



Operation

			DEF-01-F1	DEF-01-F2	DEF-01-F3
Power Supply			230VAC ±15%		110-240VAC
			115VAC ±15%		
			24VAC/VDC ±15%		
Power Consumption			2.5 VA		
Display			7-Segment Size 0.56 Inch 3 Digit		
Input	Sensor	Room	NTC/PTC (-40 to 130°C)		
		Evaparator	-	NTC/PTC (-40 to 130°C)	
		Probe3 (Option)	NTC/PTC (-40 to 130°C)		
		Probe4 (Option)	NTC/PTC (-40 to 130°C)		
	Digital Input		Free Voltage Contact		
	Input Accuracy		±2°C		
Output	Relay Output	Compressor	5A 250VAC (NO)		
		Defrost	-	5A 250VAC (NO)	
		Fan	-		5A 250VAC (NO)
		Auxiliary	-		5A 250VAC (NO)
Ambient Operation		Temperature	-10 °C to 60 °C		
		Humidity	85 % RH Non-Condensing		
Ambient Storage		Temperature	-20 °C to 80 °C		
		Humidity	85 % RH Non-Condensing		
Protection Degree		Front Protection Rating	IP52		
		Case Protection Rating	IP20		
Installation			Panel Mounting		
Material			ABS-V0		
Size (mm.)			35.25 x 79.6 x 64.4		
Weight (kg.)			90 (for Power Supply 24VAC/VDC ±15%)		
			155 (for Power Supply 115VAC ±15%, 230VAC ±15% , 110-240VAC)		

Description

- Mini Digital Refrigeration Temperature Controller DEF-01-SERIES: A small Digital temperature controller and display for chiller or refrigeration.
- Supports thermistor input (NTC or PTC).
- Temperature and indicate -40-130°C.
- 4 Relay Output to control compressor, fan, defrost and auxiliary relay.
- Dongle Terminal connect to option sensor probe, RS-485 and duplicate parameter to other devices.
- LED shows the operation of devices.
- Auxiliary Relay for making Alarm condition and Function etc.

SPEC Table

		DEF-01-F1	DEF-01-F2	DEF-01-F3
Sensor Input	Room Probe	•	•	•
	Evaporator Probe		•	•
	Probe 3 /Digital Input	•	•	•
	*Probe 4	•	•	•
Relay Output	Compressor	•	•	•
	Defrost		•	•
	Fan			•
	Auxiliary			•
Dongle Module	Copy Parameter	•	•	•
	RS-485	•	•	•

* For Probe 4 use with DEF-01-A which is an accessories for connecting.

Operation

The DEF-01-SERIES can receive input from either NTC or PTC thermistors, selectable through the keypad switch. It is capable of controlling both heating and cooling systems

This device can control in both of cooling and heating. Cooling output operates when the temperature is higher than the setpoint. the heating mode output operates when the temperature is lower than the setpoint

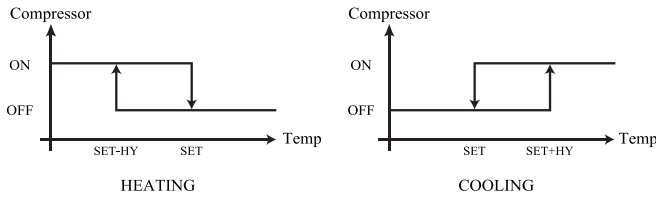
4 Relay Output for controlling Compressor, Fan, Defrost and Auxiliary Relay.

Cooling Control System

DEF-01 Series measures temperature to control the operation of the compressor. The compressor operates until the temperature decreases to the set value.

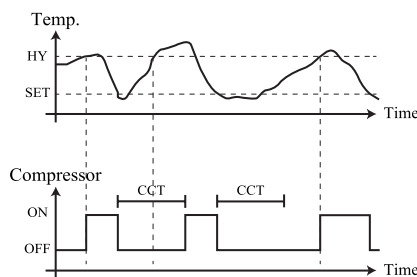
And it will start operating again when the temperature rises above the set value + hysteresis. If the user sets the operation to Heating mode, the compressor relay will operate in the opposite manner as shown in picture.

