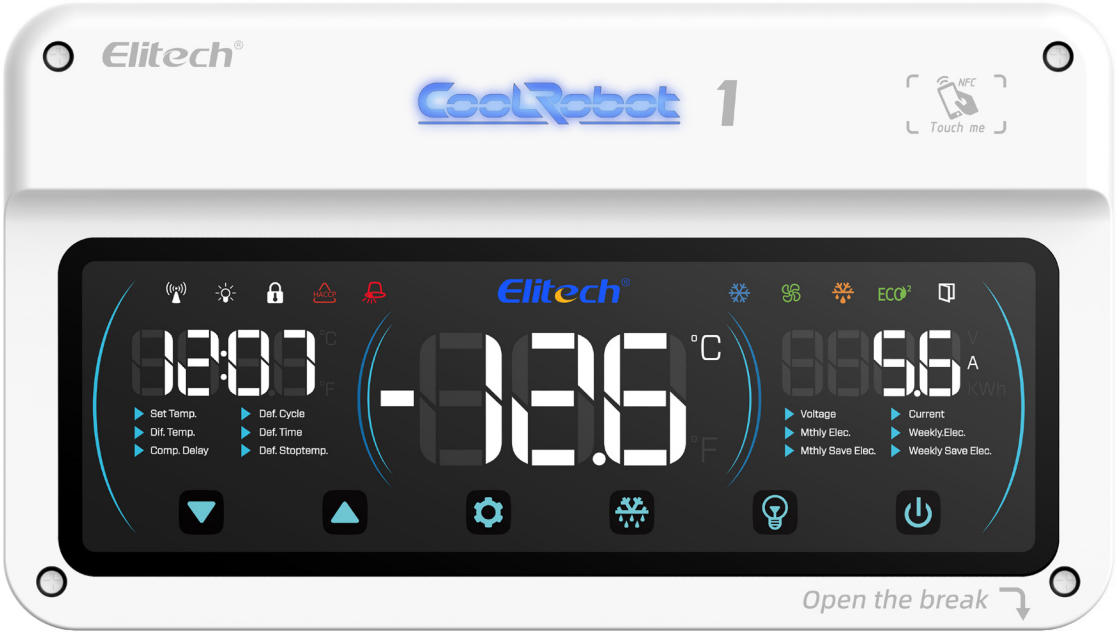
SCR-1

Controller specification



Before installing and operating the equipment, please carefully read the safety operation instructions in the manual to ensure the correct installation and safe use of the equipment.

⚠ Safety Regulations

Danger:

- Distinguish the lead of sensor and power line from output relay interface.
- Misconnection or overload of relay is not allowed;

  All connection alterations shall be carried out when the power is off.

Warning:

The control box is not allowed to be used in water or excessively humid environment, or the circumstances at high temperature or with strong electromagnetic interference or high corrosion.

Attention:

- The supply voltage shall be consistent with the voltage marked on the control box with its stability guaranteed;
- The lead of sensor is recommended to be kept away from the power line appropriately for avoidance of possible interference introduced.

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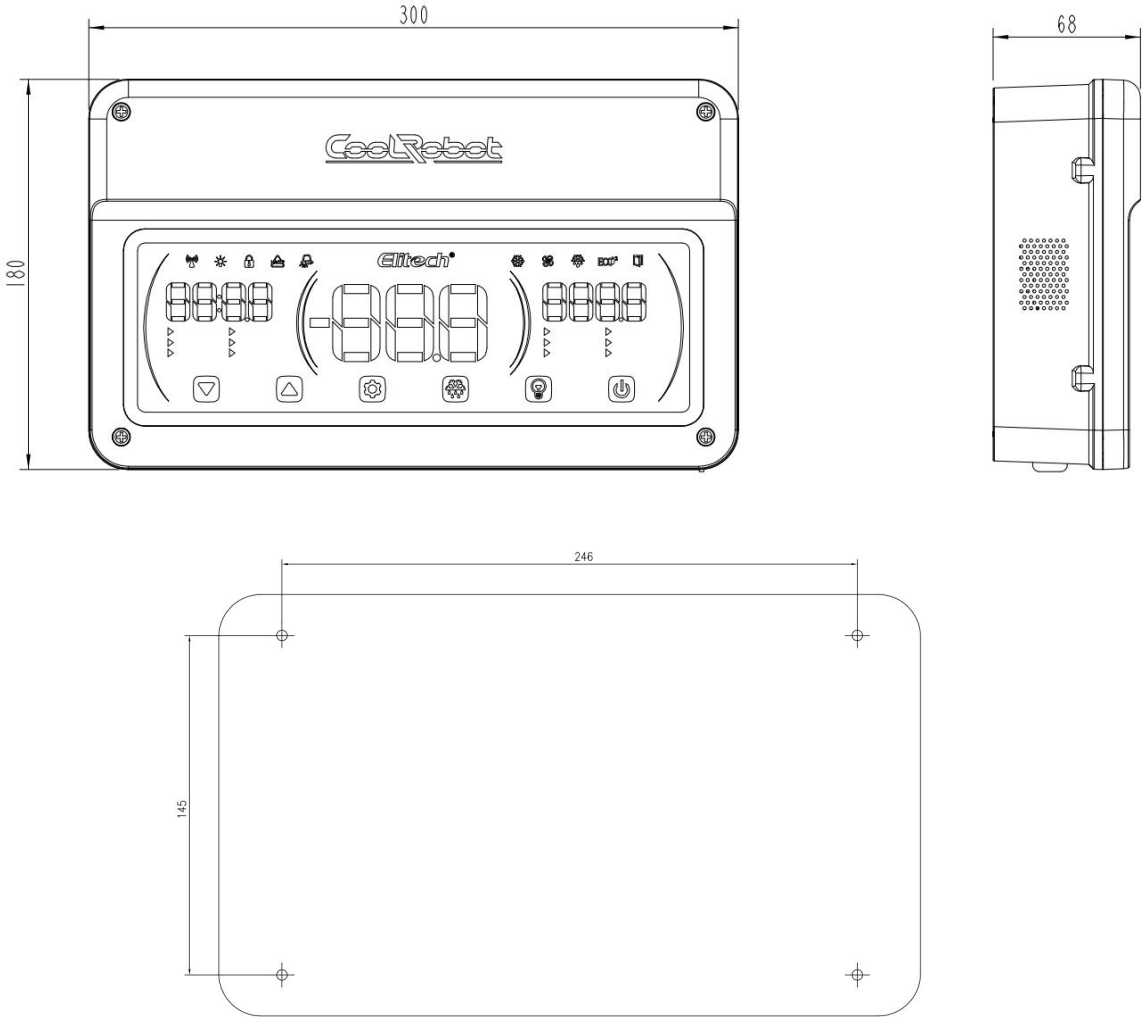
1 Overall Dimensions



2 Installing The Unit

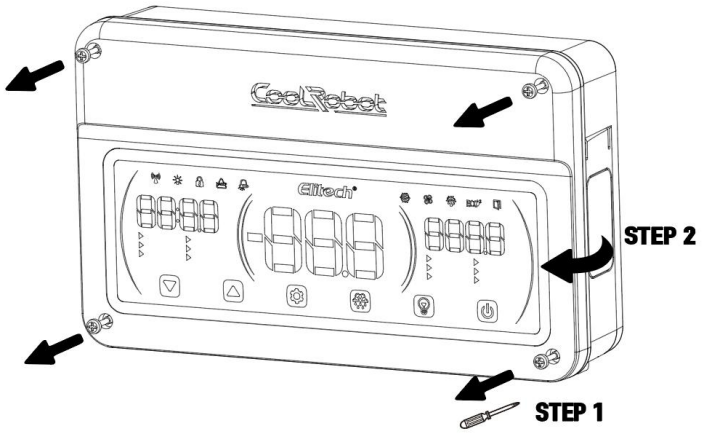


Fig.1 Unscrew the screws at the four corners of the product, and then open the front cover by turning it over to the left.

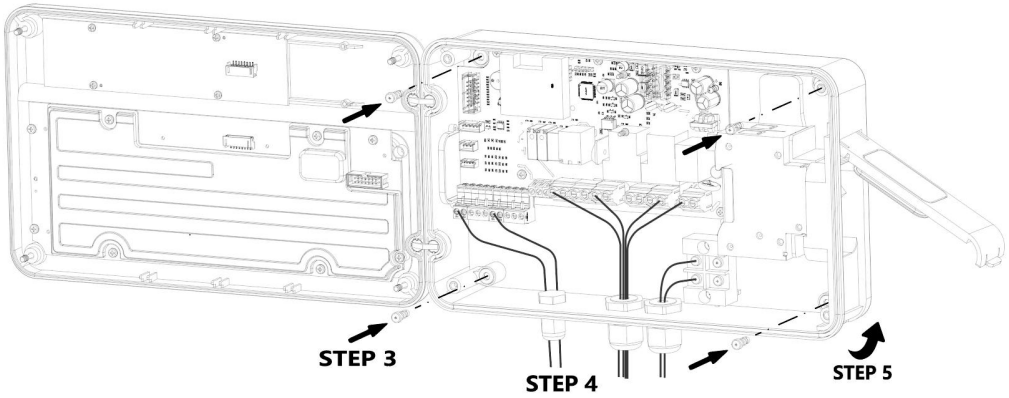


Fig.2 Use the four existing holds to fix the box back panel to the wall:use four screws of a length suitable for the thickness of the wall to which the panel will be attached.

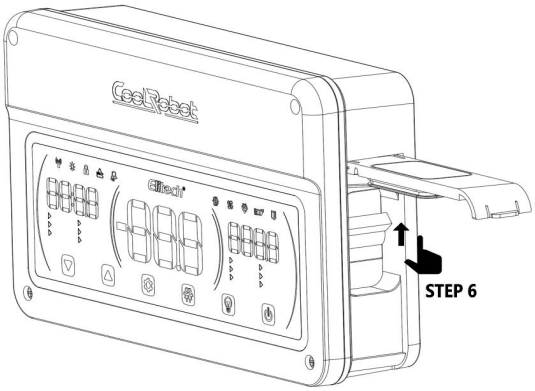


Fig.3 After the wiring is completed, turn on the air switch to power on the controller.

3 Main Function

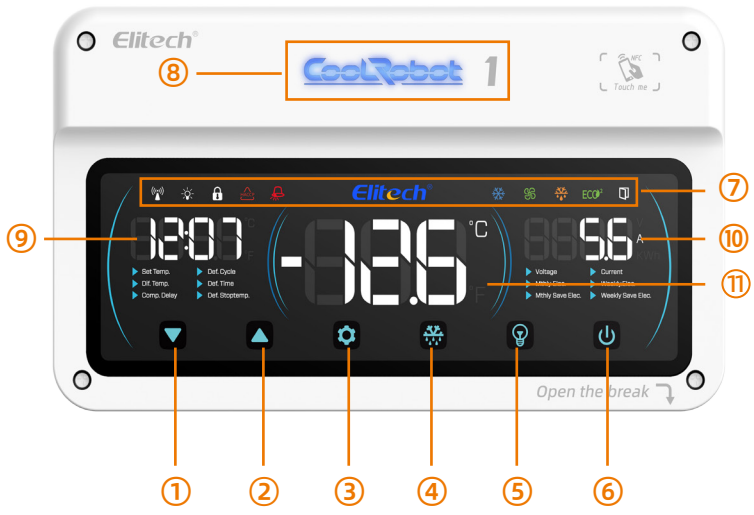
SCR-1 (Smart Cool Robot) is an intelligent refrigeration electrical control box. This electrical control box uses electronic power devices to replace the low-voltage electrical circuit, integrating the control system and the electrical execution system into one. It realizes the functions of an AC contactor through the combination of relays and other auxiliary electronic components. It can be applied to the control of small cold storage refrigeration systems worldwide and provides intelligent services.

