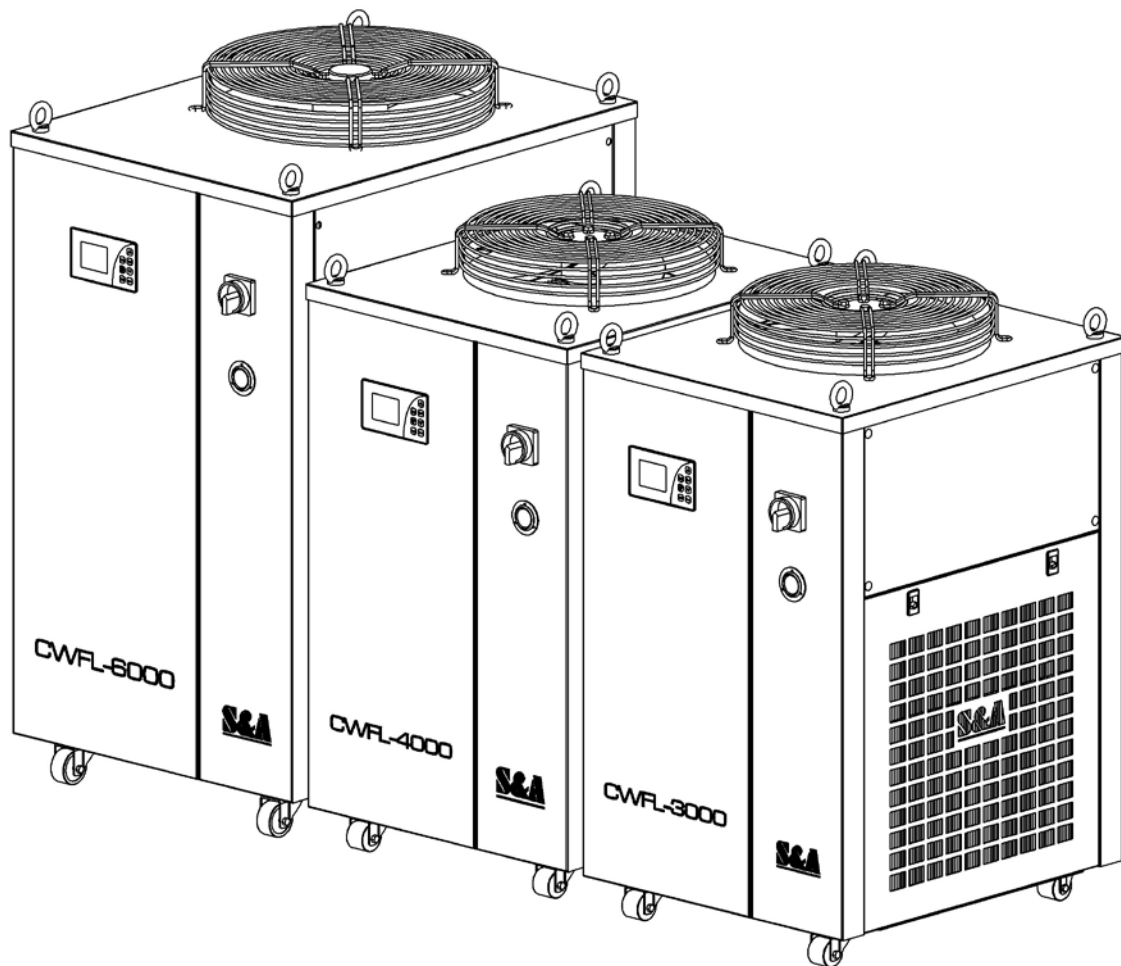


CWFL-3000/4000/6000 FIBER LASER SPECIAL CHILLER USER MANUAL



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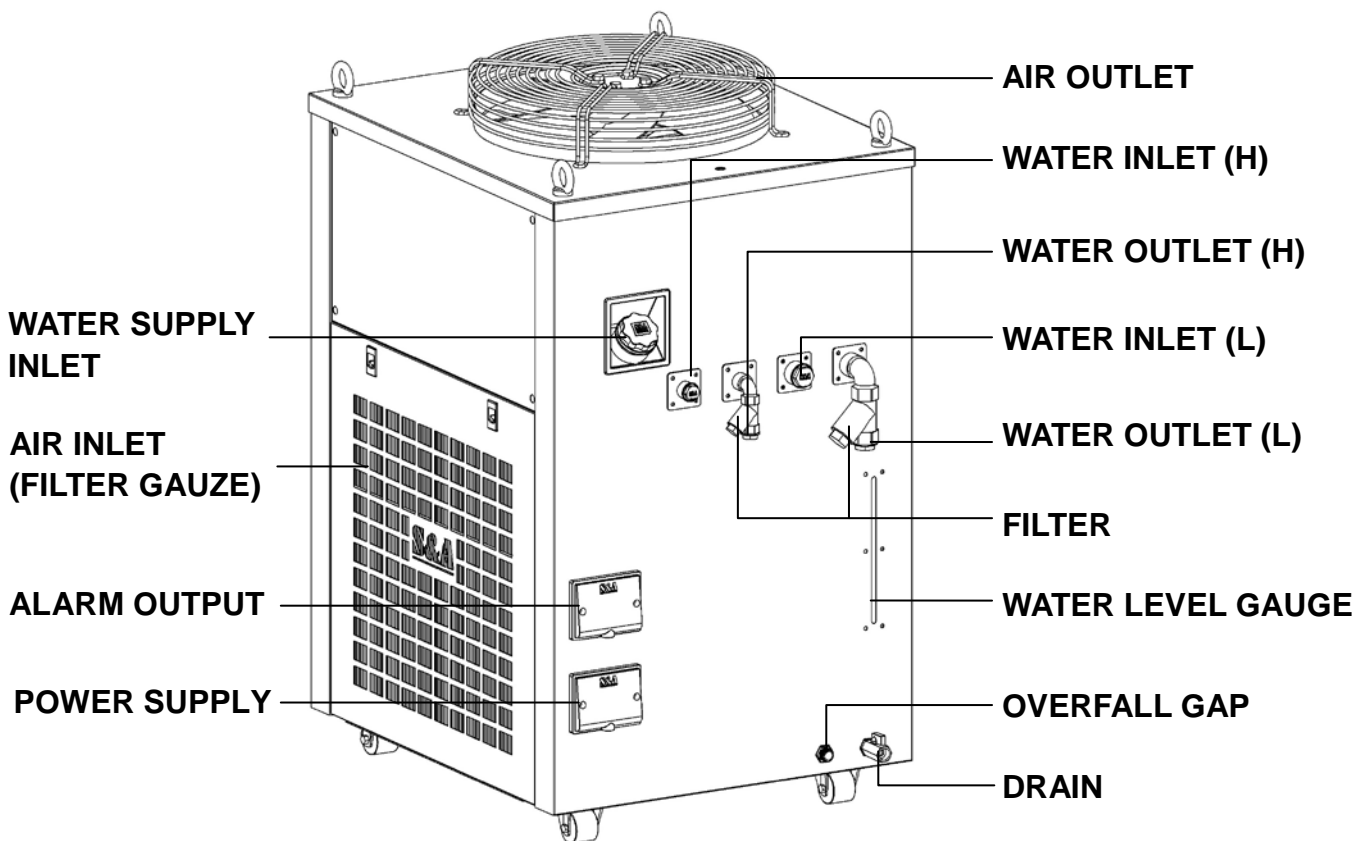
