NA630 User Guide (V1.00)

☞ Main Function:

☞Refrigeration Controlling: temperature showing, temperature controlling,boot delay protection of compressor, temperature sensor error alarm, it can run periodically with the rate of start and stop which has been set when the temperature sensor is broken.

☞Blower Fan Controlling: delay boot of fan（double controlling of temperature and time）, delay shut down of fan. It can be set as "controlled mode" and "free mode".

☞Defrosting Controlling: timing to startup the operation of defrosting, the condition of defrosting finished is double controlled by temperature and time, defrosting and dripping, manual defrosting

☞External alarm: one channel external alarm, it can be set to 5 modes: always open, always open locked, always closed, always closed locked or forbidden.

¤Main Technique Index:

- **Temperature display range:** -50～150°C（The step between -9.9 and 99.9°C is 0.1°C，else 1°C)
- **Temperature setting range:** -45～145°C（The step between -9.9 and 99.9°C is 0.1°C，else 1°C)
- **Power supply:** 220V±10% or 380V±10% (Refer to the wiring diagram)
- **Operation Environment:** temperature -10℃～45℃，humidity≤85%.
- **Relay contact capability:** 2A/250VAC (pure resistive load)
- **Temperature sensor:** NTC R25=5kΩ, B (25/50) =3470K
- **Executive standard:** Q/320585 XYK 01 (NA630-CTDF)

📖 Operation Guide

♦ What's the meaning of the index lights on the panel?

The function of the index lights on the panel is showing below：

indicator light	light	flash
Temperature setting	In the state of temperature setting	-
Refrigeration	Refrigerating	The state of compressor boot delay protection
Defrost	Defrosting	Defrosting and dripping
Fan	Fan running	-

♦ The meaning of the nixietube display:

The nixietube usually shows temperature, if it shows "SHr", it means the temperature sensor is short, and "OPE" means the temperature sensor is open.

Alarm codes are as follows:

Code	signification	Explanation
DEF	Defrosting or Dripping	-
A11	External alarm	External alarm input, refer to the internal parameter code "F50"
A21	Refrigerator sensor error	Open or short (showing "SHr" or "OPE")
A22	Defrosting sensor error	Open or short (showing "SHr" or "OPE")

♦ How to set the temperature?

Press the keys "▲" and "▼" at the same time，then enter the state of temperature setting，here the nixietube shows the temperature of setting, then use the key "▲" or key "▼" to change the value of setting（"▲"adds 0.1°C，"▼"minuses 0.1°C，press and hold them over 0.5 seconds can add or minus rapidly）.Press both keys at the same time to exit the state of setting after setting.

Notice：1. In the state of temperature setting，it will exit the state of setting if no one presses the key within 30 seconds.

2. 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 defrost manually?

Press the key "▼" for 5 seconds, and then enter the state of defrosting. The state of defrosting can be ended forcibly when you press the key "▼" and hold it for 5 seconds again.

♦ How to read the temperature of the temperature sensor?

Press the key "▼" when it shows the current temperature, and it can show the temperature of the defrosting temperature sensor. It will show the current temperature when release the key "▼".

✓ Advanced Operation

Press the key "▲" for 5 seconds or use the code "up-down-up-down-up-up-down" to enter the state of parameter setting, press the key "▲", "▼" 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 "▲" or "▼" to select the parameter code，Pressing the both keys at the same time can make it show the value of the parameter after select the parameter, here you use "▲" or "▼" to set the parameter, then press the both keys at the same time to return to the state of showing parameter code after finishing setting. （**Notice：The parameter which has been changed can be only saved after returning to the state of "Fxx" by pressing the both keys at the same time**）

Internal parameter code is showing below:

Sort	Code	Parameter Name	Range	Factory Setting	Unit	Remark
Temperature	F12	Temperature difference	0.1 – 10.0	1.0	°C	Control the temperature difference, read the principle of temperature controlling for details
	F18	Defrosting sensor revision	-10 -- +10.0	0.0	°C	Revise the defrosting sensor bias
	F19	Temperature revision	-10 -- +10.0	0.0	°C	Revise the temperature sensor bias
Compressor	F21	Compressor delay time	0 -- 10	3	min	
	F22	Compressor running frequency *	0 -- 100	0	%	Refer to the annotation
Defrosting	F31	Defrost cycle	OFF,0.1 – 99.9	12	hour	"OFF" means no defrosting
	F32	Defrost end temperature	0.0 – 50.0	15.0	°C	
	F33	Defrost end time	1 -- 99	30	min	
	F34	Dripping time	0 -- 99	5	min	
	F35	Defrost cycle timing method	0 or 1	0		0: timing directly 1: accumulative compressor running time
	F36	Use the defrost sensor or not	"YES" or "NO"	1		"NO": not use "YES": use
	F37	Compressor state when defrosting	"OFF" or "ON"	0		"OFF": electric heating "ON": heat pump
Fan	F41	Fan start temperature	-50 -- 150	-10	°C	
	F42	Fan start delay	0 -- 999	60	sec	
	F43	Fan stop delay	0 -- 999	0	sec	
	F44	Fan mode	0 or 1	0	-	0:controlled mode 1:free mode
Alarm	F50	External alarm mode *	0 - 4	0		0: without external alarm 1: always open, unlocked 2: always open, locked 3: always closed, unlocked 4: always closed, locked
Testing	F98	Reserved				
	F99	Check	**This function can attract all relays in turn, and please don't use it when the controller is running!**			
	End	Exit				

*Annotation:

1. "Compressor running frequency" is used when temperature sensor is error. This function lets compressor run in the state of protecting. In this state, the cycle is 60 minutes, then compressor runs for 60*F22 minutes, and stops for 60(1-F22) minutes. For example, if the parameter of F22 is set to 10, then the compressor runs for 6 minutes, and stops for 54 minutes, and all that. If you don't need this function, F22 can be set to 0.

