NA6942 User Guide (V1.02)

Main Function and Technique Index Main Function

Temperature controlling (refrigeration/heating): temperature display, temperature controlling (refrigeration/heating mode can be set), compressor startup delay protection, temperature sensor error alarm. It can run and stop periodically with the on-off rate when the temperature sensor is out of work.

Fan controlling: 7 fan running modes, including fan pre-start/startup delay, off delay, temperature controlling start and stop, time controlling start and stop, always on, always off, run or stop when defrosting.

Defrost controlling: 2 defrosting modes (electric heat and hot gas), 3 defrosting start modes (time alternation, accumulative compressor running time and real time clock), 2 defrosting end modes (timing and dual control by temperature and time), dripping, manual defrosting, defrosting sensor error alarm, high temperature alarm is forbidden when defrosting.

High and low temperature alarm: the high and low temperature alarm point and alarm delay time can be set, "enable delay of high temperature alarm after defrosting" can also be set.

Real-time clock: internal RTC. It keeps running when power off and provides the accurate time, used for real time defrosting.

Centralized monitoring: connect several controllers to control multiple storages, and connect touch screen to realize temperature display and parameter setting.

Main Technique Index

Temperature display range: $-50 \sim 150$ °C (The resolution is 0.1 °C.) Power supply voltage: $220V \pm 10\%$ or $380V \pm 10\%$ (referring to the wiring diagram) Operating environment: temperature -10 °C ~ 50 °C, humidity $\leq 85\%$, no condensation Relay output contact capability: 8A/250VAC (pure resistive load) Temperature sensor: NTC R25=5k Ω , B (25/50) =3470K Communication interface: TIA/EIA-485, 9600bps Executive standard: Q/320585 XYK 01 (NA6840-CTDFA)

Operation Guide

Panel:



What's the meaning of the indicator lights on the panel?

The function of the indicator lights on the panel is shown as below:

Indicator Light	Name	Light	Flash	
Ŭ.	Temp setting	In the state of temp setting		
**	Refrigeration	Refrigerating	Ready to refrigerate, in the state of compressor startup delay protection	

÷Ċ.	Heat	Heating	Ready to heat, in the state of compressor startup delay protection	
<u>, X, x</u> ¢¢¢	Defrost	Defrosting	Dripping or the state of compressor startup delay protection	
ч К	Fan	Fan running		
(((•)))	Alarm		Alarm state	

The meaning of the LED display

The LED displays temperature under normal condition. When it shows "SHr", it means the temperature sensor is short, and "OPE" means the temperature sensor is open. The temperature and the alarm code (Axx) will show alternately when in the alarm state.

The codes are as below:

Code	Signification	Explanation			
A21	Temp sensor error	Open or short (showing "OPE" or "SHr")			
122	Euoporator concor arror	Open or short (showing "OPE" or "SHr" when press the key " $\mathbf{\nabla}$ "). If you			
AZZ	Evaporator sensor error	don't need to use the evaporator sensor, you can use F59 to close the alarm.			
A31	High temp alarm				
A32	Low temp alarm				
		If you have set the probation time F87, the alarm occurs when the			
A99	Over probation time	accumulative running time is over probation time, and the controller can not			
		work.			

How to set the temperature?

Press the key "set" for at least 2 seconds to enter the state of temperature setting. Here the LED displays the setting temperature. Then use the key " \blacktriangle " or " \blacktriangledown " can change the parameter (the key " \blacktriangle " adds 0.1°C and the key " \blacktriangledown " minuses 0.1°C, press and hold each of them for over 0.5 seconds can add or minus rapidly). After setting, press "set" to exit the state of parameter setting. (The setting temperature range is limited by the parameters F13 and F14; please refer to the advanced operation.) Pressing the key "M" in the setting process means giving up and exiting, and the setting value will not be saved.

How to defrost manually?

When in the state of displaying current temperature, press the key " $\mathbf{\nabla}$ " and hold it for at least 5 seconds to enter defrosting state. In defrosting state, press the key " $\mathbf{\nabla}$ " and hold it for at least 5 seconds can finish defrosting forcibly.

How to read the temperature of the evaporator sensor?

When in the state of displaying current temperature, press the key " $\mathbf{\nabla}$ " and hold it to display the temperature of the evaporator sensor. Loose the key " $\mathbf{\nabla}$ ", then return to current temperature. Notice that if you press the key and hold it for 5 seconds or longer, the controller will enter or exit defrosting state forcibly.

How to read and adjust the real-time clock?