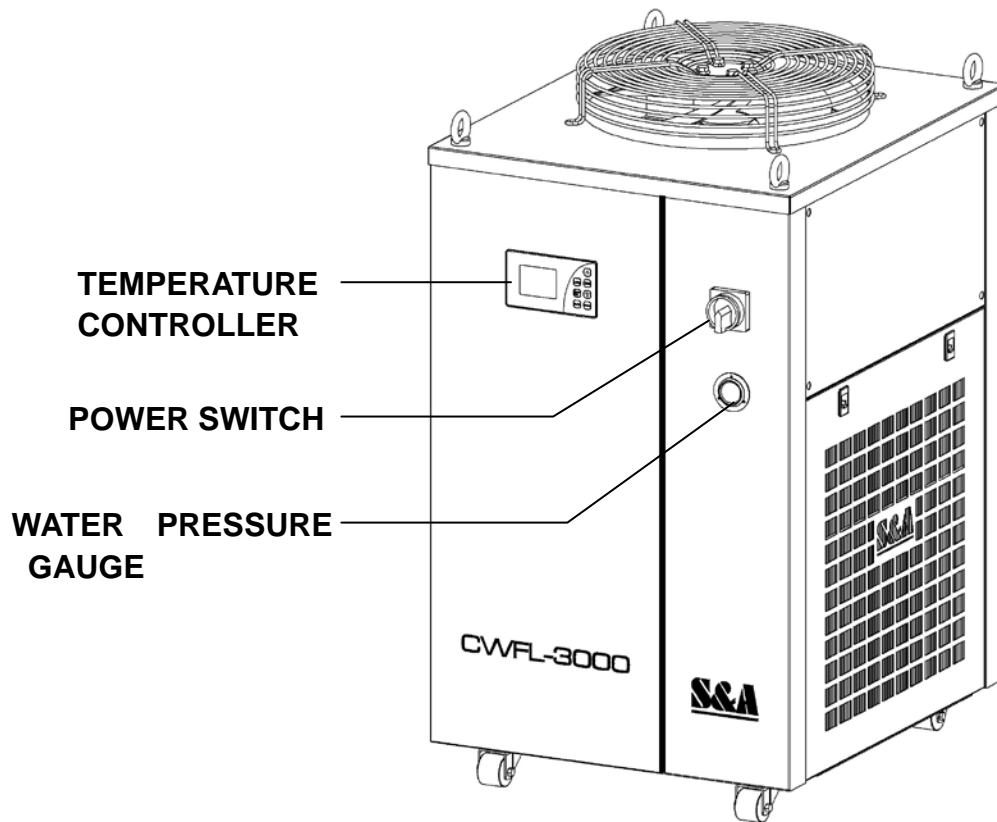
Thank you for using the machine from GUANGZHOU TEYU ELECTROMECHANICAL CO., LTD. Please read the installation instructions carefully before installing and operating and keep it properly.

