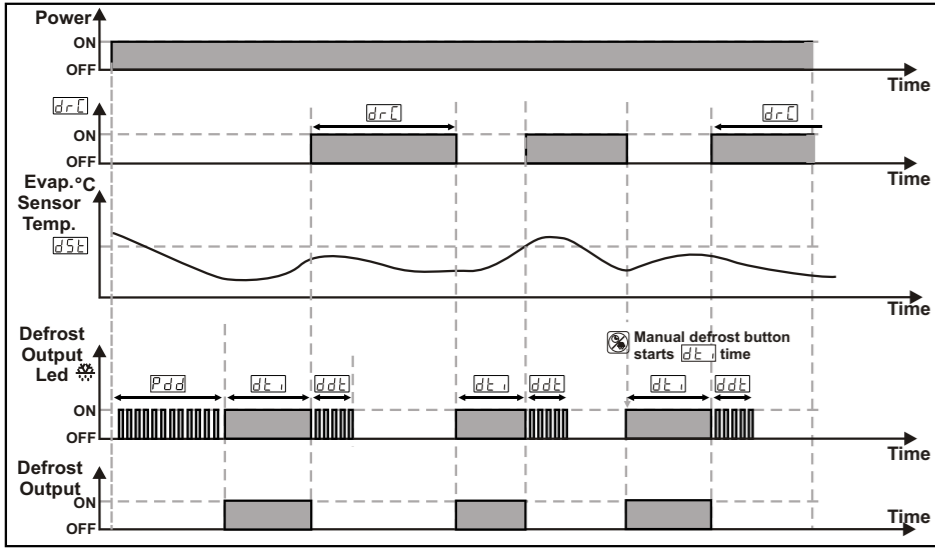
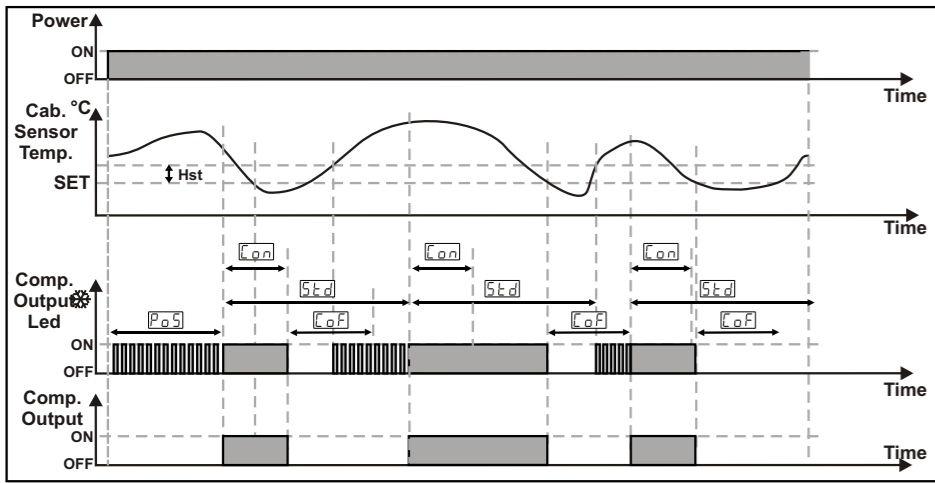


6.3 Operation Graphics of ESM-3712-CN Cooling Controller

- 1-Defrost time parameter value d_{t-1} 1,
Defrost repeat cycle parameter value d_{r-1} 1,
Defrost at power on selection and defrost delay parameter value P_{dd} 1,
Dripping time parameter value d_{de} 1 ise;



- 2- Compressor start delay at power on parameter value P_{os} 1,
Compressor start - start delay parameter value S_{td} 1,
Minimum compressor OFF time parameter value C_{of} 1,
Minimum compressor ON time parameter value C_{on} 1 ise;



6.4 Entering To The Programming Mode, Changing and Saving Parameter

Main Operating Screen

When SET button is pressed for 5 seconds, "P" led starts to blink. If programming mode entering password is different from 0, hysteresis screen is observed instead of programming mode entering screen P_{r-0} will be observed.

Programming Mode Entering Screen
Press SET button for accessing to the password entering screen.

Password Entering Screen
Enter programming mode accessing password with increment and decrement

Password Entering Screen
Press SET/OK button for entering the password.

Programming Screen

Press SET button for accessing to the parameter value. Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter

Compressor Output Hysteresis Parameter Value
Press set button for saving the parameter.