- It allows the connection of compressors with a single-phase load of less than 4HP;
- It has control functions such as refrigeration, defrosting, evaporator fan operation, crankshaft heating, liquid supply solenoid valve control, lighting control, and alarm;
- It has the functions of single-channel cold storage temperature detection, display, control, and over-temperature alarm, etc;
- It supports the input of five-way sensors: cold storage temperature sensor, defrosting sensor, multi-functional temperature sensor, humidity sensor, and low-pressure pressure transmitter;
- It has the control function of the electronic expansion valve;
- It has a built-in WIFI networking module and supports an external 4G networking module to achieve remote monitoring;
- It supports the overload protection function of the compressor and the defrosting overload protection function;
- It supports the low pressure shutdown detection function ;
- It supports the detection functions of the door switch and the unit protection;
- It supports the NFC parameter configuration, status viewing, and NFC network configuration functions;
- It supports the power consumption statistics function;
- It supports remote OTA upgrade;

4 Technical Parameter

Power supply	
Voltage	220VAC±10%　50HZ
power consumption	Less than 9W
Climatic conditions	
Working temperature	-10℃ ~ 65℃
Storage temperature	-20℃ ~ 75℃
General characteristics	
Measurement temperature range	-50℃ ~ 99.9℃
Temperature measurement accuracy	-20℃ ~ 50℃ precision ± 1℃, and the rest is ± 1.5℃
Control temperature range	-49.9℃~ 99.9℃
Temperature resolution	0.1℃
Current measurement range	0A ~ 20A
Current measurement accuracy	±0.5A
Sensor type	Temperature probe NTC - plastic sealing (10 KΩ / 25℃, B value 3435K)
Sensor wire length	2 m (including probe length)
Output Characteristics	
COMP.	4HP
DEF.	30A
FAN	20A
AUX2	16A
AUX1	5A
Valve	5A
ALARM	NO:7A/NC:5A

5 Control Panel



- Cooling ICON
- Defrost ICON
- Evaporator Fan ICON
- Energy Saving ICON
- Door ICON
- Alarm ICON
- HACCP Alarm ICON
- Lock ICON
- Light ICON
- Network ICON

5.1 Display Symbol Description

<table>
<tr><th colspan="5">Panel display</th></tr>
<tr><th>State
Position</th><th>Normal operation interface</th><th>Shutdown interface</th><th>User parameter setting interface</th><th>Other Settings Interface</th></tr>
<tr><td>⑨</td><td colspan="3">real-time clock</td><td rowspan="14">See menu operation for details</td></tr>
<tr><td>⑪</td><td colspan="2">Storage temperature</td><td>Parameter cords / Parameter values</td></tr>
<tr><td>⑩</td><td>Current value</td><td>Code "oFF"</td><td>Current value</td></tr>
<tr><td>Set Temp.</td><td rowspan="13">Off</td><td colspan="2">The indicator light will be on when adjusting the parameter of the "temperature set value", and it will be off in other states</td></tr>
<tr><td>Dif.Temp.</td><td colspan="2">The indicator light will be on when adjusting the "compressor power-on return difference" parameter is lit, and it will be off in other states</td></tr>
<tr><td>Comp.Delay</td><td colspan="2">The indicator light will be on when adjusting the "press start delay" parameter is on, and it will be off in other states</td></tr>
<tr><td>Def. Cycle</td><td colspan="2">The indicator light will be on when the defrost cycle parameter is adjusted, and it will be off in other states</td></tr>
<tr><td>Def. Time</td><td colspan="2">The indicator light will be on when adjusting the "defrost time" parameter, and it will be off in other states</td></tr>
<tr><td>Def. Stoptemp.</td><td colspan="2">The indicator light will be on when adjusting the "defrost stop temperature" parameter, and it will be off in other states</td></tr>
<tr><td>Voltage</td><td colspan="2" rowspan="7"></td><td>View voltage</td></tr>
<tr><td>Mthly Elec.</td><td>View monthly electricity</td></tr>
<tr><td>Mthly Save Elec.</td><td>Check the monthly energy-saving electricity quantity</td></tr>
<tr><td>Current</td><td>View current</td></tr>
<tr><td>Weekly Elec.</td><td>View weekly electricity</td></tr>
<tr><td>Weekly Save Elec.</td><td>Check the weekly energy saving</td></tr>
</table>

			quantity

Indicator light display					
⑦	ICON	COLOR	ON	FLASHING	OFF
	COOLING	Blue	Cooling ON	Waiting for refrigeration	Cooling OFF
	DEFROST	Orange	Defrosting	Dripping	No Defrost
	EVAPORATOR FAN	Green	Fan ON	/	Fan OFF
	LIGHT	White	Light ON	/	Light OFF
	ALARM	Red	/	Alarm ON	No Alarm
	ENERGY SAVING	Green	Energy saving ON	/	Energy saving OFF
	LOCK	White	Key lock	/	Key unlock
	NETWORK	White	WiFi connection	/	WiFi unconnected
	DOOR	Red	Door open	/	Door Close
	HACCP ALARM	Red	HACPP Alarm	/	No Alarm

LOGO Display		
LOGO	COLOR	DESCRIPTION
⑧	Black	The device is in the power-off state
	White	It is in a non-energy-saving mode and the device is in standby state
	Orange	Refrigeration state
	Purple	Defrosting state
	Red	Over-temperature alarm state
	Blue	In the energy-saving mode, the device is in standby state

5.2 Key Operation

Key Symbol	DESCRIPTION
Settings Key	In the normal mode, press the "Settings"key to enter the user parameter setting;
	In normal mode, long press the "Settings"key for 5 seconds to enter the system parameter setting
	In the user parameter setting or system parameter setting mode, press the "Settings"key to save the
	In the recovery parameter mode, press the "Settings"key to confirm the parameter recovery operation;
	In the lock machine state, long-press the "Settings" key for 5 seconds to unlock the device;
Up key	Under the parameter setting interface, press the "Up" key to increase the parameter item / parameter
	In normal mode, long press the "Up" key for 3 seconds to configure the wifi network;
Down key	Under the parameter setting interface, press the "Down" down key to reduce the parameter item / parameter value;
	In the maintenance mode, press the "Down" key to enter the self-test mode;
	In normal mode, long press the "Down" key for 3 seconds to enter the temperature view;
Light key	In normal mode, press the "Light" key to turn the light on or off;

Defrost key	In normal mode, press the "Defrost" key for 5 seconds to enter the forced frost / exit the forced frost;
Power key	In the user parameter setting or the system parameter setting mode, press the "Power" key to return to the superior menu management;
	In normal mode, press the "Power" key for 5 seconds, stop / start the controller;
+ combination key	In normal mode, press the combination key for 10 seconds, factory maintenance mode;
+ combination key	In normal mode, press the combination key combination for 5 seconds to view the WIFI network signal;
+ combination key	In energy-saving mode, press the combination keys for 5 seconds to exit the energy-saving mode.
+ combination key	In normal mode, press the combination keys for 2 seconds to enter the clock calibration mode;
+ combination key	In normal mode, press the combination key for 2 seconds to view the HACCP alarm information;

6 Quick operation guide

6.1 Unlock the device

● The device is in the unlocked state, automatically locked after 5 minutes, the "" indicator on the panel is on;

● In the lock state, the lock indicator light is on,press the key"" for 5 seconds to unlock the device and the "" indicator on the panel goes off;The device is in the locked state, and only the setting button is effective when touched;

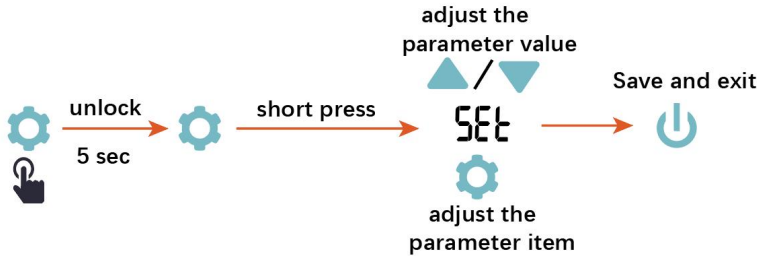
6.2 User parameter settings

● When the device is unlocked, short press the key"" to enter the user parameter setting interface, the middle window displays parameter values, such as "0.0", and the right window displays parameter items, such as "SEt";Press the key"" or "" to adjust parameter items such as"C1....d4";

● Press the key"" to adjust parameter items, such as "SET....LAL"; Press the key"" or "" to adjust the corresponding parameter value;Press the key "" or no key action for 30s to save the parameter value;

● Press the key "" or no key action 30s to automatically exit the menu setting interface.

Key operation mode:



User parameter table:

PAR.	NAME	DESCRIPTION	RANGE	DEFAULT	UM	ADDRESS
SEt	Storage temperature setpoint	When Storage temperature ≤SEt, compressor stops	-50.0 ~ 99.9	0.0	℃	0x0110
rd	compressor startup lag	When Storage temperature ≥SEt+rd, compressor starts	0.0 ~ 10.0	2.0	℃	0x0111
Ct	compressor start delay	Minimum time interval between compressor shutdown and restart	0 ~ 120	3	min	0x0112
dEC	defrost cycle	Time interval between defrosting	0 ~ 120	6	hour	0x0113
dEt	defrosting time	Duration of defrosting	0 ~ 120	30	min	0x0114
dSt	defrost stop temperature	Defrost is not allowed when the defrost sensor temperature is higher than this setting	-50.0 ~ 99.9	10.0	℃	0x0115
drt	defrosting drip time	Delay time after each defrost	0 ~ 120	3	min	0x0116
HAL	High temperature alarm value in the warehouse	When Storage temperature ≥HAL, and delay tA0 time, high temperature alarm	-50.0 ~ 99.9	30.0	℃	0x0117
LAL	Low alarm value of temperature in warehouse	When the temperature is ≤LAL, and the delay time is tA0, the temperature is too low to alarm.	-50.0 ~ 99.9	-20.0	℃	0x0118

6.3 System parameter settings

● When the device is unlocked, press the key " " for 5 seconds to enter the management parameter setting interface.

If the menu parameter password [PAS = 0], the middle window will display parameter categories (such as "dEF");

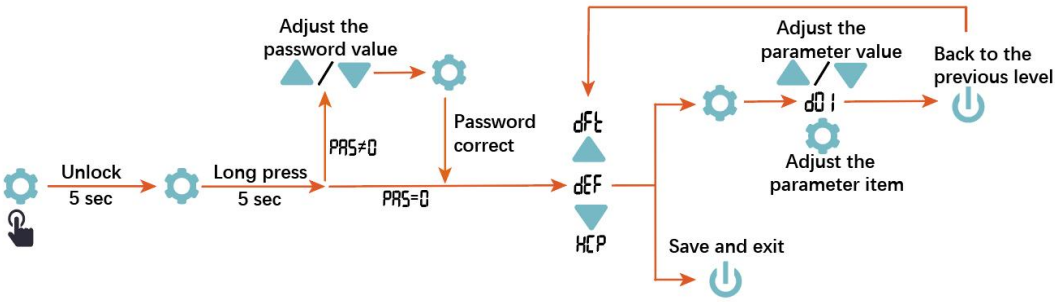
Menu parameter password [PAS = 0], middle window shows "0", "PAS"; press the key " " or " " to adjust the password value, Press the key " " ,enter the system parameter setting;

● In the system parameter setting interface, the primary menu interface, the middle window shows the parameter category (such as "dEF"), press the key" " or " " to switch the parameter category(Like "dFt...AL...HCP"), press the key " " , enter the secondary menu, Press the key " " or no key action for 30s, exit the system parameter interface;

● In the system parameter setting interface, the secondary menu interface, the middle window displays the parameter value (such as "6"), the left parameter category (such as "dEF"), and the parameter items on the right(Like "d01"), press the key " " or " " to adjust the parameter value, press the key" " , save the parameter value, and switch to the next parameter item (such as "d02"),