This installation instructions is not a quality assurance. GUANGZHOU TEYU ELECTROMECHANICAL CO., LTD reserves the right to the interpretation of correction of typographical errors, improper mentioned information and product improvement. The amended content will be reprinted in installation instructions without notice in advance.

<1> Cautions

1. Please ensure that the power supply and electrical outlet are in good contact and the earth wire must be firmly grounded!
2. Please make sure there is stable and normal voltage for the working chiller!
As the refrigeration compressor is more sensitive to the power supply and voltage, so the operating voltage of our standard product is $\pm 10\%$ of the rated voltage. If you do need a wider operating voltage range, customization is available for us.
3. Unmatched power frequency can cause the chiller damage!
Please choose model of 50Hz or 60Hz according to actual circumstance.
4. To protect the pump, it's strictly forbidden to run the chiller without water in the storage water tank!
The new machine is packed after draining whole water in the tank, so please make sure the tank has water inside before machine starting, otherwise it's easily to have the pump damaged. When the water level is below the green (NORMAL) range of the water level gauge, the cooling capacity of our chiller will go down slightly. Hence please ensure the water level is within the green (NORMAL) range. To drain through circulating pump is strictly prohibited!
5. Please be sure that the air inlet and air outlet are in good ventilation!
There must be at least 50cm from obstructions to the air outlet which is in the back of the cooler, and should leave at least 30cm between obstructions and the side air inlet.
6. The filter gauze must be regularly cleaned!
It's essential to remove and wash the dust gauze regularly, otherwise chiller malfunction can be caused by serious blockage.
7. Please pay attention to the effect of the condensate water!
With greater ambient humidity, when the water temperature is lower than the ambient temperature, the condensate water will generate on the surface of water circular pipes and the cooled components. If above circumstance appears, it is recommended to set a higher water temperature or keep pipes and cooled parts warm.
8. This product is an industrial equipment. For professional use only.

<2> Contour and parts introduction



<3> Installation


It is very simple to install this industrial cooling machine. The installation for the first time of the new machine can be carried out by following steps:

