

**EMKO**  
ON / OFF TEMPERATURE CONTROL UNITS  
ESM-XX10



- ESM-4410, ESM-7710, ESM-9910  
Digital, ON/OFF Temperature Controller Unit  
- 3 Digits display  
- NTC Input or, PTC Input or,  
J type thermocouple or,  
K type thermocouple or,  
PT-100, PT1000, 2-wire or 3-wire temperature input  
(It must be determined in order)  
- ON/OFF control form  
- Selectable heating and cooling function  
- Operating type selection with hysteresis  
- Adjustment of temperature offset value  
- Minimum pulling time adjustment for control outputs  
- Set value low limit and set value high limit boundaries  
- Password protection for programming mode

ESM series temperature controllers are designed for measuring and controlling temperature. They can be used in many applications with On/Off control form and heating and cooling selection. They are mainly used in glass, plastic, petro-chemistry, textile, automotive and machine production industries.

**SPECIFICATIONS**

- INPUT**  
NTC: NTC (10kΩ @ 25°C)  
PTC: PTC (1000Ω @ 25°C)  
Thermocouple(TC): J, K (IEC 584.1) (ITS90)  
Thermoresistance(RTD): 2 or 3-wire PT100, PT1000 (IEC 751) (ITS90)  
**Measurement Range:** It is in ordering information  
**Accuracy:** ± 1% of full 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 for two control outputs

- OUTPUT**  
**Output-1 :** Relay (7A@250V~ at resistive load ) or SSR Driver Output (Maximum 23 mA, Maximum 15 V ---)

- Output-2 :** Relay (7A@250V~ at resistive load ) or SSR Driver Output (Maximum 23 mA, Maximum 15 V ---)

Outputs that are on the device can be used as process or alarm output.

**DISPLAY**

- Process Display :**  
ESM-4410 : 10 mm Red 3 digits LED Display  
ESM-7710 : 14 mm Red 3 digits LED Display  
ESM-9910 : 20 mm Red 3 digits LED Display

**LED Display :**

- Device with 1 Output :** SET(Green), OUT(Red), PROG(Red)  
**Device with 2 Outputs :** SET1(Green), SET2(Green), OUT1(Red), OUT2(Red), PROG(Red)

**POWER SUPPLY**

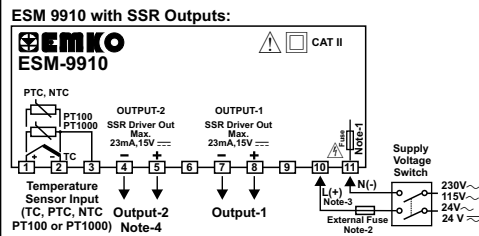
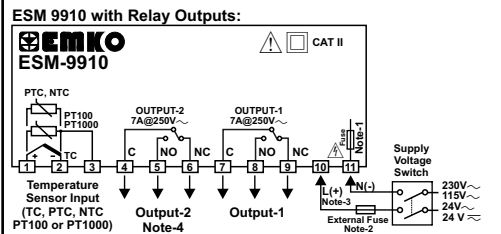
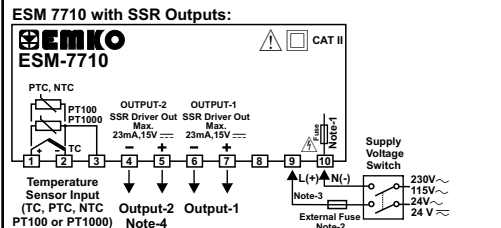
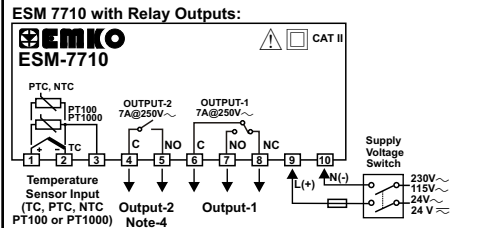
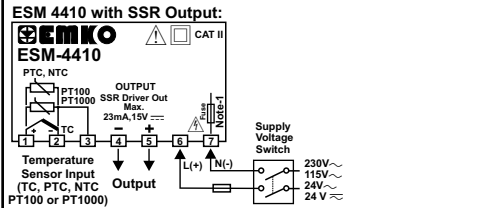
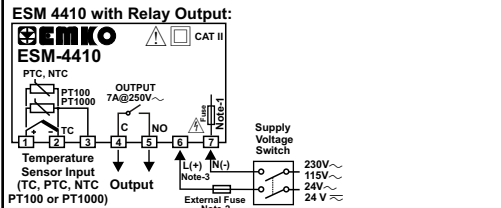
- 230 V ~ ( ±15% ) 50/60 Hz - 3 VA  
115 V ~ ( ±15% ) 50/60 Hz - 3 VA  
24 V ~ ( ±15% ) 50/60 Hz - 3 VA  
24 V ~ ( - %15, + %10 ) 50/60 Hz - 3 VA  
(Supply voltage must be determined in order)

