Elitech®

ECS–100 Temperature Controller User Manual

ECS-100 temperature controller is with the optional components of evaporator temperature sensor, condenser sensor, door switch, and buzzer. It has multiple control modes of defrost and fan for an effective energy-saving control. Large panel of color digital tube, work status symbol display, temperature display resolution is 0.1, the front panel waterproof level IP64; User menu and administrator menu separately setting with a password, to prevent user errors. Refrigeration adopts hysteresis control, with the refrigeration relay outputs 30A, which could directly drive a single phase 1.5HP compressor; It can switch between refrigeration mode and non-refrigeration mode by pressing key; with multiple protection and alarm modes optional. Specially it has the function of one-key recovery, very convenient for the production and after sale service of equipment manufacturers. The rear adopts the plug-in connection method instead of the traditional screw-type connection, which could effectively simplify processing for equipment manufacturers.

1. Operation and display panel

2. Specification

1) Mounting size: (71mm)×(29mm) (max)
2) Product size: (78.5mm)×(34.5mm)×(82mm) (max)

3. Technical parameters

1) Measuring range: -50℃～90℃
2) Resolution: 0.1℃
3) Accuracy: -40℃～50℃, ±1℃, 50℃～70℃, ±2℃, others, ±3℃
4) Controlling range: -50℃～50℃;
5) Power supply: 230±10%(VAC)
6) Power consumption: <3W
7) Output capacity:
   Refrigeration: 30A/240VAC, normal open, directly drive a single phase 1.5HP（240VAC）load
   Defrost: 5A/250VAC
   Fan: 5A/250VAC
8) Front panel waterproof level: IP64
9) Work ambient temperature: 0℃～55℃
10) Storage temperature: -25℃～75℃
11) Relative humidity: 20%～85%(non condensing)

4. Indicator light status description

Indicator light	Symbol	Status	Meaning
Setting	Set	ON	Parameter setting
		OFF	Status of temperature measuring and controlling
Refrigeration	❄	ON	Refrigeration work
		OFF	Refrigeration stop
		FLASH	Refrigeration time delay
Defrost	❄	ON	Defrost work
		OFF	Defrost stop
Fan		ON	Fan work
		OFF	Fan stop
Defrost dripping	drip	ON	Start defrost dripping
		OFF	Stop defrost dripping
Door switch		ON	Cabinet door open
		OFF	Cabinet door close
one-key recovery		ON	Execute parameter one-key recovery
Non-refrigeration		ON	Switch to non refrigeration status

5. Parameter list

Menu	Functions	Setting range	Default/H1	H2	H3	H4	H5	H6	Unit
User menu									
St	Temperature set value	Upper limit～Lower limit	4	2	3	3	-22	4	℃
Po	Administrator menu Password	00～99（password is 55, unmodified）	00	00	00	00	00	00	/
Administrator menu									
C1	Hysteresis value	0.5～9.0	4.0	4.0	2.0	4.0	4.0	4.0	℃
C2	Compressor start delay time	0～15	5	5	5	5	5	5	min
C3	Temperature calibration	-10.0～+10.0	0.0	0.0	0.0	0.0	0.0	0.0	℃
C4	Temperature set lower limit	-50～temperature set value	-2	-2	-2	-2	-26	-2	℃
C5	Temperature set upper limit	Temperature set value～50	22	22	10	10	-16	22	℃
d1	Evaporator sensor selection	0: Disabled 1: Enabled	1	1	1	1	1	1	/
d2	Evaporator sensor calibration	-10.0～+10.0	0.0	0.0	0.0	0.0	0.0	0.0	℃
d3	Defrost cycle calculation	0: accumulated refrigeration time 1: the real defrost interval	1	1	1	1	1	1	/
d4	Defrost cycle	0～90 0: Defrost forbidden	2	2	4	6	12	2	hour
d5	Defrost status display	0: Display cabinet temperature 1: Display dEF during defrost,display cabinet temperature during defrost time delay 2: Always display dEF during defrost and defrost dripping 3: Always display start-defrost cabinet temperature during defrost and defrost dripping	2	2	2	2	2	2	/
d6	The maximum time of defrost	1～90	25	25	25	25	45	25	min
d7	Defrost termination temperature	0～50	12	12	12	12	12	12	/
d8	Dripping time after defrost	0～60 0: Defrost dripping time forbidden	2	2	2	2	5	2	min
d9	Cabinet temperature display time delay after defrost	0～90	10	10	10	10	10	10	min
F1	Fan running mode	0: Fan and compressor run or stop synchronically 1: Fan runs continuously, stops during defrost 2: Fan runs continuously, stops during defrost and defrost dripping 3: Fan runs continuously, stops during defrost, fan time delay after defrost 4: controlled by the defrost sensor temperature, stop during defrost	3	3	3	3	3	3	/
F2	Min.temperature of fan	-40～Max temperature of fan	-12	-12	-12	-12	-40	-12	℃
F3	Max temperature of fan	Min.temperature of fan～50	-5	-5	-5	-5	-14	-5	℃
F4	Fan initial start time delay after electrified	0～60	4	4	4	4	4	4	min
F5	Fan start time delay after defrost	0～60 0: Fan time delay canceled	2	2	2	2	2	2	min
A1	Compressor run and stop in a proportional time after cabinet sensor failure	0: Cancel the mode of “Run/stop in a proportional time” 1: Start the mode of “Run/stop in a proportional time”	1	1	1	1	1	1	/

