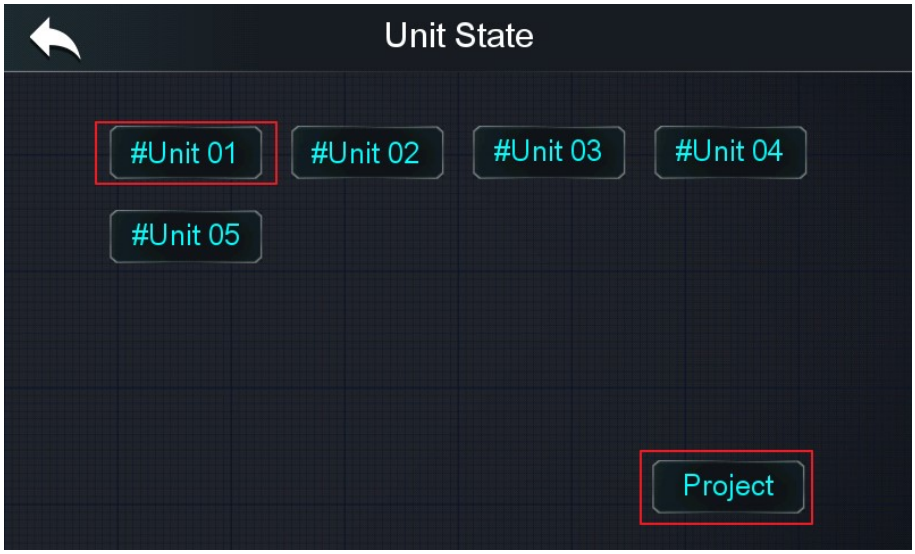


d. Press” 

”



e. Press “#Unit0X” to check the unit status.

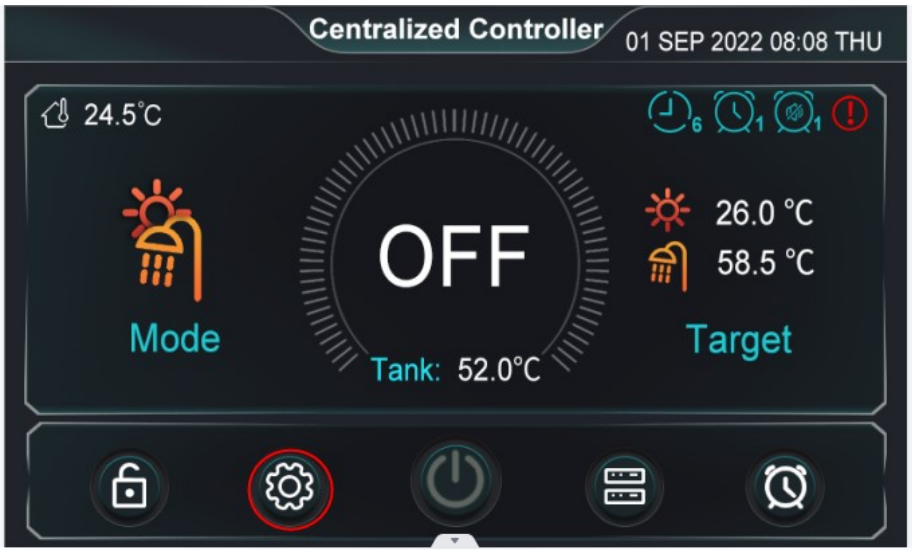


11. Energy Level Coordination

(Please be cautious with this function!)