**ENVIRONMENTAL RATINGS and PHYSICAL SPECIFICATIONS**

- Operating Temperature :** 0...50°C  
**Humidity :** 0-90%RH (none condensing)  
**Protection Class :** IP65 at front, IP20 at rear  
**Mounting :** Type-1 Enclosure Mounting  
**Installation:** Fixed installation Category II  
**Over Voltage Category:** II  
**Pollution Degree:** II, office or workplace, none conductive pollution

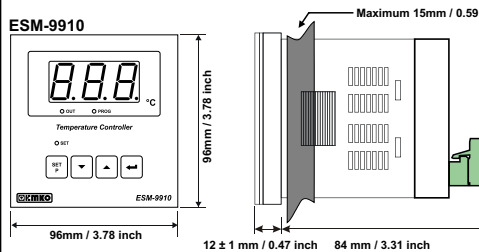
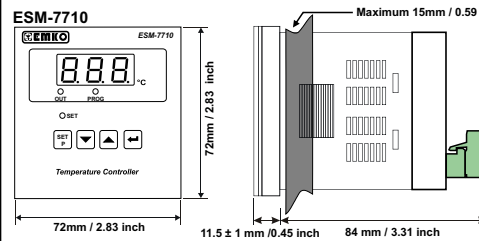
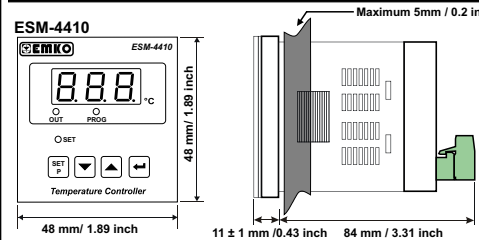
DEVICE	WEIGHT	DIMENSION	PANEL CUT-OUT
ESM-4410	160 gr	48x48 mm, Depth:95 mm	46 x 46 mm
ESM-7710	210 gr	72x72 mm, Depth:95.5 mm	69 x 69 mm
ESM-9910	280 gr	96x96 mm, Depth:96 mm	92 x 92 mm

**Electrical Wiring**

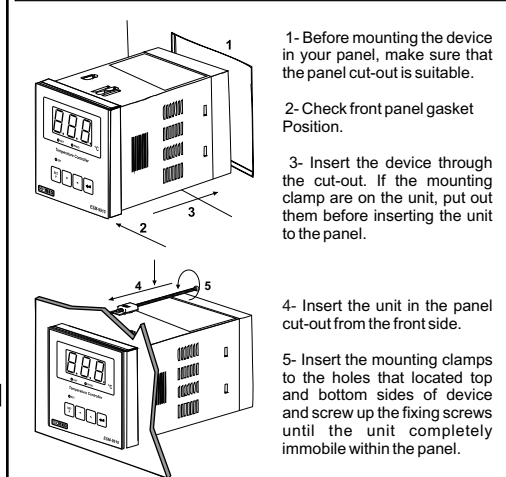


- Note-1 :** There is an internal fusible flameproof resistor.  
**Note-2 :** External fuse is recommended.  
1A~T for power supply 100...240 V ~ or 24V ---  
1A~T for power supply 24V ---  
**Note-3 :** "L" is (+) , "N" is (-) for 24V --- supply voltage  
**Note-4 :** Output-2 exists in only ESM-7710 and ESM-9910 Devices

