4.5 Entering To The Programming Mode, Changing and Saving Parameter

Main Operation Screen

When SET button is pressed for 5 seconds, “P” led starts to blink. If programming mode entering password is different from 0, programming mode entering screen PrG will be observed.

5 secs

Note-1: If programming mode accessing password is 0, hysteresis screen HSt is observed instead of programming screen accessing password PrG

Programming Mode Entering Screen
Press increment button for accessing to the password

Password Entering
Enter programming mode accessing password with increment and decrement

Password Entering
Press SET/OK button for accessing to the parameters

Note-2: Parameters can be observed by pressing SET/OK button in password entering screen without entering the programming mode entering password. But parameters can not be changed.

Programming Screen

Hysteresis Parameter
Parameter is accessed by pressing increment button. If set button is pressed, next parameter is shown.

Hysteresis Parameter Value
Change the parameter with increment and decrement buttons

Hysteresis Parameter Value
Press Set button for saving the parameter value

Programming Screen

Hysteresis Parameter
Press Set button for accessing to the next parameter

If no operation is performed in Programming mode for 20 seconds, device turns to main operation screen automatically

Programming Screen

Minimum Set Value Parameter
Parameter is accessed by pressing increment button. If set button is pressed, next parameter is shown.

Minimum Set Value
Change the parameter with increment and decrement

Minimum Set Value
Change the parameter with increment and decrement buttons

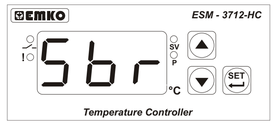
Programming Screen

Minimum Set Value Parameteri
Press Set button for saving the parameter value

Other Programming mode parameters can be accessed with the same method explained above, observed and changed.

If no operation is performed in Programming mode for 20 seconds, device turns to main operation screen automatically

5. Failure Messages in ESM-3712-HC Temperature Controller



Probe defect in analogue inputs. Sensor connection is wrong or there is no sensor connection.

6. Ordering Information

Ordering Information

ESM-3712-HC(77x35 DIN Size)	A	BC	D	E	/	FG	HI	/	U	V	W	Z
			0		/		00	/	1		0	0

A	Supply Voltage
1	100...240V ~ (- %15;+%10) 50/60Hz
2	24V~(-%15;+%10) 50/60Hz 24V⎓(-%15;+%10)
9	Customer

BC	Input Type	Scale(°C)	
05	J, Fe CuNi IEC584.1(ITS90)	0°C	800°C
10	K, NiCr Ni IEC584.1(ITS90)	0°C	999°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	Outputs	
1	01	**Process Out**	Relay Output (10A@250V~ at resistive load, 1NO)
		Alarm Out	Relay Output (5A@250V~ at resistive load, 1NO)
2	02	**Process Out**	SSR Driver Output (Max. 24mA,16V ⎓)
		Alarm Out	SSR Driver Output (Max. 24mA,16V ⎓)

V	Temp. Sensor which is given with ESM 3712 HC
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

All order information of ESM-3712-HC Temperature 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.

~ Symbol means Vac,
⎓ Symbol means Vdc,
≂ Symbol means Vac/dc

7. Specifications

Device Type	: Temperature Controller
Housing&Mounting	: 77 mm x 35 mm x 62.5 mm plastic housing for panel Mounting. Panel cut-out is 71 x 29 mm.
Protection Class	: NEMA 4X (IP65 at front , IP20 at rear).
Weight	: Approximately 0.20 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	: 100-240 V ~ (-%15;+%10) 50/60 Hz. 2VA 24V ~ (-%15;+%10) 50/60 Hz. 2VA 24V⎓(-%15;+%10) 2W
Temperature Sensor Inputs	: NTC, PTC, TC, RTD
NTC Input Type	: NTC (10 k @.25 °C)
PTC Input Type	: PTC (1000 @.25 °C)
Thermocouple Input Types	: J, K (IEC584.1)(ITS90)
Thermoresistance Input Type	: PT-100, PT-1000 (IEC751)(ITS90)
Accuracy	: ±1% of full scale for thermocouple and thermoresistance
Cold Junction Compensation	: Automatically ± 0.1°C/1°C.
Sensor Break Protection	: Upscale
Sampling Cycle	: 3 samples per second
Control Form	: ON / OFF
Relay Output	: Resistive Load 10 A@250 V ~ (Electrical Life : 100.000 operation (Full Load)
Optional SSR Output	: Maximum 24 mA,Maximum 16 V ⎓
Display	: 14 mm Red 3 digits LED Display
Leds	: SV (Green), OUT (Red), P(Red), Alarm(Red) 3 mm
Approvals	: GOST-R, CE

