

Model: ED106 Digital Temperature Controller



Dimension: 77(Length) × 35(Width) × 60(Depth)mm
Mounting hole dimension: 71(Length) × 29(Width)mm

Features of Function

- It is a mini-sized and integrated intelligent controller
- Temperature Control / Manual, automatic defrost / Evap. Fan Control / Defrost by electric heater, hot gas Time/temp. Setting to end defrost / Value Storing / Self Testing

Specifications

1. Power supply: 230VAC
2. Temperature sensor: NTC, double sensors (for cold-room temp. & defrost control), 2m(L)
3. Range of temperature display: $-45 \sim 150^{\circ}\text{C}$ ($-40 \sim 150^{\circ}\text{F}$) Accuracy: $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$)
Resolution: $0.1^{\circ}\text{C} / ^{\circ}\text{F}$ ($-19.9 \sim 99.9^{\circ}\text{C} / ^{\circ}\text{F}$)
4. Range of set temperature: $-45 \sim 45^{\circ}\text{C}$ ($-40 \sim 113^{\circ}\text{F}$) Factory default: 0°C (32°F)
5. Temperature of the operating environment: $-10 \sim 60^{\circ}\text{C}$ ($14 \sim 140^{\circ}\text{F}$);
Relative Humidity: 20%~90% (Non-condensing)
6. Relay output contact capacity
 - Compressor: N.O. 16A/250VAC
 - Defrost: N.O. 10A/250VAC
 - Evap. Fan: N.O. 5A/250VAC

Front Panel Operation

1. Set temperature (compressor stop temperature) adjustment
 - Press **SET** button, the set temperature is displayed.
 - Press **△** or **▽** button to modify and store the displayed value. Press **SET** button to exit the adjustment and display the cold-room temperature.
 - If no more button is pressed within 6 seconds, the cold-room temperature will be displayed.
(Set temperature adjustment range: parameter E1~E2)
2. Manual start/stop defrost: Press **DEF** button and hold for 6 seconds to defrost or stop defrost.
3. Display the evap. temperature: Press **△** button and hold 6 seconds the evap. Temp. is display, after 6 seconds the cold room temp. is resumed to be displayed.
4. Refrigerating LED: During refrigerating, the LED is on; when the cold-room temp. is constant, the LED is off; during the delay, the LED flashes.
5. Defrost LED: during defrosting, the LED is on; when it stops defrosting, the LED is off. During the delay display of defrost, the LED flashes.
6. Evap. Fan LED: the LED is on during fan operation. The LED is off when the Evap. fan stops operation.
7. Parameters setup
 - Press **SET** button and hold for 6 seconds to enter the parameter setup mode while E1 flashes.
 - Press again **SET** button to select sequentially from the parameters: E2, E3, E4, E5, E6, C1, F0~F9, E1.
 - Press **△** or **▽** button, the value of parameter will be displayed and can be modified and stored.
 - If no more button is pressed within 6 seconds, it will return to normal operation mode.

Parameter	Function	Set range	Default	Parameter	Function	Set range	Default
E1	Lower setpoint limit	$-45^{\circ}\text{F} \sim \text{Set temp.}$ -45°C	-31°F -35°C	F3	Defrost termination temp.	$32 \sim 86^{\circ}\text{F}$ $0 \sim 30^{\circ}\text{C}$	46°F 8°C
E2	Higher setpoint limit	Set temp. $\sim 113^{\circ}\text{F}$ 45°C	113°F 45°C	F4	Display during defrost	0=Normal display 1=Last value before defrost	0
E3	Temp. hysteresis	$1.8 \sim 36.0^{\circ}\text{F}$ $1 \sim 20.0^{\circ}\text{C}$	7.2°F 4.0°C	F5	Fan operating function	0=Parallel with comp. 1=Continuous running except defrost	0
E4	Comp. start delay time	$0 \sim 10\text{Min}$	2Min	F6	Dripping time	$0 \sim 30\text{Min}$	2
E5	Offset on room temp.	$-36.0 \sim 36.0^{\circ}\text{F}$ $-20.0 \sim 20.0^{\circ}\text{C}$	0	F7	Fan operating function after defrost end	0=Temperature 1=Time	1
E6	Offset on evap. Temp.	$-36.0 \sim 36.0^{\circ}\text{F}$ $-20.0 \sim 20.0^{\circ}\text{C}$	0	F8	Fan start -up delay after defrost end	$0 \sim 10\text{Min}$	2
C1	Temperature unit	0= $^{\circ}\text{C}$ 1= $^{\circ}\text{F}$	0	F9	Fan start temperature after defrosting (evaporator)	$-22 \sim 86^{\circ}\text{F}$ $-30 \sim 30^{\circ}\text{C}$	41°F 5°C
F0	Defrost function	0=Electric heater 1=Hot gas	0				
F1	Max. Defrost duration	$1 \sim 60\text{Min}$	20Min				
F2	Defrost interval time	$0 \sim 24\text{Hr}$	6Hr				