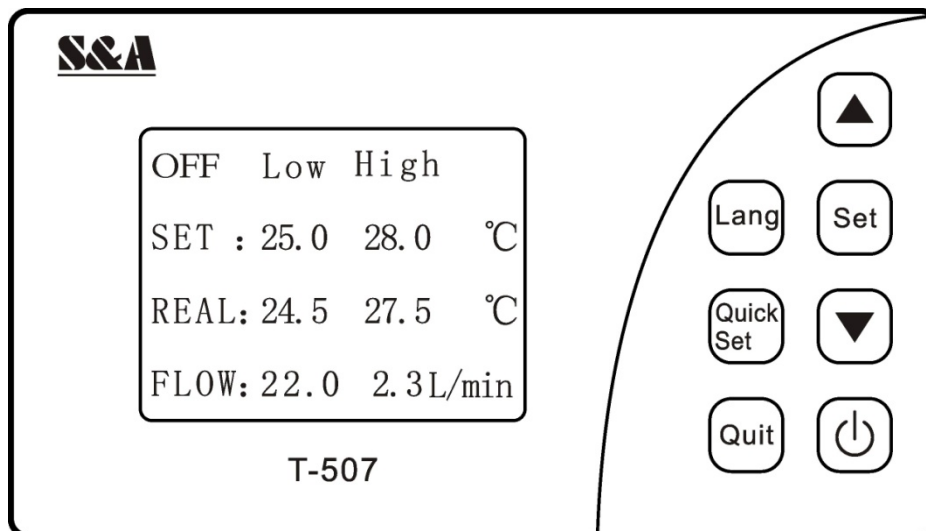
1. Open the package to check if the machine is intact and all the necessary accessories are completed.
 2. Open the water supply lid to feed cooling water.
Observing the water level gauge to feed water slowly, be careful not to have the water overflowed!
 3. According to system conditions, please connect the water inlet and outlet pipe properly.
 4. Plug in power, turn on the power switch. (Do not start up without water in the water tank!)
- (1) Power switch turned on, the circulation pump of the chiller starts working. The first time of operating may cause more bubbles in the pipe leading to a flow alarming occasionally, but running for a few minutes later, it will go back to normal.
- (2) If the chiller starts for the first time, you must immediately check whether the water pipe leaks.
- (3) Power switched on, if the water temperature is under the set value, it is normal that fans and other components of the machine do not work. The temperature controller will automatically control the working conditions of the compressor, magnetic valve, fans and other parts based on the set controlling parameters.
- (4) As it takes a longer time to start over the compressor and other components, according to different conditions, the time is range from seconds to minutes, so do not turn on and off frequently.
5. Check the water level in the water tank.
The first starting up of a new chiller will empty the air in the water pipe, causing a slight water level decline, but in order to keep the water level in the green area, it is allowed to add adequate water again. Please observe and record the current water level, and inspect it again after the chiller running for a period of time, if the water level drops obviously, please re-inspect the water pipeline leakage.
6. Adjust parameters of temperature controller.
CWFL-3000/4000/6000 series use an new intelligent controller. It works in defaulted constant temperature control mode for the low temperature end with water temperature set at 25°C which can be adjusted as needed. The high temperature end works in intelligent control mode and it will self-adjust controlling parameters according to the ambient temperature changes.
Normally users do not need to adjust the parameters. If it is necessary, please refer to page 6 , “Unit introduction and parameters adjustment.”

<4> Unit introduction and parameters adjustment

- (1) The unit use wire LCD temperature controller to realize more precise temperature control and stronger capacity of resisting disturbance. It supports MODBUS-485 communication with transmission distance up to 1.2km;
- (2) It has water line anti-icing function. Under standby condition, it functions when the room temperature is below 5°C;
- (3) It has water tank heating function;
- (4) It has water line actual flow monitoring function;

1. Temperature control panel introduction and parameters adjustment

(1) The control panel has LCD screen with 7 system operation buttons which are Language Switching-button (Lang), UP-button (▲), Down-button (▼), Power-button  Set-button (Set), Quick Set-button (Quick Set) and Quit-button (Quit). Turn off the chiller by pressing the Power-button for 3 sec while other operations can be completed by short press.




(2) User parameters quick-adjusting: under normal operation condition, press Quick Set-button to set the user menu. When it displays the set item, press Quick Set to enter into parameter adjustment interface. Press ▲ or ▼ to to switch the parameter items. If the parameters need to be modified, press Quick Set-button to enter into parameter values and press ▲ or ▼ to adjust it. Save the values and return to parameter quick setting interface by pressing Quit-button when the adjustment is completed. If there is no more action within 15 sec, it will automatically exit modifying status with modified parameters saved.

(3) User menu: under normal operation condition, press Set-button for 5 sec to show user input password interface. Input "168" by pressing ▲ or ▼, then press Set-button to enter into User menu to set the parameters. If the password is

incorrect, it will quit the setting interface and turn to normal operation interface. The default password 168 must be kept well. The user menu can not be accessed if the password is forgotten and no backup password is available.

Under user menu, in parameter items interface, press ▲ or ▼ to switch the items. If the parameters need to be modified, press Set-button to enter into parameter values and press ▲ or ▼ to adjust it. Save the values and return to parameter interface by pressing Set-button and press Quit-button to quit the user menu. If there is no more action within 15 sec, it will automatically exit modifying status with modified parameters saved.

(4) Check the history failure records: under normal operation condition, press Set- button and ▲ for 5 sec to access password input interface. Input password “123” and confirm by pressing Set-button, it will be in failure view status if the password is correct, if not, it will quit. When the system is under failure records viewing, it will show the first failure record and code. Press ▲ or ▼ can look over the failure records and press Quit-button to quit the failure viewing status.

(5) Restore factory settings: under normal operation condition, press and hold Set-button and  Power-button for 10 sec to have the password input interface popped up then input password “615” to enter into administrator setting parameters restoration function, and it will display “RECOVERY SUCCESS” and turn to operation condition after 2 sec. If the password is incorrect, it will quit the password input interface and turn to operation condition.