Press the key "⏻" or no key for 30s to return to the level menu;

Key operation mode:



Management parameter table:

CATEGORY	PAR.	NAME	DESCRIPTION	RANGE	DEFAULT	UM	ADDRESS
Conventional frost							
dEF	dEm	Defrost type	0: Electric defrosting; 1: Air defrosting; 2: Hot gas defrosting; 3: Shutdown for Defrosting	0 ~ 3	0	--	0x0400
	dCm	Defrosting cycle mode	0:Cumulative working time of the controller after power - on; 1:Cumulative working time of the compressor after power - on; 2:Defrosting based on real - time clock	0 ~ 2	0	--	0x0401
	ddm	Display during defrosting	0: When defrosting, the real-time storage temperature is displayed; 1: When defrosting, display " dEF"	0 ~ 1	0	--	0x0402
	dhd	defrost display mode	Delay start time of compressor after hot fluorine start	0 ~ 120	3	min	0x016A
Real-time clock-frost parameters							
dFt	dF1	1st defrost start hour		0 ~ 23	0	hour	0x0119
	dm1	1st defrost start min		0 ~ 59	0	Min	0x011A
	dF2	2nd defrost start hour		0 ~ 23	0	hour	0x011B
	dm2	2nd defrost start min		0 ~ 59	0	Min	0x011C
	dF3	3rd defrost start hour		0 ~ 23	0	hour	0x011D
	dm3	3rd defrost start min		0 ~ 59	0	Min	0x011E
	dF4	4th defrost start hour		0 ~ 23	0	hour	0x011F
	dm4	4th defrost start minutes		0 ~ 59	0	Min	0x0120
	dF5	5th defrost start hour		0 ~ 23	0	hour	0x0121
	dm5	5th defrost start minutes		0 ~ 59	0	Min	0x0122
	dF6	6th defrost start hour		0 ~ 23	0	hour	0x0123
	dm6	6th defrost start min.		0 ~ 59	0	Min	0x0124
	dF7	Maximum defrost times per					0x0125

		day under clock defrost		0～6	0	--	
Fan control parameters							
FAn	FSd	Start-up delay of evaporation fan	-999~ -1: The fan advance compressor starts for 1~999 seconds 0~999: The fan lag press starts in 0- -999 seconds C: Keep running	-999 ~ C	10	Sec	0x0126
	FEd	Evaporator fan shutdown delay	0~999: the fan lag press 0~999 seconds shutdown	0 ~ 999	10	sec	0x0127
	dFd	Delayed start time of fan after defrosting		0 ~ 999	0	sec	0x0128
Sensor parameters							
Pro	CA0	Storage temperature sensor correction	When the displayed storage temperature temperature has an error, the temperature can be corrected by adding or subtracting the "temperature correction setting value"	-10.0～10.0	0.0	℃	0x0129
	Pr1	defrost sensor enable	0: Disable; 1: enable	0～1	1	--	0x0403
	CA1	Defrosting sensor correction	When the defrosting temperature is error, the temperature correction can be made by adding or subtracting "temperature correction setting value"	-10.0～10.0	0.0	℃	0x012A
	Pr2	Multifunctional sensor selection	0: Not enabled; 1: enabled, as the storage temperature sensor after failure, automatically use the sensor to control the temperature; 2: only as temperature measurement, not as temperature control; (can be used as food temperature sensor) 3: Use it together with the library temperature sensor, and use the average temperature control; 4: Suction temperature;	0～4	0	--	0x0404
	CA2	Multifunctional sensor correction		-10.0～10.0	0.0	℃	0x012B
	Pr3	Humidity sensor enable	0: Disable; 1: enable	0～1	0	--	0x0405
	CA3	Humidity sensor correction		-10.0～10.0	0.0	rh%	0x012C
	Pr4	Low pressure transmitter enable	0: Disable; 1: enable	0～1	0	--	0x0406
	CA4	Low pressure transmitter calibration value		-5.0 ~ 5.0	0.0	bar	0x012D
	PL4	Low pressure transmitter 0.5V		-1.0 ~PH4	0.0	bar	0x012E

		corresponding pressure value					
	PH4	Low pressure transmitter 4.5V corresponding pressure value		PL4 ~ 80.0	20.0	bar	0x012F
Alarm parameters							
AL	Adt	Over-temperature alarm deviation value	When the storage temperature is less than or equal to (HAL-Adt), the storage temperature alarm is cancelled; When the storage temperature is greater than or equal to (LAL + Adt), the storage temperature ultra-low alarm is cancelled;	-10.0 ~ 10.0	1.0	℃	0x0130
	ALd	Over-temperature alarm delay	The alarm will only be generated if the temperature overrun duration is longer than the over-temperature alarm delay	0 ~ 120	30	min	0x0131
	AFd	First power-on over-temperature alarm delay	After power-on, temperature overrun alarm does not occur within this set time	0 ~ 120	2	hour	0x0132
	Aod	Over-temperature alarm delay after defrosting	After the defrosting, the over-temperature alarm occurs after the delay	0 ~ 300	30	min	0x0133
	Abt	Multifunctional sensor deviation alarm value	When the parameter Pr 2 = 3, the storage temperature sensor and the multifunctional sensor exceeds the value, generate alarm and shutdown	-40.0 ~ 40.0	5.0	℃	0x0134
	Abd	Multifunctional sensor deviation alarm delay		0 ~ 99	5	sec	0x0135
	ALP	Low-voltage transmitter alarm value		PL4 ~ PH4	0.0	bar	0x0136
	AdP	Pressure transmitter alarm recovery differential pressure	Low pressure alarm recovery: low pressure alarm value + pressure alarm recovery pressure difference; High pressure alarm recovery: high pressure alarm value-pressure alarm recovery pressure difference;	0.1 ~ 5.0	0.2	bar	0x0137
	APd	Pressure transmitter alarm delay		0 ~ 60	5	Sec	0x0138
	AHH	High humidity alarm value		0.0 ~ 99.9	60.0	Rh %	0x0139
	AHd	Humidity alarm delay		0 ~ 99	5	sec	0x013A
	dom	Door alarm type	0: Disable 1: Close the alarm, open if the	0 ~ 2	0	--	0x0407

			door is open 2: Disconnect the alarm, close the door				
	dod	Door switch alarm delay	Door opening is effective, alarm will be generated after delaying this time	0 ~ 120	5	min	0x013B
	LPm	Low pressure alarm type	0: disable 1: close alarm 2: open alarm	0 ~ 2	2	--	0x0408
	LPd	Low pressure alarm delay	Low pressure alarm is valid, and alarm will be generated after delay of this time	0 ~ 120	10	sec	0x013C
	PEn	The allowable number of resets under high voltage		0 ~ 20	3	--	0x016E
Input / output parameters							
Ino	doS	Door Switch Input Definition	0: does not affect the output; 1: refrigeration off, fan off, library lights on; 2: Fan off, library lights on; 3: The library light is turned on;	0 ~ 3	0	--	0x0409
	Aux1	Auxiliary output 1 type	0: crankshaft heating; 1: Water pan heating; 2: Auxiliary output;	0 ~ 2	0	--	0x040A
	ins	Auxiliary input selection	0: Disable; 1: Negative pressure shutdown detection; 2: high pressure detection; 3: External failure (people in the cold storage); 4: Auxiliary input;	0 ~ 4	0	--	0x040B
	inm	Auxiliary Input Type	0: closure valid; 1: disconnection valid	0 ~ 1	1	--	0x040C
	ind	Auxiliary input alarm delay		0 ~ 120	0	sec	0x013D
	Aux2	Auxiliary output 2 type	0: crankshaft heating; 1: water pan heating; 2: Light output; 3: Auxiliary output;	0 ~ 3	2	--	0x041A
Supply liquid solenoid valve type parameters							
VAL	vSd	Liquid supply solenoid valve advances compressor start time	When the startup conditions are met, the liquid supply solenoid valve opens the compressor in advance.	0 ~ 255	10	sec	0x013E
	vEd	Compressor maximum hysteresis solenoid valve stop time	When the shutdown conditions are met, the liquid supply solenoid valve is closed, and the compressor stops after waiting for the maximum lag time	0 ~ 255	10	sec	0x013F
Current protection parameters							

CP	CoL	Overload protection current value of compressor	Maximum overload current setting prohibited to exceed relay maximum load value 30.0A	2.0 ~ 30.0	27.0	A	0x0140
	oLE	Compressor overload protection inverse time enable	0 = disabled;1 = enabled	0 ~ 1	1	--	0x040D
	CPn	Automatic reset times after overload protection of compressor	Allow reset times within half an hour, if the number exceeds this number, the alarm cannot be automatically restored.	0 ~ 5	2	--	0x0141
	CPd	Compressor overload current protection delay	After the average current overload of the press, the alarm will be given after delaying the time.	1 ~ 99	3	sec	0x0142
	CPE	Compressor current protection function	0: disabled;1: enabled	0 ~ 1	1	--	0x040E
	dPE	Defrost current protection enable	0: disabled;1: enabled	0 ~ 1	1	--	0x040F
	doL	Defrost overload protection single-phase current value	Maximum overload current setting prohibited to exceed relay maximum load value 30.0A	2.0 ~ 30.0	27.0	A	0x0143
	dPd	Defrost overload current protection delay	After defrosting overload occurs, alarm will be generated after delaying the time.	1 ~ 99	3	sec	0x0144
	Csd	System matching delay	Compressor relay delay SCR start time	0:200ms; 1:500MS; 2:800MS; 3:1S; 4:1.5S 5:2S; 6:2.5S; 7:3S; 8:3.5S; 9:4S	3		0x0145
	CSn	Start protection detection cycle	0: Turn off startup protection	0 ~ 40	0	--	0x0146
	CPi	Compressor locked - rotor current value		40.0 ~ 99.9	40.0	A	0x0147
	CHz	Power frequency selection	0:220V/50HZ; 1:220V/60HZ	0 ~ 1	0	--	0x0410
Non-business model parameters							
ECO	oSE	Night Energy Saving Mode Start Hour	0: Disable; 1: enable	0 ~ 1	0	--	0x0411
	oSH	Night Energy Saving Mode Start Minutes		0 ~ 23	22	hour	0x0148
	oSm	Night Energy Saving Mode End Hour		0 ~ 59	0	min	0x0149
	oEH	Night Energy Saving Mode End Minutes		0 ~ 23	8	hour	0x014A

	oEm	Night Energy Saving Mode Setpoint Change Value		0 ~ 59	0	min	0x014B
	oSP	Night Energy Saving Mode Start Hour	the warehouse temperature is greater than or equal to SET + rd + oSP, refrigeration is on; the warehouse temperature is less than or equal to SET, refrigeration stop;	-10.0 ~ 10.0	2.0	℃	0x014C
Electronic expansion valve type parameters							
EEV	VE	Electronic expansion valve enables	0: Disable; 1: enable	0 ~ 1	0	--	0x0412
	VLn	Minimum opening		0 ~ 480	40	pace	0x014D
	VHn	Maximum opening		50 ~ 500	500	pace	0x014E
	VHL	Target overheat lower limit		1.0 ~ 50.0	4.0	℃	0x014F
	VHH	Target overheat upper limit		1.0 ~ 50.0	6.0	℃	0x0150
	VFn	Initial valve opening		0 ~ 500	450	pace	0x0151
	VFt	Initial opening hold time		0 ~ 300	30	sec	0x0152
	VAc	Electronic expansion valve regulation cycle		0 ~ 300	30	sec	0x0153
	VEt	Closing delay of electronic expansion valve		0 ~ 999	5	sec	0x0154
	VSt	Opening delay of electronic expansion valve		0 ~ 999	5	sec	0x0155
	VAH	Overheat value and high-temperature alarm		VAL ~ 99.9	80.0	℃	0x0156
	VAL	Overheat value and low-temperature alarm		-30.0 ~ VAH	2.0	℃	0x0157
	VAt	Overheat alarm return difference		0.0 ~ 5.0	0.5	℃	0x0158
	VHd	Overheat alarm delay		0 ~ 999	30	sec	0x0159
	VLm	Type of refrigerant	R22=3,R134a=8,R290=12,R401a=13,R404a=15,R407a=16,R407c=18,R410a=19,R507a=24	1 ~ 29	3		0x015A
	VEn	Sensor fault valve opening	Pressure sensor or a temperature sensor	0 ~ 500	150	pace	0x015B
	VHP	Overheat adjusts the minimum pressure		-10.0 ~ 10.0	0.0	bar	0x015C
	VVm	Valve control mode	0: Automatic control; 1: manual control	0 ~ 1	0	--	0x0413
	Vn	Valve opening in manual mode		0 ~ 500	175	pace	0x015D
	VKP	Kp		0.0 ~ 10.0	0.3		0x015E
	VKi	Ki		0.0 ~ 10.0	5.0		0x015F
	VKd	Kd		0.0 ~ 10.0	0.0		0x0160

