ESM-9910 96 x 96 1/4 DIN
Digital, On/Off Temperature Controller

- *3 Digits display*
- *NTC Input or,*
  PTC Input or,
  J type thermocouple or,
  K type thermocouple or,
  PT-100 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*
- *Password protection for programming mode*

ABOUT INSTRUCTION MANUAL

Instruction manual of ESM-9910 temperature controller consists of three main sections. Explanation of these sections are below. Also, there are other sections which include order information and technical specifications of the device. All titles and page numbers in instruction manual are in **"CONTENTS"** section. User can reach to any title with section number.

Installation:

In this section, physical dimensions of the device, panel mounting, electrical wiring are explained.

Operation and Parameters:

In this section, user interface of the device, how to access to the parameters, description of the parameters are explained.

Control Algorithm:

Configurable control function that is on the device is explained.

Also in these sections, there are warnings to prevent serious injury while doing the physical and electrical mounting or using the device.

Explanation of the symbols which are used in these sections are given below.

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.

CONTENTS

EU DECLARATION OF CONFORMITY

Manufacturer's Name : **EMKO ELEKTRONIK A.S.**
Manufacturer's Address : **DOSAB, Karanfil Sk., No:6,**
16369 Bursa, TURKEY

The manufacturer hereby declares that the product:

Product Name : **Temperature Controller Unit**

Type Number : **ESM-9910**

Product Category : **Electrical equipment for measurement, control and laboratory use**

Conforms to the following directives :

2006 / 95 / EC The Low Voltage Directive

2004 / 108 / EC The Electromagnetic Compatibility Directive

has been designed and manufactured to the following specifications:

EN 61000-6-4:2007 EMC Generic Emission Standard for Industrial Environments

EN 61000-6-2:2005 EMC Generic Immunity Standard for Industrial Environments

EN 61010-1:2001   Safety Requirements for electrical equipment for measurement, control and laboratory use

When and Where Issued

Authorized Signature

16th October 2009

Name   : Serpil YAKIN

Bursa-TURKEY
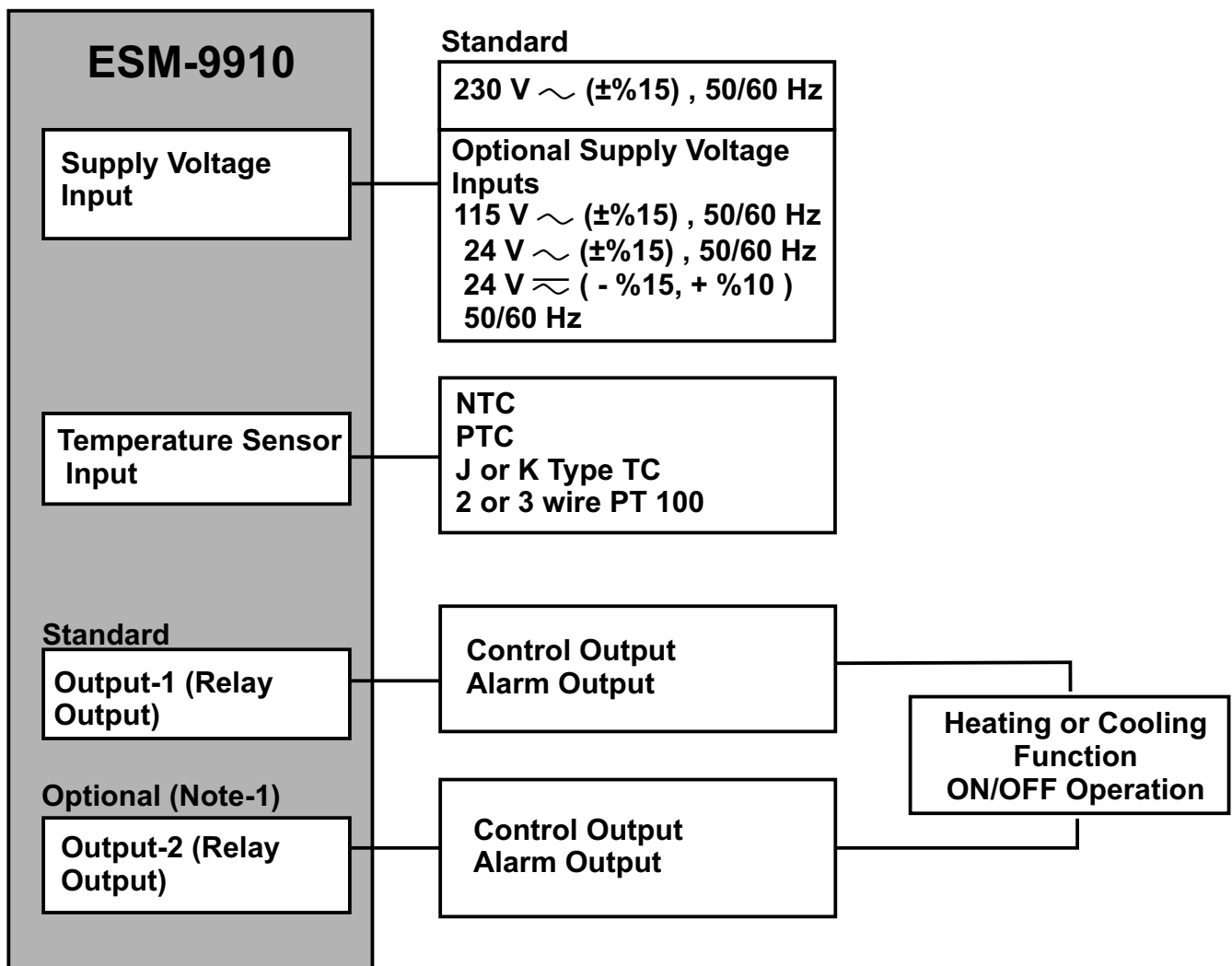
Position   : Quality Manager

1. Preface

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. Some application fields which they are used are listed below:

Application Fields
Glass
Plastic
Petro-Chemistry
Textile
Automative
Machine Production Industries

1.1 General Specifications

ESM-9910

Supply Voltage Input

Standard

230 V $\sim$ (±%15) , 50/60 Hz

Optional Supply Voltage Inputs 115 V $\sim$ (±%15) , 50/60 Hz 24 V $\sim$ (±%15) , 50/60 Hz 24 V $\overline{\sim}$ (- %15, + %10) 50/60 Hz

Temperature Sensor Input

NTC PTC J or K Type TC 2 or 3 wire PT 100

Standard

Output-1 (Relay Output)

Control Output Alarm Output

Optional (Note-1)

Output-2 (Relay Output)

Control Output Alarm Output

Heating or Cooling Function ON/OFF Operation

Note-1: Optional Relay output is standard in ESM-9910 with two relays

1.2 Ordering Information

ESM-9910 (96x96 1/4 DIN)	A	BC	D	E	/	FG	HI	/	U	V	W	Z
			0		/		00	/	2		0	0

All order information of ESM-9910 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.