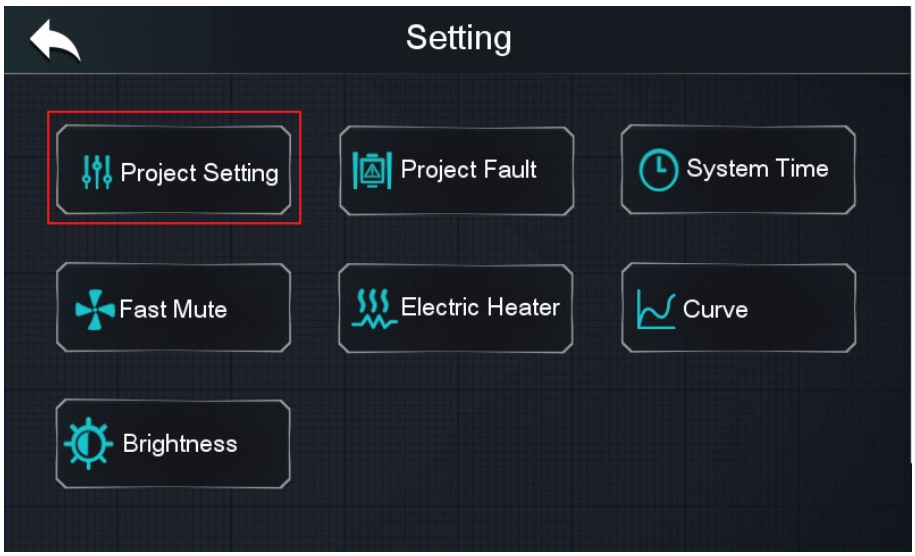
11.1 Screen Instruction.

a. Press “  ” on main interface



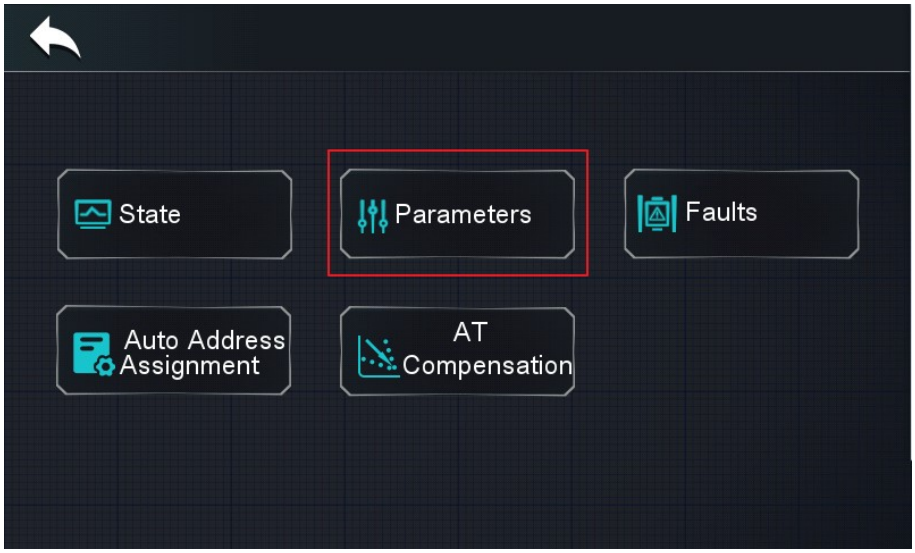
b. Press ” 

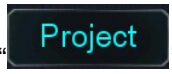
” and enter “22”



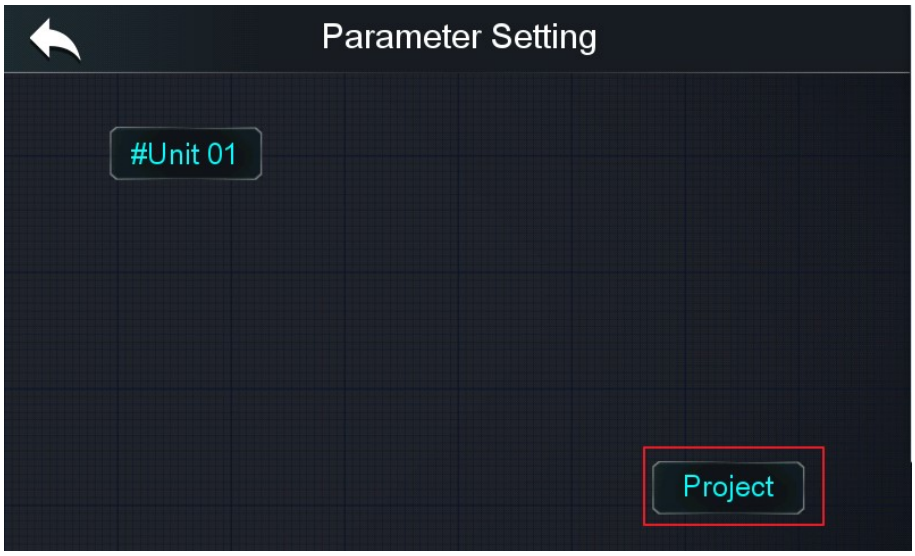
c. Press “ 

”

