1. Product overview

ECS-974neo is a universal standard temperature controller.

2.Display and operation panel

Mounting size: 71 x 29 mm　　　　Product size: 78.5 x 34.5 x 74 mm

3. Technical parameters

1)Temperature measuring range: -50℃~99℃(Only when sensor calibration value is set to 0)
2)Resolution: 0.1℃/1℃ settable
3)Accuracy: ±1℃(-40℃~50℃), ±2℃(others)
4)Temperature control range: -50℃~99℃
5)Power supply: 220 VAC±10 %, 50/60Hz;　Overall power consumption: <3W
6)Input port: Cabinet sensor, Evaporator sensor
7)Output port: Cooling/Defrost/Fan
8)Protection grade of front panel: IP65
9)Operating ambient temperature:0℃~55℃
10)Storage temperature:-25℃~75℃
11)Storage humidity: 20%~85% (non-condensing)

4. LED

LED	Symbol	Status	Meaning
Setting	set	ON	Set administrator menu
Cooling	❄	ON	Cooling starts.
		OFF	Cooling stops.
		Flash	Cooling delays.
Defrost	❄	ON	Defrost starts.
		OFF	Defrost stops.
Fan	✿	ON	Fan starts.
		OFF	Fan stops.
Drip	drip	ON	Dripping.
		OFF	Drip stops.

5.Parameter table

No.	Menu Item	Description	Setting range	Default	Unit
		User menu			
0	SEt	Temperature set-point	LSE~HSE	4.0℃	℃
		Administrator menu			
1	PA1	Administrator menu password	00~250	-	/
2	diF	Differential	0.1℃~30.0℃	2.0	℃
3	HSE	Higher SEt. Max possible set-point	SEt~99.0	90.0	℃
4	LSE	Lower SEt. Min possible set-point	-50.0~SEt	-50.0	℃

No.	Menu Item	Description	Setting range	Default	Unit
5	Ont	Ont: On time (compressor). Compressor activation time in the event of faulty probe.	0~250	0	min
6	OFt	OFt: OFF time (compressor). Compressor stop time in the event of a faulty probe. If Ont=0, the compressor is off. If Ont≠0 and OFt=0, the compressor is always on. If Ont≠0 and OFt≠0, the compressor functions in duty cycle mode per Ont/OFt.	0~250	1	min
7	dOF	Delay (after power) OFF. Delay after switch off; the indicated time must elapse between switch-off of the compressor relay and the successive switch-on.	0~250	0	min
8	OdO	Delay Output (from power) On. Delay time in activating the outputs after switch-on of the controller or after a power failure.	0~250	0	min
9	dty	Defrost type:0 = electric defrost;　　　1 = reverse cycle defrost (hot gas);　　　2 = Free defrost (compressor hot).	0~2	0	/
10	dit	Defrost interval time. Interval between the start of two successive defrost operations.	1~250	6	hour
11	dCt	Defrost Counting type. Selection of count mode for the defrost interval.　0 = compressor operating hours; 1= fixed time interval; 2 = compressor stop hours.	0/1/2	1	/
12	dOH	Defrost offset hour. Start-of-defrost delay time from startup of controller.	1~59	1	min
13	dEt	Defrost endurance time. Defrost time-out; dEt=0, defrost is disabled.	0~250	30	min
14	H42	Whether to enable evaporator sensor: y=yes; n=no	n/y	y	/
15	dSt	Defrost stop temperature	-50.0~99.0	8.0	℃
16	dPO	Defrost (at) Power On. Determines if at the start-up the controller must enter defrosting (if the temperature measured allows this operation). y = yes; n = no.	n/y	n	/
17	FSt	Fan stop temperature	-50.0~99.0	2.0	℃
18	FAd	Fan activation differential	1.0~50.0	2.0	℃
19	Fdt	Fan delay time. Delay time in activating fans after a defrost operation.	0~250	0	min
20	dt	Drainage time. Dripping time	1~250	1	min
21	dFd	Defrost fan disable. Allows to select the evaporator probes exclusion during defrost. y = yes; n = no.	n/y	y	/
22	FCO	Fan Compressor OFF. Allows selecting compressor fans lock OFF (switched off). y = fans activated; n = fans off	n/y	y	/
23	HAL	High Alarm differential	0.1~20.0	4.0	℃
24	LAL	Low Alarm differential	0.1~20.0	4.0	℃
25	PAO	Power-on Alarm Override. Alarm exclusion time after controller switch on or after a power failure.	0~15	0	hour
26	dAO	Defrost Alarm Override. Alarm exclusion time after defrost.	0~250	0	min
27	tAO	Temperature Alarm Override. Temperature alarm signal delay time.	0~250	0	min
28	LOC	Keyboard locking. y = yes; n = no	n/y	n	/
29	PA1	Password 1.	0~250	5	/
30	ndt	number display type. View with decimal point. y = yes; n = no	n/y	y	/
31	CA1	Calibration 1. Positive or negative temperature value added to the value read by probe 1.	-12.0~12.0	0	℃
32	CA2	Calibration 2. Positive or negative temperature value added to the value read by probe 2.	-12.0~12.0	0	℃
33	ddL	Defrost display Lock. Viewing mode during defrosting. 0 = shows the temperature read by the cabinet probe; 1 = locks the reading on the temperature value read by cabinet probe when defrosting starts, and until the next time the Set-point value is reached; 2 = displays "dEF" during defrosting, and until the next time the Set-point value is reached.	0/1/2	1	/

