# ECS-02CX Temperature controller instruction

## 1.Product Overview

ECS-02CX is a general type temperature controller , temperature units ℃/℉ and Working mode cooling and heating can be selected by the menu. It can be choose two sensors : one for room , and the other one is for defrost . Defrost sensor , defrost relay and hot key are optional .

## 2.operation and display panel



## 3.Specifications and dimensions

Installation dimension : 71mm×29mm          Controller size : 78.5mm×34.5mm×74mm

## 4.Technical parameters

1）Measuring range : -50～99℃/℉ (only refers to the sensor calibration value is set to 0)

2）Temperature resolution : 9.9～-9.9 , 0.1℃/℉ , the others,1℃/2℉

3）Measurement accuracy : -40℃～50℃ , ±1℃ , 50℃～70℃ , ±2℃ , the others : ±3℃
   or -40℉～99℉, ±2℉ , the others : ±6℉

4）Temperature controlling range : -50～99℃/℉

5）Power supply : 220±10%(VAC) , 50/60Hz

6）power consumption : <3W

7）Rated current of the relays :

   Refrigeration : 30A/220VAC , it can directly drive 1.5 HP (220VAC) compressor , single phase
   or 17A/220VAC , it can directly drive 1.0HP (220VAC) compressor , single phase
   or 10A/220VAC

   Defrost: 10A/220VAC( suggest connect the max 1.4 KW electric heating wire)

8)  Front panel water proof : IP65

9）The back shell water proof : None

10) Operation condition : 0℃～55℃

11) Storage condition : -25℃～75℃,

12) Relative humidity : 20%～85% (relative humidity )

## 5.Indicator light status description

| Indicator light | Symbol | Status | Meaning |
|---|---|---|---|
| Setting | **set** | On | Parameter settings |
| | | Off | working order |

| Compressor | ❄ | On | Cooling / heating |
|---|---|---|---|
| | | Off | Cooling / heating stoped |
| | | Flashing | Cooling / heating delay |
| Defrost | ❄ | On | Defrost work |
| | | Off | Defrost stop |
| Temperature unit | ℃ | On | Temperature unit is ℃ |
| Temperature unit | ℉ | On | Temperature unit is ℉ |
| Temperature set point value indicator | 👁 | On | Check the set point |

## 6.Parameter Table

| Menu | Functions | Setting range | Default | Level |
|---|---|---|---|---|
| St | Temperature setting value | Maximum ～Minimum Set Point | 3 | Pr0 |
| Hy | Hysteretic value | 0.1～10℃<br>1～25℉ | 2 | Pr1 |
| LS | Minimum set point | -50℃～St<br>-50℉～St | -50 | Pr2 |
| US | Maximum set point | St～99℃<br>St～99℉ | 99 | Pr2 |
| ot | Cabinet sensor calibration | -9.9～9.9℃<br>-20～20℉ | 0 | Pr1 |
| P2 | Evaporator sensor selection | y：Enable<br>n：Forbidden | y | Pr1 |
| oE | Evaporator sensor calibration | -9.9～9.9℃<br>-20～20℉ | 0 | Pr2 |
| od | Outputs activation delay at start up | 0～99min | 0 | Pr2 |
| AC | Anti-short cycle delay | 0～50min | 1 | Pr1 |
| Cy | Compressor running time in the mode of "Run/stop in a proportional time" | 0～99min | 15 | Pr2 |
| Cn | Compressor stop time in the mode of "Run/stop in a proportional time" | 0～99min | 30 | Pr2 |
| CH | Cooling /Heating | CL：Cooling<br>Ht：Heating | CL | Pr2 |
| CF | ℃/℉ | C：℃ | C | Pr2 |

| | | F：℉ | | |
|---|---|---|---|---|
| Ld | Default Display | P1：Display the cabinet sensor<br>P2：Display the evaporator sensor<br>SP：Display the temperature setpoint | P1 | Pr2 |
| dE | Defrost termination temperature | -50～90℃<br>-50～90℉ | 2 | Pr1 |
| id | Defrost cycle | 0～99hour | 8 | Pr1 |
| Md | The maximum time of defrost | 1～99min | 20 | Pr1 |
| dF | Defrost status display | rt : Display cabinet temperature<br>It : Display start-defrost cabinet temperature<br>St : Display temperature setting value<br>dF : Display "dF" | it | Pr2 |
| AU | Cabinet temperature upper limit alarm value | (AL+1)～99℃<br>(AL+1)～99℉ | 99 | Pr1 |
| AL | Cabinet temperature lower limit alarm value | -50℃～(AU-1)<br>-50℉～(AU-1) | -50 | Pr1 |
| Ad | Temperature alarm delay | 0～99min | 15 | Pr2 |
| dA | Exclusion of temperature alarm at startup | 0～99min | 90 | Pr2 |