When in the state of displaying temperature, press the key "set" to enter the state of displaying time. Press the key "set" and hold it to enter the state of adjusting time, and press the key "set" to return to the state of displaying temperature.

In the state of adjusting time, you can adjust the hour by using the key " \blacktriangle " and " \blacktriangledown " when the hour part of the LED flashes. Then press the key "set", and the minute part of the LED flashes. You can also use the key " \blacktriangle " and " \blacktriangledown " to adjust the value. Press the key "set" again to exit. Pressing the key "M" in the adjusting process means giving up and exiting, and the time will not

be saved.

How to refrigerate or heat forcibly?

When in the state of displaying temperature, the temperature is between "setting temperature – temperature difference" and "setting temperature + temperature difference". At this time, the system may or not refrigerate. Here you press the key " \blacktriangle " and hold it for 5 seconds, the controller will enter the refrigeration state forcibly when in the refrigeration mode, and stops refrigerating when the temperature is below "setting temperature - temperature difference"; the controller will enter the heating state forcibly when in the heating mode, and stops heating when the temperature is above "setting temperature + temperature difference".

Advanced Operation

Press the key "M" and hold it for 5 seconds to enter parameter setting state. The LED displays "PAS" to hint you to enter the password if you have set the password. You can use the key " \blacktriangle " and " \blacktriangledown " to enter the password. If the password is correct, the LED will display the parameter code. Then use " \bigstar " or " \blacktriangledown " to select the parameter code. Pressing the "set" key can make it to show the value of the parameter after selecting the parameter. Here you use " \bigstar " or " \blacktriangledown " to set the parameter (pressing the key and not release can add or minus rapidly), then press the "set" key to return to the state of showing parameter code after finishing setting. Pressing the key "M" can exit the parameter setting state when displaying the parameter code. Pressing the key "M" means canceling when in the parameter setting process, and the parameter will not be changed.

Sort	Code	Parameter Name	Range	Factory setting	Unit	Remark
Temp controlling	F11	Setting temp	F14-F13	0	°C/ °F	The setting range is limited by F13 and F14.
	F12	Temp difference	0.1-20	1	°C/ °F	Control the temperature difference (referring to temperature controlling- basic operating principle)
	F13	Max setting temp	-58-302	302	°C/ °F	Notice: the controller will follow the rule F14 <f11<f13 forcibly.<="" td=""></f11<f13>
	F14	Min setting temp	-58-302	-58	°C/ °F	If one parameter cannot be adjusted, it is because this parameter is limited by other parameters. You must first adjust other parameters.
	F15	High temp alarm temp	OFF, -58-302	OFF	°C/ °F	OFF means no high temp alarm
	F16	Low temp alarm temp	OFF, -58-302	OFF	°C/ °F	OFF means no low temp alarm
	F17	Temp alarm delay	0.1-99.9	15	min	The alarm occurs when continuous time of high temp or low temp is longer than the setting time.

Internal parameter codes are as below:

	F18	Evaporator sensor adjustment	-20.0-20.0	0.0	°C/ °F	adjust the evaporator sensor bias
	F19	Temp sensor adjustment	-20.0-20.0	0.0	°C/ °F	adjust the temperature sensor bias
	F20	Compressor delay when power on	0-10	3	min	-
	F21	Compressor delay time	0-10	3	min	-
Compressor	F22	Compressor running frequency when error	0-100	0	%	Enable when the temperature
Compressor	F23	Compressor on/off cycle when error	5-999	60	min	sensor is error
	F29	Compressor controlling mode (temp controlling mode)	COOL/ HEAT	COOL	-	COOL: refrigeration mode HEAT: heating mode
	F31	Defrosting alternation time (Enable when F35=1 and 2)	0.1-99.9	12	hour	-
	F32	Defrosting end temp	0.0-100	15	°C/ °F	-
	F33	Defrosting end time	1-99	30	min	-
	F34	Dripping time	0-99	5	min	-
Defrosting	F35	Defrosting start mode	OFF, 1-3	1	_	OFF: defrosting is off 1: time alternation start 2: time alternation start, the alternation is compressor accumulative running time 3: RTC start
	F36	Defrosting stop mode	0 or 1	1	-	0: only controlled by time 1: controlled by both time and temp
	F37	Defrosting heat mode	0 or 1	0	-	0: electric heat 1: hot gas
	F38	Fan state when defrosting	OFF or ON	OFF	-	OFF: fan off when defrosting ON: fan on when defrosting
	F39	High temp alarm delay time after defrosting ends	0-999	0	min	The high temp alarm will not occur when defrosting or after defrosting ends for some time. 0: The high temp alarm is irrelevant to defrosting state.
Fan	F41	Fan mode	OFF, 1-6	1	-	OFF: fan off 1: follow the compressor state, fan startup delay, off delay 2:follow the compressor state, fan pre-start, off delay 3: fan is controlled by the