(6) Unit operation condition query: the screen will display the operation conditions of the compressor, water pump and the indoor exhaust temperature parameters, etc. by pressing Quick Set-button and ▲ at the same time and release them. Press ▲ or ▼ for page turning and it will automatically exit after displaying for 5 sec.

(7) Clock adjustment: under normal operation condition, press Quick Set-button for 5 sec to access clock adjustment interface with time/year flashing. Press ▲ or ▼ to adjust year and confirm by pressing Quick Set-button; with time flashing, press ▲ or ▼ to adjust hour and confirm by pressing Quick Set-button; with minute flashing, press ▲ or ▼ to adjust minute and save the clock setting by pressing Quick Set- button.

(8) Language switching: the system default language is Chinese. For switching to English, press Lang-button and the system will change the Chinese interface to English interface as default language.

(9) Forced refrigeration: under normal operation condition, press ▲ or ▼ at the same time for 5 sec to activate forced refrigeration function. Press Power-button can stop the machine and cancel forced refrigeration function.

2. Detailed parameter setting is as below table

Order	Code	Set item	Range	Factory setting	Remark	illustration	Register address
1	F1	Set temp.	F10~F9 / -20~40	25	Intelligent mode / Constant temp mode	setup menu of low temp system	0x0401
2	F2	Temp. difference values	-15~5	-2			0x0402
3	F3	Cooling hysteresis	0.1~3.0	0.8	0.1 resolution ratio		0x0403
4	F4	Way of control	0~1	0	0 Constant, 1 Intelligent		0x0404
5	F5	Set temp.	F7~F6 / -20~40	30	Intelligent mode / Constant temp mode	setup menu of high temp system	0x0405
6	F6	Temp. difference values	-15~5	-2			0x0406
7	F7	Cooling hysteresis	0.1~3.0	1	0.1 resolution ratio		0x0407
8	F8	Way of control	0~1	1	0 Constant, 1 Intelligent		0x0408
9	F9	The highest set temp.	(F10+1)~40	35	Constant temp. mode	Common in high&low Temp systems	0x0409
10	F10	The lowest set temp.	1~ (F9-1)	20	Min. 1, Constant temp. mode invalid		0x040a
11	F11	Ultra-high room temp. alarm	40~50	45			0x040b
12	F12	Ultra-high water temp. alarm	1~20	10			0x040c
13	F13	Ultra-low water temp. alarm	1~60	15			0x040d
14	F14	Temp. alarm delay	0~30	5	Minute		0x040e
15	F15	Sensor failure alarm delay	0~180	10	Second		0x040f
16	F16	Water flow detection delay of machine startup	0~180	5	Second		0x0410
17	F17	Flow alarm delay	0~180	2	Second		0x0411
18	F18	Heating hysteresis	0~10	0.8	0.1 resolution ratio		0x0412
19	F19	Water pump stop delay	0~180	5	Second		0x0413
20	F20	Startup delay	0~180	30	Second		0x0414
21	F21	Compressor activate protection	0~180	90	Second		0x0415
22	F22	Turn on setting of phase sequence protection	On off	/	Single-phase OFF / three-phase ON		0x0416
23	F23	Turn on setting of external input function (startup and standby)	On off	off			0x0417
24	F24	NO and NC setting of external input function	NO / NC	NC	NO-normally opened / NC-normally closed	0x0418	
25	F25	External input activation delay	0~180	0	Second	0x0419	

26	F26	External input standby activation delay	0~180	0	Second		0x041a
27	F27	Conductivity alarm activation setting	On off	/	With conductivity ON / Without conductivity OFF		0x041b
28	F28	Ultra-high conductivity alarm setting value	0.5~100	10	μs/cm		0x041c
29	F29	Relay NO/NC setting under lower limit of conductivity	NO/NC	NC	NO-normally opened NC-normally closed		0x041d
30	F30	Relay output setting under lower limit of conductivity	0.5~100	2.5	μs/cm		0x041e
31	F31	Ultra-low conductivity alarm setting value	0.5~100	2	μs/cm		0x041f
32	F32	Self-starting after being electrified	On off	off			0x044d
33	F33	Key lock of Chiller On/Off	0-1	1	0: lock, 1: unlock		0x0450

NOTE:

- (1) In parameter setting status, the system runs under original parameters;**
- (2) Under Constant Temperature control mode (“ F4” and “F8” set at 0), water temperature is controlled by “F1” and “F5”;**
- (3) Under Intelligent Control mode (“ F4” and “F8” set at 1), water temperature is self-adjusting according to ambient temperature. The temperature difference is controlled by “F2” and “F6”.**
- (4) The low temp section and high temp section of the chiller can be set different control modes.**

3. Failure warning processing mode

When alarm occurs, the failure alarm code will be displayed on the upper right corner of the LCD screen. In alarming state, the alarm sound could be suspended by pressing any button, but the alarm display remains until the alarm condition is eliminated.