8. Fan start up delay after defrosting: when defrosting sensor temperature \leq defrosting fan startup delay temperature (F9), the fan operates.
9. The factory default resumption: press ∇ button for 1 second and then press \triangle button simultaneously for 6 seconds, the LED flashes, all parameters will be resumed to factory defaults. After 6 seconds, it returns to normal operation mode.
10. Parameters Locking
In normal operating, press ∇ button and hold for 6 seconds to lock the parameters if "OFF" is displayed or to unlock if "ON" is displayed. Parameters can be displayed only and can not be modified if locked, but the adjustment of the set temp. is active (factory default is "ON")

Function details

1. Temperature control

- After the delay time, the compressor starts operating when cold-room temperature \geq (set temp. + Hysteresis), and will be off when cold-room temperature \leq set temp.
- To protect the compressor, it can re-start unless the time when the compressor stops every time is longer than the delay time (Parameter E4).

2. Defrosting function: when F0=0, it means defrost by electric heater; when F0=1, it means defrost by hot gas.

- Enter defrosting: it defrosts only if the temp. of the evap. sensor is less than defrost termination temperature (parameter F3).
- Exist defrosting: when the temp. of the evap. sensor $>$ the temp. of defrost termination or the defrost duration ends, it will exit the defrost state.

When the defrost interval time is set to "00", the function of automatic defrosting will be cancelled.

- Defrost by electric heater: after working for a defrosting interval time, it will automatically enter defrosting state. The defrosting LED will turn on, the compressor will stop, the electric heater will work and the evaporation fan will stop. After defrosting, the electric heater will stop working, and after dripping time F6 it will enter normal temperature control mode, if cold-room temperature $>$ (set temp. + Hysteresis), the compressor will start.

- Defrost by electric heater: after working for a defrosting interval time, it will automatically enter defrost state. The defrosting LED will turn on, the compressor and switch valve will be connected. After defrosting, the compressor will stop. After dripping time, the switch valve will be disconnected and enter normal temperature control mode, if cold-room temperature $>$ (set temp. + Hysteresis), the compressor will start.

3. Fan control

- Fan start mode is decided by parameter F5, when F5=0, the fan and the compressor operate synchronously, the compressor starts, the fan will start, the compressor stops the fan will stop.
- When F5=1, the fan will operate all along and will stop when defrosting. After defrosting, the fan delay start mode is decided by parameter F7; when F7=1, defrosting ends, the fan will start after delay time (parameter F8 set value); when F7=0, after defrosting, the fan start will be decided by parameter F9, only when evaporator defrosting sensor temperature $<$ parameter F9, the fan will start.

4. Display during defrost

- When setting the parameter F4=1, the room temp. is locked during defrost, and the last value before defrost is displayed. When defrost ends, normal display will be resumed after 20 minutes delay of room temp. display (or when cold-room temperature $<$ set temp.). The defrost LED flashes during the delay.

5. Abnormal work mode:

- When room sensor is short circuited or overheated (more than 150°C / 150°F), "HH" is displayed; when room sensor is open-circuited or temperature is too low (less than -45°C / -45°F), "LL" is displayed. At that time the compressor automatically enters time working mode by the cycle of 45 minutes on and 15 minutes off.
- When Evap. sensor fails or exceeds the displayed range, the defrost termination will be just controlled by the defrost duration. (Parameter F1)

Notes for Installation

1. The sensor cable must be kept separately from main voltage wires in order to avoid high frequency noise induced. Separate the power supply of the loads from the power supply of the controller.
2. When installation the probe shall be placed with the head upward and the wire downward; The evaporator probe must be installed between the fins of the evaporator in the area, where probably the ice is the thickest. Don't place the evaporator probe near the electric heater.
3. The temperature controller can not be installed in the area with water drops.

Accessories for the temperature controller

1. Two pc of temperature sensor
2. One pc of installation stand
3. One pc of cover panel and one pc of $\phi 3 \times 10$ mm screw

Circuit Diagram