A	Supply Voltage
2	24 V $\rightleftharpoons$ (- %15, + %10) 50/60 Hz
3	24 V $\sim$ (± %15) 50/60 Hz
4	115 V $\sim$ (± %15) 50/60 Hz
5	230 V $\sim$ (± %15) 50/60 Hz
9	Customer

BC	Input Type	Scale(°C)	
12	PTC (Note-1)	-50°C	150°C
15	PTC (Note-1)	-19.9°C	99.9°C
09	PT 100 , IEC751(ITS90)	-19.9°C	99.9°C
03	PT 100 , IEC751(ITS90)	0°C	400°C
05	J ,Fe CuNi IEC584.1(ITS90)	0°C	800°C
10	K ,NiCr Ni IEC584.1(ITS90)	0°C	999°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 23mA,15V)

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

V	Temp.Sensor which is given with ESM-9910
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

⚠️ $\sim$ □Vac,
$\overline{\underline{}}$ □Vdc,
$\overline{\sim}$ □Vacdc

1.3 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.

1.4 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.

2.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.
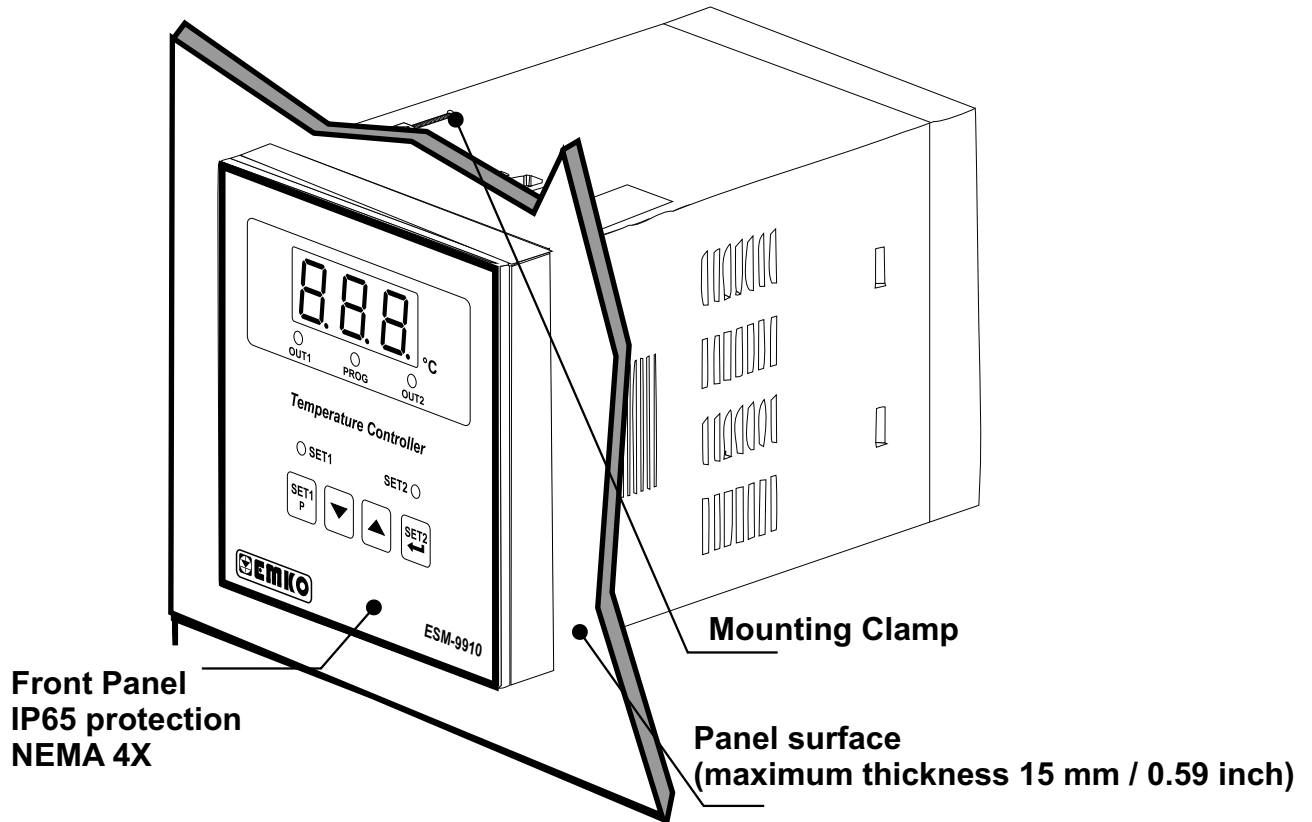
Do not use the unit in combustible or explosive gaseous atmospheres.

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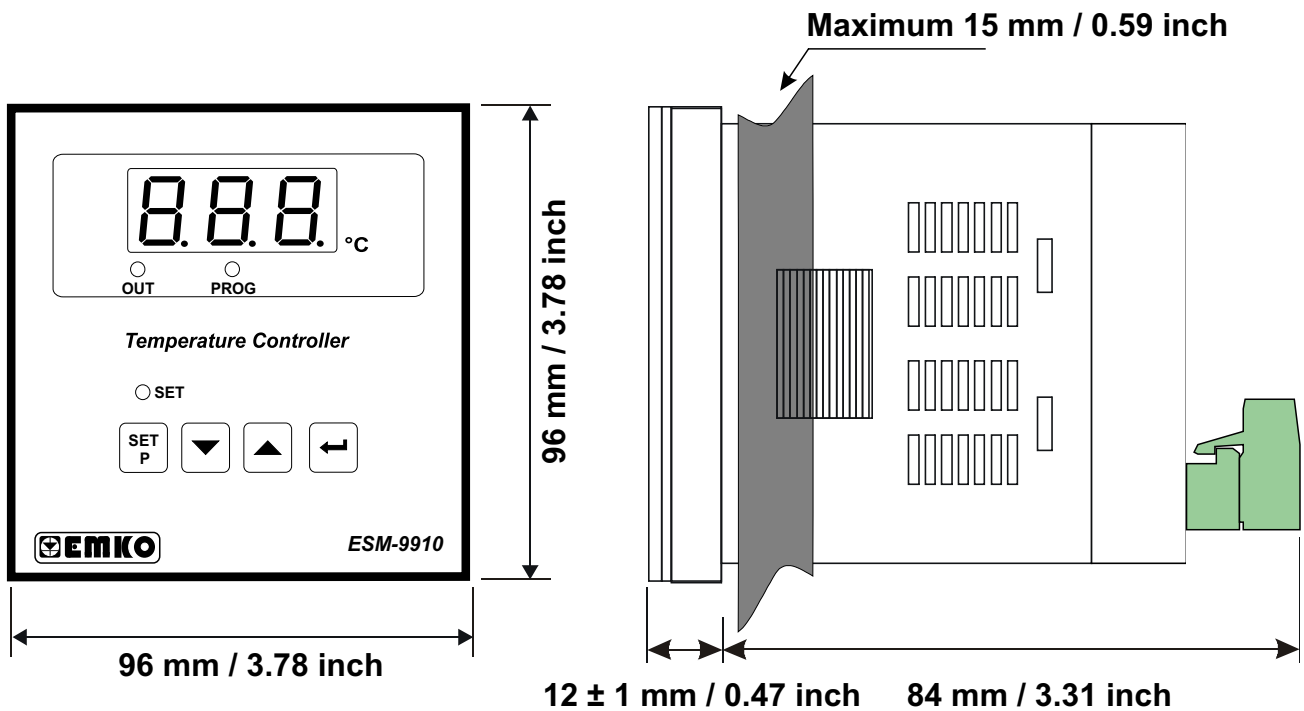
Montage of the product on a system must be done with it's own fixing clamps. Do not do the montage of the device with inappropriate fixing clamp. Be sure that device will not fall while doing the montage.