						evaporator temp, start when low temp, stop when high temp 4: fan is controlled by the evaporator temp, start when high temp, stop when low temp 5:fan is on when the compressor is on, and times to start and stop when the compressor stops 6: fan always running	
	F42	Fan pre-start/startup delay time	0-999	30	sec	Enable when F41=1 and 2	
	F43	Fan off delay time	0-999	0	sec		
	F44	Fan start temp	-58-302	-10	°C/ °F	Enable when F41=3 and 4	
	F45	Fan start temp difference	0.1-50	5	°C/ °F		
	F46	Fan start time	1-999	5	min	Enable when F41=5	
	F47	Fan stop time	1-999	10	min		
Alarm	F57	Alarm output mode	0-1	0	-	0: always open, closed whenalarm1: always closed, open whenalarm	
	F59	Whether use the evaporator sensor error alarm	YES/NO	YES	-	-	
	F60	Set the RTC time	00:00- 23:59	-	-	-	
RTC	F61 -F66	6 real-time defrosting start time (Enable when F35=3)	00:00-23: 59 OFF	OFF	-	OFF means not using	
	F80	Password	OFF, 0001-999 9	OFF	-	OFF means no password 0000 means clearing password	
	F81	Temp unit	°C/°F	°C	-	°C : Centigrade °F : Fahrenheit	
System setting	F85	Display accumulative running time	-	-	hour	-	
	F86	Accumulative running time reset	-	-	-	-	
	F87	Probation time	OFF, 1-9999	OFF	hour	The controller will stop if the accumulative time is over probation time, and shows the alarm code "A99". OFF means no probation time.	

	F88	Controller address	1-20	random	-	-
	F98	Factory reserved				
Testing	F99	Self-check	This functio Please don't	n can attract	t all rela	ys in turn. htroller is running.
	End	Exit				

Basic Operating Principle

Temperature controlling

The controller has 2 temperature controlling modes: refrigeration and heating (F29). Temperature controlling point is controlled by "Setting temp (F11, or press and hold the "set" key to set)" and "Temp difference (F12)". In refrigeration mode, the controller begins to refrigerate when the temperature of the temperature sensor is over "Setting temp + Temp difference", and stops refrigerating when the temperature is under "Setting temp - Temp difference"; In heating mode, the controller begins to heat when the temperature of the temperature sensor is over "Setting temp - Temp difference"; and stops heating temp - Temp difference", and stops heating temp - Temp difference".

High and low temperature alarm

When the temperature is higher than "High temp alarm temp (F15)" and the continuous time is over "Temp alarm delay (F17)", the high temperature alarm occurs. When the temperature is lower than the alarm point, the high temperature is eliminated immediately. The high temp alarm can delay when defrosting, i.e., the high temp alarm will not occur when defrosting or after defrosting ends for some time (This time can be set by parameter "F39"). If F39=0, it means that the high temp alarm is irrelevant to defrosting state. When the temperature is lower than "Low temp alarm temp (F16)" and the continuous time is over "Temp alarm delay (F17)", the low temperature alarm occurs. When the temperature is higher than the alarm point, the low temperature is eliminated immediately.

Compressor delay when power on

The compressor delay when power on is set by F20, for example, 3 minutes. The controller does not start the compressor within 3 minutes after power on.

Compressor delay time

The compressor delay time is set by F21, for example, 3 minutes. The controller contains a "compressor halt calculagraph". It begins to time when compressor stops. The program first checks 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, the compressor will start again when the calculagraph reaches 3 minutes. This will ensure that the start alternation is over 3 minutes after halt, so it can prevent breaking the compressor as the result of frequent start.

Compressor running timly when temperature sensor is error

When the temperature sensor is error, you can make the compressor continues to run with a setting on/off rate to prevent the goods in the cold storage from destroying. The rate is set by F22 and F23, for example, F22=20, F23=50. When the temperature sensor is error, the cycle is 50 minutes, and the compressor stops for 40 minutes and runs for 10 minutes.