6. Keys' function

6.1 Keys

Key	Function	Operation	LED
SET	Access user menu	Press and release	set LED on
	Access administrator menu	Press for 5 sec	set LED on
	Shift between menus and parameters	Press	set LED on
▲	Scrolls through the menu items & increases the values	Press	set LED on
	Upload data to copy card	Press for 3 sec	Display "uP" if upload succeeded; display "Er" if upload failed.
▼	Scrolls through the menu items & decreases the values	Press	set LED on
	Download data from copy card	Press for 3 sec	Display"do" if download succeeded; display "Er" if download failed.
❄	Exit user menu	Press	set LED off
	View the temperature read by evaporator probe	Press	Display defrost temperature
	Force defrost to start/stop	Press for 3 sec	❄ on or off
▲+▼	Reset to default (the second copy)	Press for 10 sec	Display "rSt" if it succeeded.

6.2 Operation

1) Set temperature

a. Press and release the SET key to enter user menu, set LED lights and SEt is displayed.

b. Press the SET key to display SEt value.

c. Use ▲ and ▼ keys to change SEt value.

d. Press ❄ key or keep the controller inactive for 30 sec to save settings and exit.

e. If the keys are locked, LOC is displayed and it is disabled to adjust SEt value.

2) Set password

a. Press the SET key for 5 sec, the controller displays PA1 (administrator menu password). (If you want to enter administrator menu, you need to input correct password. When PA1≠0, and you enter administrator menu, the controller displays PA1 value. When PA1=0, you will enter administrator menu directly).

b. Press the SET key to display 00, then press ▲ or ▼ to enter the password value.

c. After entering password value, press the SET key (to confirm the password), PA1 is displayed. The controller automatically verifies the correctness of the password. When the password is verified (enter administrator menu), use ▲ or ▼ key to scroll through diF, HSE…… CA2, ddL; Otherwise, the controller will exit settings.

d. Once set, PA1 value must be remembered. Otherwise, parameters cannot be changed. The value 125 is a universal password.

3) Set parameters (PA1 value is input correctly to access administrator menu settings)

a. When a menu item is selected, press SET key to set its value.

b. Use ▲ or ▼ to change the value.

c. Press SET key to back for selecting another item.

d. Press ❄ key or keep the controller inactive for 30 sec to save settings and exit.

4) Reset parameters

a.In measuring status, press ▲ and ▼ keys for 10 sec, rST is displayed and the controller resets to default.

b.When Elitech copy card CPK-4 is used to download parameters to the controller, it doubles parameters.

c.The first copy is used to control and the second is used to reset parameters.

d.If the second is changed, please connect CPK-4 again to download parameters.

5) Force to start/stop defrost: Press ❄ for 3 sec to shift between cooling, defrost and drip.

6) Copy card

Upload (copy parameters in the controller to the copy card)

a.Use keys to set parameters

b.Insert the copy card, press ▲ key until "uP" is displayed.

c.Plug out the copy card after 5 sec to power on the controller again.

Download (copy parameters in the copy card to the controller)

a.Insert the copy card, press ▼ key until "do" is displayed.

b.Plug out the copy card after 5 sec to power on the controller again.

Note: "Er" shows to indicate upload/download programming failure. Check whether the copy card is connected well.

"EP" shows to indicate the data in copy card disagrees with controller model, causing programming failure. Find a correct copy card to upload or download parameters.

In this course, keep the power supply stable and copy card connected well. Please do not plug out the copy card before the operation is finished.

7. Control output

7.1 Cooling:

Normally,

Cabinet temperature > temperature set-point (SEt value) + differential (diF), compressor starts when minimum protection time elapses.

Cabinet temperature < SEt value, compressor stops.

Note: The minimum protection time equals to OdO (delay Output (from power) On) at power on for the first time and later dOF (delay (after power) OFF).

If cabinet temperature sensor is faulty, cooling outputs in duty cycle mode per Ont/Oft.

①Ont=0, Oft=0, the compressor is always off.

②Ont=0, Oft≠0, the compressor is always off.

③Ont≠0, Oft=0, the compressor is always on.

7.2 Defrost

1) dEt=0 (defrost endurance time is set to 0), defrost is disabled.

2) dEt≠0, neither during defrosting nor dripping:

① Evaporator sensor is enabled (H42=y), evaporator sensor temperature ≥ defrost stop temperature (dSt), defrost cannot start.

② H42=y, evaporator sensor temperature < dSt, or evaporator sensor is disabled (H42=n), defrost can start in any one of the following conditions:

a.If dPO=y (defrost (at) Power On is enabled), and dOH (defrost Offset Hour) elapses.

b.Defrost interval time (dit) elapses.

c.Press ❄ for 3 sec.