	VSn	Refrigeration shutdown valve opening degree	--	0 ~ 500	0	pac e	0x0161
	Vdn	Hot fluorinated valve opening	--	0 ~ 500	250	pac e	0x0162
	Vrn	Opening of return cooling valve	--	0 ~ 500	250	pac e	0x0163
	VHE	Excessive heat alarm enables	0: Disable; 1: enable	0 ~ 1	0	--	0x0414
	VT	Valve type selection	0: Sanhua electronic expansion valve; 1: Danfoss electronic expansion valve	0 ~ 1	1		0x0415
System parameters							
SYS	Adr	mailing address		1 ~ 127	1		0x0164
	PAS	Menu Password Settings		0 ~ 999	0		0x0165
	bzE	Buzzer is enabled during the alarm	0: Disable; 1: enable	0 ~ 1	1	--	0x0416
HACCP parameters							
HcP	HCE	The HACCP function is enabled	0: Disable; 1: enable	0 ~ 1	0	--	0x0417
	HCA	Alarm relay output form during the HACCP alarm	0: HACCP alarm relay has no output; 1: HACCP alarm relay output;	0~1	0	--	0x0418
	SHH	HACCP high-temperature alarm value	When the controller is greater than the set parameter, and the time exceeds the time set by the parameter drA, HACCP high temperature alarm, the accuracy of this parameter is 0.1℃, the display of the alarm depends on the parameters set by HCs	SLH~99.0	30.0	℃	0x0166
	SLH	HACCP Low-temperature alarm value	When the controller is less than the set parameter set, and the time exceeds the time set by the parameter drA, HACCP low temperature alarm, the accuracy of this parameter is 0.1℃, the display of the alarm depends on the parameters set by HCs	-49.0~SHH	-30.0	℃	0x0167
	drA	HACCP alarm delay		0~99	10	Min	0x0168
	drH	HACCP alarm reset time setting	After the controller is set by the parameter, the HACCP alarm will be automatically reset. If set to 0, the HACCP alarm record will be stored	0~254	0	hour	0x0169
	HCP	HACCP alarm sensor selection	0: Library temperature sensor detection; 1: standby sensor detection;	0~1	0	--	0x0419

6.4 Forced defrosting

● When the device is in the unlocked state, the controller is in neither the defrosting nor the dripping state,and the defrosting temperature is lower than the defrosting stop temperature [dSt],press and hold the key " " for more than 5 seconds, enter the forced defrosting state, defrosting indicator light " " on;

● In the forced defrosting state, long press the key " " for more than 5 seconds, exit the forced defrosting state, and the defrosting indicator light " " will turn off.

6.5 Temperature / power viewing function

● When the device is in the unlocked state, press and hold the " " key for 3 seconds to enter the temperature viewing interface. The temperature is displayed in the middle window, the probe code (such as "t1") is displayed in the right window, and the real-time clock is displayed in the left window. When checking the battery charge, the left window will not be displayed. The battery charge value is displayed in the middle window, the battery charge code is displayed in the right window, and the corresponding indicator light will turn on.

● In the temperature viewing interface, press the " " or " " key to switch the display of the probe values. t1 - warehouse temperature; t2 - defrosting temperature; t3 - standby sensor temperature; H1 - humidity; P1 - low pressure; P2 - solenoid valve opening degree; P3 - degree of superheat; when the "Voltage" indicator light is on, it shows the voltage; when the "Current" indicator light is on, it shows the current; when the "Mthly Elec." indicator light is on, it shows the monthly electricity consumption; when the "Mthly Save Elec." indicator light is on, it shows the monthly saved electricity consumption; when the "Weekly Elec." indicator light is on, it shows the weekly electricity consumption; when the "Weekly Save Elec." indicator light is on, it shows the weekly saved electricity consumption.

● If the sensor malfunctions, the probe code (such as "t1") is displayed in the right window, and the corresponding fault code (such as "E1") is displayed in the middle window. If the sensor is disabled, the probe code (such as "t1") is displayed in the right window, and "---" is displayed in the middle window.

● In the temperature viewing interface, press the " " key or if there is no key operation for 30 seconds, exit the temperature viewing interface.

6.6 Switch machine function

● When the device is unlocked, press the key " " for more than 5 seconds, enter the shutdown state, the controller output is disconnected,the middle window shows the real-time library temperature, the left window displays the real-time clock,The right-side window shows "OFF";

● In the shutdown state, long press the key " " for more than 5 seconds to enter the normal operation state;

● In the shutdown state, the relay output is disconnected, and the alarm is removed;

● In the shutdown state, the light can be controlled normally;

6.7 Clock calibration function

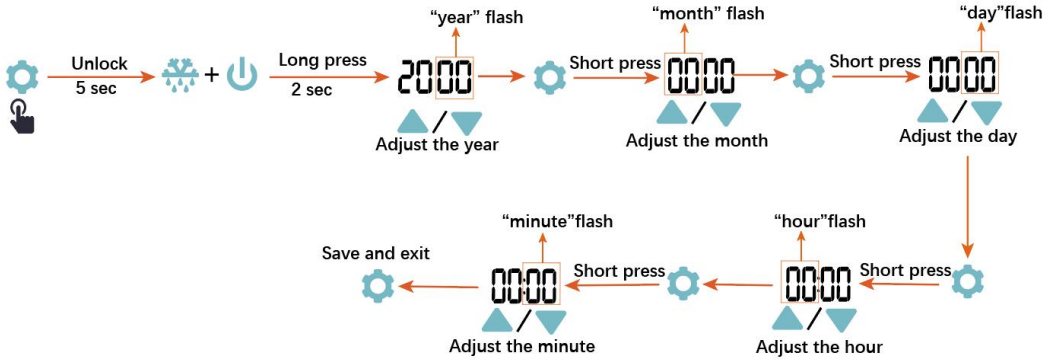
● When the device is unlocked, long press the key " " + " "for more than 2 seconds to enter the clock calibration function;

● The "00" number of "20 00" on the left side window flashes, press the key " " or " " to calibration year, press the key" " to save year;

● Left window "00 00 (month day)" "month" number flashing, press the key"▲" or "▼" to calibrate the month, press the key"⚙" to save the month;"Day" number flashes, press the key "▲" or "" ▼ "to calibrate days, press the key"⚙" to save days;

● The number of "00:00 (time: minutes)" flashes, press the key"▲" or "▼"to calibration hours, press the key "⚙" key to save hours; Flash split numbers, press the key"▲" or "▼" to calibrate minutes, and press the key" ⚙" to save minutes.

● In the clock calibration interface, press the "⏻" key or if there is no key operation for 30 seconds, exit the calibration interface without saving the time.



6.8 The HACCP information query

● When the device is unlocked, press the key "▲" + "▼" for more than 2 seconds to enter HACCP information query, the middle window displays code "ACP" (high and low temperature alarm information),The left window shows the code "HCP", the right window shows the code "ALr"; press the key "▲" or "▼", and the middle window cycles the code "ACP" (temperature alarm information), "Pt" (maximum mild and minimum temperature information);Press the key "⏻"or 30 seconds without button operation, exit the HACCP information query;

● View the cold alarm date and time

When the middle window displays the code "ACP", press the key "⚙" , enter the overtemperature alarm time to view, the middle window displays the code "1t" (the first overtemperature alarm information),Press the key "▲" or "▼" to flip the high temperature alarm message "2t" (Article 2)..., the right window shows the alarm date, such as "06 20" (June 20), The left window displays the alarm time, such as "12:20"; press the key "⏻" or 30 seconds to return to the previous level display;

● View the maximum, mild and coldest temperature alarm date and time

When the code "Pt" is displayed in the middle window, press the key"⚙" to enter the temperature alarm time to view, the middle window shows the high temperature value "20.0" (the highest temperature alarm value),The right window shows the date of the highest temperature alarm, such as "06 20" (June 20), and the left window shows the time of the highest temperature alarm, such as "12:20";Press the key "▼" to display the cold alarm temperature and time; press the key "⏻" or 30 seconds to return to the previous level display;

6.9 Restore the factory parameter settings

● When the device is unlocked, long press the key" " + " " for more than 10 seconds to enter the recovery factory Settings interface, the middle window shows "FAC", and the right window displays "rst";

● In the restore factory Settings interface, press the key" " to restore the factory parameters, only after the recovery, the right window shows "OK";

● Press the key" " key or no key action 30s automatically exit to the normal interface.

7 Basic Working Principle

7.1 Compressor control

● When it is neither in the defrosting nor the dripping state, if the warehouse temperature is higher than the temperature set value [SEt] plus the compressor start - up differential [rd], and the minimum shutdown time [ct] is met, the liquid supply solenoid valve opens. After the liquid supply valve opens in advance for the time [vSd], the compressor starts. When the warehouse temperature is lower than the temperature set value [SEt], the liquid supply solenoid valve closes. If the closing time of the liquid supply solenoid valve exceeds [vEd], the compressor stops.

● In the hot - fluorine defrosting state, when the compressor meets the minimum shutdown time [dhd], the compressor starts. After the defrosting is completed, the compressor stops and waits for the next round of refrigeration to start.

● During the start - up process of the compressor, if there are low - pressure alarms, high - pressure alarms, or current overloads in the system, the compressor stops immediately and waits for the faults to be resolved.

7.2 Defrost control

● When the defrosting cycle time is up or defrosting is manually initiated, if the defrosting probe is enabled and the defrosting temperature is lower than the defrosting stop temperature [dSt], defrosting starts. If the defrosting probe is not enabled, the system directly enters the defrosting state;

● In the electric defrosting mode, during defrosting, the defrosting relay outputs signals until defrosting ends, at which point the defrosting relay stops outputting. In the hot - fluorine defrosting mode, during defrosting, the defrosting relay outputs signals. The compressor starts after meeting the defrosting shutdown time [dhd]. Until defrosting ends, both the defrosting relay and the compressor relay stop outputting;

● During defrosting, when the defrosting temperature is higher than the defrosting stop temperature [dSt] or the defrosting time [dEt] is up, the system enters the defrosting drip state. After the defrosting drip lasts for [drt], the system exits the defrosting state;

7.3 Crankshaft heating control

When the compressor is stopped, the crankshaft is heated and opened; when the compressor is open, the crankshaft heating is closed;

7.4 Evaporative fan control

● During refrigeration, the evaporative fan can start the compressor in advance or lag the compressor according to the evaporative fan start mode [Fsd];The evaporating fan is closed according to the evaporating fan shutdown mode [F02], and the lag compressor is closed;

- When the defrosting mode is weathered frost [dEm], the evaporation fan is opened during the defrosting period;
- When the system has a high-voltage alarm, the evaporation fan is closed;

8 Alarm Code

code	description	remarks
E01	Temperature sensor fault, refrigeration according to the proportion (stop 30 minutes, open 15 minutes) operation, buzzer sounds.	Sensor class failure
E02	Defrost sensor fault, defrost according to the set defrost cycle and defrost time operation, buzzer sounds.	
E03	Store temperature exceeds the upper limit of measurement (99.9℃), refrigeration operates according to the proportion (stop for 30 minutes, open for 15 minutes), buzzer sounds.	
E04	Defrosting temperature exceeds the upper limit of measurement (99.9℃), defrosting operates according to the preset defrosting cycle and defrosting time, and the buzzer rings.	
E05	Multifunctional sensor failure	
E06	Humidity sensor failure	
E07	Low pressure transmitter failure	
E08	Temperature sensor error alarm	
dor	Door switch alarm	
LP	Unit low pressure alarm	
HP	Unit high pressure alarm	
Lo	Store temperature ultra-low temperature alarm	
Hi	Store temperature ultra high temperature alarm	
EE	Parameter storage fault	
LPL	Low Pressure Transmitter Low Alarm	
OL1	Press overload protection	
OL2	Defrost overload protection	
ECP	Compressor startup failure	The compressor startup current exceeds 30A, after startup failure; after 5 locks, the fault cannot be restored.
SHA	High superheat alarm	
SLA	Low superheat alarm	
HUH	Humidity alarm	
HA	HACCP over-temperature alarm	
NPA	Negative pressure switch alarm	
EFA	External fault alarm	

8.1 Alarm Output Control

The controller has a buzzer alarm output. In normal operation, the buzzer rings when the following conditions occur.

