



ECS-02CX Temperature controller instruction

1.Product overview

ECS-02CX is a general type temperature controller , temperature units $^{\circ}\text{C}$ / $^{\circ}\text{F}$ 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 : $-50\sim99\text{ }^{\circ}\text{C}$ / $^{\circ}\text{F}$ (only refers to the sensor calibration value is set to 0)
- 2) Temperature resolution : $9.9\sim-9.9$, $0.1\text{ }^{\circ}\text{C}$ / $^{\circ}\text{F}$, the others, $1\text{ }^{\circ}\text{C}$ / $2\text{ }^{\circ}\text{F}$
- 3) Measurement accuracy : $-40\text{ }^{\circ}\text{C}\sim50\text{ }^{\circ}\text{C}$, $\pm1\text{ }^{\circ}\text{C}$, $50\text{ }^{\circ}\text{C}\sim70\text{ }^{\circ}\text{C}$, $\pm2\text{ }^{\circ}\text{C}$, the others : $\pm3\text{ }^{\circ}\text{C}$ or $-40\text{ }^{\circ}\text{F}\sim99\text{ }^{\circ}\text{F}$, $\pm2\text{ }^{\circ}\text{F}$, the others : $\pm6\text{ }^{\circ}\text{F}$
- 4) Temperature controlling range : $-50\sim99\text{ }^{\circ}\text{C}$ / $^{\circ}\text{F}$
- 5) Power supply : $220\pm10\%$ (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 : $0\text{ }^{\circ}\text{C}\sim55\text{ }^{\circ}\text{C}$
- 11) Storage condition : $-25\text{ }^{\circ}\text{C}\sim75\text{ }^{\circ}\text{C}$,
- 12) Relative humidity : 20% $\sim$ 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	$^{\circ}\text{C}$	On	Temperature unit is $^{\circ}\text{C}$
Temperature unit	$^{\circ}\text{F}$	On	Temperature unit is $^{\circ}\text{F}$
Temperature set point value indicator		On	Check the set point

6.Parameter table

Menu	Functions	Setting range	Default	Level
St	Temperature setting value	Maximum $\sim$ Minimum Set Point	3	Pr0
Hy	Hysteretic value	$0.1\sim10\text{ }^{\circ}\text{C}$ $1\sim25\text{ }^{\circ}\text{F}$	2	Pr1
LS	Minimum set point	$-50\text{ }^{\circ}\text{C}\sim\text{St}$ $-50\text{ }^{\circ}\text{F}\sim\text{St}$	-50	Pr2
US	Maximum set point	$\text{St}\sim99\text{ }^{\circ}\text{C}$ $\text{St}\sim99\text{ }^{\circ}\text{F}$	99	Pr2
ot	Cabinet sensor calibration	$-9.9\sim9.9\text{ }^{\circ}\text{C}$ $-20\sim20\text{ }^{\circ}\text{F}$	0	Pr1
P2	Evaporator sensor selection	y: Enable n: Forbidden	y	Pr1
oE	Evaporator sensor calibration	$-9.9\sim9.9\text{ }^{\circ}\text{C}$ $-20\sim20\text{ }^{\circ}\text{F}$	0	Pr2
od	Outputs activation delay at start up	$0\sim99\text{min}$	0	Pr2
AC	Anti-short cycle delay	$0\sim50\text{min}$	1	Pr1
Cy	Compressor running time in the mode of "Run/stop in a proportional time"	$0\sim99\text{min}$	15	Pr2
Cn	Compressor stop time in the mode of "Run/stop in a proportional time"	$0\sim99\text{min}$	30	Pr2
CH	Cooling /Heating	CL: Cooling Ht: Heating	CL	Pr2

CF	$^{\circ}\text{C}$ / $^{\circ}\text{F}$	C: $^{\circ}\text{C}$ F: $^{\circ}\text{F}$	C	Pr2
Ld	Default Display	P1: Display the cabinet sensor P2: Display the evaporator sensor SP: Display the temperature setpoint	P1	Pr2
dE	Defrost termination temperature	$-50\sim90\text{ }^{\circ}\text{C}$ $-50\sim90\text{ }^{\circ}\text{F}$	2	Pr1
id	Defrost cycle	$0\sim99\text{hour}$	8	Pr1
Md	The maximum time of defrost	$1\sim99\text{min}$	20	Pr1
dF	Defrost status display	rt : Display cabinet temperature It : Display start-defrost cabinet temperature St : Display temperature setting value dF : Display "dF"	it	Pr2
AU	Cabinet temperature upper limit alarm value	$(\text{AL}+1)\sim99\text{ }^{\circ}\text{C}$ $(\text{AL}+1)\sim99\text{ }^{\circ}\text{F}$	99	Pr1
AL	Cabinet temperature lower limit alarm value	$-50\text{ }^{\circ}\text{C}\sim(\text{AU}-1)$ $-50\text{ }^{\circ}\text{F}\sim(\text{AU}-1)$	-50	Pr1
Ad	Temperature alarm delay	$0\sim99\text{min}$	15	Pr2
dA	Exclusion of temperature alarm at startup	$0\sim99\text{min}$	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
	The values of user menu parameters recovery	Press and hold for 10 sec	If it succeeds, the panel displays "st"
▲	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“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 succeeded 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.

Parameter value recovery

- a) When the controller in the temperature display status , pressing both set+ ▲ 10s, will display rS code . it means that the controller already recovery.
- b) When using the CPK-4 hot key to program the controller, it will auto double backup parameters.
- c) The first is use to drive the controller and the second will use to recovery the controller.
- d) Connect CPk-4 again and download the data if you want to modify the second backup parameter.

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” and “Cn”
P2	Evaporator sensor fault	Defrost relay will working follow the preset of “id” and “Md”
HA	Cabinet high temperature alarm	Outputs unchanged
LA	Cabinet low temperature alarm	Outputs unchanged
ηP	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.

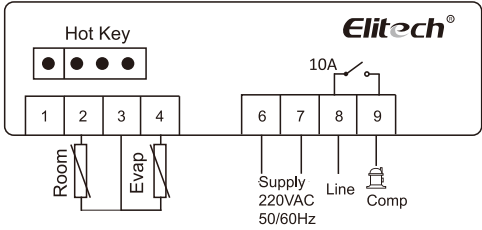
9.Hot key

- 1) Upload (copy the program from the controller to the hot key)
① Program one controller by the front keypad.
② Insert the “Hot key” and keep pressing ▲key until the “uP” message appears.
③ 3s later remove the “Hot Key”, and power on again.
- 2) Download
① Insert the “Hot key”, keep pressing the ▼key until the “do” message appears.
② remove the “Hot Key”, and 3s later power on again.

NOTE: The “Er” message is displayed for failed programming. Then you need to check whether the connection is secure or not, then repeat those same steps.

★ Pelase make sure that the power is stable and the connection is secure during this time. And please don’t remove or insert the hot key until the upload or download action is finished.

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.