JC-C Water Chiller Control System

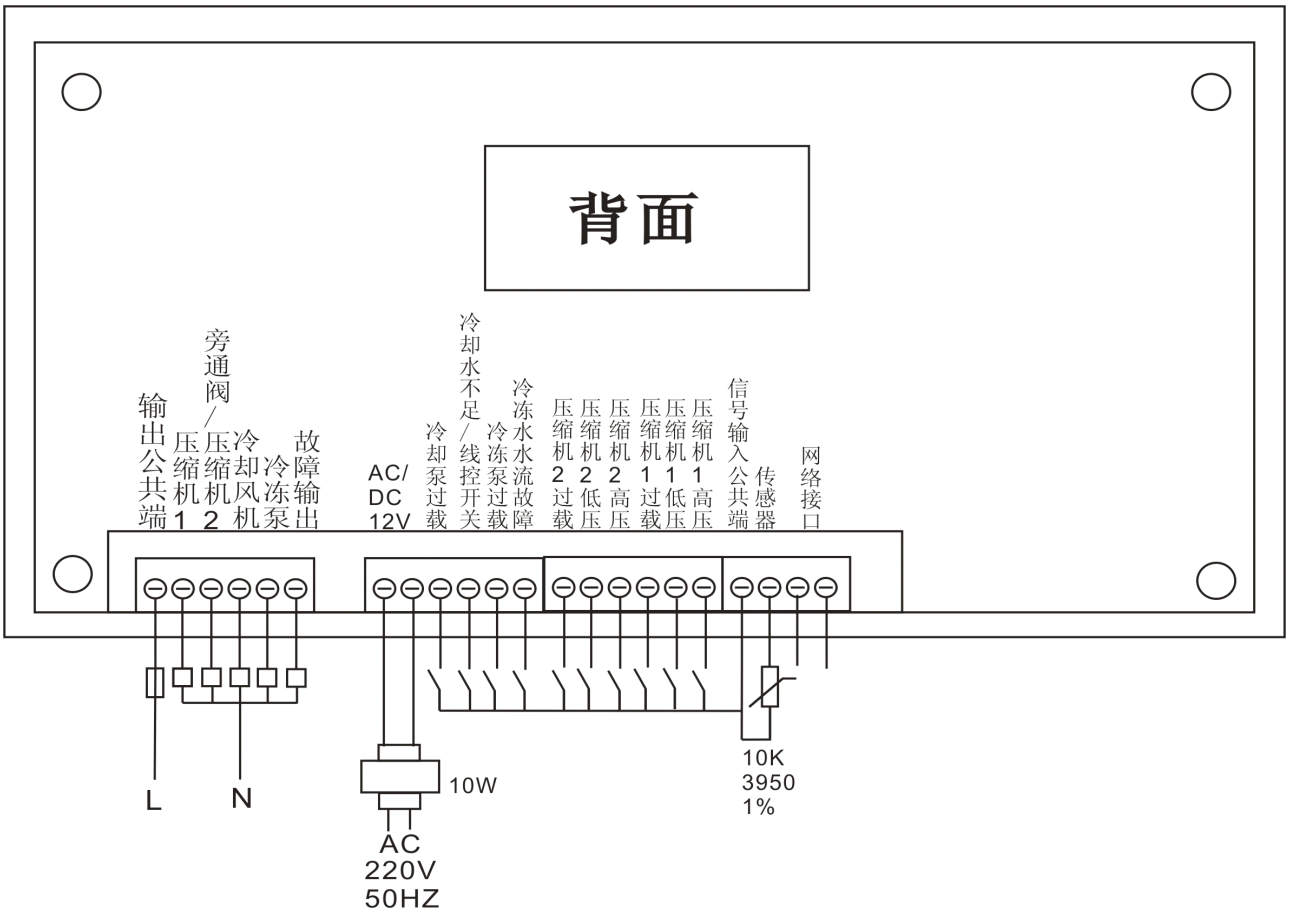
User's Manual

I. Overview

- This system is a highly intelligent and highly integrated controller. It is furnished with touch membrane switch, lattice LCD. All the operating directions are intuitive easy to understand, and all the information is searchable by operating LCD. The controller is used to control 1-2 sets of compressors, 1 set of freezing pump, 1 alarm output signal. LCD serves as the human-machine dialogue window, through which user can make various settings and control operations.
- The system has a wide range of protection functions, all signal input ports can be set as NO (normally open) or NC (normally close) according different requirements of the system. For now, the ports include inadequate freezing water, cooling pump / cooling fan overload, freezing pump overload, inadequate cooling water flow / remote switch, compressor 1 at high pressure, compressor 1 at low pressure, compressor 1 overload, compressor 2 at high pressure, compressor 2 overload, compressor 2 at low pressure.