Press any key, can eliminate the buzzer alarm sound;

Library temperature probe fault alarm [E01]:

● When the storage temperature probe is faulty, the middle window displays the fault code [E01];

● In the case of storage temperature probe failure, the controller controls the compressor in a fixed mode:
stop for 30 minutes and run for 15 minutes.

● After the fault of the storage temperature probe is eliminated, enter the temperature control mode and exit the fixed on and stop mode.

Defrost temperature probe fault alarm[E02]:

● When the defrosting probe fails, the middle window displays the fault code [E02];

● In the defrosting state, the controller controls the set defrosting cycle [dEC] and the defrosting time [dEt].

● When the defrosting probe fault is restored, the defrosting time and temperature are double controlled under the defrosting state.

Storage temperature exceeding the upper measurement limit [E03]:

● The upper limit of the library temperature measurement [99.9℃], the middle window shows the fault code [E03],
alternating with the temperature display;

Defrost temperature exceeding the upper measurement limit[E04]:

● Defrost temperature temperature measurement limit [99.9℃], fault code [E04] is displayed in the middle window,
alternating with temperature;

Multifunctional temperature sensor fault [E05]:

● In the case of the Multifunctional temperature sensor enabled [Pr2 = 0], when the Multifunctional temperature sensor fails,
the temperature display window displays the fault code [E05];

● [Pr2 = 0] when the Multifunctional temperature sensor is disabled;

Humidity sensor fault [E06]:

● In the case of humidity sensor enabled [Pr3 = 1], when the humidity sensor fails, the temperature display window displays the
fault code [E06];

● When the humidity sensor is disabled, [Pr3 = 0], fault recovery;

Low-pressure pressure transmitter fault [E07]:

● In the case of low pressure transmitter enabling [Pr4 = 1], when the low pressure transmitter fails, the temperature display window
displays the fault code [E07];

● [Pr4 = 0] when low pressure transmitter is disabled, fault recovery;

Storage temperature differential alarm [E08]:

● When the sensor difference is large to alarm, the temperature display window displays the fault code [E08];

● When the average temperature [Pr2 = 3] of the backup sensor and the storage temperature sensor is used as the control temperature,
if the | storage temperature-backup temperature | sensor deviation alarm value [Abt],And the delay time exceeds the sensor deviation
alarm time [Abd], generating the sensor difference is large alarm;

● In the sensor difference of large alarm, if | storage temperature-standby temperature | < sensor deviation alarm value [Abt], cancel the
sensor difference of large alarm.

Door switch alarm [dor]:

● When the door switch alarms, the middle window displays the fault code [dor];

● When the door is open and effective, and the delay time door switch alarm delay [dod], to generate the door switch alarm;

Unit low pressure alarm [LP]:

● When the unit has a low-voltage alarm, the middle window displays the fault code [LP];

● When the low voltage fault input is detected, and the delay time unit low voltage alarm delay [LPd], generating the unit protection low voltage alarm;

Unit high-voltage alarm [HP]:

● When the unit high voltage alarm, the middle window displays the fault code [HP];

● When the auxiliary input [ins = 2], according to the selection of the auxiliary input type [inm], when a high - pressure fault input is detected and the delay time is greater than or equal to the unit high - pressure alarm delay [ind], a high - pressure alarm for unit Protection will be triggered. When the auxiliary input [ins ≠ 2], the high - pressure alarm for the unit will be cancelled;

● When a high-pressure alarm occurs, the compressor stops. If the number of shutdowns within half an hour exceeds [PEn], the fault cannot be automatically recovered.

Storage temperature ultra low alarm [Lo] / Storage temperature ultra high alarm [Hi]:

● Controller first power-up time instrument power-up over-temperature alarm delay [AFd];

● When the storage temperature temperature high temperature alarm value [HAL], and the duration of over-temperature alarm delay [ALd], the controller produces ultra-high temperature alarm, the middle window shows [Hi];

When the storage temperature is <the storage temperature high temperature alarm value [HAL] - over-temperature alarm return difference [Adt], the ultra-high temperature alarm is cancelled;

● When the storage temperature temperature low temperature alarm value [LAL], and the duration of over-temperature alarm delay [ALd], the controller produces ultra-low temperature alarm, the middle window shows [Lo];

When the storage temperature> the storage temperature low temperature alarm value [LAL] + over-temperature alarm return difference [Adt], the ultra-low temperature alarm is cancelled;

● When the storage temperature sensor fails, the storage temperature overlimit alarm is cancelled;

● No ultra-high temperature generated during defrosting alarm;

Ultra-low alarm of low pressure transmitter [LPL]:

● Low pressure transmitter under normal circumstances, low pressure value low pressure transmitter alarm value [ALP], and the duration exceeds the pressure transmitter alarm delay [Apd],The temperature display window displays the fault code [LPL];

● Low pressure pressure value low pressure transmitter alarm value [ALP] + pressure alarm recovery pressure difference [AdP]; low pressure transmitter ultra low alarm recovery;

● [Pr4 = 0] when the low pressure transmitter is disabled, fault recovery;

● In the case of low pressure transmitter enabling [Pr4 = 1], the low pressure transmitter fails;

Press machine overload protection alarm [oL1]:

● When a compressor overload protection alarm occurs, the fault code [oL1] is displayed in the middle window.

● When the compressor overload protection is enabled ([CPE = 1]), after the compressor is powered on, if the average current is greater than or equal to the compressor overload protection current value [CoL] and the duration is greater than or equal to the overload current protection delay time [CPd], compressor overload protection is triggered and the compressor output is disconnected.

● After the compressor overload protection is triggered, it will automatically reset after 5 minutes. If the number of consecutive resets within half an hour is greater than the maximum number of automatic resets for compressor overload protection [CPn], the compressor overload protection will no longer reset.

● When the compressor overload protection is disabled ([CPE = 0]), the compressor overload protection current value is calculated based on the maximum current the relay can withstand [30.0A].

Defrosting Overload protection alarm [oL2]:

● When a defrosting overload protection alarm occurs, the fault code [oL2] is displayed in the middle window.

● When the defrosting current protection enable parameter [dPE = 1], after defrosting starts, if the single-phase current value is greater than or equal to the single-phase current value for defrosting overload protection [doL], and the duration is greater than or equal to the defrosting overload current protection delay [dPd], defrosting overload protection is triggered and the defrosting output is disconnected.

● When the defrosting current protection enable parameter [dPE = 0], the defrosting overload protection current value is calculated based on the maximum current the relay can withstand [30.0A].

● At the start of the next defrosting cycle, if the single-phase current value is less than the single-phase current value for defrosting overload protection [doL], defrosting will start and the defrosting overload protection alarm will be cancelled.

Excessive heat and high alarm [SHA]:

● Electronic expansion valve is disabled [VE = 0], and the alarm is cancelled;

● When the electronic expansion valve is enabled [VE = 1] and the superheat alarm is enabled [VHE = 1], the superheat degree is equal to the suction temperature minus the saturation temperature (low-pressure).If the superheat degree is greater than or equal to the upper limit alarm value of the superheat degree [VAH], and the duration exceeds the superheat alarm delay [VHd], a high superheat alarm will be generated, and the fault code [SHA] will be displayed.

● When the superheat degree is less than or equal to the upper limit alarm value of the superheat degree [VAH] minus the superheat alarm hysteresis [VAt], the alarm will be cancelled.

● When the low-pressure pressure transmitter is disabled or faulty, or the suction temperature sensor is disabled or faulty, the alarm will be cancelled.

● When the electronic expansion valve is disabled [VE = 0] or the superheat alarm is disabled [VHE = 0], the alarm will be cancelled.

Over-heat-low alarm [SLA]:

● When the electronic expansion valve is enabled [VE = 1] and the superheat alarm is enabled [VHE = 1], if the superheat degree is less than or equal to the lower limit alarm value of the superheat degree [VAL], and the duration exceeds the superheat alarm delay [VHd], a low superheat alarm will be generated, and the fault code [SLA] will be displayed.

● When the superheat degree is greater than or equal to the lower limit alarm value of the superheat degree [VAL] plus the superheat alarm hysteresis [VAt], the alarm will be cancelled.

● When the low-pressure pressure transmitter is disabled or faulty, or the suction temperature sensor is disabled or faulty, the alarm will be cancelled.

● When the electronic expansion valve is disabled [VE = 0] or the superheat alarm is disabled [VHE = 0], the alarm will be cancelled.

High humidity alarm [HUH]:

● When the humidity is higher than the high - humidity alarm value [AHH] and the duration exceeds [AHd], a high - humidity alarm will be triggered, and the code [HUH] will be displayed.

●When the humidity is lower than the high - humidity alarm value [AHH], the alarm will be cancelled.

●When the humidity sensor is disabled ([Pr3 = 0]), the high - humidity alarm will be cancelled.

HACCP Over-temperature alarm [HA]:

● HACCP function enables [HCE = 1], probe detection temperature HACCP high temperature alarm value [SHH], and the duration exceeds [drA], produce HACCP overtemperature alarm;When the probe detection temperature is <HACCP high temperature alarm value [SHH], the alarm is cancelled;

● HACCP function enables [HCE = 1], probe detection temperature HACCP low temperature alarm value [SLH], and the duration exceeds [drA], produce HACCP overtemperature alarm;When the probe detects the temperature> HACCP high temperature alarm value [SLH], the alarm is cancelled;

● The HACCP function is disabled [HCE = 0], and the alarm is cancelled;

Negative pressure switch alarm [NPA]:

● When the negative pressure function is enabled (auxiliary input [ins = 1]), according to the selection of the auxiliary input type [inm], if the disconnection alarm is set ([inm = 1]), when the disconnection of the auxiliary input signal is detected and the duration exceeds [ind], a negative pressure switch alarm will be triggered. The alarm will be cancelled when the auxiliary input signal is closed.

●When the negative pressure function is cancelled (auxiliary input [ins ≠ 1]), the negative pressure alarm signal will be cancelled.

External fault alarm [EFA]:

●When the external fault detection function is enabled (auxiliary input [ins = 3]), according to the selection of the auxiliary input type [inm], if the disconnection alarm is set ([inm = 1]), when the disconnection of the auxiliary input signal is detected and the duration exceeds [ind], an external fault alarm will be triggered. The alarm will be cancelled when the auxiliary input signal is closed.

●When the external fault detection is cancelled (auxiliary input [ins ≠ 3]), the external alarm signal will be cancelled.