4. Failure code table

Failure code	Description	Alarm phenomenon	Alarm action	Elimination method
E00	Communication failure alarm	E00 shown with alarm sound	None	Automatic clearing after mainboard and operation panel are connected well
E01	Low temp. system flow alarm	E01 shown with alarm sound	The compressor, condenser fans and heater of the high/low temp. system shut down	Automatic clearing

CWFL-3000/4000/6000 Series

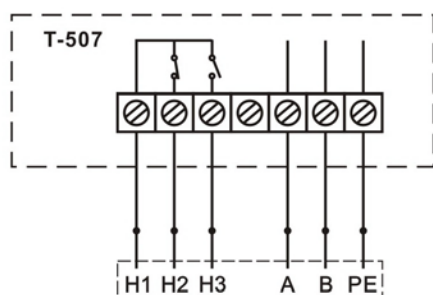
E02	High temp. system flow alarm	E02 shown with alarm sound	Heater of the high temp. system shut down	Automatic clearing
E03	Ultra-high room temp. alarm	E03 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing
E04	Low temp. system ultra-low water temp alarm	E04 shown with alarm sound	The compressor, condenser fans and heater of the high/low temp. system shut down	Automatic clearing
E05	Low temp. system ultra-high water temp alarm	E05 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing
E06	High temp. system ultra-low water temp alarm	E06 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing
E07	High temp. system ultra-high water temp alarm	E07 shown with alarm sound	Heater of the high temp. system shut down	Automatic clearing
E08	Wrong phase and lacking phase alarm	E08 shown with alarm sound	The water pump, compressor, condenser fans and heater of the high/low temp. system shut down	Manual clearing
E09	Compressor overload alarm	E09 shown with alarm sound	The compressor, condenser fans and heater of the high/low temp. system shut down	Manual clearing
E10	Low temp. water pump overload alarm	E10 shown with alarm sound	The water pump, compressor, condenser fans and heater of the high/low temp. system shut down	Manual clearing
E11	High temp. water pump overload alarm	E11 shown with alarm sound	The water pump and high temp. system heater shut down	Manual clearing
E12	Refrigeration system high pressure alarm	E12 shown with alarm sound	The compressor and condenser fans shut down	Manual clearing
E13	Refrigeration system low pressure alarm	E13 shown with alarm sound	The compressor and condenser fans shut down	Automatic clearing
E14	Room temp. sensor failure alarm	E14 shown with alarm sound	Switched to constant temp. mode and each refrigeration part runs under usual procedures	Automatic clearing
E15	Low temp. system water temp. sensor failure alarm	E15 shown with alarm sound	The water pump, compressor, condenser fans and heater of the high/low temp. system shut down	Automatic clearing
E16	High temp. system water temp. sensor failure alarm	E16 shown with alarm sound	High temp. system water pump and heater shut down	Automatic clearing
E17	Ultra-high conductivity alarm	E17 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing
E18	Ultra-low conductivity alarm	E18 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing

E19	Ultra-low water level alarm	E19 shown with alarm sound	The unit runs normally under set values; the water pump, compressor, condenser fans and heater of the high/low temp. system shut down	Automatic clearing
E20	Exhaust temp. sensor failure alarm	E20 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing
E21	Ultra-high exhaust temp. alarm	E21 shown with alarm sound	Each refrigeration part runs under usual procedures	Automatic clearing

<5> Alarm and communication output

For ensuring the equipment will not be damaged when abnormal condition occurs in the chiller, it has alarm protection function.

1. Alarm and MODBUS RS-485 communication output wiring diagram.



H1, H2 and H3 are alarm signal output terminal; A, B and PE are MODBUS RS-485 communication output terminal.

2. Working condition table of alarm signal

Unit condition	Built-in buzzer of temp. controller	OUT H1、H2	OUT H1、H3	ILUS
Working normally	No Sound	Disconnection	Breakover	
E00、E01、E08、E09、E10、E12、E13、E15	Sounds	Breakover	Disconnection	
E02、E03、E11、E14、E16、E17、E18、E20、E21	Sounds	Disconnection	Breakover	
E04、E05、E06、E07	Sounds	Breakover	Disconnection	Optional
E19	Sounds	Breakover	Disconnection	Activate after output terminal delaying

Note: The flow alarm is connected to the normally open relay and normally closed relay contacts, requiring operating current less than 5A, working voltage less than 300V.