- Both the working principles and functions of the controller comply with relevant technical standards and requirements.
- All input and output signals have adequate anti-interference ability, therefore ensuring the unit works stably and reliably, and no error operation or tremble will occur.
- Both the safety and electromagnetic compatibility meet national standards regarding the safety and electromagnetic compatibility of electronic products.
- It provides multi-tier password protection for parameter settings. All the parameters to be set have corresponding default values, such default values will be automatically written in when the machine is started up for the first time user can manually resume default values in the menu “Factory setting”.

II. Installation

1. Installation wiring diagram of controller (please refer to the photos of real product).



从左到右

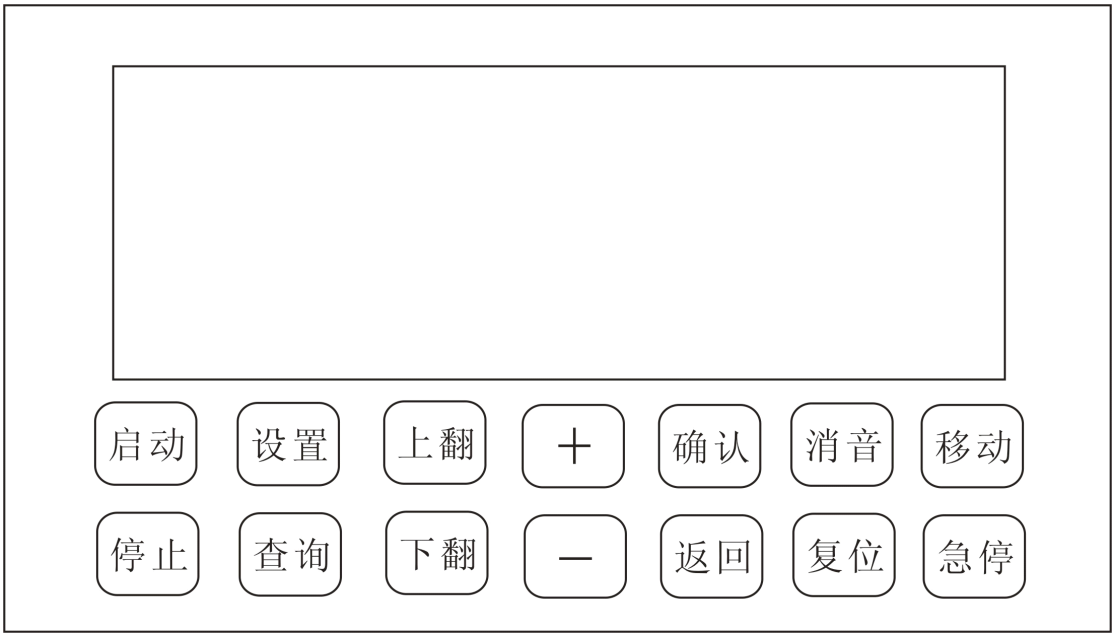
Output public port
Bypass valve
Compressor 1
Compressor 2
Cooling fan
Freezing pump
Fault output