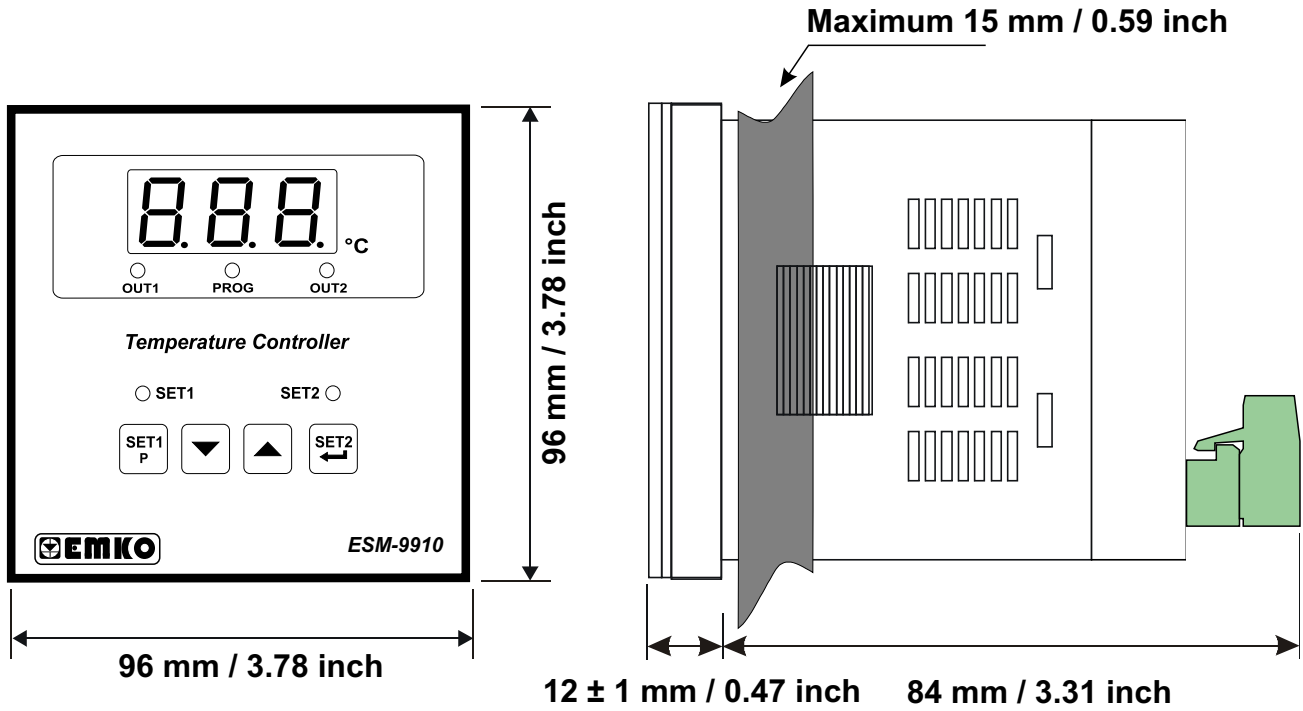**It is your responsibility if this equipment is used in a manner not specified in this instruction manual.**
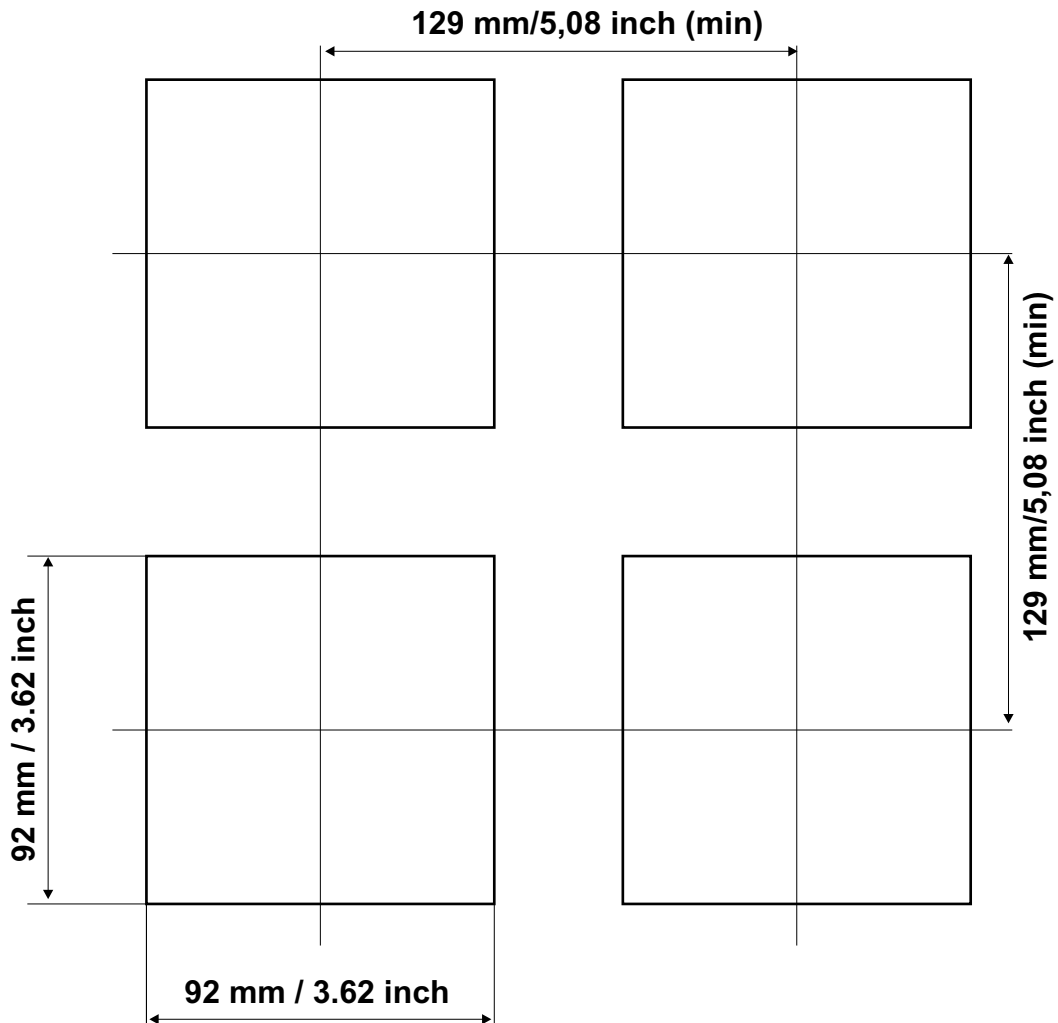
2.1 General Description