<6> MODBUS RS-485 communication function

This system adapts slave mode of MODBUS-RTU communication, 9600 baud rate, no parity checking, 8 data bit, 1 stop bit and support MODBUS-RTU 03 (Read Holding Registers) and 06 (Read Holding Registers) commands. Communication formats are as below:

1. Command format 03

Host send command

Function code	1 bytes	0x03
Initial address	2 bytes	From 0x0400 to 0x044a, From 0x0100 to 0x0108, From 0x0800 to 0x0803
Register number	2 bytes	From 1 to 10

Slave response

Function code	1 bytes	0x03
Number of bytes	1 bytes	2*N ("N" is the number of registers)
Register value	N*2 bytes	

Error

Error code	1 bytes	0x83
Exception code	1 bytes	01 or 02 or 03 or 04

For example: if the host's sending address is 1, requests 108-110 command of slave read register and send 01 03 00 6B 00 03 XX YY, thereinto, 01 as slave address, 03 as function code, 00 6B as initial address, 00 03 as register number and XX YY as the result of CRC verification.

Slave response: 01 03 06 02 2B 00 00 00 64 XX YY, thereinto, 01 as slave address, 03 as function code, 06 as number of bytes, 02 2B 00 00 00 64 corresponding to the values in 108-110 of register respectively and XX YY as verification code.

If the slave receives wrong data, return to data 01 83 01 XX YY, thereinto, 01 as slave address. 83 as error code, 01 as exception code and XX YY as check sum.

2. Command format 06

Host send command

Function code	1 bytes	0x06
Register address	2 bytes	From 0x0400 to 0x044a
Register value	2 bytes	From 0x000 to 0xffff

Slave response

Function code	1 bytes	0x86
Register address	2 bytes	From 0x0400 to 0x044a
Register value	2 bytes	From 0x000 to 0xffff

Error

Error code	1 bytes	0x86
Exception code	1 bytes	01 or 02 or 03 or 04

For example: if the host's sending address is 1, requests command of writing data 00 03 to register 2. Host send: 01 06 00 02 00 03 XX YY, thereinto, 01 as slave address, 06 as function code, 00 02 as register address, 00 03 as written data and XX YY as verification code.

Slave response: 01 06 00 02 00 03 XX YY, thereinto, 01 as slave address, 06 as function code, 00 02 as register address, 00 03 as written data and XX YY as CRC verification code.

If there is data error or communication exception, send 01 86 02 XX YY.

3. Read only parameter (sensor, current)

Read-only						
Register address	Description	Range	Default	Unit	Data resolution	Symbol
0x0100	Room temp. sensor temperature	-25 ~ 100		℃	0.1/bit	yes
0x0101	Water temp. sensor temperature(Low temp)	-25 ~ 100		℃	0.1/bit	yes
0x0102	Water temp. sensor temperature(High temp)	-25 ~ 100		℃	0.1/bit	yes
0x0103	Compressor exhaust temperature	-25 ~ 140		℃	0.1/bit	yes
0x0104	Flow of the first waterway	0.1-200		L/Min	0.1/bit	yes
0x0105	Flow of the second waterway	0.1-200		L/Min	0.1/bit	yes
0x0106	Conductivity	0.1-500		μs/cm	0.1/bit	yes
0x0107	Compressor current (Three-phase average)	0-50		A	0.1/bit	yes
0x0108	Low temp. water pump current	0-50		A	0.1/bit	yes
0x0109	High temp. water pump current	0-50		A	0.1/bit	yes

4. Read only parameter (state)

Read-only					
Register address	Description	Bit definition			
0x0800	Relay output status	MSByte	Bit7(MSb)	Retain	
			Bit6	Retain	
			Bit5	Retain	
			Bit4	Retain	
			Bit3	Retain	
			Bit2	Alarm output relay	0: Off 1: On
			Bit1	Conductivity lower limit relay	0: Off 1: On
		Bit0(LSb)	High temp. heating rod	0: Off 1: On	
		LSByte	Bit7(MSb)	High temp. water pump relay	0: Off 1: On
			Bit6	High temp. refrigeration relay	0: Off 1: On
			Bit5	Compressor crankcase heating	0: Off 1: On
			Bit4	Low temp. heating rod	0: Off 1: On
			Bit3	Low temp. refrigerant solenoid valve	0: Off 1: On
			Bit2	Condensing fan	0: Off 1: On
Bit1	Compressor relay		0: Off 1: On		
Bit0(LSb)	Low temp. water pump	0: Off 1: On			
0x0801	Digital input switch status	MSByte	Bit7(MSb)	Retain	
			Bit6	Retain	
			Bit5	Retain	
			Bit4	Retain	
			Bit3	Retain	
			Bit2	Retain	
			Bit1	Retain	
		Bit0(LSb)	Retain		
		LSByte	Bit7(MSb)	Retain	
			Bit6	Retain	
			Bit5	External input	0: No input 1: Input
			Bit4	Refrigerant low pressure	0: No input 1: Input
			Bit3	Refrigerant high pressure	0: No input 1: Input
			Bit2	Spare 2	0: No input 1: Input
Bit1	Spare 1		0: No input 1: Input		
Bit0(LSb)	Water level	0: No input 1: Input			