Cooling pump overload
Inadequate freezing water,
Remote switch
Freezing pump overload
Freezing water flow fault
Compressor 2 overload
Compressor 2 at low pressure

Compressor 2 at high pressure,
Compressor 1 overload
Compressor 1 at low pressure
Compressor 1 at high pressure,
Input public port
Sensor
Net port

2. Installation measurements of controller

Frontal



155mm(L)*92mm（W）

从左到右，从上到下
Start
Set
Up
OK
Mute
Move

Stop
Inquiry
Down
Back
Reset
Emergency stop

III. Operating instructions

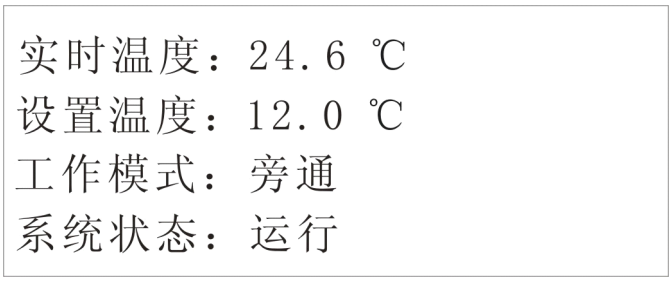
1. Overview

The controller employs different level user access, for this purpose it provides two levels of menus respectively, i.e.: Custom Setting, Factory Setting. User can enter corresponding menu through different passwords.

2. Power-on

After power-on, the name, trademark, phone number, etc. of vendor appears in the screen, then the system enters working interface. The vendor information in the start-up interface can be disabled by operating the menu “Factory Setting”.

3. Working interface



Real-time temperature
Set temperature
Working mode
System status

Real-time temperature, set temperature, working mode, start/stop status of current system will be displayed in this interface.

4. Enter setting menu

Please enter password

Press “Set” button to enter this interface, enter appropriate passwords to enter the setting menu of corresponding level. User password is: 000121, factory password is: 000168

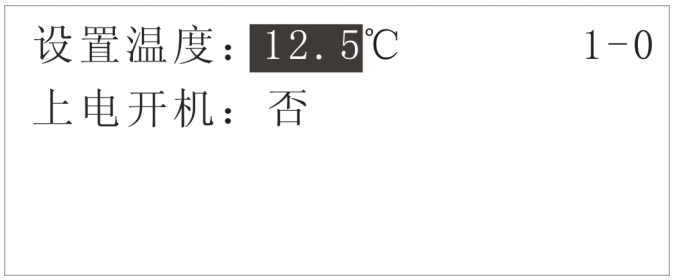
Press “Move” button to select the position of numbers, press “+”“—” button to change the number, press “OK” button to enter setting menu, press “Back” to return to working interface.

5. Fault inquiry

1 Water outlet at too low temperature Inquiry
2 High-pressure fault
3 No fault
4 No fault

Press “Inquiry” button to enter the interface of fault inquiry, the faults not yet reset is displayed in inverse color.

6. Custom setting interface



Set temperature:
Power-on

Press “Move” button to select options, press “+”“- ” to change parameters.

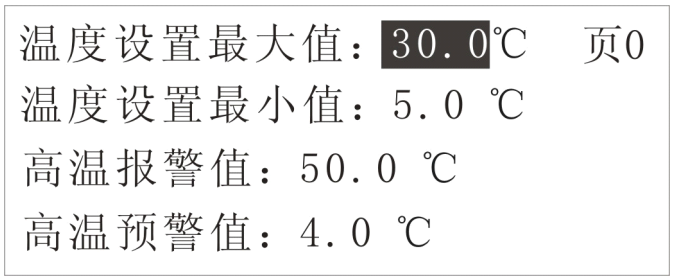
Notes:

Set temperature: to set the water outlet temperature of water chiller.