Mounting Clamp

**Front Panel
IP65 protection
NEMA 4X**

**Panel surface
(maximum thickness 15 mm / 0.59 inch)**

2.2 Front View and Dimensions of ESM-9910 Temperature Controller with One Relay

Maximum 15 mm / 0.59 inch

96 mm / 3.78 inch

96 mm / 3.78 inch

12 ± 1 mm / 0.47 inch   **84 mm / 3.31 inch**

2.3 Front View and Dimensions of ESM-9910 Temperature Controller with Two Relays

Maximum 15 mm / 0.59 inch

96 mm / 3.78 inch

96 mm / 3.78 inch

°C

OUT1   PROG   OUT2

Temperature Controller

○ SET1   SET2 ○

SET1
P

SET2

EMKO   *ESM-9910*

12 ± 1 mm / 0.47 inch   **84 mm / 3.31 inch**

2.4 Panel Cut-Out

129 mm/5,08 inch (min)

129 mm/5,08 inch (min)

92 mm / 3.62 inch

92 mm / 3.62 inch

2.5 Environmental Ratings

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)

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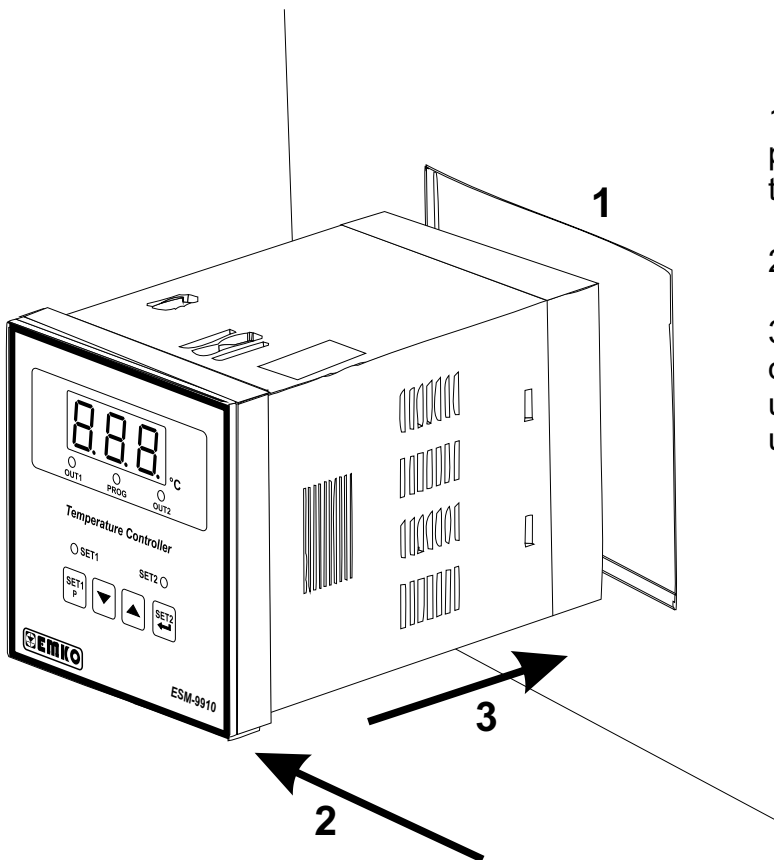
1-Before mounting the device in your panel, make sure that the cut-out is of the right size.

2-Check front panel gasket position

3-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.

During installation into a metal panel, care should be taken to avoid injury from metal burrs which might be present. The equipment can loosen from vibration and become dislodged if installation parts are not properly tightened. These precautions for the safety of the person who does the panel mounting.

