📖 Operating Guide

✍ *How to set the upper limit and lower limit of temperature?*

Press the key of select to show the upper limit and lower limit of temperature, then use the key of "▲"or"▼" to change the set value.(The key of "▲"adds 0.1°C, and the key of"▼"minuses 0.1°C, press the keys and hold them over 0.5 seconds can increase and decrease rapidly). Notice that the controller can automatically ensure "upper limit temperature" is higher for 0.5°C than "lower limit temperature".

✍ *How to set the alarm temperature?*

Press the "select" key to display the "alarm temperature", and then press the keys "▲" or "▼" to change the setting value("▲"adds 0.5°C，"▼"minuses 0.5°C，press and hold them over 0.5 seconds can add or minus rapidly).

Notice: The value can be only saved after exiting the state of setting. The value which has been set can not be saved if the power is off before exiting the state of setting.

✍ *How to eliminate the alarm signal?*

Press any key to eliminate when in the alarm signal.

✍ *How to deal with the alarm?*

The controller will lock the state of alarm during some time when the external alarm occurs, the light of alarm is flashing, if the statement happens, you must first find the cause of troubles according to the light of alarm, and then you can press the key of resume to relieve the state of alarm after eliminating the troubles. Here the "locked" means the controller will be still in the alarm state after repealing the external alarm signal. The "water pump overload" and "high pressure" alarms will be locked for 1 hour (The time can be set, please refer to the senior operation: F51), and the "water lack" and "high temperature" alarms will not be locked.

✍ *How to start up and shut down?*

Press the on-off key and hold it for 1 second, and the controller can be turned on or off, the on-off state of the controller is indicated by the "power supply" light. Notice that in off state of the controller, only the compressor, the fan and the water pump stop working, but the temperature display part is still working.

✓ Advanced Operation

The controller can adjust some internal parameter to meet all kinds of need. These parameters are supplied for special technologist, and common users don't need to know. Please don't change the internal parameter of the controller casually, lest lead to the abnormity of the controller. The way to set the internal parameter is as below:

Use the code to enter the state of parameter setting, the code is "up-down-up-down-up-up-down", press the key of up or down continuously in the state of showing current temperature, and it must be finished within 3 seconds，if the code is right, you can enter the state of parameter setting, here the nixietube shows "Fxx"，there into xx is a number，it means parameter code.

Use the key of up or down to select the parameter code, press the key of select to show the value of the parameter after you have selected one parameter, here you can use the key of up or down again to set the parameter, then press the key of select again to return the state of showing parameter code after finishing setting.（**The parameter which has been changed can be only saved after returning to the state of "Fxx" by pressing the key of "select"**）

Internal parameter code is as follows:

Sort	Code	Parameter Name	Range	Factory Setting	Unit	Remark
Temperature controlling	F19	Temperature revision	-5 -- +5	0	°C	Revise the prober bias
Compressor	F21	Compressor halt protection time	0 -- 10	3	min	
Alarm	F51	External alarm lock time*	0 -- 240	60	min	Refer to the annotation 1
	F52	Water lack alarm resuming time*	0 -- 240	5	min	Refer to the annotation 2
Testing	F99	Check				**This function can attract all relays in turn, please don't use it when the controller is running!**
	F00	Exit				

*Annotation: 1. "External alarm lock time" means that when outdoor alarm occurred, even if the outdoor alarm is removed, the controller will keep the state of alarm for a few time. Press the key "resume" can cleanup alarm forcibly.

2. "Water lack alarm resuming time" means that the controller will give a water lack alarm and turn off the compressor and the water pump when the water pressure is abnormal. But after the water pump has been turned off, the water pressure can not be checked and the controller can not know when the water supply will resume. The purpose of the parameter is to repeal the water lack alarm automatically after some time, and make the water pump starts up again. Pressing the "resume" key can clear the water lack alarm immediately.

❄ Operating Principle

✍ *Temperature Controlling*

Temperature controlling is based on "Upper limit temperature" and "Lower limit temperature" .If "Upper limit temperature" is 20°C, "Lower limit temperature" is 18°C, when temperature prober (refrigerator sensor) apperceives that the temperature is higher than 20°C, compressor turns on, then if the temperature is lower than 18°C, compressor stops. Thus temperature can be controlled between 18°C and 20°C.

✍ *Boot delay protection of compressor*

The controller contains a "compress halt calculagraph"，it begins to time when compressor stops, the program first check the calculagraph before booting the compressor next time, the program will immediately boot the compressor if the calculagraph reach 3 minutes ,if the calculagraph doesn't reach 3 minutes ,it will boot later when the calculagraph reaches 3 minutes. In addition, the controller doesn't turn on the compressor within 3 minutes after the power supply is on.（The introduction above is based on that the "boot delay protection of compressor" is 3 minutes, this parameter can be set, if you don't need delay, it can be set to 0.）

✍ *Fan controlling*

The fan and the compressor start up or stop at the same time.

✍ *Water pump controlling*

The controller will turn on the water pump and check the water pressure signal when it starts up. The compressor will not be turned on until the water pressure is normal (Water pressure switch close).If the water pressure is abnormal after the water pump starts up for 1 minute, or the water pressure signal is being interrupted for above 5 seconds, the controller gives a water lack alarm and turns off the water pump and the compressor. The water lack alarm can be repealed after some time, and the time can be set (Please refer to the senior operation).

✍ *Alarm output*

When the "water pump overload" , "high pressure" , "water lack" and temperature sensor invalidating(Showing "EE" or "-EE") happens, the controller will turn off the compressor, the fan and the water pump, and give an alarm signal.

✍ *High temperature alarm output*

When the temperature is higher than the "alarm temperature" or the temperature sensor invalidates (Showing "EE" or "-EE"), the controller will give a separate alarm signal, it used to turn off the laser machine.

Main Function：

☞ Temperature Display   ☞ Temperature Controlling（Refrigeration）

☞Water pump controlling   ☞ Water pressure checking

☞ Water lack alarm   ☞ Compressor boot delay protection

☞ Temperature sensor error alarm

☞ External alarm (Water pump overload, high pressure)

☞Alarm signal output

☞High temperature alarm, independent high temperature alarm output

Main Technique Index：

🄿 Temperature Display Range： -50～125°C（Step 0.1°C）

🄿 Temperature Setting Range： -45～120°C, adjustable

🄿 Power Supply：9～12V AC

🄿 Relay contact capacity： 2A/380V

🄿 Drilling Size(mm)：106.3x165 (Height*width)

Wiring Diagram：
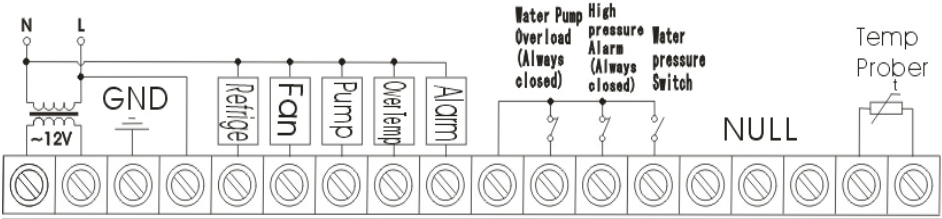
Notice：

1. The earth terminal of the controller should be connected with the earth terminal of the electric cabinet reliably，be sure to connect the earth well.

2. Please use power supply transformer and temperature sensors which are supplied by our company.

3. Water pump overload alarm and high pressure alarm must be shorted if not use, or the controller will enter the alarm state and can not run normally.

4. Water pump checking switch must be shorted if not use.

NA1553 Laser Cooling Water Unit Controller

User Guide