Compressor Output Hysteresis Parameter
Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter

Note-1: If programming mode accessing password is 0, hysteresis screen is observed instead of programming mode entering screen P_{r-0} will be observed.

Note-2: If programming mode accessing password is 0 parameter values can be seen. But parameter values can not be changed.

Note: If no operation is performed in programming mode for 20 seconds, device turns to main operation screen automatically.

7. Failure Messages in ESM-3712-CN Cooling Controller

- 1- b_{u-1} message blinking. Cabinet temperature sensor failure. Sensor connection is wrong or there is no sensor connection. While this message shown on this display, if buzzer function selection parameter b_{u-1} is 3 or 4, internal buzzer starts to operate.

10. Specifications

Weight	: Approximately 0.2 Kg
Environmental Ratings	: Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
Storage / Operating Temperature	: -40 °C to +85 °C / 0 °C to +50 °C
Storage / Operating Humidity	: 90 % max. (None condensing)
Installation	: Fixed installation
Overvoltage Category	: II
Pollution Degree	: II, office or workplace, none conductive pollution
Operating Conditions	: Continuous
Supply Voltage and Power	: 230V~ (±%15) 50/60Hz - 1.5VA 115V~ (±%15) 50/60Hz - 1.5VA 10-30V== 1.5W NTC or PTC
Temperature Sensor Inputs	: NTC (10 k @25 °C) or PTC (1000 @25 °C)
NTC Input Type or PTC Input Type	: ±1 % of full scale for thermoresistance
Accuracy	: Upscale
Sensor Break Protection	: 3 samples per second
Sampling Cycle	: ON / OFF
Control Form	: 16(8) A@250 V~ at resistive load(Compressor Output) 5 A@250 V~ at resistive load(Defrost and Fan Output)
Relay Outputs	: 14 mm Red 4 digit LED Display S (Green), P (Green), °C (Yellow), °F (Yellow), Alarm(Red), Defrost Output (Red), Fan Output (Red), Compressor Output (Red)
Display LED	: 83dB
Internal Buzzer	: GOST-R, CE

11. Ordering Information

ESM-3712-CN (Printed on Board)	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
A Supply Voltage	1 115V~ (±%15) 50/60Hz - 1.5VA 5 230V~ (±%15) 50/60Hz - 1.5VA 8 10 - 30 V ==
BC Input Type	12 PTC (Note-1) :50°C/-58°F :150°C/302°F 18 NTC (Note-1) :50°C/-58°F :100°C/212°F
E Compressor Output	1 Relay Output (16(8) A@250 V~ at resistive load, 1 NO) FG Defrost Output 01 Relay Output (5 A@250 V~ at resistive load, 1 NO)
H I Fan Output	01 Relay Output (5 A@250 V~ at resistive load, 1 NO)
V Temp. Sensor which is given with ESM-3712-CN	0 None 1 PTC-M6L40.K1.5 (PTC Air Probe with 1.5 mt silicon cable) 2 PTC-M6L30.K1.5.1/8" (PTC Liquid Probe with 1.5 mt silicon cable) 3 NTC-M6L20.K1.5 (NTC Sensor, thermoplastic moulded with 1.5 m cable for cooling application) 4 NTC-M6L50.K1.5 (NTC Sensor, stainless steel housing with 1.5 m cable for cooling application) 9 Customer

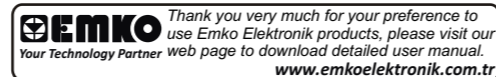
All order information of ESM-3712-CN Cooling Controller are given on the table at left. User may form appropriate device configuration from information and codes that at the table and convert it to the ordering codes.

Firstly, supply voltage then other specifications must be determined. Please fill the order code blanks according to your needs.

Please contact us, if your needs are out of the standards.

Note-1: If input type is selected PTC or NTC (BC= 12, 18), 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.

~ Vac,
~ Vdc
~ Vdc or Vac can be applied



ESM-3712-CN 77x35 DIN Size



ESM-3712-CN 77 x 35 DIN Size Digital, ON / OFF Cooling Controller

- 4 Digits Display
- NTC Input or PTC Input (Must be determined in order.)
- 3 output for compressor, defrost and fan controls
- 2 sensor input for cabinet and evaporator
- Configurable digital input
- ON / OFF Control
- Separately adjustable 2 offset value for cabinet and evaporator sensor
- Set value boundaries
- Operation selection of compressor operate continuously, stops or operates periodically in case of cabinet probe defect
- Compressor protection delays
- Selectable defrost function (hot gas or electric)
- Adjustable defrost time from front panel
- Manual defrost from front panel
- Defrost parameters
- Alarm parameters
- Fan can be operated depending on compressor and defrost
- Fan can be operated depending on evaporator temperature or (cabinet - evaporator) temperature
- Adjustable internal buzzer according to the defrost, cabinet probe defect and alarm status
- Defrost time and/or manual defrost and/or temperature set value protection
- Password protection for programming mode
- Installing parameters using Prokey
- Remote access, data collecting and controlling with Modbus RTU
- Having CE mark according to European Norms