## 7. FRONT PANEL COMMANDS

| Key | Function | Button action | Indicator light |
|---|---|---|---|
| Set | To display target set point | Press and release immediately | 👁 Indicator light on |
| | Set point value | Push the key for more than 2 seconds | **set** Indicator light on |
| | Save the set point and exit the setting mode | Press the response | **set** Indicator light off |
| | In programming mode it selects a parameter | Press the response | **set** Indicator light on |
| Set+▼ | To enter in programming mode | Pressing the keys for 3s | **set** Indicator light on |
| Set+▲ | To return to room temperature display | Press the response | **set** Indicator light off |
| ▲ | In programming mode it browses the parameter codes or increases the displayed value | Press the response | **set** Indicator light on |

| | | | |
|---|---|---|---|
| | Upload the data to copy card | Pressing the keys for 1s | success "uP" 、 Failure "Er" |
| ▼ | In programming mode it browses the parameter codes or decreases the displayed value | Press the response | **set** Indicator light on |
| | Download the copy card | pressing the keys for 1s | success "do" 、 Failure "Er" |
| ❄ | To display the Evaporator temperature | Press the response | |
| | Start manual defrost | pressing the keys for 2s | ❄ Indicator lightt on |

**HOW TO SEE THE SET POINT :**

1) Push and immediately release the **Set** key, the set point will be showed and the 👁LED starts lighting ;

2) Push and immediately release the **Set** key or wait about 15s to return to normal visualisation.

**HOW TO CHANGE THE SET POINT :**

1) Push the **Set** key for more than 2 seconds to change the set point value ;

2) The value of the set point will be displayed and the "set "LED starts lighting ;

3) To change the Set value press the ▲or ▼ within 15s ;

4) To memorise the new set point value push the **Set** key again or wait 15s.

**HOW TO CHANGE A PARAMETER VALUE :**

**To change the parameter's value operate as follows:（first level Pr1）**

1）Enter the Programming mode by pressing the **Set**+ ▼keys for 3s , the "set" LED starts to light ;

2）Select the required parameter. Press the **Set** key to display its value ;

3）Use▲ or ▼to change its value ;

4）Press **Set** to store the new value and move to the following parameter ;

5）**To exit :** Press **Set**+▲ or wait 15s without pressing a key .

**HIDDEN MENU（the second level Pr2）**

**(**The hidden menu includes all the parameters of the instrument (Pr1 and Pr2)**)**

1) Enter the Programming mode by pressing the **Set**+▼ keys for 3s the" set "LED starts to light ;

2) Then push again the **Set**+▼ keys for more than 7s,the L2 label will be displayed; release the **Set**+▼ keys , it will display the set point value of "Hy", then you already enter into the hidden menu ;

3) Select the required parameter ;

4) Press the **Set** key to display its value ;

5) Use ▲or ▼to change its value ;

6) Press **Set** to store the new value and move to the following parameter ;

7) **To exit:** Press **Set**+▲ or wait 15s without pressing a key.

**NOTE:** If none parameter is present in L1, the "nP" message is displayed. Keep pressing **SET＋▼** until the "L2" message is displayed , will enter in to the hidden menu (second level) .

**HOW TO MOVE A PARAMETER FROM THE HIDDEN MENU(Pr2) TO THE FIRST LEVEL (Pr1) AND**

**VICEVERSA.**

Each parameter present in the HIDDEN MENU can be removed or put into "THE FIRST LEVEL" (user level) by pressing **SET**+ ▼.

In moving the decimal point will be on or off , the decimal point off means the parameter is successed to move ; the decimal point on means the parameter is only find in the hidden menu( second level)

**TO LOCK/ UNLOCK THE KEYBOARD**

Keep pressed ▲+▼ for more than 3s,the **"oF"** message will be displayed and the keyboard will be locked.

Keep pressed ▲+▼ for more than 3s ,the **"on"** message will be displayed and the keyboard will be unlocked.

**MANUAL DEFROST**

Press ❄ to view the current evaporator sensor measured temperature value.

Push the ❄ key for more than 2 seconds and a manual defrost will start.