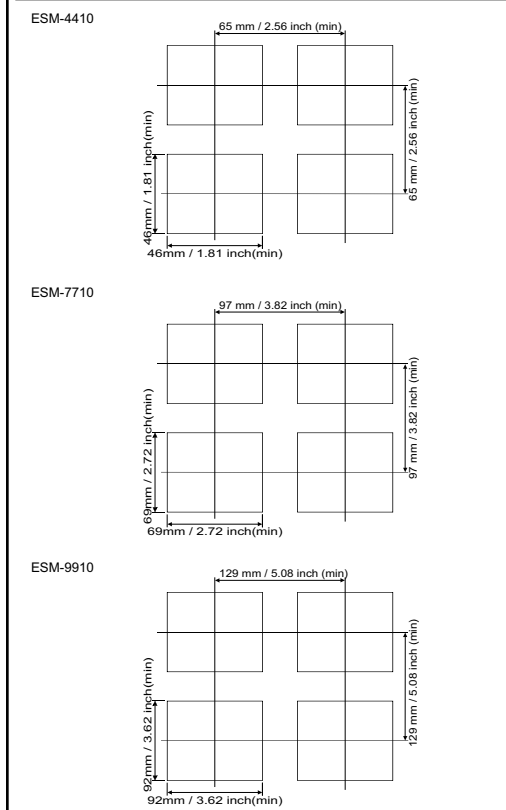
**Dimension**



**Panel Mounting**



**Panel Cut-out**



### Front Panel Definition

**Temperature Display**  
 Led indication of OUTPUT-1 is active, Programming mode is active, OUTPUT-2 is active  
 Led indication of SET1/2 value changing mode

**SET1 P** It is used for entering to SET1 value changing mode and programming mode

**SET2 P** It is used for entering to SET2 value changing mode and confirm a parameter in programming mode

**▲** It is used to increase the value

**▼** It is used to decrease the value

### Parameters

**5uL** **Minimum Set Value Parameter**  
 Set value can not be lower than this value. This parameter value can be adjusted from minimum value of devices scale to maximum set value parameter [5uL]

**5uH** **Maximum Set Value Parameter**  
 Set value can not be greater than this value. This parameter value can be adjusted from minimum set value [5uL] to maximum value of device scale

**H51** **Hysteresis Parameter For Output-1**  
 1 to 100 °C for TC Type Devices,  
 1 to 100 °C for PT100 (0°C, 400°C), PT1000 (-50°C, 400°C),  
 1.0 to 10.0 °C for PT100, Pt1000 (-19.9°C, 99.9°C),  
 1 to 100 °C for PTC (-50°C, 150°C),  
 1.0 to 10.0 °C for PTC and NTC (-19.9°C, 99.9°C),  
 1 to 20 °C for NTC (-50°C, 100°C)

**H52** **Hysteresis Parameter For Output-2**  
 1 to 100 °C for TC Type Devices,  
 1 to 100 °C for PT100 (0°C, 400°C), PT1000 (-50°C, 400°C),  
 1.0 to 10.0 °C for PT100, Pt1000 (-19.9°C, 99.9°C),  
 1 to 100 °C for PTC (-50°C, 150°C),  
 1.0 to 10.0 °C for PTC and NTC (-19.9°C, 99.9°C),  
 1 to 20 °C for NTC (-50°C, 100°C)

**fL1** **Operation type selection parameter of output-1**  
 0 Operation Type of Output-1 relay can be adjusted as "HEATING". Normally energised.  
 1 Operation Type of Output-1 relay can be adjusted as "COOLING". Normally de-energised.

**fL2** **Operation type selection parameter of output-2**  
 This parameter is not active in devices with one relay.  
 0 Operation Type of Output-2 relay can be adjusted as "HEATING". Normally energised.  
 1 Operation Type of Output-2 relay can be adjusted as "COOLING". Normally de-energised.