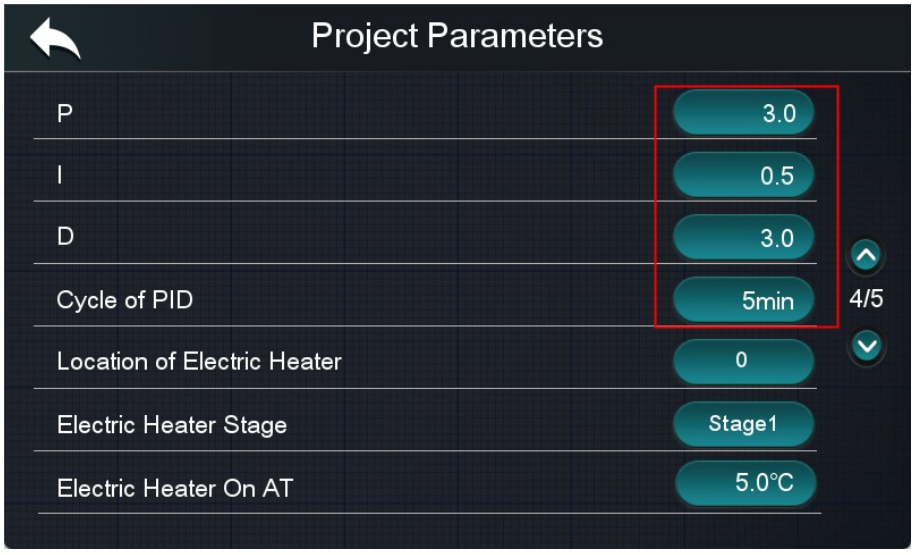


d. Press “ 

”.



e. Set the parameters “P”, “I”, “D”, “Cycle of PID”.



11.2 PID Control Logic

Calculation formula: PID = P*Diff.+ (I * Diff.) + I'+D*(Diff.-Diff.')

Diff.: The temperature difference of the project water temperature from the target temperature.

Diff.': Temperature difference of the last cycle.

I': I value of the last cycle.

The maximum number of units allowed to run at the same time for different PID values:

PID	0＜PID＜10	10≤PID＜20	20≤PID＜30	30≤PID＜40	……
Number of units allowed to run	1	2	3	4	……

11.3 Parameter Setting

Parameter “P”: This parameter mainly affects the operating number of units in the first stage of PID regulation.
The larger the P parameter value, the more units run in the early stage of PID regulation (i.e., when there is a demand for heating in the early stages of project start-up). As the number of units running increases, the water temperature gradually approaches the target temperature, the effect of P becomes smaller.

Parameter “I”: This parameter mainly affects the operating number of the unit when the water temperature close to the target temperature.
The larger the I-value, the more units will be run in the later stages(The stage when the water temperature is approaching the target temperature and each unit is about to shut down); however, the reaction speed of the project will become slower (The number of units decreases too slowly when the target temperature is almost met; the number of units increases too slowly when the target temperature is not met.)

Parameter “D”: This parameter is used to control the effect of the temperature difference change rate on the number of units operating.
The larger the D parameter value, the greater influence of the temperature difference change rate on the number of operating units.

Suggested parameter changes:
①During the operation, the water temperature rises gradually, and when it is almost close to the target temperature, it is already in a stable state but has not reached the target temperature, so the “I” parameter can be increased appropriately at this time.
②During the operation, the water temperature has reached the target temperature, but the centralized controller does not control each unit to shut down during this time, resulting in a continuous increase in water temperature. At this time, the “I” parameter can be reduced appropriately.
③When the project has heating demand, but the centralized controller does not control each unit to turn on during this time, resulting in low water temperature, the “I” parameter can be reduced appropriately.