**8.Output**

1 Cooling/Heating :

  Cooling :

 Normal status : When the cabinet temperature is higher than the set point + hysteresis (Hy),and finish the Anti-short cycle delay time(AC), cooling will start ;

When the cabinet temperature is lower than the set point, cooling will stop.

For the first time the power on ,and the time up to (od) value , if the cabinet temperature is higher than the set point + hysteresis (Hy) , cooling will start.

Heating:

Normal status : When the cabinet temperature is lower than the set point , and finish the Anti-short cycle delay time(AC), heating will start ;

When the cabinet temperature is higher than the set point + hysteresis (Hy), heating will stop.

For the first time the power on ,and the time up to (od) value , if the cabinet temperature is lower than the set point , heating will start.

If the cabinet sensor is fault , the compressor will run and stop according to the set time.( running time Cy and stop time Cn).

2 Defrost:

  1) If the defrost cycle (id=0) , the defrost will be forbidden .

  2) id≠0:

① The Evaporator sensor start to work (P2=y), the evaporator's sensor temperature is higher than the defrost termination temperature(dE) , it can't open the defrost function .

② The Evaporator sensor start to work (P2=y) and the evaporator's sensor temperature is lower than the defrost termination temperature(dE) or (P2=n) , the defrost function will start when fit one of the next conditions :

a) The controller will start defrost according to the set defrost cycle.

b) Press ❄ for 2s，start defrost.

  3) Under the defrost state（Any of the following conditions can be closed defrosting）:

①The evaporator sensor start to work (P2=y) ,Evaporator sensor temperature ＞ Defrost termination temperature（**d7**）,defrost is closed

②Maximum time of defrost（Md）runs out，defrost is closed；

③ Press 🌨 for 2s，stop defrost；

3 Fault Alarm ：

| Mess. | Cause | Outputs |
|---|---|---|
| P1 | Cabinet temperature sensor fault | Compressor output according to "Cy" e "Cn" |
| P2 | Evaporator sensor fault | Defrost relay will working fellow the preset of "id" and "Md" |
| HA | Cabinet high temperature alarm | Outputs unchanged |
| LA | Cabinet low temperature alarm | Outputs unchanged |
| nP | Evaporator sensor is forbidden ,display screen show the evaporator's temperature | |
| Er | **Hot key** program failure | |

1) When the temperature sensor is fault , it is display P1 or P2, it will recover when the problem is solved.

2) Cabinet over temperature alarm :

When the cabinet temperature is beyond the (AU) set point , Ad and (dA) all finished , it will display HA, when the temperature is lower than the (AU) , the alarm will stop.

When the cabinet temperature is below the( AL) set point , Ad and (dA) all finished , it will display LA, when the temperature is higher than the (AL) , the alarm will stop.

## 9.Hot key

1) Upload

① Program one controller with the front keypad.

② Insert the "Hot key" and push ▲key; the **"uP"** message appears.

③ Turn OFF the instrument remove the "Hot Key", then turn the controller ON again.

2) Download

① Insert the "Hot key", push the ▼key,  the controller will display "do".

② Turn OFF the instrument remove the "Hot Key", then turn he controller ON again.

**NOTE**: The "**Er**" message is displayed for failed programming. Then you need to check that did the connection is secure or not, then repet the below step .

★ Pelase make sure that the power is stable during this time.

## 10.Wiring diagram
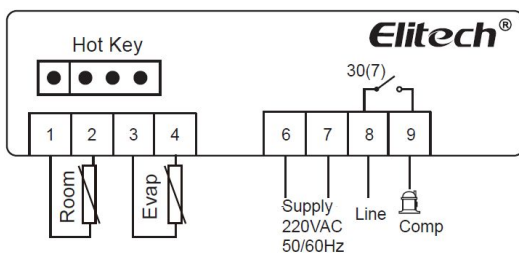


## 11.Safety rules

★Danger :

1) Strictly distinguish the power wire, relay output, sensor down-lead and data line, and the relay could not be overloaded.

2) Prohibit connecting the wire terminals without electricity cut-off.

★Warning :

Prohibit using this unit under the environment of over damp, high temp., strong electromagnetism interference or strong corrosion.

★Notice:

1) The power supply should conform to the voltage value indicated in the instruction, and make sure a steady power supply.

2) To avoid the possible interference, the sensor down-lead/data line and power wire should be kept in a proper distance.

3) When evaporator sensor is installed, the sensor should be well connected with the copper tube which is 5cm away from evaporator inlet.