Power-on: if it is set as “Yes”, the system will run automatically after power-on, if it is set as “No”, the system will not run unless you press the button “Start”.

7. Factory setting interface

***Note: the unit of the time appearing in the setting is second, the unit of temperature is ℃.**



Maximum temperature value:
Minimum temperature value:
High-temperature alarm value:
High-temperature EW value:

Notes:

Maximum temperature value: the upper limit of the temperature that user can set

Minimum temperature value: the lower limit of the temperature that user can

set

High-temperature alarm value: the temperature at which the system will alarm

High-temperature EW value: when the water outlet temperature reaches this value, the system gives out early warning but continues working.

Low-temperature alarm value:
Temperature compensation value:
Temperature tolerance:
Model selection:

Notes:

Low-temperature alarm value: the low temperature at which the system will alarm.

Temperature compensation value: temperature correction value of water outlet sensor

Temperature tolerance: the controlled tolerance of the set temperature.

Model selection: select the model of the machine currently controlled, the difference between the models Air Cooling and Water Cooling is the time for determining the faults of cooling water. In Water Cooling mode, every time the cooling pump is started, the system will not determine the faults until "Delay for Flow Test" time is out, but the model Air Cooling only does so at the cooling pump is started for the first time.

Number of air compressors:
Flow Fault Delay:
Delay for Flow Test:
Delay After Start Of Cooling Pump:

Notes:

Number of air compressors: the number of air compressors running in current system.

Flow Fault Delay: once flow fault occurs, the system will continuously alarm during the delay.

Delay for Flow Test: after the relevant cooling pump is started, the system will not test the faults until the delay time is out.

Delay After Start Of Cooling Pump: after the cooling pump is started, the system will not proceed to the next step until the delay time is out.

Delay for General Fault:
Start Interval of Compressor:
Pump Stop for Inadequate Freezing Water:
Delay After Start of Cooling Pump:

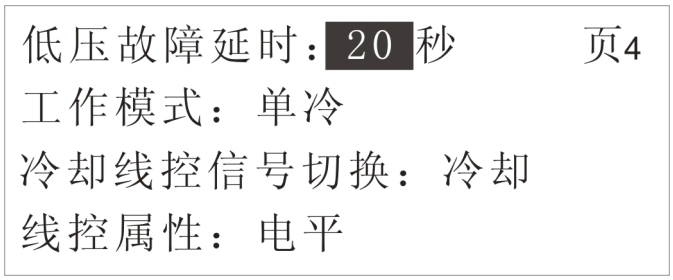
Notes:

Delay for General Fault: once any fault other than flow fault occurs, the system will continuously alarm during the delay

Start Interval of Compressor: once the compressor has been started then stopped, it can't be restarted until after the interval.

Pump Stop for Inadequate Freezing Water: it is used to set whether to stop the freezing pump in the event of freezing water flow fault. It is mainly used in laser water chiller.

Delay After Start of Cooling Pump: after cooling pump / cooling fan is started, the compressor will not be started after the delay time is out.



Delay for Low-pressure Fault:
Working mode:
Cooling remote signal switching:
Properties of remote control:

Notes:

Delay for Low-pressure Fault: the time for determining low-pressure faults.

Working mode: the way the system adjusts temperature. There are two ways

to do so, i.e.: cooling only (KF)/ bypass, in bypass mode, the water outlet temperature is adjusted through bypass valve without stopping compressor.

Cooling remote signal switching: to select cooling/remote control signal line, namely select inadequate freezing water signal line or remote control signal line.

Properties of remote control: the control mode of remote control signal. If you choose electric level mode, when it is switched on, the system will be started, when it is switched off, the system will be stopped. In such mode, the system is fully controlled by remote control signals. If you choose pulse mode, when it is switched on, the system already stopped will be started, or the system already started will be stopped. User can also conduct start/stop operations by operating buttons on the control mode. In such mode, the system is not fully controlled by remote control signals.