Operation(Continue)



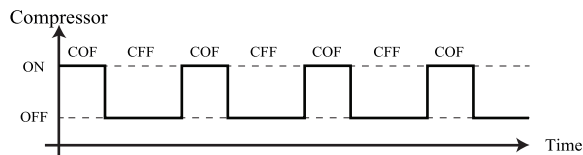
Picture 1 Compressor Relay operation

User can set delay value to operate compressor(CCT) to protect compressor to over operate as picture



Picture 2 the operation of CCT

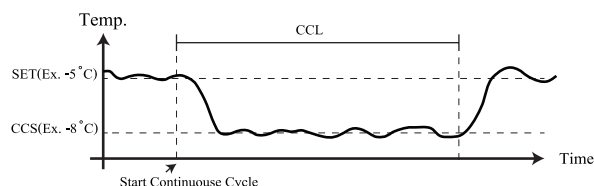
Probe1 (Room Probe) measures temperature inside the chilling room. If the room probe is broken or malfunctions, the DEF-01 Series can detect it. In this case, the compressor relay will switch control mode to COF (On Time) or CFF (Off Time), where the compressor operates and stops according to the time settings, as shown in the diagram.



Picture 3 COF and CFF period time operation

Continuous Cycle or operate continuously. it is suitable for decreasing goods temperature that just insert to chiller or Refrigeration.

Device will work with 2 Set point. Main setpoint(SET) is set and temporary Setpoint (CCS) which is operate in time period that user press keypad to command and operate as time from setting as picture 4.



รูปที่ 4 การทำงานของโหมดต่อเนื่อง

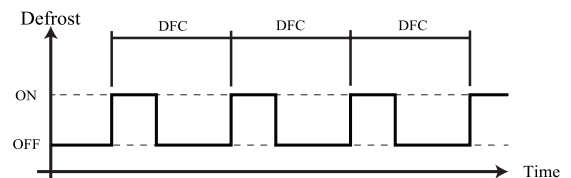
Defrost system

Defrost system can command from:

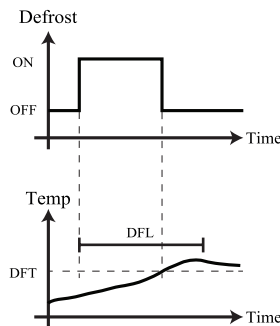
1. Keypad / Digital Input: Starts the defrost system when the keypad is pressed.
2. Time Period (DFC Setting): Defrost can be activated at set intervals. For example, if the chiller operates for 5 hours, the system will start a defrost cycle for 20 minutes (Defrost Length in minutes, see Picture 5).

Defrost end date

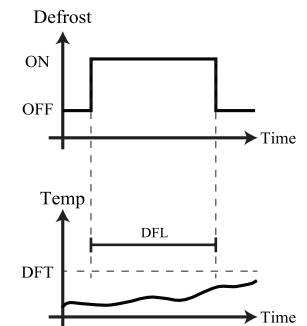
After the defrost system starts operation, the user can set the end of defrost time using the temperature of the evaporator probe as the parameter. When the probe temperature rises above the set value, the defrost system will stop. This applies to both defrosting conditions as shown in Pictures 6 and 7.



Picture 5 Defrost system operation by time interval.

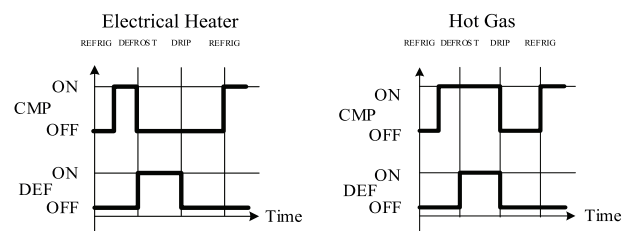


Picture 6 Defrost system operation by temperature.