8. Other Informations

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

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EMKO

Temperature Controller

ESM-3712-HC 77x35 DIN Size

ESM-3712-HC(SET + ALARM)
77 x 35 DIN Size
Digital, ON / OFF Temperature Controller

- **3 Digits display**
- **PTC input or**
  NTC input or
  J Type Thermocouple input or
  K Type Thermocouple input or
  2-wire PT-100 input or
  2-wire PT-1000 input (It must be determined in order)
- **Temperature control output and alarm output**
- **Process and alarm set values boundaries**
- **Selectable heating or cooling function**
- **Adjustable temperature offset value**
- **Relay or SSR driver output**
- **Operation selection of compressor operates continuously, stops or operates periodically in case of probe defect**
- **Compressor protection times**
- **Password protection for programming section**

1.3 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 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 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.

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, 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.

1.Preface

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

Application Fields	Applications
Glass	Heating
Food	Baking Ovens
Plastic	Incubators
Petro-Chemistry	Storages
Textile, Automative	Air Conditioning
Machine Production Industries	Etc...
Etc...	

1.1 Operating Conditions

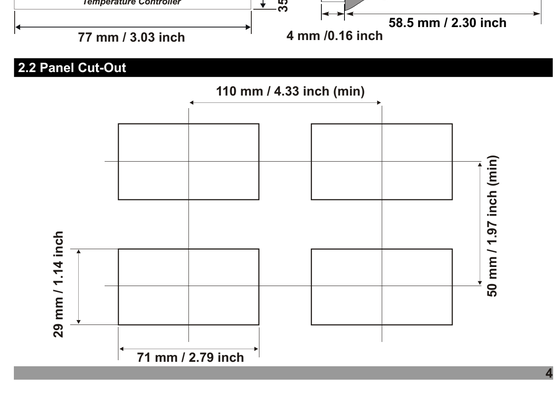
Operating Temperature : 0 to 50 °C

Max. Operating Humidity : 90% Rh (non-condensing)

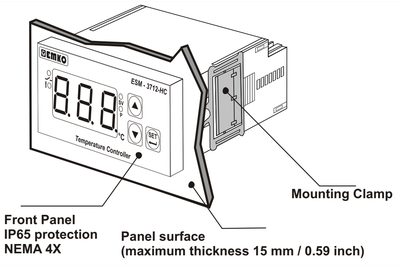
Altitude : Up to 2000 m.

Forbidden Conditions:
Corrosive atmosphere, Explosive atmosphere,
Home applications (The unit is only for industrial applications)

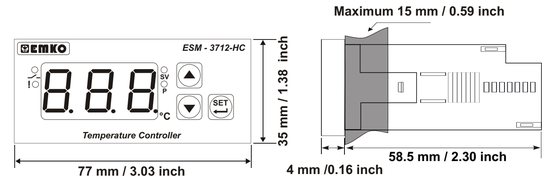
1.2 General Specifications



2. General Description

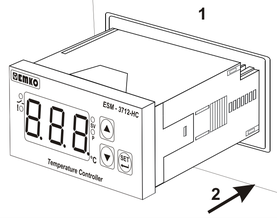


2.1 Front View and Dimensions of ESM-3712-HC Temperature Controller



2.2 Panel Cut-Out

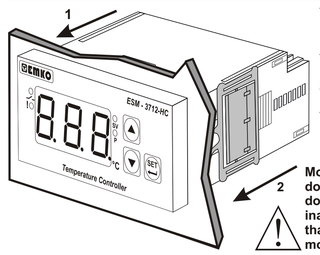
2.3 Panel Mounting



1-Before mounting the device in your panel, make sure that the cut-out is of the right size.