Menu	Functions	Setting range	Default/H1	H2	H3	H4	H5	H6	Unit
A2	Compressor stop time in the mode of “Run/stop in a proportional time”	1～60	5	5	5	5	5	5	/
A3	Compressor running time in the mode of “Run/stop in a proportional time”	1～60	30	30	30	30	30	30	/
A4	Buzzer selection	0: Buzzer output disabled 1: Buzzer output enabled	1	1	1	1	1	1	/
A5	Cabinet temperature lower limit alarm value	-40～Cabinet temperature upper limit alarm value	-10	-10	-10	-10	-28	-10	℃
A6	Cabinet temperature upper limit alarm value	Cabinet temperature lower limit alarm value～70	24	15	15	15	-14	24	℃
A7	Cabinet over temperature alarm time delay	0～60	20	20	20	20	20	20	3min
A8	The initial cabinet over temperature alarm time delay after electrified	0～60	40	40	40	40	40	40	3min
do	Control output during door open	0: door switch canceled	0	0	0	0	0	0	/
cd1	condenser sensor selection	0: Disabled 1: Enabled	1	1	1	0	0	1	/
cd2	Condenser high temperature alarm start value	30～90	55	55	55	55	55	55	℃
cd3	Lower hysteresis of condenser high temperature alarm	1～15	5	5	5	5	5	5	℃

6. Keys Function

6.1 Keys description

Keys	Function
Set	Enter the status of parameter setting;
	Switch between menu and parameter;
☼	Adjust menu and parameters;
↻	Adjust menu and parameters;
	Press more than10 to execute parameter one-key recovery
Rst	Exit from parameter setting;
	View evaporator sensor temperature value
	Press 3s to start forced defrost

6.2 Keys operation

1）In the status of temperature measuring and controlling, press Set key for three seconds to enter user menu, it displays the code St, then press Set key again, display the value of St. It could be modified by pressing the key ☼ or ↻.

2）When it displays the code St, press the key ☼, display the code Po, then press Set key, display 00, at this time, press ☼ or ↻ to input the password of administrator menu.

3）Press Set key again to confirm the password input, and the controller will automatically verify the correctness of password. When it passes, it could enter all parameter items in the administrator menu, or else, only the parameters items St and Po available, others could not be displayed.

4）When the parameter item is selected, press Set key to enter to the setting of the current item, press ☼ or ↻ to modify the value, and then press Set key to return to the menu.

5）Under the status of parameter setting, press Rst key or no key operation within 30s, it will exit from parameter setting and automatically save the current parameter value.

6）The password input of administrator menu only be valid for once. After exit from the parameter setting, it needs to input the correct password again for next parameter adjustment.

7）In the status of temperature measuring and controlling, press Rst to view the current evaporator sensor measured temperature value. Press Rst for three seconds to force the open or close of defrost.

8）In the status of temperature measuring and controlling, press the key ↻ for 10S, the indicator light of one-key recovery will light, it displays the code HO and enter to the operation of one-key recovery. It could continue to select the parameter recovery items by pressing key ↻, and the selection range is H0～H7, press key Rst to execute the parameter recovery and then exit, if there is no parameter recovery operation within 30S, it will automatically exit from the mode without recovery of parameters.（Note：This operation needs a stable power supply. If the power supply is abnormal, it needs to re-electrify the controller with stable power supply and execute the one-key recovery again.）

H0	Give up parameter recovery, no change of each parameter, no display of parameter recovery success code dr
H1	Recovery the parameter H1, recovery success display dr
H2	Recovery the parameter H2, recovery success display dr
H3	Recovery the parameter H3, recovery success display dr
H4	Recovery the parameter H4, recovery success display dr
H5	Recovery the parameter H5, recovery success display dr
H6	Recovery the parameter H6, recovery success display dr
H7	Only for factory production testing, users is forbidden to use

9）In the status of temperature measuring and controlling, press both Set and ↻ for three seconds, the controller enters to the non-refrigeration mode, the non-refrigeration indicator light will be on.