12. Parameter List

Parameter	Range	Default
Main Circulation Pump Operation Mode	0-[Always On] / 1-[Saving] / 2-[Interval]	Automatically get the parameter value of #unit 01
Interval Time	1~120min	Automatically get the parameter value of #unit 01
Operation Duration Time	1~30min	Automatically get the parameter value of #unit 01
Running Time of Main Circulation Pump Before Compressor Starts	0~30min	Automatically get the parameter value of #unit 01
DHW Pump Operation Mode	0-[Always On] / 1-[Saving] / 2-[Interval]	Automatically get the parameter value of #unit 01
Temp. Control Selection	0-[Inlet] / 1-[Outlet] / 2-[Buffer Tank]	1
Percentage of Units Allowed to Defrost	0~100%	50
Quantity of Units in The Project	1~16 unit（s）	1
Min. Compressor Optimum Operating Frequency	40~90Hz	48
Max. Compressor Optimum Operating Frequency	40~90Hz	66
Supported Mode of Project	1-[Cooling] / 2-[Heating] / 3-[DHW] / 4-[Cooling + DHW] / 5-[Heating + DHW] / 6-[Cooling + Heating + DHW]	6
Max. Cooling Target Temp.	-30.0~80℃	28
Min. Cooling Target Temp.	-30.0~80℃	5
Max. Heating Target Temp.	-30~90℃	60

Min. Heating Target Temp.	-30~90℃	15
Max. DHW Target Temp.	0~85℃	58
Min. DHW Target Temp.	0~85℃	15
Enable weather compensation	0-[NO] / 1-[YES]	0
Slope	0~3.5	1.0
Offset	0~85℃	45
P	0~99.0	3.0
I	0~99.0	5.0
D	0~99.0	3.0
Cycle of PID	0~100min	5
Enable Energy level coordination	0-[NO] / 1-[YES]	1
Location of Electric Heater	0-[Not Available] / 1-[Main Water Circuit] / 2-[DHW Tank] / 3-[Buffer Tank]	0
Electric Heater Stage	1-[Stage1] / 2-[Stage2] / 3-[Stage3]	1
Electric Heater On AT	-30~60℃	7
Electric Heater Delays On Time	10~999min	30
Electric Heater Forced On Time	10~1440min	180
AT to Start Electric Heater Without Delay	-30~60℃	0
Electric Heater Off Temp. Diff	0-20℃	2
Electric Heater Opening Temp.Diff	0-20℃	2

13. Fault List & Troubleshooting

Error code	Error name	Relevant parts information	Review and resolve
E08	#Unit 1~16 Communication Fault	Communication of the centralized control board and the unit is abnormal	1、Check whether the quantity of units is set correctly 2、Check whether the connection is correct 3、Check whether the H10 parameter of each unit is duplicated. 4、If the above three points are correct, please replace the signal line and check again whether the fault disappears. For example: A project requires centralized control 8 units, [#Unit 05 Communication Fault], [#Unit 06 Communication Fault], [#Unit 07 Communication Fault] and [#Unit 08 Communication Fault] appear at the same time. ● Check if the quantity of units is set to 8； ● Check if the wiring connection between #Unit 04 and #Unit 05 is correct; ● Check whether the signal wire between #Unit 04 and #Unit 05 is valid - replace the signal wire between #Unit 04 and #Unit 05, and check whether the communication fault disappears.
P03	DHW Tank Sensor Fault	The temp. sensor is broken or short circuit	1. Check whether the #Unit1 temperature sensor is loose. If so, connect the temp. sensor well; 2. Replace the temperature sensor.
P03a	Buffer Tank Temp. Sensor Fault	The temp. sensor is broken or short circuit	1. Check whether the #Unit1 temperature sensor is loose. If so, connect the temperature sensor well; 2. Replace the temperature sensor.