2. "External alarm mode": "Always open" means that in normal state external alarm signal is open, and controller will give an alarm when closed. "Always closed" is on the contrary. "locked" means that when external alarm signal is in the normal state, the controller is still in the alarm state , and it needs manual resuming.

❄ Basic Operation principle

✍Temperature controlling

Temperature controlling is based on "temperature setting" and "temperature difference setting", suppose "temperature setting" is 20°C，"temperature difference setting" is 2°C，so it begins to refrigerate when the temperature of the temperature sensor is over 22°C, and it stops refrigerating when the temperature is under 18°C, thus the temperature can be controlled at about 20±2°C.

&⌒ **Compressor delay time**

The controller contains a "compressor halt calculagraph", and it begins to time when compressor stops, the program first check the calculagraph before starting the compressor next time, the program will immediately start the compressor if the calculagraph reach 3 minutes ,if the calculagraph doesn't reach 3 minutes ,it will start again when the calculagraph reaches 3 minutes. Thus you can ensure that the boot alternation is over 3 minutes after halt, so it can prevent to breaking the compressor as a result of frequent boot.

In addition, the controller doesn't boot the compressor within 3 minutes after turning on the power supply, thus the compressor can also be protected in the state of power cut and then power on. （*Annotation：The time of boot delay protection can be adjusted, it sets to 3 minutes above.）

&⌒**Auto defrosting principle**

Micro-controller starts the defrosting function according to the defrosting cycle. After defrosted, Micro-controller can probe the evaporator temperature by defrosting temperature sensor. If the temperature reaches the "Defrost end temperature", defrosting will stop, if defrosting time is longer than "defrost end time", the defrosting will be turned off forcibly.

The defrosting cycle has two timing modes (F35), F35=0 means timing directly, F35=1 means accumulating the compressor running time.

&⌒**Defrosting and dripping**

Set the dripping water 5 minutes, after finishing defrosting, in 5 minutes, compressor doesn't run, in this state, "Defrost" LED will flash. But in two conditions, controller couldn't enter the state of dripping: one is that finishing the defrosting manually, the other is that defrosting end which caused by temperature sensor's error.

&⌒**About fan controlling**

Fan has two operation modes: "controlled mode" and "free mode".

In "controlled mode"，fan only runs in the state of cooling, but after cooling, fan don't start immediately, controller probes the evaporator temperature by defrosting temperature sensor, when evaporator temperature is lower than "Fan start temperature", fan runs. After cooling, if the evaporator temperature doesn't drop during a time, longer than "Fan start delay", fan will run compulsively. If fan runs immediately, setting "Fan start delay" is 0, after compressor stops, fan don't stop immediately, it will delay some time through "Fan stop delay", if don't need delay, setting "Fan stop delay" is 0.

In "free mode"，fan always runs，only in defrosting fan stops. In this mode, "Fan start temperature", "Fan start delay", "Fan stop delay" has no operation.

Wiring Diagram:

NTC=5kΩ/25℃

2A 250V AC

T1:Temperature Sensor
T2:Defrost Sensor
S1:Alarm Signal Input
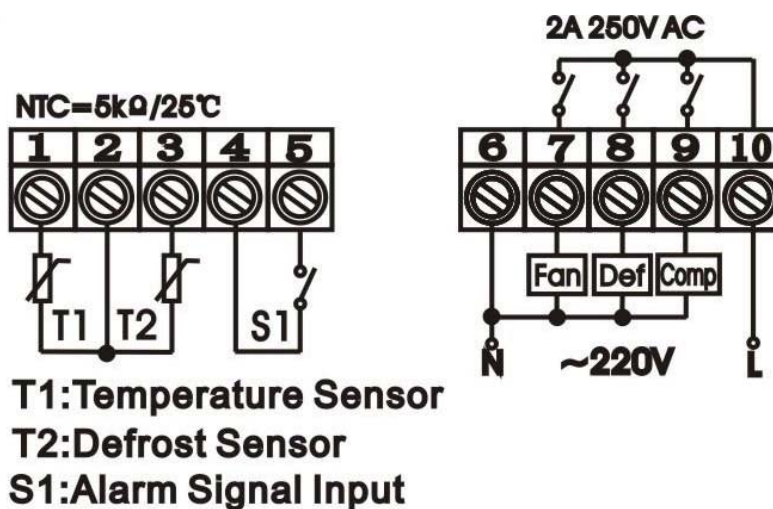
Notice：

    1、Please place the temperature sensor at the place of air return of the air-cooler, and the defrosting sensor above the air return pipe of the air-cooler

    2、Please use the temperature sensor which are supplied by our company.