7. Control output

7.1 Compressor：

Normal status：When the cabinet temperature is higher than the set temperature+hysteresis, and finish the compressor start delay time, the compress will start；

When the cabinet temperature is lower than the set temperature, the compressor will close.

Cabinet temperature sensor failure：when the function of “Run/stop in a proportional time” is closed, the compressor closes；When the function of “Run/stop in a proportional time” opens, the compressor will run and stop according to the set time.

7.2 Defrost：

The controller will start defrost according to the set defrost cycle or it can be manually started. (If both the evaporator sensor and defrost termination temperature are enabled, the evaporator sensor temperature needs lower than the defrost termination temperature)；

Defrost stops according to the defrost time or the defrost termination temperature of the evaporator sensor or it could be manually stopped.

When the evaporator sensor is forbidden or the evaporator sensor fails, defrost stops by the defrost time or manually stops.

7.3 Fan:

0: Fan and compressor run or stop synchronically
1: Fan runs continuously, stops during defrost
2: Fan runs continuously, stops during defrost and defrost dripping
3: Fan runs continuously, stops during defrost, fan time delay after defrost
4: controlled by the defrost sensor temperature, stop during defrost

Fan running mode：

1）Fan and compressor run or stop synchronically；

2）Fan runs continuously, stops during defrost；

3）Fan runs continuously, stops during defrost and defrost dripping；

4）Fan runs continuously, stops during defrost, fan time delay after defrost；

5）When it is not in the status of defrost, and the evaporator temperature is within the minimum temperature of fan and the maximum temperature of fan, the fan runs, or else, fan stops; Fan stops during defrosting；

6）When the control output after door open is selected as parameter 1,the fan stops when the cabinet door opens, and it will return to its normal working status when the door is closed.

（Note：The fan won’t start until it finishes “fan initial start time delay after electrified”.）

7.4 Alarm:

Temperature sensor failure alarm：

When cabinet sensor fails, the digital tube display E1；

When evaporator sensor fails, the digital tube display E2；

When condenser sensor fails, the digital tube display E3；

Condenser high temperature alarm: If the condenser sensor is selected, when the condenser temperature is higher than the condenser high temperature alarm start value, it will alarm and display cH.While it will not have an effect on the control output. When the temperature falls back to (the condenser high temperature alarm value-condenser high temperature alarm lower hysteresis), the alarm is released.

Cabinet over temperature alarm: When the cabinet temperature is higher than the cabinet temperature upper limit alarm value, and cabinet over temperature alarm time delay or the initial cabinet over temperature alarm time delay after electrified has been finished, the digital tube will display rH, and the alarm will be released when the temperature is lower than the cabinet temperature upper limit alarm value; When the cabinet temperature is lower than the cabinet temperature lower limit alarm value, and cabinet over temperature alarm time delay or the initial cabinet over temperature alarm time delay after electrified has been finished, the digital tube will display rL, and the alarm will be released when the temperature is higher than the cabinet temperature lower limit alarm value.

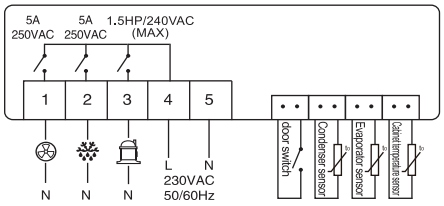
If the buzzer is selected as 1, when the alarm occurs, the buzzer beeps; When all alarm is released, the buzzer mutes, or press any key to mute the alarm.

Alarm code	Alarm reason
E1	Cabinet temperature sensor failure
E2	Evaporator sensor failure
E3	Condenser sensor failure
cH	Condenser high temperature alarm
rH	Cabinet high temperature alarm
rL	Cabinet low temperature alarm

7.5 Non-refrigeration working mode:

When the controller is in the non-refrigeration working mode, it will close the control output of compressor, fan and evaporator(not including buzzer).

8. Wiring diagram



9. 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.

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