2.7 Installation Fixing Clamp
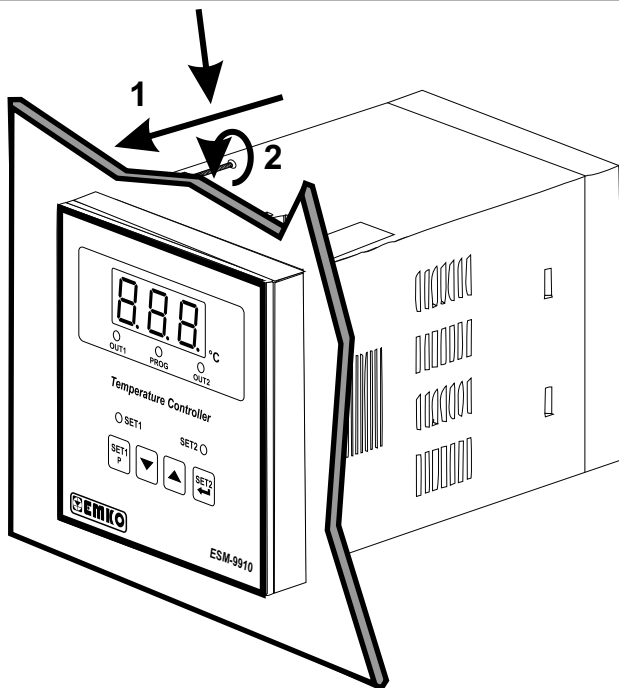
The unit is designed for panel mounting.

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

2- Insert the mounting clamps to the holes that located top and screw up the fixing screws until the unit completely immobile within the panel
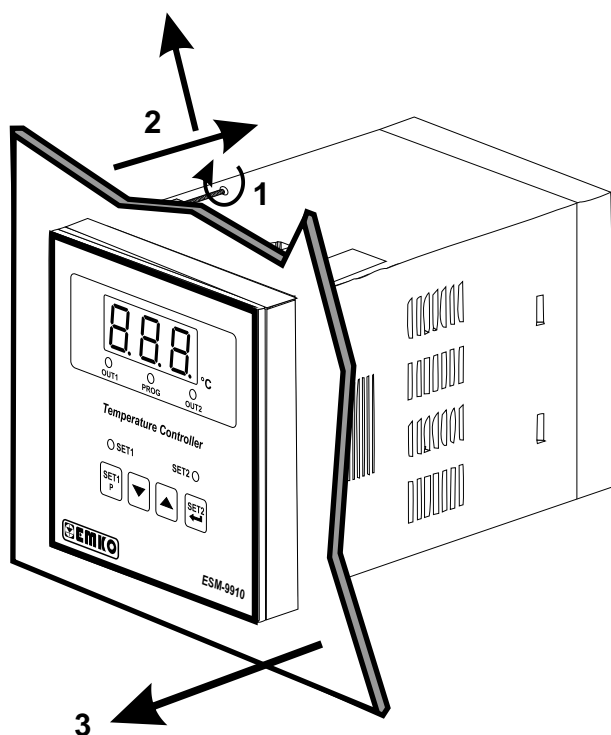
Montage of the unit to a system must be done with it's own fixing clamps. Do not do the montage of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the montage.

2.8 Removing from the Panel

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

1-Loosen the screws.

2-Pull mounting clamps from top and bottom fixing sockets.

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

3.Electrical Wirings

⚠ You must ensure that the device is correctly configured for your application. Incorrect configuration could result in damage to the temperature being controlled, and/or personal injury. It is your responsibility, as the installer, to ensure that the configuration is correct.
Device parameters has factory default values. These parameters must be set according to the system's needs.

⚠ Only qualified personnel and technicians should work on this equipment. This equipment contains internal circuits with voltage dangerous to human life. There is severe danger for human life in the case of unauthorized intervention.

⚠ 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.

3.1 Terminal Layout and Connection Instructions
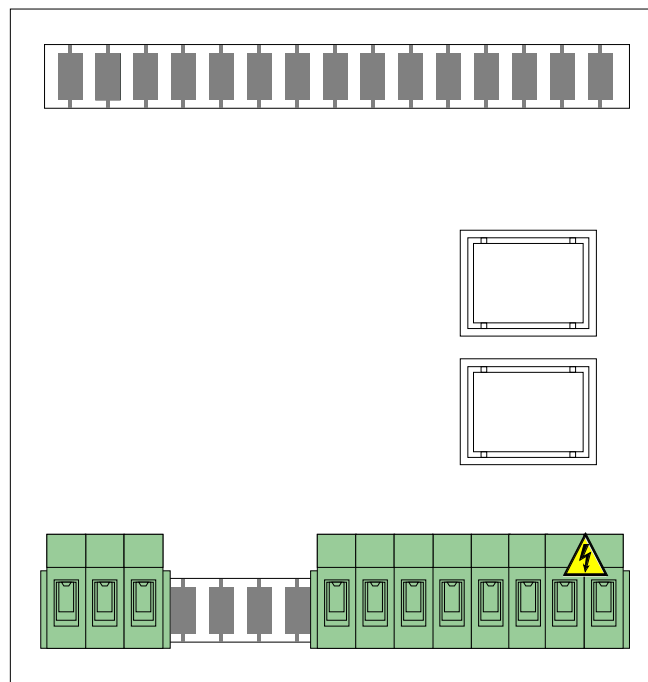
Max. 2.5 mm / 0.098 inch
Wire Size:
14AWG/1 mm²
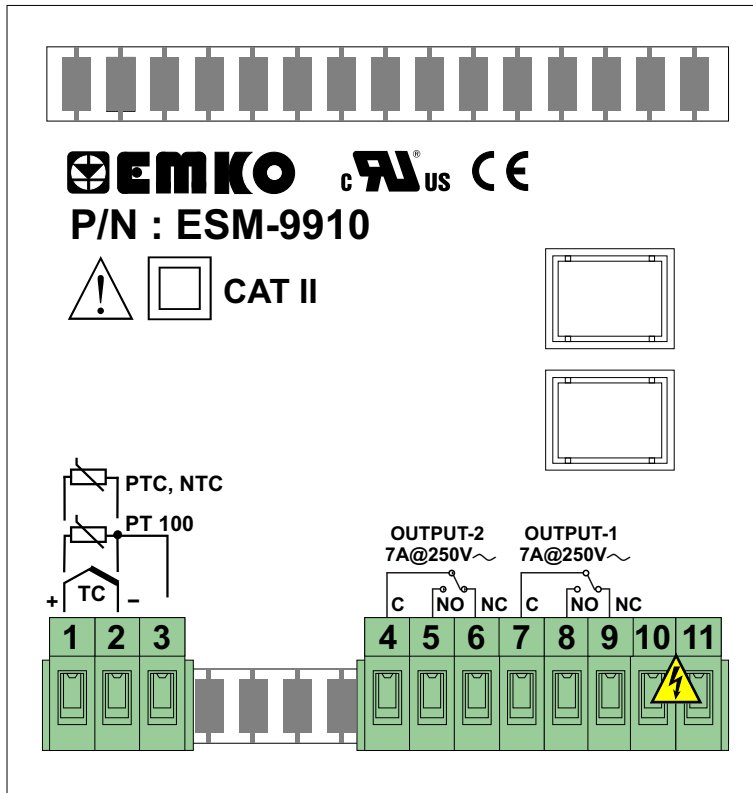**Solid /Stranded**
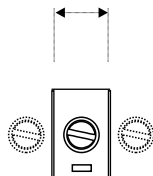
Torque
0.5 Nm

Screw driver
0.8 x 3 mm

3.2 Electrical Wiring Diagram

Electrical wiring of the device must be the same as 'Electrical Wiring Diagram' below to prevent damage to the process being controlled and personnel injury.

