

Digital controller with defrost and fans management

ECS-2180neo



General warning

Please read before using this manual

- This manual should be kept near the device as a quick reference
- This device should not be used for purposes different than described in manual
- Check application before proceeding

Safety precautions

- Must be installed by a suitably qualified person
- Check the supply voltage is correct before connecting the device
- Do not expose the device to water or moisture, use the device within operating limits
- Disconnect all electrical connections before any kind of maintenance
- In case of failure or faulty operation please return to supplier with a detailed report of problem
- Show precaution in checking the current ratings of any device connected to relays
- Ensure probe cables are separate from power supply to avoid interference
- In industrial applications consider the use of mains filters in parallel with inductive loads

General description

ECS-2180 neo is a microprocessor based controller suitable for medium or low temperature refrigeration control. It has 3 relay outputs to control compressor fan and defrost, which can be electric or hot gas. Two NTC temperature probes are supplied for thermostatic control and for evaporator defrost control

Functions

Compressor

The regulation is performed according to the temperature measured by the indoor probe (terminals 1&2). As temperature increases at reaches set point + differential and the compressor is started. As temperature decreases and reaches set point the compressor will switch off. Visual indication on the display shows when compressor relay is engaged. This indicator flashes during a delay, such as avoiding short cycling

Defrost

The defrost mode can be selected for: electric heater or hot gas. For medium temp application an "off cycle" defrost can be utilised where defrost will occur when compressor is off

Defrost is interval timed and this is adjustable by user. Defrost probe will end the period of defrosting or by interval period Defrost has visual indication on display

Fan control (Evaporator indoor)

The fan control is configurable to run only with compressor or to run continuously. Adjustable drip time is a feature designed to allow ice/water extra time to be removed from evaporator. Fan motor has high temp stop point as a safety feature preventing circulation of warm air

SET: Press for 3 seconds to change set point, display shows St

Press  to increase set point

Press  to lower set point

LED Display

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

Keys	Function	Button action
Set	Enter the status of parameter setting;	pressing the keys for 3s
	Switch between menu and parameter;	Press the response
	Adjust menu and parameters;	Press the response
	Open/close light(only valid for the model with light control)	Press the response
	Upload the data to copy card	pressing the keys for 3s
	Adjust menu and parameters	Press the response
	Download the copy card	pressing the keys for 3s
	View evaporator sensor temperature	Press the response
	Exit from parameter setting;	Press the response

How to change parameters (Administrator menu)

Press Set for 3 seconds:

Press 

Press Set and enter administrator password 55 by using

Press  to increase

Press  to lower

Once 55 is reached, push set and then 

Now push  to go through administrator level

Differential is changed by pushing set point on C1 use  and

 To increase or decrease differential

Buzzer mute Press any key to silence alarm buzzer

Other common parameters, can be accessed by pushing set button with following codes:

D4 Defrost interval set range 0-90 hours. Time between defrosts

D6 = defrost period set range 1-90 minutes. Length of defrost but this can be over ridden by defrost probe indicating that frost is clear

A6 = Maximum temperature alarm range AL1-70 °C. High Temp alarm

A5 = Minimum temperature alarm range -40 °C– AU1. Low Temp alarm

C6 Max set point range +85°C. To limit the maximum set point

C5 Min set point range -50°C To limit the minimum set point

A7 Alarm delay range 0-60 minutes. Delay before alarm activates

C7 Compressor short cycle protection range 0-90 minutes. Stops compressor stop starting excessively

A2 Compressor run time in event of probe failure range 0-60 minutes. Compressor will run for this timed period with no input to avoid thawing of product

A3 Compressor stop time in event of probe failure range 0-60 minutes. Compressor will cycle off after this period of time with no input to avoid freezing product

D1 Evaporator probe presence 0 = disabled 1 = enabled

D2 Probe calibration range -10 to 10°C adjustment of probe input reading if accuracy is poor due to extended probe or interference

D7 defrost stop temperature, defrost terminates when this setting is reached

F5 fan stop temperature, fans will not run at or above this setting

D8 drip time, at end of defrost time is allowed for condensate to drip off coil

D11 defrost mode 0 is electric heater 1 is hot gas

F1 fan mode 0 fan operates simultaneously with compressor 1 fan operates continuously stops during defrost 2 fan operates continuously stops during defrost and drip time 3 fan operates continuously stops during defrost fan time delay after defrost 4 Controlled by sensor fan stops during defrost

A full list of parameters follows (some are optional and depend on model)

Parameter list

Menu	Functions	Setting range	Default	Unit
Common user menu				
St	Temperature set value	Upper limit~Lower limit	4°C	°C/ °F
Po	Administrator menu Password	00~99 (password is 55,unmodified)	00	/
Administrator's menu				
C1	Hysteresis value	0.5°C~9.0°C 1°F~20°F	4.0°C	°C/°F
C2	Compressor start Min. interval	0~60	5	min
C3	Compressor initial start Min. interval	0~90	5	min
C4	Cabinet sensor calibration	-10.0°C~10.0°C -20°F~20°F	0.0°C	°C/°F
C5	Temperature set lower limit	-50°C~temperature set value -58°F~temperature set value	-2°C	°C/°F
C6	Temperature set upper limit	temperature set value~85°C temperature set value~185°F	22°C	°C/°F
C7	Max.standby time after finishing compressor start Min. interval (note①)	0~90 0:Max.standby time calculation is forbidden	9	min
C8	Refrigeration Min. running time	0~90 0: Refrigeration Min.running time calculation is forbidden	0	min
d1	Evaporator sensor selection	0: Disabled 1: Enabled	1	/

d2	Evaporator sensor calibration	-10.0°C~10.0°C -20°F~20°F	0.0°C	°C/°F
d3	Defrost cycle calculation	0: accumulated refrigeration time 1: natural time	1	/
d4	Defrost cycle	0~90 0: Defrost forbidden	2	hour
d5	Defrost status display	0:Display cabinet temperature 1:Display dEF during defrost and defrost time delay, display cabinet temperature after finishing 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	/
d6	The maximum time of defrost	1~90	25	min

d7	Defrost termination temperature	0°C~50°C 32°F~122°F	12°C	°C/°F
d8	Dripping time after defrost	0~60 0: Defrost dripping time forbidden	2	min
d9	Cabinet temperature display time delay after defrost	0~90	10	min
d10	Time delay after defrost start	0~60 0:Defrost start time delay is canceled	10	min
d11	Defrost type	0:Electric heating defrost 1:Hot gas defrost	0	/

