Cooling Controller

CE

ESM-3770-D

Digital ON / OFF Cooling Controller

- Cooling Applications
- Economic
- Easy to Use

- **3 Digit display**
- **NTC input or**
  PTC input or
  2-wire PT-100 Input or
  2-wire PT-1000 Input(It must be determined in order)
- **ON / OFF Temperature Control**
- **Compressor, Fan and Defrost outputs**
- **Evaporator and Cabinet sensor inputs**
- **Compressor OK digital input**
- **Adjustable hysteresis value**
- **Determine compressor working period in case of Cabinet probe defect**
- **Defrost output controlling parameters**
- **Fan output controlling parameters**
- **Password protection for programming mode**

SPECIFICATIONS

INPUT
NTC : NTC (10 k @25 °C)
PTC : PTC (1000 @25 °C)
Thermoresistance (RTD) : 2-wire PT 100, PT 1000 (IEC 751)(ITS90)

Measurement Range : It is in ordering information
Accuracy : ±1% of scale
Cold Junction Compensation : Automatically ±0.1°C/1°C
Sensor Break Protection : Upscale
Sampling Cycle : 3 samples per second

CONTROL
Control Form : ON/OFF
ON/OFF hysteresis : It can be configured by the user

OUTPUTS
Control Output :
Compressor Out Relay (10A@250V~ at resistive load)
Defrost Out Relay (5A@250V~ at resistive load)
Fan Out Relay (5A@250V~ at resistive load)

DISPLAY
Process Display :
ESM-3770-D : 14 mm Red 3 digits LED Display

LED Indicators :
SV (Red), Compressor Output Active (Red), Error (Red), Fan Output Active (Red), Defrost Output Active (Red),

POWER SUPPLY

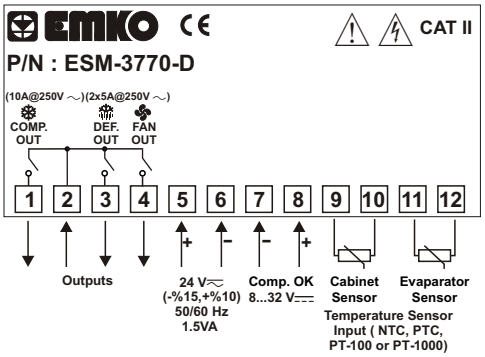
Supply Voltage :
24 V ≂ (-%15, +%10) 50/60 Hz -1.5 VA

ENVIRONMENTAL RATINGS and PHYSICAL SPECIFICATIONS

Operating Temperature : 0...50°C
Humidity : 0-90%RH (none condensing)
Protection Class : IP65 at front, IP20 at rear

Weight :
ESM-3770-D : 150 gr
Dimension :
ESM-3770-D : 77 x 35 mm, Depth : 62.5 mm
Panel Cut-Out :
ESM-3770-D : 71 x 29 mm

Electrical Wiring



Ordering Information

ESM-3770-D (77x35 DIN)

A	BC	D	E	/	FG	HI	/	U	V	W	Z
2		0		/			/	1		0	0

A	Supply Voltage
2	24 V ≂ (-%15, +%10) 50/60 Hz

BC	Input Type	Scale(°C)	
11	PT 100, IEC751(ITS90)	-50°C	400°C
09	PT 100, IEC751(ITS90)	-19.9°C	99.9°C
12	PTC (Note-1)	-50°C	150°C
15	PTC (Note-1)	-19.9°C	99.9°C
14	PT 1000, IEC751(ITS90)	-50°C	400°C
13	PT 1000, IEC751(ITS90)	-19.9°C	99.9°C
18	NTC (Note-1)	-50°C	100°C
19	NTC (Note-1)	-19.9°C	99.9°C

Note-1 : If input type is selected PTC or NTC (BC = 12, 15, 18, 19), Temperature sensor is given with the device. For this reason, If input type is selected as PTC, sensor type (V = 0,1 or 2) or If input type is selected as NTC, sensor type (V = 0,3 or 4) must be declared in ordering information.

E	FG	HI	Outputs
1	01	01	Compressor Output(10 A@250 V ~ at resistive load, 1NO) Defrost Output(5 A@250 V ~ at resistive load, 1NO) Fan Output(5 A@250 V ~ at resistive load, 1NO)

V	Temperature Sensor that is given with ESM-3770-D
0	None
1	PTC-M6L40.K1.5 (PTC Air Probe with 1.5 m silicon cable)
2	PTCS-M6L30.K1.5.1/8" (PTC Liquid Probe with 1.5 m silicon cable)
3	NTC-M5L20.K1.5 (NTC Probe, thermoplastic moulded with 1.5 m cable for cooling application)
4	NTC-M6L50.K1.5 (NTC Probe, stainless steel housing with 1.5 m cable for cooling application)
9	Customer

Installation

Before beginning installation of this product, please read the instruction manual and warnings below carefully.

In package ,
- One piece unit
- Two pieces mounting clamps
- One piece instruction manual

A visual inspection of this product for possible damage occured during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.