9 MODBUS-RTU RS485 Communications

This system adopts MODBUS-RTU, communication slave mode, port rate 9600, no parity, 8 bit data bit, 1 bit stop bit, supports MODBUS-RTU command 03 (read hold register), 06 (write single register).

Register address	description	scope	unit	data resolution ratio	Have / without symbol
0x0100	controlling temperature	-40.0 ~ 99.9	℃	0.1/bit	have
0x0101	storage temperature	-40.0 ~ 99.9	℃	0.1/bit	have
0x0102	defrosting temperature	-40.0 ~ 99.9	℃	0.1/bit	have
0x0103	Multifunctional Sensor Temperature	-40.0 ~ 99.9	℃	0.1/bit	have
0x0104	humidity temperature	-40.0 ~ 99.9	℃	0.1/bit	have
0x0105	low-pressure pressure	-1.0 ~ 16.0	Bar	0.1/bit	have
0x0106	average current	0 ~ 80	A	0.1/bit	have
0x0107	Starting current 1	0 ~ 80	A	0.1/bit	have
0x0108	Starting current 2	0 ~ 80	A	0.1/bit	have
0x0109	Starting current 3	0 ~ 80	A	0.1/bit	have
0x010A	Starting current 4	0 ~ 80	A	0.1/bit	have
0x010B	degree of superheat	-20.0 ~ 40.0	℃	0.1/bit	have
0x010C	Electronic Expansion Valve Steps	0 ~ 500	--	1/bit	not have
0x010D	software version	0 ~ 99	--	1/bit	not have
0x010E	electric quantity	0 ~ 9999	Kwh	0.1/bit	not have

9.1 Relay Output Status

Register address			number	name	remarks
0x0200	output state		bit0	Power state	1: ON / 0: Off
			bit1	Energy saving state	
			bit2	Refrigeration state	
			bit3	Defrost state	
			bit4	dripping state	
			bit5	open-door status	
			bit6	Compressor relay output status	
			bit7	Defrost relay output status	

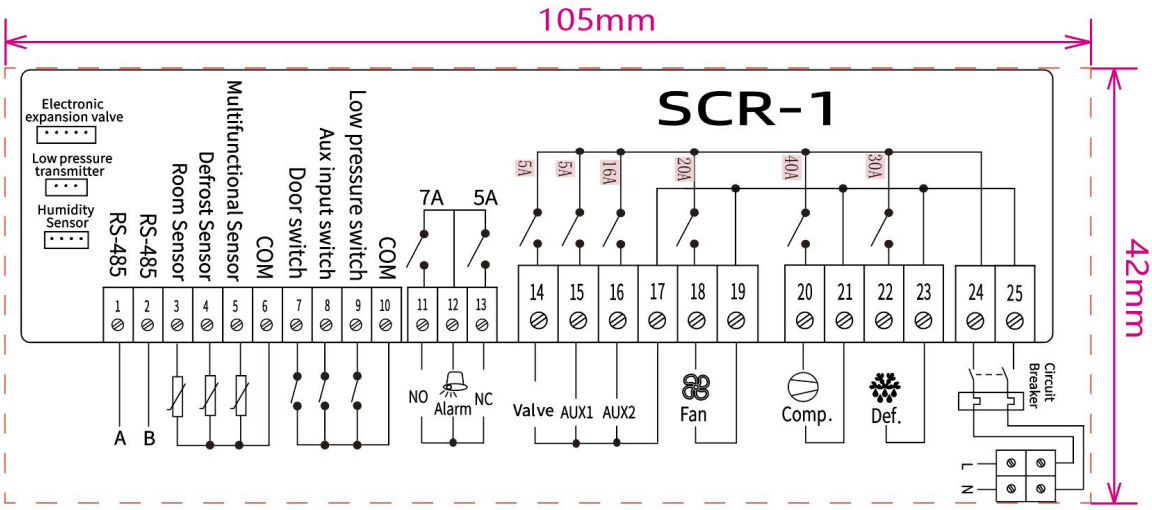
			bit8	Evaporator fan relay output status	
			bit9	Crankshaft Heating Relay Output Status	
			bit10	Light relay output status	
			bit11	Output status of liquid supply solenoid valve	
			bit12	Alarm relay output status	
			bit13		
			bit14		
			bit15		

9.2 Alarm Relay Output

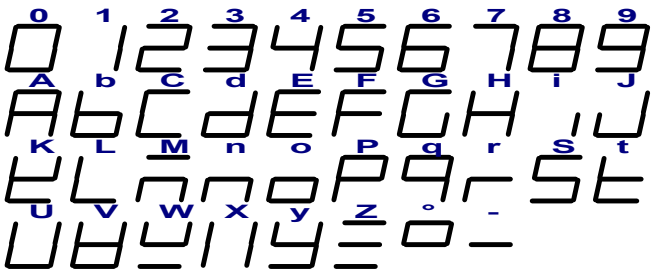
Register address			number	name	remarks
0x0300	Alarm output		bit0	Storage temperature sensor fault	0: No alarm / 1: alarm
			bit1	Defrost sensor fault	
			bit2	Temperature exceeds upper limit of measurement	
			bit3	Defrosting exceeds the upper limit of measurement	
			bit4	Multifunctional sensor failure	
			bit5	Humidity sensor failure	
			bit6	Low pressure transmitter failure	
			bit7	Alarm for temperature exceeding	
			bit8	Door switch alarm	
			bit9	Unit low pressure alarm	
			bit10	Unit high pressure alarm	
			bit11	Store temperature ultra-low temperature alarm	
			bit12	Store temperature ultra high temperature alarm	
			bit13	Parameter storage fault	
			bit14	Low Pressure Transmitter Ultra Low Pressure Alarm	
			bit15	Compressor overload protection	
0x0301			bit16	Defrost overload protection	
			bit17	Compressor start-up protection	
			bit18	High superheat alarm	
			bit19	Humidity alarm	
			bit20	HACCP over-temperature alarm	
			bit21	--	

			bit22	Negative pressure switch alarm	
			bit23	external fault alarm	
			bit24		
			bit25		
			bit26		
			bit27		
			bit28		
			bit29		
			bit30		
			bit31		

10 Wiring Diagram



11 Appendix: Character set



12 Network Configuration Operation

1. Open the "Elitech iCold" APP, log in to your account and enter the main interface of the cloud platform (as shown in Figure 1). Click the "+" icon in the upper right corner of the interface to enter the device addition interface (as shown in Figure 2). There are two ways to add a device: adding a device via NFC and adding a device by scanning the device's GUID QR code.

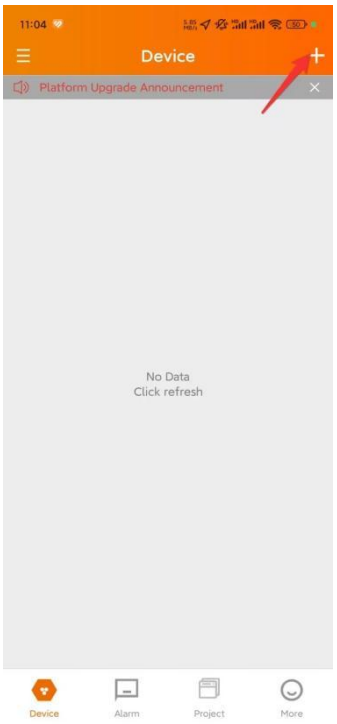


Fig.1 The main interface of the cloud platform

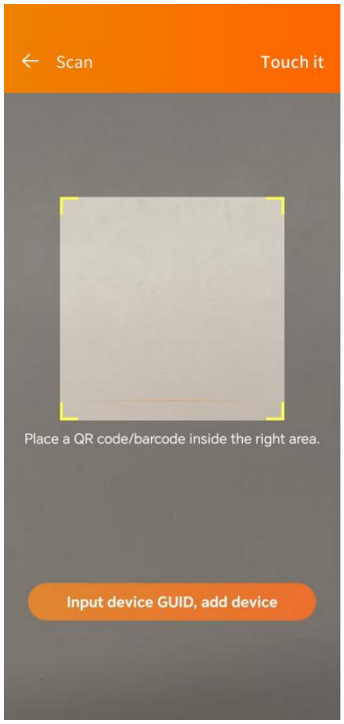


Fig.2 Device Addition Method Selection Interface

1.1. Adding a device via NFC: As shown in Figure 2, click "Touch it" in the upper right corner, and the APP will enter the NFC touch interface (as shown in Figure 3). Touch the NFC area of the device controller with your mobile phone, and the APP will jump to the interface for reading device information via NFC (as shown in Figure 4).

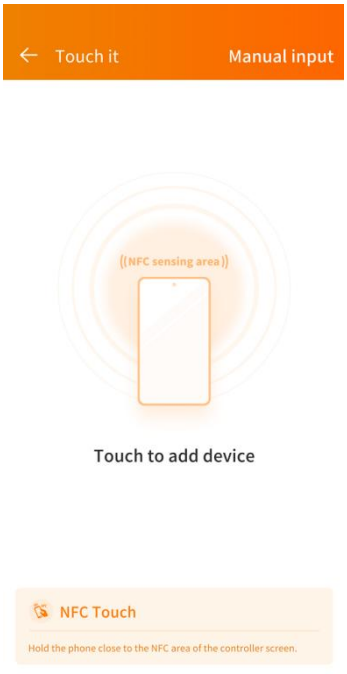


Fig.3 NFC Touch Controller

Fig.4 Read device information via NFC

1.2. Adding a device by scanning the device's GUID QR code: As shown in Figure 2, click "Scan" in the upper left corner, and the APP will enter the QR code scanning interface (as shown in Figure 5).

Fig.5 Scan the QR code of the device

2. Device operation method: When the device is in the unlocked state,long-press the "▲" key for 3 seconds to enter the WIFI network configuration function. The real-time cold storage temperature will be displayed in the middle window, "wif" will be displayed in the left window, and "rst" will be displayed in the right window. When the WIFI reset is successful, "ok" will be displayed in the right window. When the WIFI reset fails, "Err" will be displayed in the right window, and the device will return to the normal operation state after 10 seconds.

3. Turn on the Bluetooth of your mobile phone according to the APP prompt, and click "Configure" (as shown in Figure 6). After the mobile phone detects the device's Bluetooth, the device information will be displayed (as shown in Figure 7).

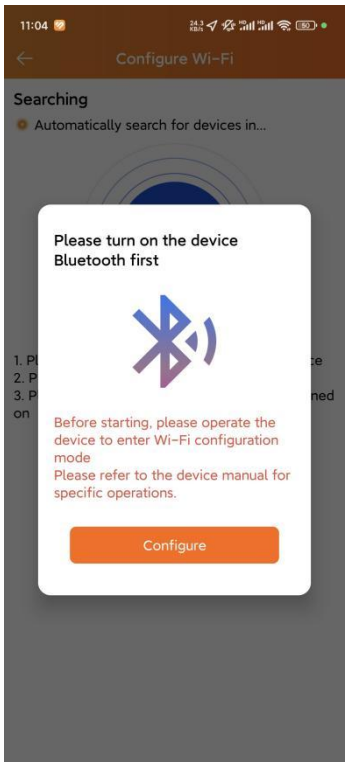


Fig.6 Prompt to turn on the Bluetooth of the mobile phone

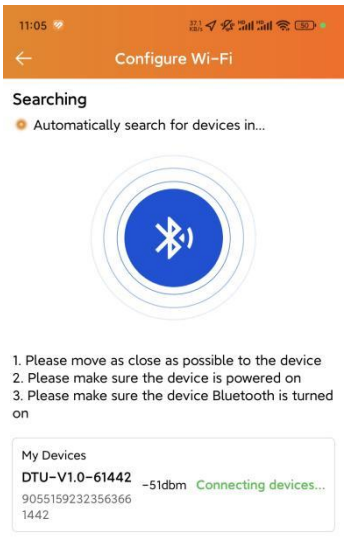


Fig.7 Display device information

4. After the device is successfully paired with the mobile phone's Bluetooth, the APP will jump to the network connection interface. Select the WIFI network and enter the password (as shown in Figure 8/9).