Picture 7 Defrost system operation by time.

User can select the defrost pattern as Electrical Heater or Hot Gas as picture 8.



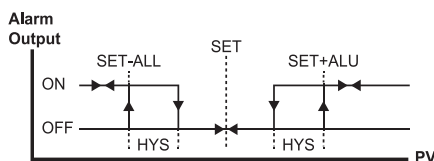
Picture 8 the defrost pattern.

Alarm It can set to alarm when high temperature or more than the setting. Beside it can delay time before alarm. And there are 8 functions as picture 10.

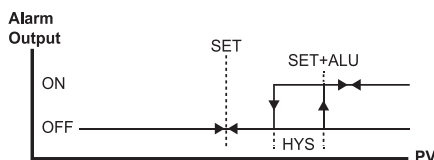
Operation(Continue)

Picture 10

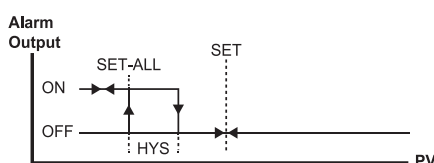
1. Deviation High Low Band Alarm



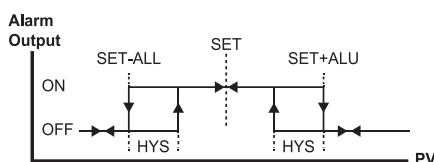
2. Deviation value High Alarm



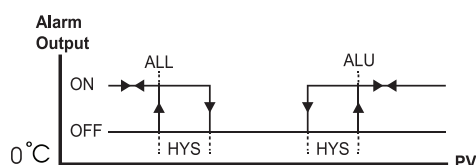
3. Deviation value Low Alarm



4. Deviation value High Low Range Alarm



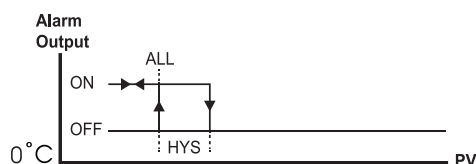
5. Absolute High Low Band Alarm



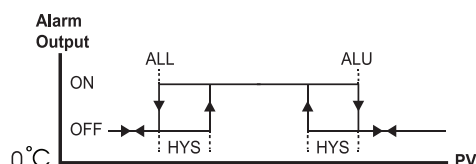
6. Absolute High Alarm



7. Absolute Low Alarm



8. Absolute High Low Range Alarm



The operation of fan

The user can set the fan to operate related with the compressor or to run continuously. During defrost, the fan can also be configured to either operate or stop, according to the selected pattern.

1. C-N = The fan works together with the compressor and stops working during defrosting.
2. O-N = The fan runs all the time and stops while defrosting.
3. C-Y = The fan will work together with the compressor and will work while defrosting.
4. O-Y = The fan is running all the time.

Digital Input operation

Can be configured to receive input signals for various functions, such as defrost operation notification, voltage switch, door open/close switch, or curtain switch. An alarm delay time can also be set.

The Digital Input Operation Symbol

- EAL = External Alarm screen will show "EA".
- SAL = Serious Alarm screen will show "SA".
- PAL = Pressure Switch Alarm screen will show "PA".
- DOR = Door Open.
- DEF = Defrost start defrost ice.
- AUX = Auxiliary Relay.
- HTR = Inverse Action Mode.
- ES = Energy Save.

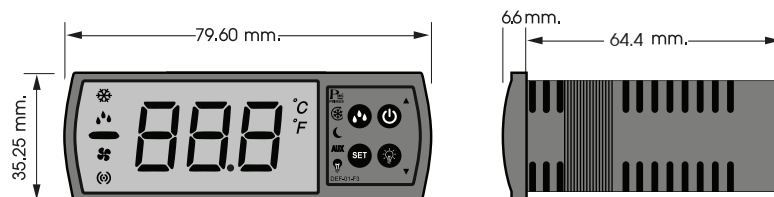
Dongle Module that can perform the following additional functions:

Dongle Module 1 (DEF-01-A1, DEF-01-A2): Copies the setting program, setpoints, and function values of the DEF-01 Series from the master device to other units, reducing setup time.