Fault output: NC
Properties of high-pressure signals: NO
Properties of low-pressure signals: NO
Properties of overload signals: NO

Properties of freezing signals: NO
Properties of freezing pump overload: NO
Properties of cooling water signals: NO
Properties of cooling pump overload: NO

Notes:

Fault output: while in NC mode, no output is found when the system is stopped; output is found when the system is started; no output is found in case of fault, it is mainly used for interlocking of external device; while in NO mode, no output is found whether the system is started or stopped, but output is found only in case of fault, it is mainly used for external alarming device.

Others: signal input NO/NC setting

Reset factory setting:	**Page 7**
Display manufacturer name:	
Address	
Baud rate	

Notes:

Reset factory settings: reset all default factory settings

Display manufacturer name: display the manufacturer information in start-up interface.

IV: Control logic

1. Power on/off

Press “Start” or “Stop” button in working interface to start or stop the system respectively, current status will be displayed in working status field in the interface.

Start processes:

Start freezing pump-------delay (configurable)--------start cooling pump (cooling fan)------- delay (configurable)--------adjust, start, stop compressors based on power-consuming conditions.

Stop processes:

Stop all compressors-------- delay (configurable)--------stop cooling pump(cooling fan)------- delay (configurable)---------stop freezing pump.

2. Power adjustment

Cooling only (KF) mode

Single-compressor system

While temperature is rising, start the compressor when the water outlet temperature is ≥ set temperature + temperature tolerance; stop the compressor when the water outlet temperature is ＜ set temperature.

Dual-compressor system

While temperature is rising, start one compressor whose running time is the shortest among all, start one compressors when water outlet temperature is ≥set temperature + temperature tolerance; While temperature is falling, stop one compressor whose running time is the longest among all when the water outlet temperature is ＜ set temperature, stop all compressor when the water outlet temperature is ＜ set temperature-temperature tolerance.

Bypass mode:

Note: bypass mode is only available for single-compressor system.

While temperature is rising, close bypass valve when the water outlet temperature is ≥set temperature + temperature tolerance; open bypass valve when the water outlet temperature is ＜set temperature.

3. Responses to faults

Faults leading to stop of compressors: Stop the corresponding compressors in case of compressor low pressure, compressor high pressure, compressor overload, cooling pump (fan) overload, inadequate cooling water.

Faults leading to stop of system: Inadequate freezing water flow, fault of freezing pump, probe in short-circuit, probe in open-circuit, low-temperature fault.

4. Warning

When the system gives out warning, “Fault” will appear in working interface. To turn off the warning, press “Mute” button, press “Reset” to eliminate the fault, or you can press “Inquiry” to enter inquiry interface to identify the fault description.

Fault list

1 *压缩机* ***1*** *高压故障，*Compressor 1 at high pressure,

2 *压缩机* ***1*** *低压故障,* Compressor 1 at low pressure,

3 *压缩机* ***1*** *过载故障,*Compressor 1 overload,

4 *压缩机* ***2*** *高压故障，*Compressor 2 at high pressure,

5 *压缩机* ***2*** *低压故障,* Compressor 2 at low pressure,

6 *压缩机* ***2*** *过载故障,*Compressor 2 overload,

7 *冷冻水水流故障（无冷冻水流动的意思），*freezing water flow fault (no freezing water

flow),

8 *冷冻泵过载故障（冷冻泵超负荷的意思）*，cooling pump overload (freezing pump is above its capacity),

9 *冷却水不足故障*，inadequate cooling water,

10 *冷却泵过载故障*，cooling pump overload,

11 *出水温度过高*，water outlet at too high-temperature,

12 *出水温度过低*，water outlet at too low-temperature,

13 *温度传感器开路*，temperature sensor in open-circuit,

14 *温度传感器短路* temperature sensor in short-circuit.

15 *高温预警故障* high-temperature ew