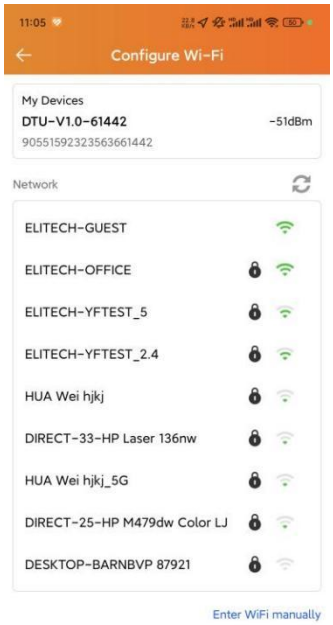


Fig.8 Network List

Fig.9 Enter the password for the WIFI network

5. After the device's WIFI is successfully connected to the router, the network indicator "" on the controller is on,APP enter the device information filling interface. Select the business scenario in the interface. The cold storage name can be customized according to the customer's needs. Click "Confirm Addition", and a dialog box will pop up when the device is successfully added. Check the device in the corresponding business scenario.

Fig.10 The device is successfully connected to Wi-Fi

Fig.11 Enter device information

6.Network signal viewing

6.1 When the device is unlocked, long press the key "▲+ ❄ "for 3 seconds to start the WIFI network signal query, and the middle window displays the power supply situation of the module (" on ": the module power supply is on;"Off": the module power supply is off), the left window shows "net", the right window shows the network signal value (such as "32");

6.2 For module power supply on, press the key "⚙" for 5 seconds, module power supply off, middle window displays "off"; module power supply off, Press the key "⚙" for 5 seconds,Module power supply is on, and the middle window displays "on";

6.3 Press the key"⏻" or no key for 10 seconds to return to the normal operation interface.

Note: The network signal ten digits represents the network connection state, and the one digit represents the network strength;

network state	Network strength
0: The wifi is not configured	0: No signal
1: The wifi is not connected to the router	1:1 lattice signal, weak signal
2: Wifi is connected to the router but cannot access the Internet	2:2 grid signal, medium signal
3: In the wifi connection	3:3 grid signal, good signal
4:2G in the connection	4:4 Grid signal, the signal is very good
5:4G in the connection	
6: In the Bluetooth connection	

13 NFC Settings

1.Open the "Elitech iCold" App, Log in to your account and enter the main interface of the cloud platform,Click on the "≡" icon in the upper - right corner of the interface, then select "Application Service" --> "CoolRobot Toolbox" (as shown in Figure 12).

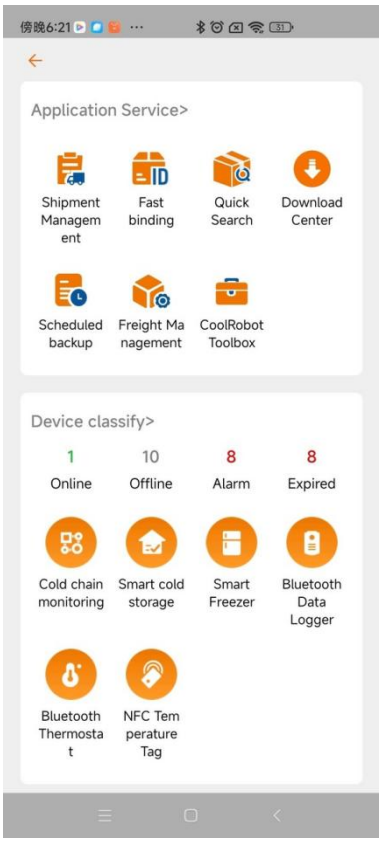


Fig.12 Enter CoolRobot Toolbox

2.Click to enter the NFC CoolRobot Toolbox interface and select "Quick Configuration"(as shown in Figure 13). Touch the NFC area of the device to read the device parameters(as shown in Figure 14).After the parameter reading is completed, you can set the parameters in batches,Then click "write"(as shown in Figure 15). Touch the NFC area of the device with your phone to send the parameters to the device. Once the parameter setting is completed, a success interfacewill be displayed(as shown in Figure 16).

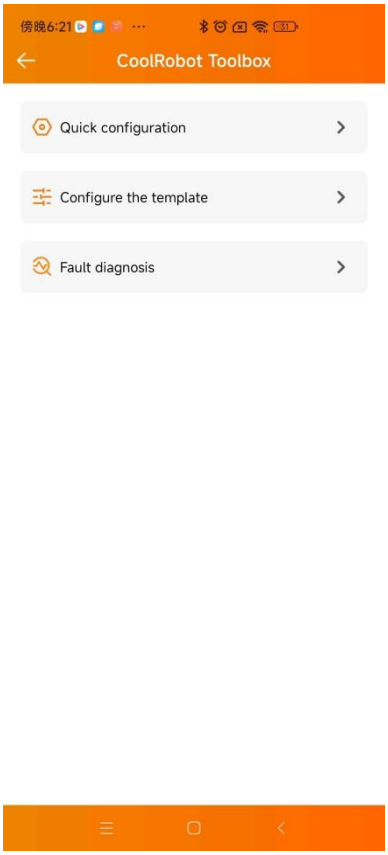


Fig.13 Select Quick Configuration

Fig.14 Touch the device

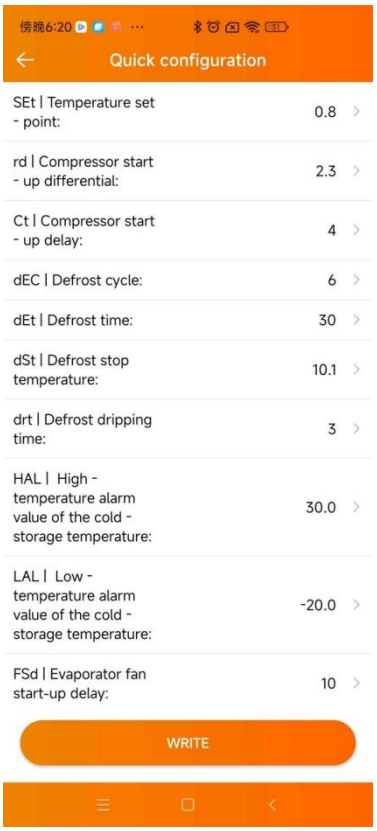


Fig.15 The parameters read by NFC

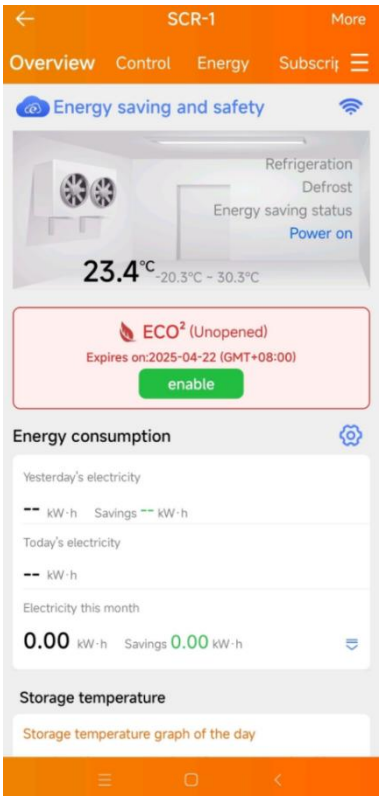
Fig.16 The NFC settings parameters have been successfully configured

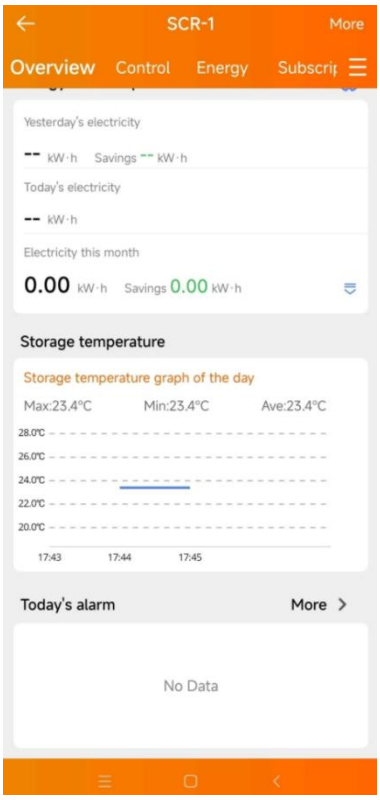
14 OTA

The device supports OTA remote upgrade. When a new version is released, the platform will push version information to notify customers. Users can independently select the upgrade time according to the operating status of the device. After tapping the upgrade button on the APP, the device will enter the upgrade state. Once the upgrade is completed, the APP will pop up a prompt window saying "Version upgrade successful", and the device will then start to run with the functions of the new version.

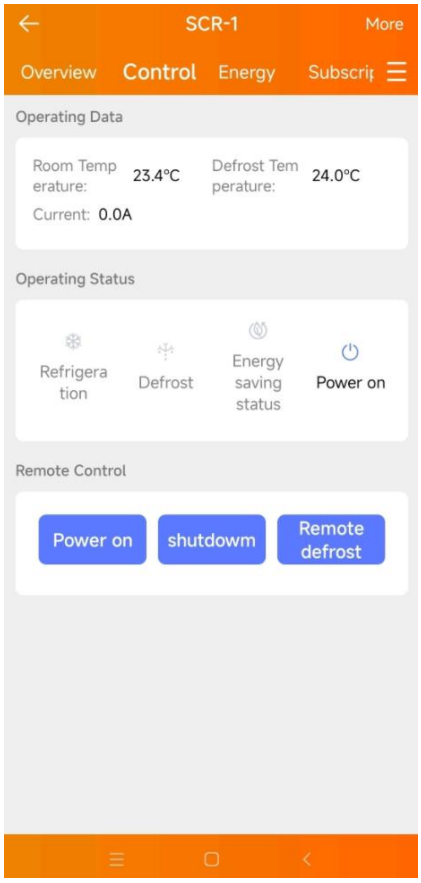
15 APP

1、"Overview" interface: Displays the real-time operation status of the device, the current warehouse temperature, power consumption statistics information, alarm information, etc. (as shown in the figure below).

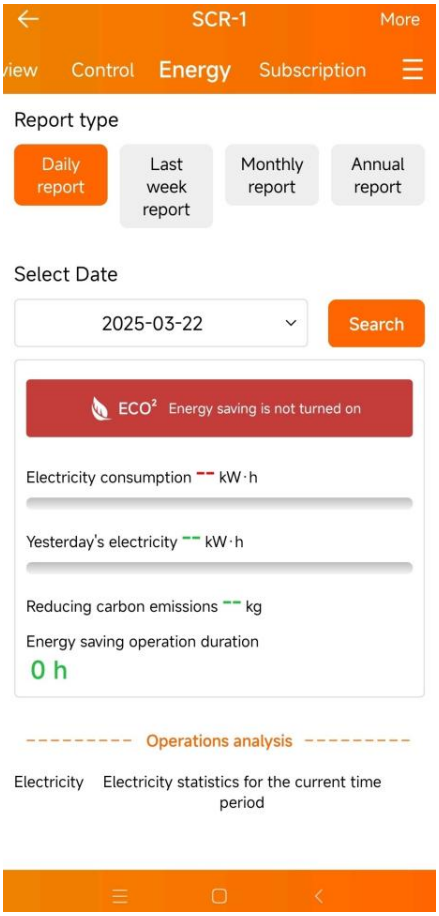




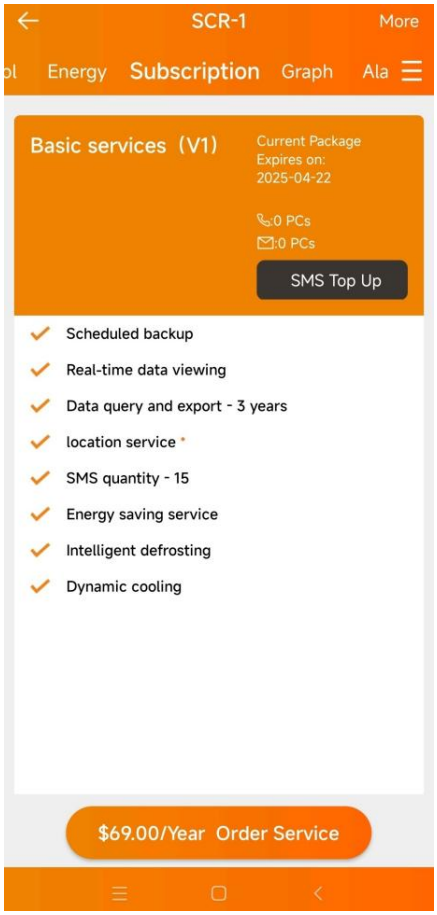
2、"Control" interface:This interface displays all the warehouse temperature values, defrosting values, and current values; shows the operation status of the device; provides remote operation functions, including power on/off and forced defrosting (as shown in the figure below).