0x0802	Alarm status (high 16-bit)	MSByte	Bit7(MSb)	Retain	
			Bit6	Retain	
			Bit5	Retain	
			Bit4	Retain	
			Bit3	Retain	
			Bit2	Retain	
			Bit1	Retain	
			Bit0(LSb)	Retain	
		LSByte	Bit7(MSb)	Write administrator parameter error	0: Correct 1: Error
			Bit6	Write user parameter error	0: Correct 1: Error
			Bit5	Ultra-high exhaust temp. alarm	0: No alarm 1: Alarm
			Bit4	Exhaust temp. sensor failure alarm	0: No alarm 1: Alarm
			Bit3	Ultra-low water temp alarm	0: No alarm 1: Alarm
			Bit2	Ultra-low conductivity alarm	0: No alarm 1: Alarm
			Bit1	Ultra-high conductivity alarm	0: No alarm 1: Alarm
Bit0(LSb)	High temp. system water temp. sensor failure alarm	0: No alarm 1: Alarm			
0x0803	Alarm status (low 16-bit)	MSByte	Bit7(MSb)	Low temp. system water temp. sensor failure	0: No alarm 1: Alarm
			Bit6	Room temp. sensor failure	0: No alarm 1: Alarm
			Bit5	Refrigeration system low pressure	0: No alarm 1: Alarm
			Bit4	Refrigeration system High pressure	0: No alarm 1: Alarm
			Bit3	High temp. water pump overload	0: No alarm 1: Alarm
			Bit2	Low temp. water pump overload	0: No alarm 1: Alarm
			Bit1	Compressor overload	0: No alarm 1: Alarm
			Bit0(LSb)	Wrong phase and lacking phase	0: No alarm 1: Alarm
		LSByte	Bit7(MSb)	High temp. system ultra-high water temp	0: No alarm 1: Alarm

5. Read/Write Registers(Use only when the external input function is turned off)

Register address	Description	Range	Default	Unit	Remark	Symbol
0x0804	Chiller On/Off	0-1	--		0: On, 1: Off	No

<7> Simple troubleshooting

Failure	Failure Cause	Approach
Machine turned on but unelectrified	Power cord is not plugged in place	Check and ensure the power interface and the power plug is plugged in place and in good contact
	Fuse burnt-out	Open the electric box cover, check the protective tube, replace with spare one if necessary and check whether the power supply voltage is stable; Check and ensure the power interface and the power plug are in good contact
Flow Alarm (controller displays E01 or E02) use a water pipe directly connect to the water outlet and inlet but still without water flowing	Water level in the storage water tank is too low	Check the water level gauge display, add water until the level shown in the green area; And check whether water circulation pipe leaks
Flow alarm occurs while running with other equipment (controller displays E01 or E02), but there is water flowing and no alarm when use a water pipe directly connected to the chiller water outlet and inlet.	Water circulation pipes are blocked or a pipe bending deformation.	Check water circulation pipe
Ultra-high temperature alarm(controller displays E05 or E07)	Blocked dust gauze, bad thermolysis	Unpick and wash the dust gauze regularly
	Poor ventilation for air outlet and inlet	To ensure a smooth ventilation for air outlet and inlet
	Voltage is extremely low or unstable	To improve the power supply circuit or use a voltage regulator
	Improper parameter settings on thermostat	To reset controlling parameters or restore factory settings
	Switch the power frequently	To ensure there is sufficient time for refrigeration (more than 5 minutes)
	Excessive heat load	Reduce the heat load or use other model with larger cooling capacity
Alarm for ultra-high room temperature(controller displays E03)	The working ambient temperature is too high for the chiller	To improve the ventilation to guarantee that the machine is running under 40°C.
Serious problem of condensate water	Water temperature is much lower than ambient temperature, high humidity	Increase water temperature or to preserve heat for pipeline
Water drains slowly from outfall during water changing	Injection port is not open	Open the injection port