Note: dit and dOH is counted per dCt=1(fixed time interval), dCt=0(compressor operating hours) or dCt=2(compressor stop hours).

3) During defrosting, defrost stops in any one of the following conditions:

① Evaporator sensor is enabled (H42=y), evaporator sensor temperature > dSt.

② dEt (defrost endurance time) elapses.

③ Press ❄ for 3 sec.

4) The controller enters dripping time after defrost to drain the water generated during defrosting. Cooling is disabled during drainage time (dt). It enters cooling cycle status after drainage time elapses.

5) Display during defrosting

ddL=0 (Defrost display Lock): shows the temperature read by the cabinet probe.

ddL=1: locks the reading on the temperature value read by cabinet probe when defrosting starts, and until the next time the Set-point value is reached.

ddL=2: displays the label "dEF" during defrosting, and until the next time the Set-point value is reached.

6) Defrost type: dty = 0: electric defrost; dty = 1: reverse cycle defrost (hot gas); dty = 2: Free defrost (compressor hot).

Defrost type \ System status	Electric defrost	Reverse cycle defrost	Free defrost
Cooling	Compressor is on	Compressor is on	Compressor is on
	Electric heating is off	Four-way valve closes.	--
Defrost	Compressor is off	Compressor is on	Compressor is off
	Electric heating is on	Four-way valve opens.	--
Dripping	Compressor is off	Compressor is off	Compressor is off
	Electric heating is off	Four-way valve opens.	--

7.3 Fan

If evaporator sensor is enabled (H42=y), fan runs per evaporator temperature. Fan runs when the temperature value read by evaporator probe < FSt (Fan stop temperature) – FAd (Fan activation differential). Fan stops when the temperature value read by evaporator probe > FSt.

In cooling status: FCO=y (Fan activated), fan runs only based on the value read by the evaporator probe. FCO=n(Fan off), fan runs only based on the value read by the evaporator probe when compressor switches on for cooling.

In defrosting status: dFd=y(Defrost fan disable), fan runs only based on the value read by the evaporator probe.
dFd=n, fan stops during defrosting.

Fan is activated when Fan delay time (Fdt) elapses after a defrost operation.

When evaporator sensor is faulty or disabled, fan does not run based on the value read by the evaporator probe. i.e. in cooling status:
FCO=y (Fan activated), fan runs.
FCO=n(Fan off), fan runs when compressor switches on for cooling. Fan stops when compressor switches off.
In defrosting status: dFd=y(Defrost fan disable), fan runs during defrosting.
dFd==n, fan stops during defrosting.
Fan is activated when Fan delay time (Fdt) elapses after a defrost operation.

7.4 Alarm

When cabinet sensor fails, E1 is displayed. When evaporator sensor fails, E2 is displayed.
High cabinet temperature alarm is triggered when cabinet temperature > SEt value + HAL (High Alarm differential), and temperature alarm delay elapses. AH1 is displayed. High cabinet temperature alarm is removed when cabinet temperature < SEt value + HAL.
Low cabinet temperature alarm is triggered when cabinet temperature < SEt value - LAL (Low Alarm differential), and temperature alarm delay elapses. AL1 is displayed. Low cabinet temperature alarm is removed when cabinet temperature > SEt value + LAL.
Note:Temperature alarm delay equals to PAO (Power-on Alarm Override) after power on for the first time, dAO (defrost Alarm Override) during defrosting and tAO (temperature Alarm Override) in other conditions.

8. Fault code

Display	Fault
E1	Cabinet sensor fault
E2	Evaporator sensor fault
AH1	High cabinet temperature alarm
AL1	Low cabinet temperature alarm
Er	Copy card programming failure
EP	The data in copy card disagrees with controller model, causing programming failure.
rSt	Reset to default (the second copy).

9. Wiring diagram:(Refer to actual products)
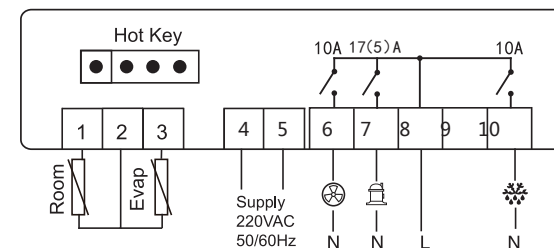
10. Safety precautions

1)Do distinguish the ports of sensor lead, power cord and relays. Please do not connect lines wrong. The relay cannot be overloaded.
2)Wiring requires disconnection of power supply first.

★ **Warning:**
The controller is forbidden to be used in water or too humid environment, high temperature, strong electromagnetic interference or strong corrosion environment.

★ **Notice:**
1)The power voltage must be in accordance with the voltage labeled on the controller. Please ensure the stability of power voltage.
2)Suggest keeping suitable distance between sensor lead and power cord to avoid possible interference.
3)Remove the sensor by slightly plugging out its end downwards.