3、"Energy" interface: This interface allows you to view daily energy-saving reports, weekly energy-saving reports, monthly energy-saving reports, etc. (as shown in the figure below).

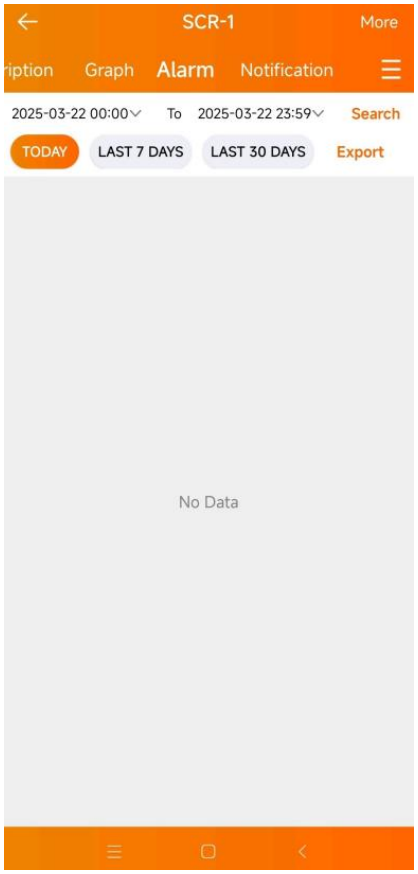


4、"Subscription" interface: This interface provides an introduction to the recharge service packages of the platform (as shown in the figure below).

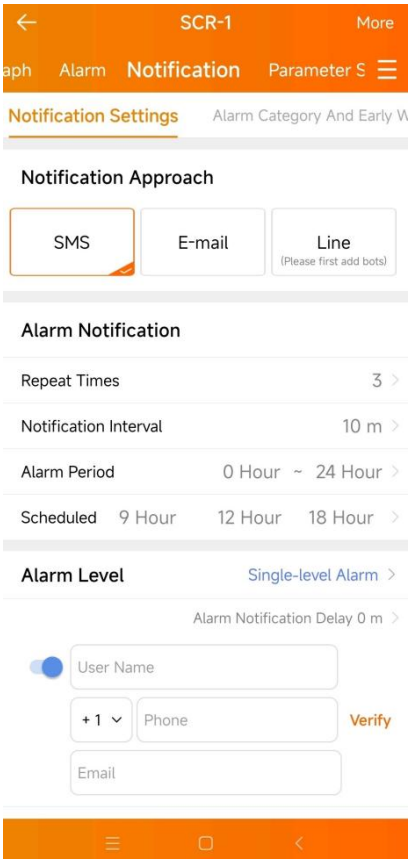


4、"Graph" interface: This is a data icon interface. You can enter a time period in this interface to view the data records and temperature curves of each probe. The data records can be exported in the form of an "Excel" spreadsheet or a "PDF" report. (as shown in the figure below)

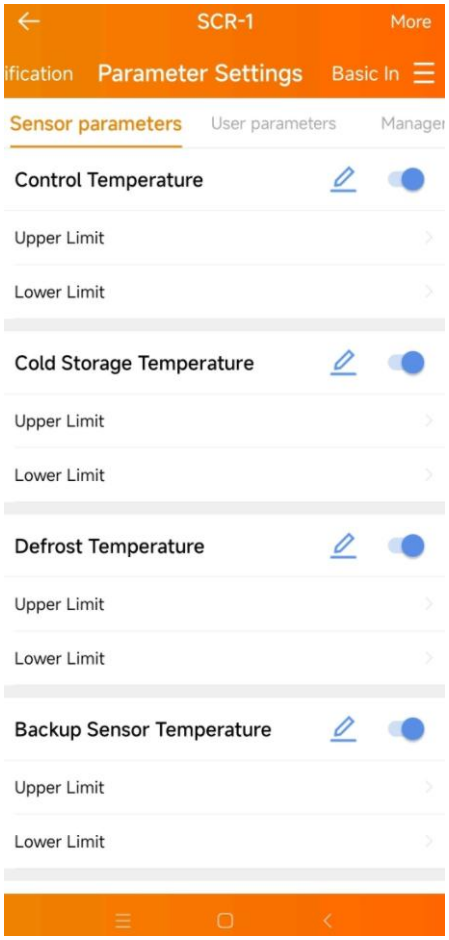
5、"Alarm" interface: This is an alarm query interface. You can view the alarm records according to the input time period, and the alarm records can be exported in the form of an "Excel" spreadsheet or a "PDF" report. (as shown in the figure below)

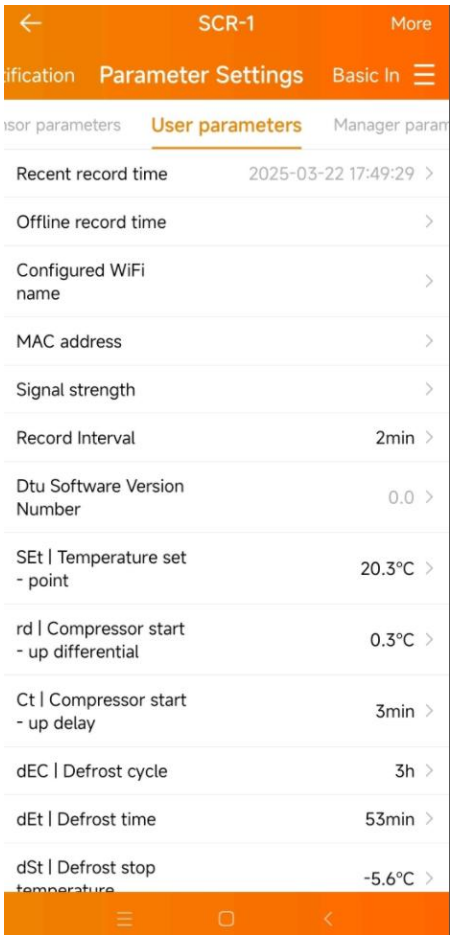


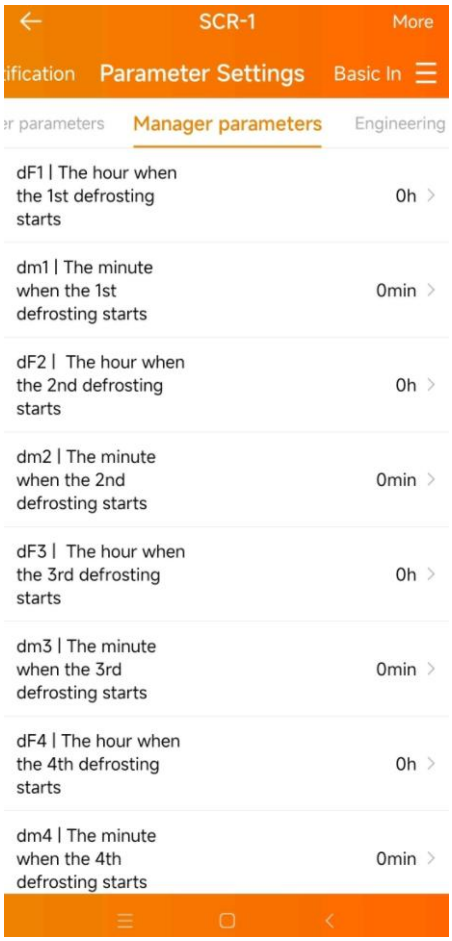
6、"Notification" interface: This is a push settings interface. You can select the push method, the contact information for alarm push, and other relevant information on this interface. (as shown in the figure below)



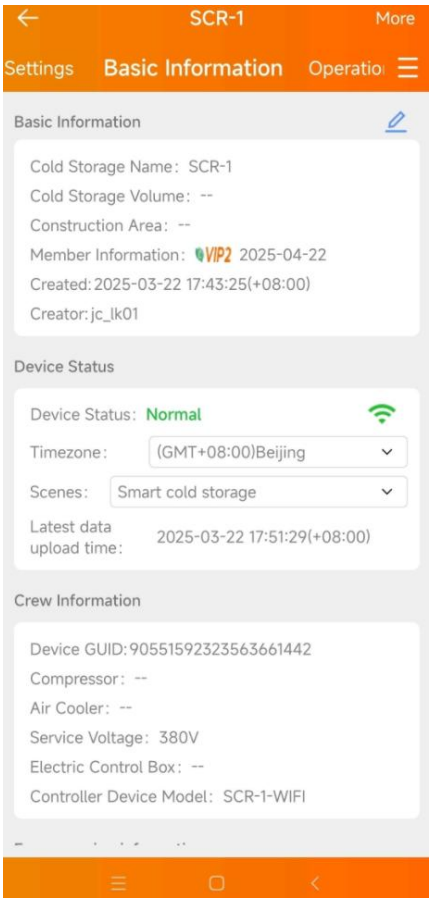
7、"Parameter Settings" interface: This interface includes "Sensor Parameters", "User Parameters", "Administrator Parameters", and "Engineering Parameters". You can view the parameter configuration of the controller in the corresponding interfaces, and also modify the parameters remotely and send them to the controller. (as shown in the figure below)



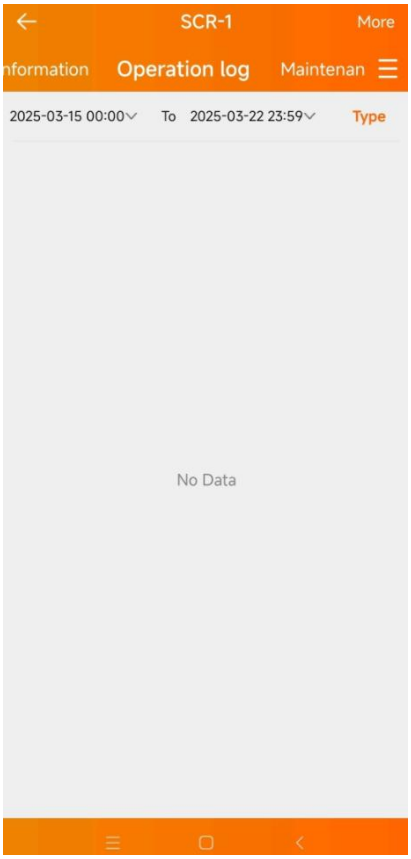




8、"Basic Information" interface: This interface displays the creation information of the cold storage, the equipment status, the unit information, and the installation information. (as shown in the figure below)



9、"Operation log" interface: Displays the operation log of the equipment. (as shown in the figure below)



10、"Maintenance Records" interface: This interface displays the maintenance records of the equipment.