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 defrost sensor, fan stops during defrost.	3	/
F2	Fan initial start time delay after electrified	0~60	4	min
F3	Fan start time delay after defrost	0~60 0: Fan time delay canceled	2	min
F4	Fan working lowest temp.	-50°C~Fan working highest temp. -58°F~Fan working highest temp.	-12	°C/°F

F5	Fan working highest temp.	Fan working lowest temp.~85°C Fan working lowest temp.~185°F	-5	°C/°F
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	/
A2	Compressor stop time in the mode of "Run/stop in a proportional time"	1~60	5	min
A3	Compressor running time in the mode of "Run/stop in a proportional time"	1~60	30	min
A4	Buzzer alarm output switch	0: Buzzer output disabled 1: Buzzer output enabled	1	/
A5	Cabinet temperature lower limit alarm value	-50°C~Cabinet temperature upper limit alarm value -58°F~Cabinet temperature upper limit alarm value	-10°C	°C/°F

A6	Cabinet temperature upper limit alarm value	Cabinet temperature lower limit alarm value~85°C Cabinet temperature lower limit alarm value~185°F	24°C	°C/°F
A7	Cabinet over temperature alarm time delay	0~60	20	3min
A8	The initial cabinet over temperature alarm time delay after electrified	0~60	40	3min
A9	Over temperature alarm upper deviation	1°C~30°C 1°F~60°F	10°C	°C/°F

A10	Over temperature alarm lower deviation	1°C ~ 30°C	5°C	°C/°F
		1°F ~ 60°F		
A11	Over temperature alarm mode	0: Absolute temperature point 1: set value + over temperature alarm deviation	0	/
A12	Light/Alarm relay selection	0: Light output 1: Alarm output	0	/
do1	Control output of door switch	0: Door switch is canceled 1: Close fan during door open 2: Turn on the light when door open, turn off the light when door closed 3: Close fan and turn on the light when door open, Turn off the light when door closed 4: When door is open, it is the synchronous signal input of defrost, defrost will start.	0	/

do2	Buzzer response when door open	0: NO 1: YES	0	/
cd1	Condenser sensor selection	0: Disabled 1: Enabled	0	/
cd2	Condenser high temperature alarm start value	30°C ~ 90°C	55°C	°C/°F
		86°F ~ 194°F		
cd3	Lower hysteresis of condenser high temperature alarm	1°C ~ 15°C	5°C	°C/°F
		2°F ~ 30°F		
u1	Celsius / Fahrenheit selection (note ②)	00: Fahrenheit 01: Celsius	01	/

Note ① only applicable when sensor is functional

Note ② Caution required when changing from Celsius Fahrenheit as all parameters will change accordingly.

ALARM CODES

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
Er	Copy card programming failure
EP	Inconsistent data between copy card and controller, programming failure

SPECIFICATION

Front panel 34.5 (H) x 76mm (W) +/- 2mm

Cut out 30 (H) x 72mm (W) +/- 1mm

Operating temperature -5 to 55°C

Storage temperature -10 to 65°C

Power supply 12/24 Volt DC

Power consumption < 10 watts

Temperature range -40 to 90°C

Inputs = 2 NTC sensors 1.5m

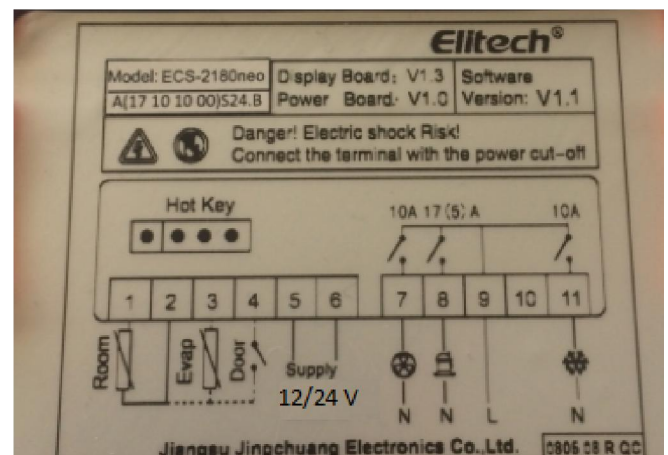
Outputs:

- Compressor output 17/7Amp
- Fan output 10 Amp
- Defrost output 10 Amp
- Alarm output = built in buzzer

Problem solver

- **Remove power from controller**
- E1 or E2 check probe connections, clean plug in terminals
- Probes can be extended to 100m but should have good watertight connections, recalibration may be required for long extension
- LA alarm = excessive temperature, allow controller to cool down and relocate or ventilate to keep cool
- Relay failure = check full load amperage of output to ensure that it is below ratings on controller
- Defrost will not start = check coil temperature
- Fan will not start = check coil temperature

Wiring



Warranty procedure

1 year replacement warranty

Return controller to supplier complete with probes

Give detailed description of fault and equipment