EMKO cRUus CE

P/N : ESM-9910

⚠ ▢ **CAT II**

PTC, NTC
PT 100
+ TC −

OUTPUT-2
7A@250V∼
C NO NC

OUTPUT-1
7A@250V∼
C NO NC

| 1 | 2 | 3 | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

L (+)   N (-)

Temperature Input
(TC, PT-100, PTC or NTC)

Relay Output
This Relay Module is in
ESM-9910.A.BC.0.1/01.00
types

Relay Output
This Relay Module is in
ESM-9910.A.BC.0.1/01.00 and
ESM-9910.A.BC.0.1/00.00
types

Supply Voltage Input
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
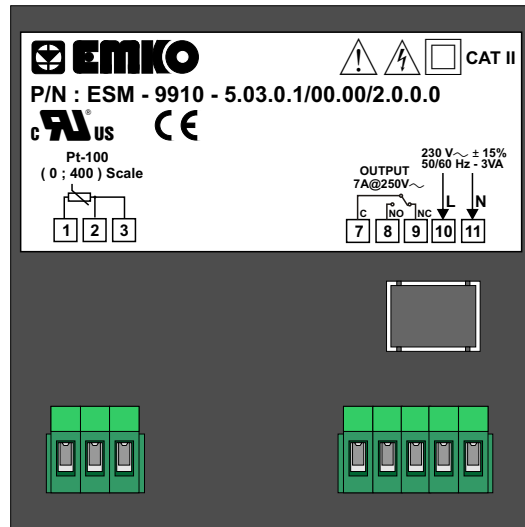**(It must be determined in order)**

ⓘ **Temperature input is in CAT II class.**

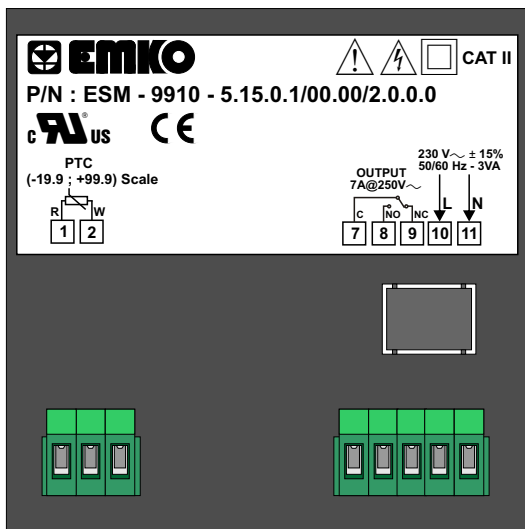## 3.3 Labels for ESM-9910 Temperature Controller with One Relay

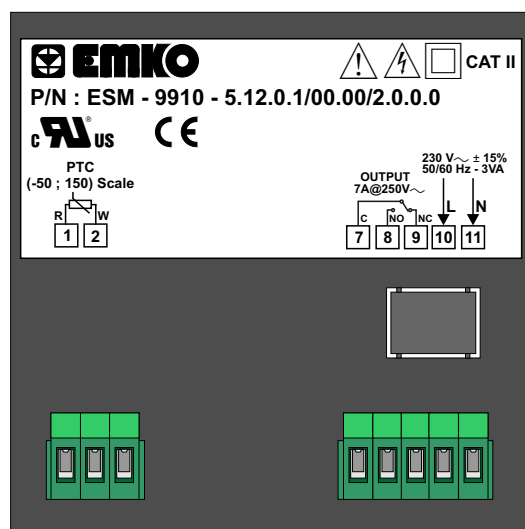**Rear label appearance of the device that have PT-100 (-19.9°C ; + 99.9°C) Scale**

EMKO
⚠ ⚡ ☐ CAT II
P/N : ESM - 9910 - 5.09.0.1/00.00/2.0.0.0
c(UL)us CE
Pt-100
(-19.9 ; +99.9) Scale
230 V ~ ± 15%
50/60 Hz - 3VA
OUTPUT
7A@250V~
C NO NC   L N
1 2 3   7 8 9 10 11

Rear label appearance of the device that have PT-100 (0°C ; 400°C) Scale

EMKO
⚠ ⚡ ☐ CAT II
P/N : ESM - 9910 - 5.03.0.1/00.00/2.0.0.0
c(UL)us CE
Pt-100
(0 ; 400) Scale
230 V ~ ± 15%
50/60 Hz - 3VA
OUTPUT
7A@250V~
C NO NC   L N
1 2 3   7 8 9 10 11

Rear label appearance of the device that have PTC (-19.9°C ; + 99.9°C) Scale

EMKO
⚠ ⚡ ☐ CAT II
P/N : ESM - 9910 - 5.15.0.1/00.00/2.0.0.0
c(UL)us CE
PTC
(-19.9 ; +99.9) Scale
230 V ~ ± 15%
50/60 Hz - 3VA
OUTPUT
7A@250V~
R W   C NO NC   L N
1 2   7 8 9 10 11

Rear label appearance of the device that have PTC (-50°C ; 150°C) Scale

EMKO
⚠ ⚡ ☐ CAT II
P/N : ESM - 9910 - 5.12.0.1/00.00/2.0.0.0
c(UL)us CE
PTC
(-50 ; 150) Scale
230 V ~ ± 15%
50/60 Hz - 3VA
OUTPUT
7A@250V~
R W   C NO NC   L N
1 2   7 8 9 10 11

Rear label appearance of the device that have J Type Thermocouple (0°C ; 800°C) Scale

EMKO
⚠ ⚡ ☐ CAT II
P/N : ESM - 9910 - 5.05.0.1/00.00/2.0.0.0
c(UL)us CE
J TYPE TC
(0 ; 800) Scale
230 V ~ ± 15%
50/60 Hz - 3VA
OUTPUT
7A@250V~
+ −   C NO NC   L N
1 2   7 8 9 10 11

Rear label appearance of the device that have K Type Thermocouple (0°C ; 999°C) Scale

EMKO
⚠ ⚡ ☐ CAT II
P/N : ESM - 9910 - 5.10.0.1/00.00/2.0.0.0
c(UL)us CE
K TYPE TC
(0 ; 999) Scale
230 V ~ ± 15%
50/60 Hz - 3VA
OUTPUT
7A@250V~
+ −   C NO NC   L N
1 2   7 8 9 10 11