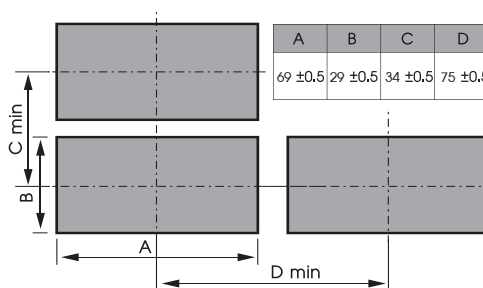
Dongle Module 2 (DEF-01-A3): Connects the RS-485 module for communication with a computer.

Dongle Module 3 (DEF-01-A4): Provides an additional terminal for a fourth probe to measure condenser temperature.

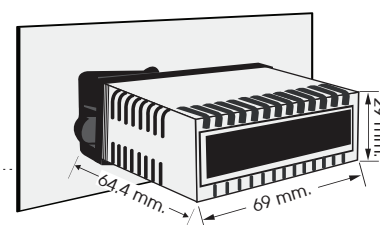
Dimension



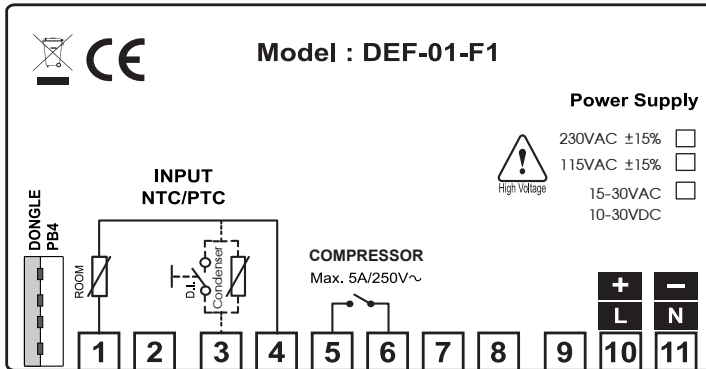
Die Cut



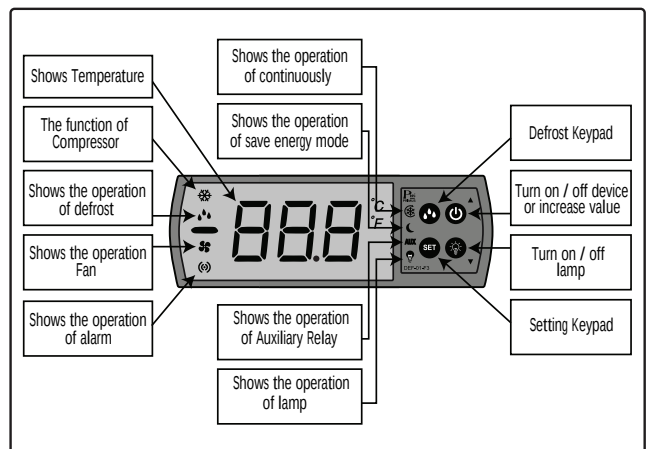
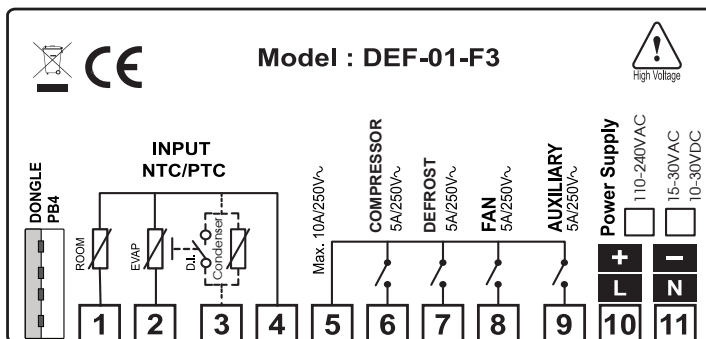
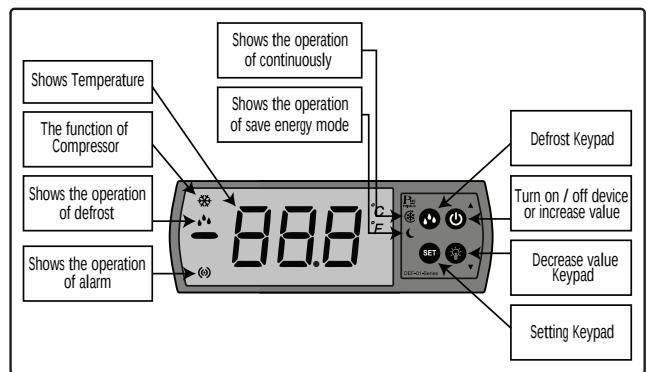
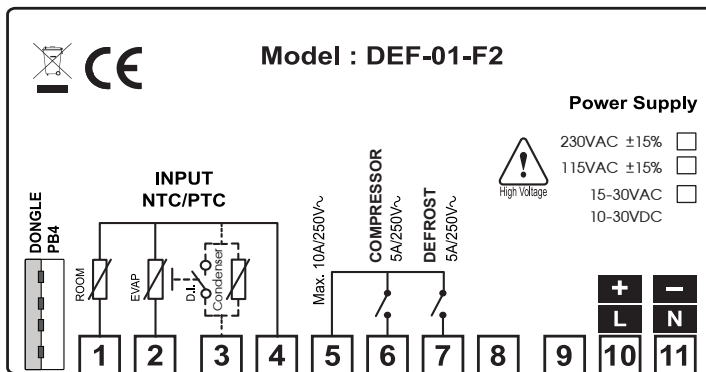
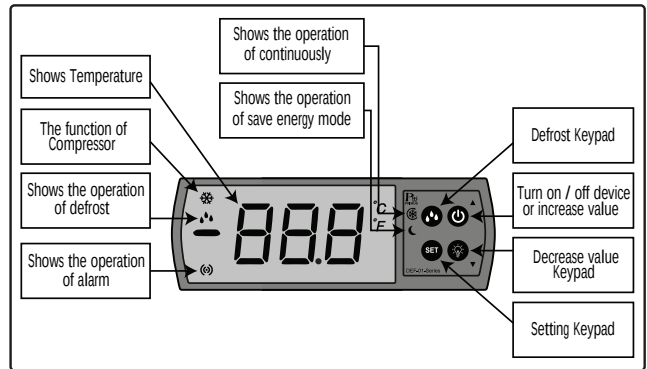
Installation



Wiring Diagram



Screen Appearance



WARNING

- Make sure the correct wiring connection before turning on electricity. Mis-wiring may cause malfunction of the unit and fire etc.
- Never modify the unit to prevent damage or incident such as malfunction and fire etc.

Accessories



- **DEF-01-A1 :**
Dongle Module for Copy Parameter



- **DEF-01-A2 :**
Dongle Module for Copy Parameter With Supply 9 VDC



- **DEF-01-A3 :**
Dongle Module for RS-485 Expansion Module



- **DEF-01-A4 :**
Dongle Module for Expansion Probe

Ordering Code

DEF-01- Output - Power Supply	
Output	
F1	1 Relay Output (Compressor)
F2	2 Relay Output (Compressor, Defrost)
Power Supply	
24	15-30VAC/10-30VDC
115	115VAC ±15%
230	230VAC ±15%

DEF-01- F3 - Power Supply	
Output	
F3	4 Relay Output (Compressor, Defrost, Fan, Auxiliary)
Power Supply	
24	15-30VAC/10-30VDC
230	110-240VAC

*** Free Input Sensor NTC 6x50mm. Wire 1 M. (10K) for		
DEF-01-F1	1 Cable	
DEF-01-F2	2 Cable	
DEF-01-F3	2 Cable	