Instruction Manual. ENG ESM-3712-CN 02 V02 09/12

1. Preface

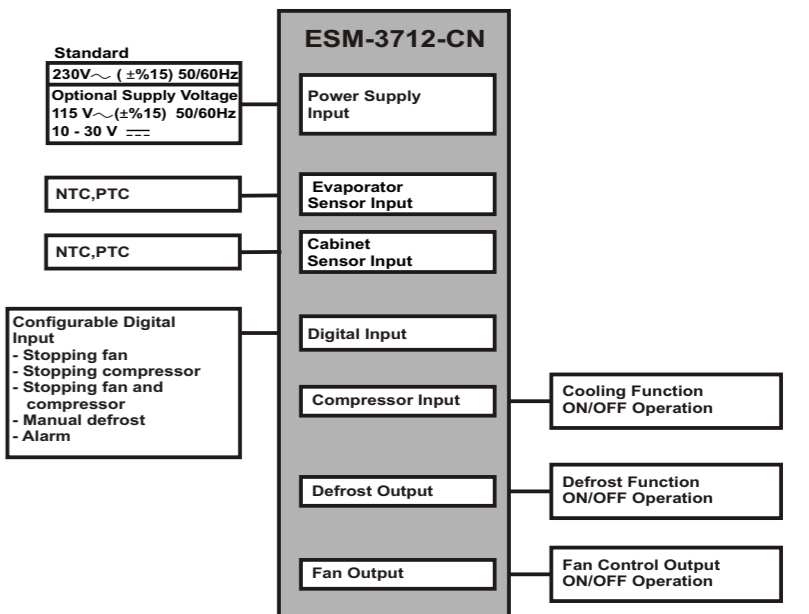
ESM-3712-CN series cooling controllers are designed for controlling cooling process. They can be used in many applications with their easy-use, On / Off control form and defrost properties. Some application and application fields which they are used are below:

Application Fields	Applications
Food Machine production industries etc...	Refrigerators Air Conditioning Storages Freezers etc...

1.1 Environmental Ratings

- Operating Temperature** : 0 to 50 °C
- Max. Operating Humidity** : 90% Rh (non-condensing)
- Altitude** : Up to 2000 m.
- Forbidden Conditions:**
Corrosive atmosphere
Explosive atmosphere
Home applications (The unit is only for industrial applications)

1.2 General Specifications



7. Failure Messages in ESM-3712-CN Cooling Controller

- 2- b_{u-2} message blinking. Evaporator temperature sensor failure. sensor connection is wrong or there is no sensor connection.
- 3- r_{l-1} message blinking. For absolute alarm, if cabinet temperature sensor value is lower than temperature alarm minimum parameter r_{u-1} value and for relative alarm, if cabinet temperature sensor value is lower than (Temperature Set - r_{u-1}), then r_{l-1} message starts to blink. If buzzer function selection parameter b_{u-1} is 2 or 4, internal buzzer starts to operate.
- 4- r_{h-1} message blinking. For absolute alarm, if cabinet temperature sensor value is higher than temperature alarm maximum parameter r_{u-1} value and for relative alarm, if cabinet temperature sensor value is higher than (Temperature Set + r_{u-1}), then r_{h-1} message starts to blink. If buzzer function selection parameter b_{u-1} is 2 or 4, internal buzzer starts to operate.
- 5- d_{d-1} message blinking. When the digital input is active and digital input function selection parameter value d_{f-1} is 0 or 2 d_{d-1} message starts to blink.
- 6- d_{f-1} message blinking. When the digital input is active and digital input function selection parameter value d_{f-1} is 1 or 4 d_{f-1} message starts to blink. If buzzer function selection parameter b_{u-1} is 2 or 4, internal buzzer starts to operate.