2-Insert the device through the cut-out. If the mounting clamps are on the unit, put out them before inserting the unit to the panel.

2.4 Installation Fixing Clamp



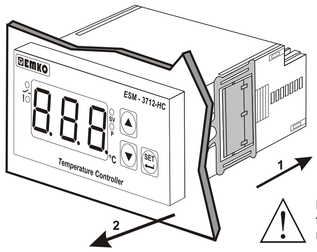
The unit is designed for panel mounting.

1-Insert the unit in the panel cut-out from the front side.

2- Insert the mounting clamps to the holes that located left and right sides of the device and make the unit completely immobile within the panel

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

2.5 Removing from the Panel



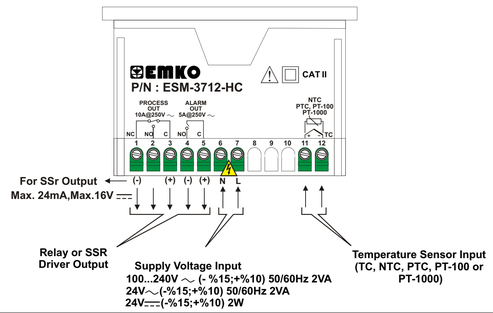
Loosen the screws

1-Pull mounting clamps from left and right fixing sockets.

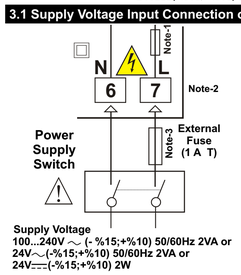
2-Pull the unit through the front side of the panel

Before starting to remove the unit from panel, power off the unit and the related system.

3. Electrical Wiring Diagram



3.1 Supply Voltage Input Connection of the Device



Note-1 : There is an internal 33R fusible flameproof resistor in 100-240 V ~ 50/60Hz There is an internal 4R7 fusible flameproof resistor in 24V≂ 50/60Hz

Note-2: "L" is (+), "N" is (-) for 24V ⎓ Supply Voltage

Note-3: External Fuse is recommended

Make sure that the power supply voltage is same indicated on the instrument. Switch on the power supply only after that all the electrical connection have been completed. Supply voltage range must be determined in order. While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit. Controlling prevents damages in unit and system and possible accidents as a result of incorrect supply voltage.

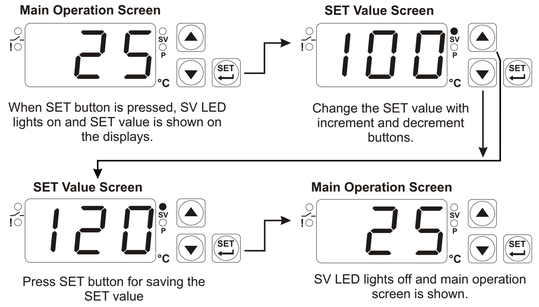
There is no power supply switch or fuse on the device. So a power supply switch and a fuse must be added to the supply voltage input. Power supply switch and fuse must be put to a place where user can reach easily. Power supply switch must be two poled for seperating phase and neutral. On/Off condition of power supply switch is very important in electrical connection. On/Off condition of power supply switch must be signed for preventing the wrong connection.

External fuse must be on phase connection in ~supply input.

External fuse must be on (+) line connection in ⎓supply input.

The instrument is protected with an internal fuse (Please refer to Note-1 for information). In case of failure it is suggested to return the instrument to the manufacturer for repair.

4.2 Changing and Saving Set Value



SET value is can be adjusted from minimum set value parameter SuL to maximum set value parameter SuH , Which can be accessed from programming parameters.

If no operation is performed in Set value mode for 20 seconds, device turns to main operation screen automatically.