**oFt** **Process Offset Parameter**  
 -10 to 10 °C for TC Type Devices,  
 -10 to 10 °C for PT100(0°C, 400°C), PT1000(-50°C, 400°C),  
 -10.0 to 10.0 °C for PT100, PT1000(-19.9°C, 99.9°C),  
 -10 to 10 °C for PTC(-50°C, 150°C),  
 -10.0 to 10.0 °C for PTC and NTC(-19.9°C, 99.9°C),  
 -10 to 10 °C for NTC(-50°C, 100°C)

**fLt** **Minimum Pulling Time Parameter for Output-1**  
 When Output-1 is inactive this time must be expired for Output-1 to become active again. It can be adjusted from 0 to 100 seconds

**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.

### Entering to Programming Mode, Changing and Saving Parameters

**Main Operation Screen**  
 When [SET1] button is pressed for 10 seconds PROG led starts to blink. If programming mode entering password is different from 0 programming mode entering screen will be observed.

**Programming Mode Entering Screen**  
 Press [▲] button for accessing to the password entering screen

**Password Entering Screen**  
 Enter the programming mode accessing password with [▼] and [▲] buttons

**Password Entering Screen**  
 Press [SET1] button for accessing to the parameters

**Minimum Set Value Parameter**

**Maximum Set Value Parameter**

**Hysteresis for Output-1**

**Hysteresis for Output-2**

**Operation Form Selection for Output-1**

**Operation Form Selection for Output-2**

**Process Offset Parameter**

**Minimum Pulling Time for Output-1**

**Programming Mode Accessing Password**

If [5uL] button is pressed again, device turns to [5uL] parameter beginning of the programming mode.

### Adjustment of Set Values

#### ESM-xx10 with Two Relays

**Adjustment of SET1 Value**

**Main Operation Screen**  
 Press [SET1] button

**SET1 value**  
 SET1 LED lights on

**Change SET1 value with [▼] and [▲] buttons**

**Save SET1 value with [SET1] button**

**Adjustment of SET2 Value**

**Main Operation Screen**  
 Press [SET2] button

**SET2 value**  
 SET2 LED lights on

**Change SET2 value with [▼] and [▲] buttons**

**Save SET2 value with [SET2] button**

**Main Operation Screen**

### ESM-xx10 with One Relay

**Main Operation Screen**  
 Press [SET] button

**SET value**  
 SET LED lights on

**Change SET value with [▼] and [▲] buttons**

**Save SET value with [SET] button**

**Main Operation Screen**

### Failure Message

Sensor failure in analogue inputs. It means sensor connection is wrong or there is no sensor.

**i** If no operation is done in programming or Set value mode for 20 seconds, device turns to main operation screen automatically.

## 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 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 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 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 its own 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.

## Other Information

### Producer Firm 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 Firm 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

## Ordering Information

ESM-4410 (48 x 48 1/4 DIN)	A	BC	D	E	/	FG	HI	/	U	V	W	Z
ESM-7710 (72 x 72 1/4 DIN)			0	1	/		00	/	2		0	0
ESM-9910 (96 x 96 1/4 DIN)					/							

A Supply Voltage	
2	24 V $\sim$ ( - %15, + %10 ) 50/60 Hz
3	24 V $\sim$ ( $\pm$ %15 ) 50/60 Hz
4	115 V $\sim$ ( $\pm$ %15 ) 50/60 Hz
5	230 V $\sim$ ( $\pm$ %15 ) 50/60 Hz
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
09 PT 100 , IEC751(ITS90)	-19.9°C 99.9°C
03 PT 100 , IEC751(ITS90)	0°C 400°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 Output-1
1 Relay Output(7A@250V $\sim$ at resistive load,1NO+1NC)
2 SSR Driver Output (Maximum 23 mA, 15 V $\sim$ )

FG Output-2
00 None
01 For ESM9910; Relay Output(7A@250V $\sim$ at resistive load,1NO+1NC) For ESM7710; Relay Output(7A@250V $\sim$ at resistive load,1NO)
02 SSR Driver Output (Maximum 23 mA, 15 V $\sim$ )

V Temp.Sensor which is given with ESM-xx10
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




This symbol is used for safety warnings. User must pay attention to these warnings.



This symbol is used to determine the dangerous situations as a result of an electric shock. User must pay attention to these warnings definitely.



This symbol is used to determine the important notes about functions and usage of the device

 Thank you very much for your preference to use Emko Elektronik products, please visit our Your Technology Partner web page to download detailed user manual.  
[www.emkoelektronik.com.tr](http://www.emkoelektronik.com.tr)