The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

Do not use the unit in combustible or explosive gaseous atmospheres.

During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.

Montage of the product on a system must be done with it's fixing clamps. Do not do the montage of the device with inappropriate fixing clamp. Be sure that device will not fall while doing the montage.

It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

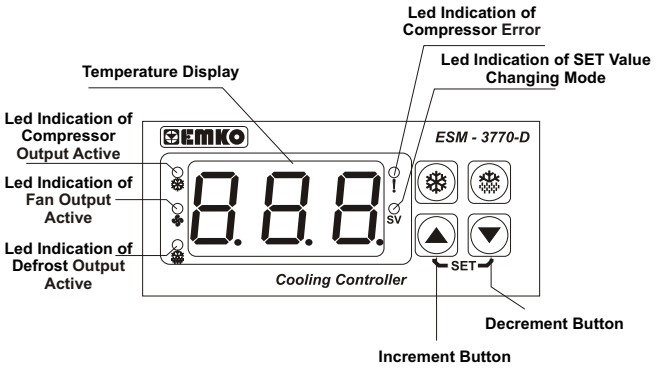
Warranty

EMKO Elektronik warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.
Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

Front Panel



Set Value Changing Mode

It can be accessed with ▲ or ▼ button that is on front panel. When whichever ▲ or ▼ button is pressed SEt expression is shown on the display, after releasing the pressed button set value is shown on the display and SV led becomes active. Set value can be adjusted with ▲ and ▼ buttons.

Press ❄ button for exit from set value changing mode with saving set value or press ❄ button for exit from set value changing mode without saving set value

Parameters

Entering to Programming Mode

When both ▲ and ▼ button is pressed, SEt expression is shown on the display. After 5 secs pressing both buttons, programming mode accessing password PrG is shown on the display. After entering the programming mode accessing password, paramters can be accesing

Press ❄ button for showing parameter value and saving the parameter value, press ❄ button for exit from parameter section without saving parameter value.

S1 Evaporator Sensor Selection Parameter
000 = Evaporator sensor is passive
001 = Evaporator sensor is active

H1 Hysteresis Parameter for Compressor Output
Hysteresis value for compressor output is determined with this parameter. It can be adjusted from
1 to 10°C for NTC (-50°C, 150°C),
0.1 to 10.0°C for NTC (-19.9°C, 99.9°C),
1 to10°C for PTC (-50°C, 150°C),
0.1 to 10.0°C for PTC (-19.9°C, 99.9°C),
1 to 10°C for PT-100 (-50°C , 400°C),
0.1 to 10.0°C for PT-100 (-19.9°C, 99.9°C),
1 to 10°C for PT-1000 (-50°C , 400°C),
0.1 to 10.0°C for PT-1000 (-19.9°C, 99.9°C)

H2 Compressor Working Period In Case of Cabinet Probe Defect Parameter
Compressor working period in case of cabinet probe defect is determined with this parameter.
It can be adjusted from 1 to 240 minutes

H3 Compressor Working Percentage In Case of Cabinet Probe Defect Parameter
Compressor working percentage in case of cabinet probe defect is determined with this parameter.
It can be adjusted from 0 to 100

d1 Defrost Repeat Cycle Parameter
Defrost repeat cycle is determine with this parameter. When pressed the ❄ button for starting the device, this time is starts
It can be adjusted from 1 to 99 hours.

d2 Defrost Stopping Temperature Parameter
For evaporator sensor selection parameter S1 = 0 (evaporator sensor is active) While the defrost operation is in progress, when the temperature value that is read from the evaporator sensor is higher than the this parameter value, then defrost operation is stoppped. It can be adjusted from minimum value to maximum value of device scale.

d3 Defrost Time Parameter
Defrost time is determined with this parameter
It can be adjusted from 0 to 99 minutes.

F1 Fan Stopping Temperature Parameter
when the temperature value that is read from the cabinet sensor is lower than the this parameter value, then fan is stopped.
It can be adjusted from minimum value to maximum value of device scale.

F2 Hysteresis Parameter for Fan Output
Hysteresis value for fan output is determined with this parameter.
It can be adjusted from 1°C to 15°C
1 to 15°C for NTC (-50°C, 150°C),
0.1 to 15.0°C for NTC (-19.9°C, 99.9°C),
1 to15°C for PTC (-50°C, 150°C),
0.1 to 15.0°C for PTC (-19.9°C, 99.9°C),
1 to 15°C for PT-100 (-50°C , 400°C),
0.1 to 15.0°C for PT-100 (-19.9°C, 99.9°C),
1 to 15°C for PT-1000 (-50°C , 400°C),
0.1 to 15.0°C for PT-1000 (-19.9°C, 99.9°C)

F3 Fan Delay Time After Completion of Defrost Time Parameter
It can be adjusted from 0 to 15 minutes.

PAS Programming Mode Accessing Password
It is used for accessing to programming mode. It can be adjusted from 0 to 999. If it is 0, password is not entered for accessing to the parameters.

Other Informations

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