4.3 Program Parameters

HSt **Hysteresis Parameter for Output (Default = 1)**
1 to 100 °C for TC Type Devices,
1 to 100 °C for PT-100 (-50°C, 400°C) and PT-1000 (-50°C, 400°C),
0.1 to 10.0 °C for PT-100 (-19.9°C, 99.9°C) and PT-1000 (-19.9°C, 99.9°C),
1 to 20 °C for PTC (-50°C, 150°C) and NTC (-50°C, 100°C),
0.1 to 10.0 °C for PTC (-19.9°C, 99.9°C) and NTC (-19.9°C, 99.9°C)

SuL **Minimum Set Value Parameter (Default =Minimum value of device scale)**
Set value can not be lower than this value. This parameter value can be adjusted from minimum value of device scale to maximum set value parameter SuH

SuH **Maximum Set Value Parameter (Default = Maximum value of device scale)**
Set value can not be greater than this value. This parameter value can be adjusted from minimum set value SuL to maximum value of the device scale

oFt **Process Offset Parameter (Default = 0)**
-100 to 100 °C for TC Type Devices,
-100 to 100 °C for PT-100 (-50°C , 400°C) and PT-1000 (-50°C , 400°C),
-10.0 to 10.0 °C for PT-100 (-19.9°C, 99.9°C) and PT-1000 (-19.9°C, 99.9°C),
-20 to 20 °C for PTC (-50°C, 150°C) and NTC (-50°C, 100°C),
-10.0 to 10.0 °C for PTC (-19.9°C, 99.9°C) and NTC (-19.9°C, 99.9°C)

AtS **Alarm Type Selection Parameter**

0	Sensor Failure Alarm
1	Process High Alarm
2	Process Low Alarm
3	Deviation High Alarm
4	Deviation Low Alarm
5	Deviation Band Alarm
6	Deviation Range Alarm

ALL **Alarm Set Value Low Limit Parameter**
Alarm set value can not be lower than this value.
This parameter value can be adjusted from, minimum process set value parameter to alarm set value high limit parameter value.

AuL **Alarm Set Value High Limit Parameter**
Alarm set value can not be greater than this value.
This parameter value can be adjusted from alarm set value low limit parameter value to maximum process set value parameter

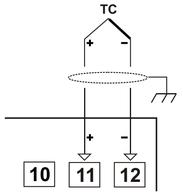
Aon **Alarm On Delay Time Parameter**
It can be adjusted from 0 to 99 minutes.

AoF **Alarm Off Delay Time Parameter**
It can be adjusted from 0 to 99 minutes.
When this parameter is 99, if increment button is pressed, LCH is observed and alarm latching output is selected. To make the alarm latching output passive, decrement button must be pressed in main operation screen.

APd **Alarm Delay Parameter After Power On**
This parameter defines the delay for the alarm is being active after power on. It can be adjusted from 0 to 99 minutes.

3.2 Temperature Sensor Input Connection

3.2.1 TC (Thermocouple) Connection



Connect the wires with the polarity as shown in the figure left.

Always use compensation wire corresponding to the thermocouple used. If present, the shield must be connected to a proper ground.

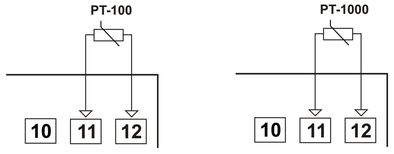
Input resistance is greater than 10M

3.2.2 PTC and NTC Connection

Input resistance is greater than 10M .

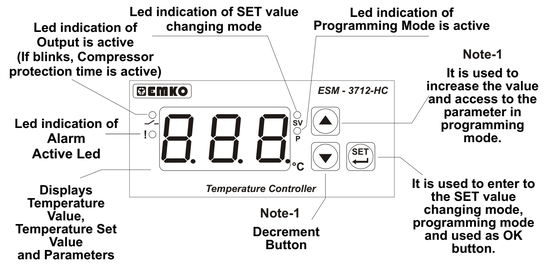
Pay attention the cable colours of PTC probe while doing the PTC probe connection.

3.2.3 PT-100 and PT-1000 Connection



Input resistance is greater than 10M .

