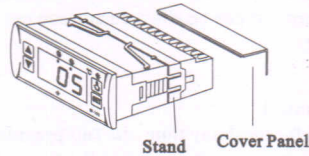
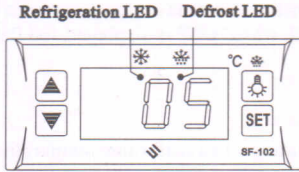


Model: SF-102 Digital Temperature Controller



Features of Function

- It is a mini-sized and integrated intelligent controller and applicable to the compressor of one HP.
- Main functions : Temperature Display/ Temperature Control/ Manual, automatic defrost by turning off compressor / Light Control/ Value Storing/ Self Testing /Parameter Locking

Specifications

1. Output of the outside sealed transformer: 12VAC(one transformer matched with one temp. controller)
2. Temperature sensor: NTC, double sensors (for cold-room temp.& defrost control),2m(L)
3. Range of temperature display: $-45\sim+150^{\circ}\text{C}$ ($-45\sim+150^{\circ}\text{F}$); Accuracy: $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$)
4. Range of set temperature: $-45\sim+45^{\circ}\text{C}$ ($-45\sim+113^{\circ}\text{F}$); Factory default : 0°C (32°F)
5. Dimension: $77(\text{Length})\times 35(\text{Width})\times 60(\text{Depth})\text{mm}$
Mounting hole dimension: $71(\text{Length})\times 29(\text{Width})\text{mm}$
6. Temperature of the operating environment: $-10\sim 60^{\circ}\text{C}$ ($14\sim 140^{\circ}\text{F}$);
Relative Humidity: 20%~90%(Non-condensing)
7. Relay output contact capacity
 - Compressor: N.O. 20A/250VAC
(applicable to one HP Compressor, if more it needs to connect an to AC contactor)
 - Light: N.O. 5A/250VAC

Front Panel Operation

1. Set temperature
 - 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 10 seconds, the cold-room temperature will be displayed.
2. Light: Press **☀** button, it lights; Press again, it stops.
3. Manual start/stop defrost: Press **☀** button and hold for 6 seconds to defrost or stop defrost.
4. Display the evap. Temperature : Press **▲** button and hold for 6 seconds, the evap. temp. is displayed, after 10 seconds the cold-room temp. is resumed to be displayed.
5. Refrigeration LED: During refrigeration, the LED is on; When the cold room temp. is constant, the LED is off; During the delay, the LED flashes.
6. 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.
7. Parameter setup
 - Press **SET** button for 6 seconds to enter parameter setting, at the same time "PAS" will be displayed and flash; press **▲** or **▼** to enter a tens digit and press **SET** button to confirm; and then press **▲** or **▼** to enter a single digit and press **SET** button to confirm. If it is correct, parameter code E1 will be displayed (when it is set to 00, the password will be cancelled).
 - Press again **SET** button to select sequentially from the parameters : E2,E3,E4,E5,E6,F1,F2,F3,F4,C1.
 - Press **▲** or **▼** button, the value of parameter will be displayed and can be modified and stored.
 - If no more button is pressed within 10 seconds, it will return to normal operation mode.

Parameter	Function	Set range	Default	Parameter	Function	Set range	Default
PAS	Password	00~99		E6	Offset on evap. Temp.	$-20\sim 20^{\circ}\text{C}$ $-36\sim 36^{\circ}\text{F}$	0
E1	Lower setpoint limit	$-45^{\circ}\text{C}\sim\text{Set temp.}$ -45°F	-22°C -8°F	F1	Max. Defrost duration	1~60Min	20Min
E2	Higher setpoint limit	Set temp.~ 45°C 113°F	10°C 50°F	F2	Defrost interval time	0~24Hr	4Hr
E3	Temp. hysteresis	$1\sim 10^{\circ}\text{C}$ $1\sim 18^{\circ}\text{F}$	5°C 9°F	F3	Defrost termination temp.	$0\sim 45^{\circ}\text{C}$ $32\sim 113^{\circ}\text{F}$	8°C 46°F
E4	Comp.start delay time	0~10Min	2Min	F4	Display during defrost	0=Normal display 1= Last value before defrost	0
E5	Offset on room temp.	$-20\sim 20^{\circ}\text{C}$ $-36\sim 36^{\circ}\text{F}$	0	C1	Temperature unit	Celsius= $^{\circ}\text{C}$ Fahr.= $^{\circ}\text{F}$	$^{\circ}\text{C}$

8. Parameter locking:

Press button for 6 seconds, when "OFF" is displayed and flashes, it means set temperature is locked, the set temperature just can be checked and can not be modified; when "ON" is displayed and flashes, it means unlocking.

Function details

1. Temperature Control

- After turning on for the delay time, the compressor starts operating when cold-room temperature \geq (set temperature + Hysteresis), and will be off when cold-room temperature \leq set temperature.
- To protect the compressor, it can not be re-started unless the time when the compressor stops every time is longer than the delay time (Parameter E4).

2. Defrosting Functions

- It defrosts only if the temp. of the evap. sensor is less than the defrost termination temp. (Parameter F3)
- Operating after a defrost interval time it will automatically enter the status of defrost. If the temperature of evap. sensor is less than the defrost termination temperature, the defrost LED will turn on, and the compressor will stop.
- When the temp. of the evap. Sensor is over the temp. of defrost termination; or the defrost duration ends, the compressor will exit the defrost status. After two minutes dripping time it will enter in the normal status of refrigeration.
- When the defrost interval time is set to "00", the function of automatic defrost will be cancelled.

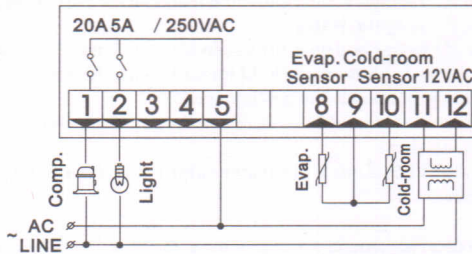
3. Display during defrost

- 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. The defrost LED flashes during the delay.

4. Abnormal work mode

- When the room sensor is short-circuited or overheated (more than 150°C / 150°F) "HH" is displayed; When the 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 works by the cycle of 45 minutes on and 15 minutes off.
- When the Evap. sensor fails or over the displayed range, the defrost termination will be just controlled by the defrost duration. (Parameter F1)

5. Circuit Diagram



Notes for Installation

1. The sensor cable leads 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 install the sensor, it shall be placed with the head upward and the wire downward; The evaporator sensor must be installed between the fins of the evaporator in the area, where probably the ice is the thickest. Don't place the evaporator sensor near the electric heater.
3. In case of long-distance sensor installation from the controller, the sensor cable may be prolonged up to 100 m max. without any re-calibration.
4. The temperature controller can not be installed in the area with water drops.

Accessories for the temperature controller

1. One attached transformer
2. Two temperature sensors
3. One installation stand
4. One cover panel and 1 $\phi 3 \times 10\text{mm}$ screw