

User Manual ECS-974neo Temperature Controller

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°C~99°C(Only when sensor calibration value is set to 0)
- 2)Resolution: 0.1°C/1°C settlable
- 3)Accuracy: ±1°C(-40°C~50°C), ±2°C(others)
- 4)Temperature control range: -50°C~99°C
- 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°C~55°C
- 10)Storage temperature:-25°C~75°C
- 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°C | °C |
| Administrator menu | | | | | |
| 1 | PA1 | Administrator menu password | 00~250 | - | / |
| 2 | diF | Differential | 0.1°C~30.0°C | 2.0 | °C |
| 3 | HSE | Higher SEt. Max possible set-point | SEt~99.0 | 90.0 | °C |
| 4 | LSE | Lower SEt. Min possible set-point | -50.0~SEt | -50.0 | °C |

| No. | Menu Item | Description | Setting range | Default | Unit |
|-----|-----------|--|---------------|---------|------|
| 5 | Ont | Ont: On time (compressor). Compressor activation time in the event of faulty probe. OFt: OFF time (compressor). Compressor stop time in the event of a faulty probe. | 0~250 | 0 | min |
| 6 | OFt | 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 | °C |
| 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 | °C |
| 18 | FAd | Fan activation differential | 1.0~50.0 | 2.0 | °C |
| 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 | °C |
| 24 | LAL | Low Alarm differential | 0.1~20.0 | 4.0 | °C |
| 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 | °C |
| 32 | CA2 | Calibration 2. Positive or negative temperature value added to the value read by probe 2. | -12.0~12.0 | 0 | °C |
| 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

- Press and release the SET key to enter user menu, set LED lights and SET is displayed.
- Press the SET key to display SET value.
- Use ▲ and ▼ keys to change SET value.
- Press ❄ key or keep the controller inactive for 30 sec to save settings and exit.
- If the keys are locked, LOC is displayed and it is disabled to adjust SET value.

2) Set password

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

- When a menu item is selected, press SET key to set its value.
- Use ▲ or ▼ to change the value.
- Press SET key to back for selecting another item.
- Press ❄ key or keep the controller inactive for 30 sec to save settings and exit.

4) Reset parameters

- In measuring status, press ▲ and ▼ keys for 10 sec, rST is displayed and the controller resets to default.
- When Elitech copy card CPK-4 is used to download parameters to the controller, it doubles parameters.
- The first copy is used to control and the second is used to reset parameters.
- If the second is changed, please connect CPK-4 again to download parameters.

- 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)
- Use keys to set parameters
 - Insert the copy card, press ▲ key until "uP" is displayed.
 - Plug out the copy card after 5 sec to power on the controller again.

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

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

- Ont=0, OfT=0, the compressor is always off.
- Ont=0, OfT≠0, the compressor is always off.
- Ont≠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:

- Evaporator sensor is enabled (H42=y), evaporator sensor temperature ≥ defrost stop temperature (dSt), defrost cannot start.
- H42=y, evaporator sensor temperature < dSt, or evaporator sensor is disabled (H42=n), defrost can start in any one of the following conditions:
 - If dPO=y (defrost (at) Power On is enabled), and dOH (defrost Offset Hour) elapses.
 - Defrost interval time (dit) elapses.
- 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:

- Evaporator sensor is enabled (H42=y), evaporator sensor temperature > dSt.
- dEt (defrost endurance time) elapses.
- 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).

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

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.

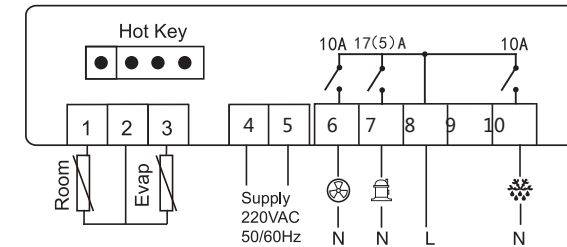
Low cabinet temperature alarm is triggered when cabinet temperature < SET value - LAL (Low Alarm differential), and temperature alarm delay elapses. AL1 is displayed. Low cabinet temperature alarm is removed when cabinet temperature > SET value + LAL.

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 not 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.