Auto defrosting principle

The controller has 4 defrosting start modes which can be selected (F35): OFF: Defrosting is off;

1: Time alternation. The controller will start defrosting according to the setting alternation time which is set in "Defrosting alternation time (F31)";

2: Accumulative compressor running time. If compressor accumulative running time reaches the time which is set in "Defrosting alternation time (F31)", the controller starts defrosting;

3: RTC start. The controller starts defrosting according to the actual time (for example, 6:00 am). 6 points can be set at most (F61-F66). In this mode, "Defrosting alternation time (F31)" doesn't work.

The controller has 2 defrosting end modes which can be selected (F36):

0: time control. The defrosting time can be set by F33. The controller will stop defrosting when it reaches the defrosting time;

1: controlled by both time and temperature. The controller will check the defrosting effect through evaporator sensor after starting defrosting. If the sensor temperature reaches the "Defrosting end temperature (F32)", the controller will turn off defrosting. If the defrosting time is longer than "Defrosting end time (F33)", the defrosting will be turned off forcibly.

The controller has 2 defrosting heat modes which can be selected (F37):

0: electric heat. The compressor stops and the defrosting output is turned on (the defrosting output controls the electric heater);

1: hot gas. The compressor and defrosting output is turned on (the defrosting output controls the valve).

<u>Dripping</u>

A dripping time can be set (F34), for example, 5 minutes. The compressor doesn't run 5 minutes after defrosting ends. In this state, "Defrost" indicator light will flash. But in two conditions the controller can't enter the dripping state: one is finishing the defrosting manually, and the other is defrosting finish caused by temperature sensor error.

Fan controlling

Fan has 7 running modes (F41):

OFF: fan is off, and it may start when defrosting (depends on F38);

1: in refrigeration/heating mode, follow the compressor state, fan starts lingeringly after compressor starts (F42), fan stops lingeringly after compressor stops (F43);

2: in refrigeration/heating mode, follow the compressor state, fan starts ahead before compressor starts (F42), fan stops lingeringly after compressor stops (F43);

3: fan is controlled by the evaporator temperature. It starts when low temperature, and stops when high temperature (F44 and F45). Fan starts when the evaporator temperature is below F44 and stops when the evaporator temperature is over F44 + F45;

4: fan is controlled by the evaporator temperature. It starts when high temperature, and stops when low temperature (F44 and F45). The fan starts when the evaporator temperature is over F44 and stops when the evaporator temperature is below F44 - F45;

5: fan is on when the compressor is on, and times to start and stop when the compressor is off. The on/off time is set by F46 and F47, i.e., on for F46 minutes and off for F47 minutes;

6: fan always running, but it stops when external alarm occurs. In addition, it may stop when defrosting (depends on F38). In spite of which mode, fan state only depends on F38 when defrosting. In spite of which mode, fan stops when external alarm occurs.

Probation time

A probation time can be set (F87). The controller can add up the running time after power is on. If the accumulative running time is over the probation time, the controller will stop and display the alarm code A99. If you want to eliminate the limit of probation time, set F87 to "OFF" or use F86 to clear the accumulative running time. Then you can try to use it again. The parameter F85 can be used to examine the accumulative running time of the controller (hour).

Password

In order to prevent irrespective persons from changing the parameters, a password can be set (F80). If you have set a password, the controller will hint you to enter the password after you press the key "M" for 5 seconds. You must enter the correct password to set the parameters. If you don't need the password, you can set F80 to "OFF". Notice that you must remember the password, and if you forget the password, you cannot enter the setting state.

<u>Alarm output</u>

The controller has one separate alarm output. When the states below occur, the alarm output contact will act.

- 1. Temperature sensor error;
- 2. Evaporator sensor error (parameter F59 can turn off this alarm);
- 3. High temperature alarm;
- 4. Low temperature alarm.

Alarm output can be set to 2 modes (F57): always open or always closed. In "always open" mode, alarm output contact opens when it is normal, and closes when alarm occurs; in "always closed" mode, alarm output contact closes when it is normal, and opens when alarm occurs.

Wiring Diagram:



Notice:

1. Please read the guide carefully before using, and set the parameters correctly.

2. Please place the temperature sensor at the place of air return of the air-cooler.

3. The evaporator sensor must be fixed on the air return pipe of the evaporator. If you don't use the evaporator sensor, please set F59 to NO, or the controller will generate alarm.

4. Please use the temperature sensors which are supplied by our company.

5. The RTC power of the controller is supplied by super capacitance, and the RTC can run for 3 days after power cut. If the power cut time is over 3 days, you may adjust the RTC again.

6. RS485 communication bus must be twisted-pair. Controller address should be reset before installation and cannot be repetitive. A should be connected to interface A and B should be connected to interface B.