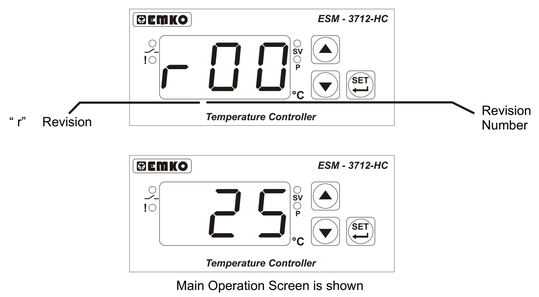
4. Front Panel Definition and Accessing to the Menus



Note-1: If increment or decrement button is pressed for 5 seconds continuously, increment and decrement number become 10, if increment or decrement button is pressed for 10 seconds continuously, increment and decrement number become 100.

4.1 Observation of Software Revision on the Displays

When power is first applied to the temperature controller, software revision number is shown on the displays.



Main Operation Screen is shown

If there is an unexpected situation while opening the device, power off the device and inform a qualified personnel.

AlS **Alarm Set Value Parameter**
Alarm output is controlled according to this value.
For alarm type selection paramater AtS = 1 or 2, this parameter value is can be adjusted from alarm set value low limit ALL parameter to alarm set value high limit AuL Parameter, for alarm type selection paramater AtS = 3,4,5 or 6 this parameter value is can be adjusted from 0 to alarm set value high limit AuL Parameter.

ALH **Alarm Hysteresis Parameter**
Alarm hysteresis value. This parameter is can be adjusted 0 to %50 of the device scale

HCS **Operating Type Parameter**

0	Heating
1	Cooling

PoS **Switch On Delay After Power On Parameter**
When power is first applied to the device, this time delay must be expired for activation of the compressor. It can be adjusted from 0 to 20 minutes

SPd **Compressor Stop/Start Time Delay Parameter**
When compressor is inactive, this time delay must be expired for activation of the compressor. It can be adjusted from 0 to 20 minutes.

Std **Compressor Start/Start Time Delay Parameter**
This time delay must be expired between two activation of the compressor.
It can be adjusted from 0 to 20 minutes.

PdF **Probe Defect Parameter**

0	Compressor is OFF in case of probe defect
1	Compressor is ON in case of probe defect
2	Compressor operates periodically according to Pon and PoF time periods in case of probe defect.

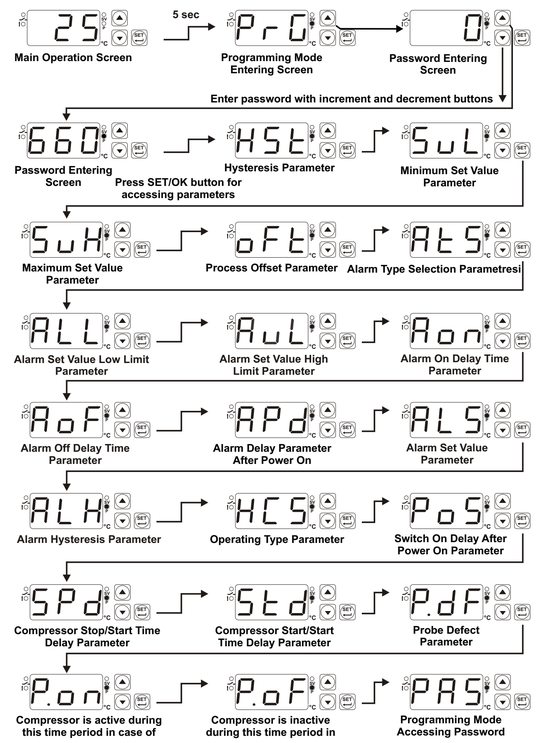
Pon **Compressor is active during this time period in case of probe defect**
If Probe Defect Parameter PdF is 2 , then this parameter can be observed. It can be adjusted from 0 to 99.

PoF **Compressor is inactive during this time period in case of probe defect**
If Probe Defect Parameter PdF is 2 , then this parameter can be observed. It can be adjusted from 0 to 99.

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

PoS, SPd, Std, PdF, Pon and PoF parameters are observed if Operating type is selected " Cooling ". If operating type is selected " Heating " beginning of the parameters list is shown.

4.4 Easy Access Diagram Of Programming Mode Parameters



If no operation is performed in Programming mode for 20 seconds, device turns to main operation screen automatically