Rear label appearance of the device that have PT-100 (-19.9°C ; + 99.9°C) Scale

Rear label appearance of the device that have PT-100 (0°C ; 400°C) Scale

Rear label appearance of the device that have PTC (-19.9°C ; + 99.9°C) Scale

Rear label appearance of the device that have PTC (-50°C ; 150°C) Scale

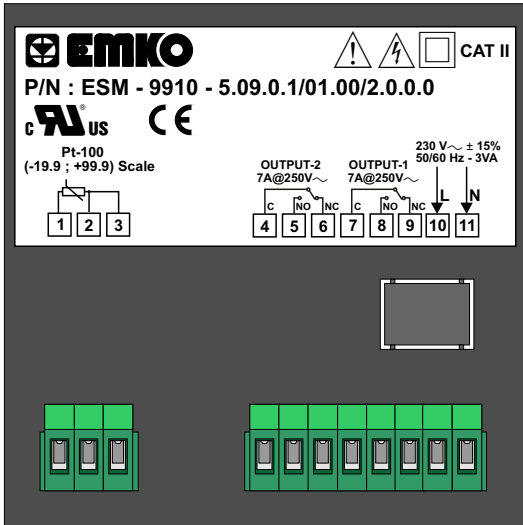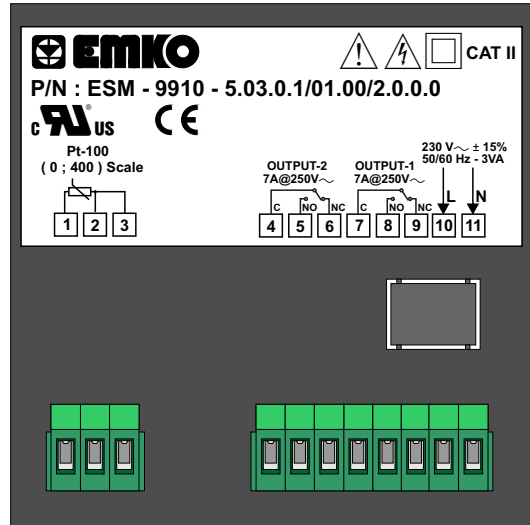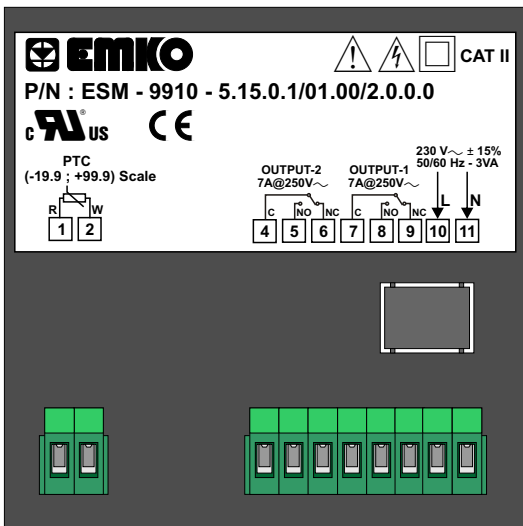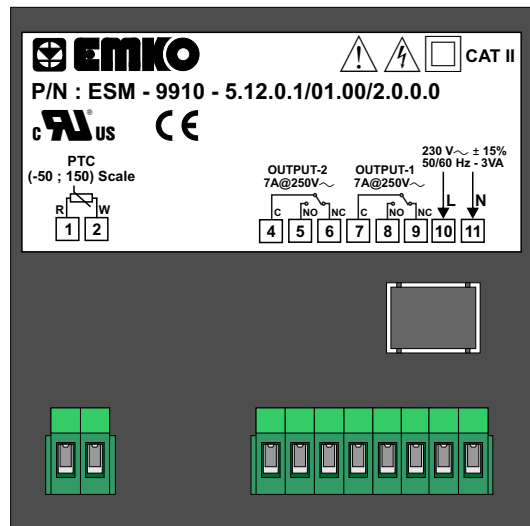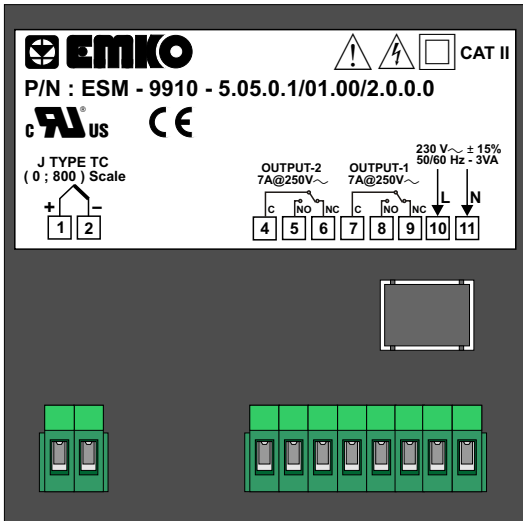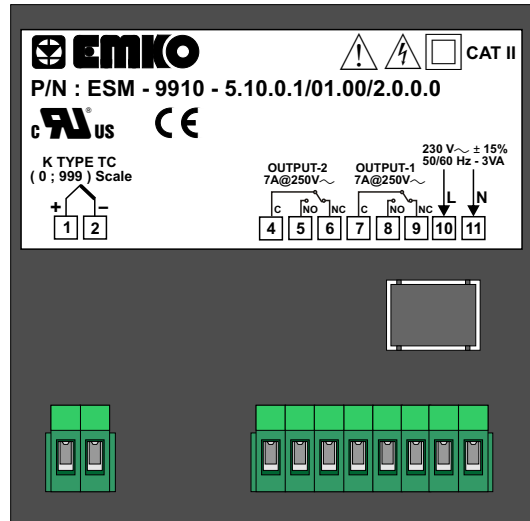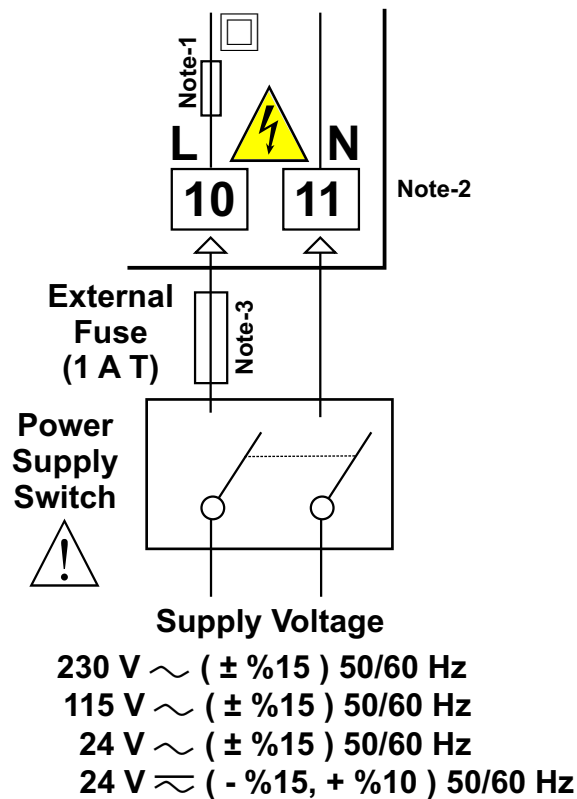**Rear label appearance of the device that have J Type Thermocouple (0°C ; 800°C) Scale**

Rear label appearance of the device that have K Type Thermocouple (0°C ; 999°C) Scale

Connection of Supply Voltage Input

Note-1

L ⚡ **N**

| **10** | **11** | Note-2 |

External Fuse (1 A T) Note-3

Power Supply Switch ⚠

Supply Voltage

230 V ∿ (± %15) 50/60 Hz
115 V ∿ (± %15) 50/60 Hz
24 V ∿ (± %15) 50/60 Hz
24 V ⎓∿ (- %15, + %10) 50/60 Hz

Note-1 : There is an internal 33R Ω fusible flameproof resistor in 100-240 V ∿ 50/60Hz
There is an internal 4R7 Ω fusible flameproof resistor in 24V∿ 50/60Hz and 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 the same indicated on the instrument.**
Switch on the power supply only after that all the electrical connections 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 on the device. So a power supply switch must be added to the supply voltage input. In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument.Power supply switch shall be easily accessible by the user.**
Power switch must be two poled for seperating phase and neutral. On/Off condition of power switch is very important in electrical connection. On/Off condition of power switch must be signed for preventing the wrong connection.