8. Manual Defrost Operation with Defrost Button

While defrost time parameter value d_{t-1} 1, button protection parameter value P_{r-1} = 0 or 2 and defrost output is inactive, in main operation screen if defrost button is pressed for 3 seconds manual defrost will be active

8.1 Manual Defrost Operation with Digital Input

While digital input function selection parameter value d_{f-1} = 3 if digital input contact selection parameter value d_{t-1} = 1 (normally open NO) and the K switch is getting closed, or if digital input contact selection parameter value d_{t-1} = 2 (normally close NC) and the K switch is getting opened manual defrost will be active

9. Modbus Addresses of Device Status Parameters (Read Input Register)

MODBUS ADRES:30001	Cabinet Temperature Value
MODBUS ADRES:30002	Evaporator Temperature Value
MODBUS ADRES:30003	Led Status : 0.bit °C Led, 4.bit Fan Led, 5.bit Defrost Led, 6.bit Compressor Led, 7.bit Alarm Led 13.bit Programming Led, 14.bit Set Led
MODBUS ADRES:30004	Device Status : 0.bit Alarm Status, 1.bit Buzzer Status 2.bit Cabinet Sensor Lost Status, 3.bit Evaporator Sensor Lost Status 7.bit Defrost Status
MODBUS ADRES:30005	Output Status : 0.bit Compressor Output 1.bit Defrost Output 2.bit Fan Output
MODBUS ADRES:30006	Device Type and Version

10. Specifications

- Device Type** : Cooling Controller
- Housing & Mounting** : 76 mm x 34.5 mm x 71 mm plastic housing for panel
Panel cut-out is 71 x 29 mm
- Protection Class** : NEMA 4X (IP65 at front, IP20 at rear)

1.3 Installation

A visual inspection of this product for possible damage occurred 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 supply 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 result in malfunction, electric shock or fire.

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

During putting equipment 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.

1.4 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.

1.5 Maintenance

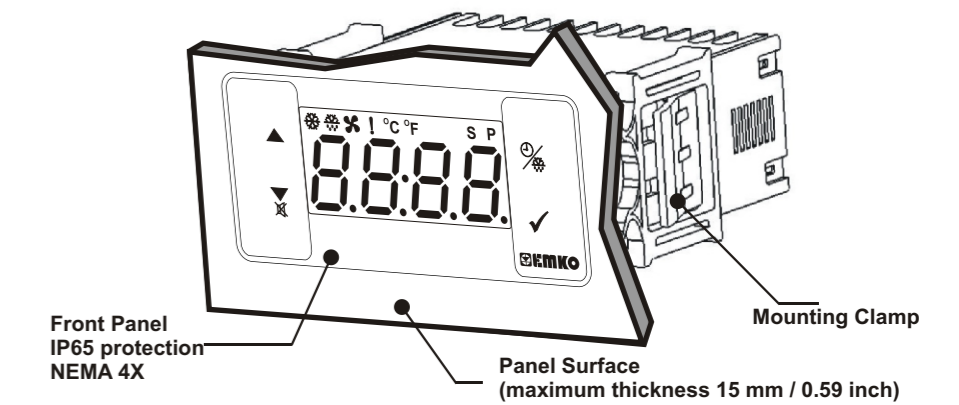
Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts. Do not clean the case with hydrocarbon-based solvents (Petrol, Trichloroethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth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

1.6 Manufacturer Company

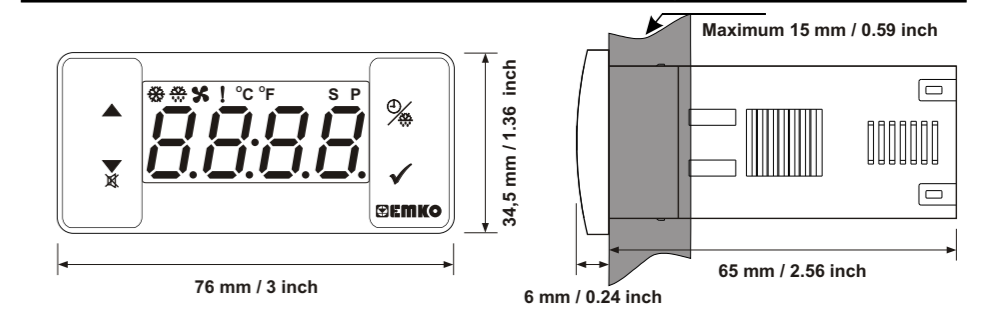
Manufacturer Information:
Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369 BURSA/TURKEY
Phone : +90 224 261 1900
Fax : +90 224 261 1912

Repair and maintenance service information:
Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369 BURSA/TURKEY
Phone : +90 224 261 1900
Fax : +90 224 261 1912

2. General Description



2.1 Front View and Dimensions of ESM-3712-CN Cooling Controller



2.2 Panel Cut-Out