If an external fuse is used, it must be on phase connection in ∿supply input.
If an external fuse is used, it 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.**

3.6 Temperature Input Connection

3.6.1 TC (Thermocouple) Connection

TC
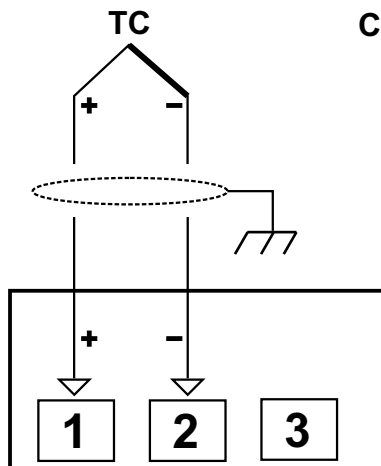
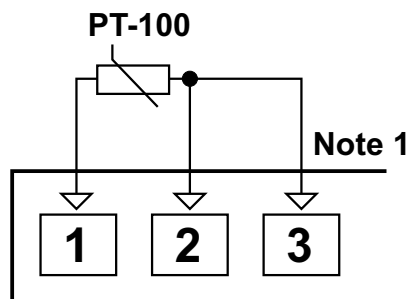**Connect the wires with the polarity as shown in the figure at left.**

Always use compensation wire corresponding to the thermocouple used. If present, the shield must be connected to a proper ground.
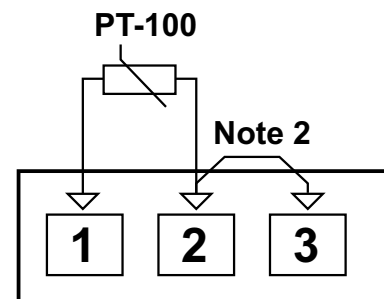
Input resistance is greater than 10 MΩ.

3.6.2 RTD Connections

PT-100

Note 1

3-wire PT-100 connection
(with line compensation)
(Max. Line impedance is 10 Ω)

PT-100

Note 2

2-wire PT-100 connection
(without line compensation)

Note 1 : In 3-wire system, use always cables of the same diameter (min 1mm²)
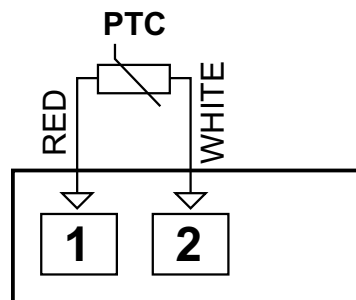Its necessary to use cable in the same gauge and type for doing the line compensation properly.
Note 2 : Install a jumper between terminals 2 and 3 when using a 2-wire RTD.
Note 3 : If the distance is longer than 10 meters, use 3-wire system.

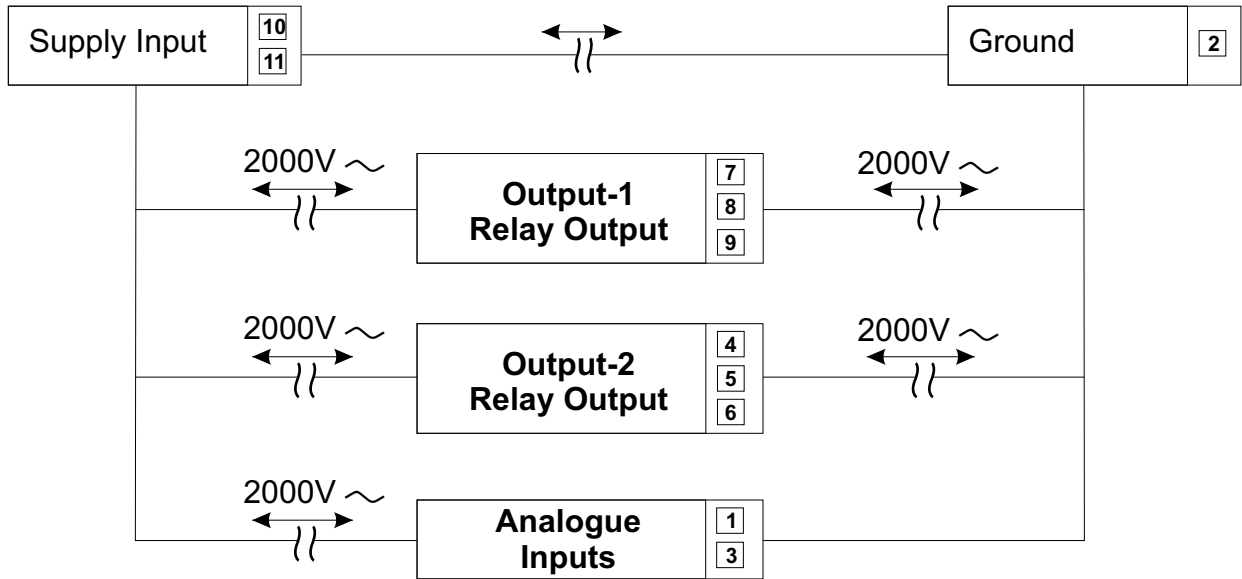**Input resistance is greater than 10 MΩ.**

3.6.3 PTC and NTC Connections

PTC

RED   WHITE

NTC
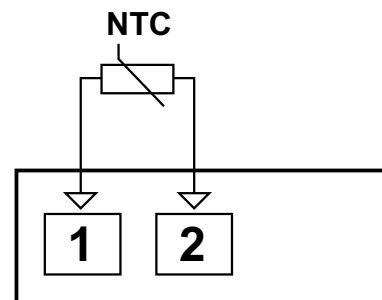
Input resistance is greater than 10 MΩ.r.

While doing the PTC Probe connection, pay attention to the PTC Probe cable colour.
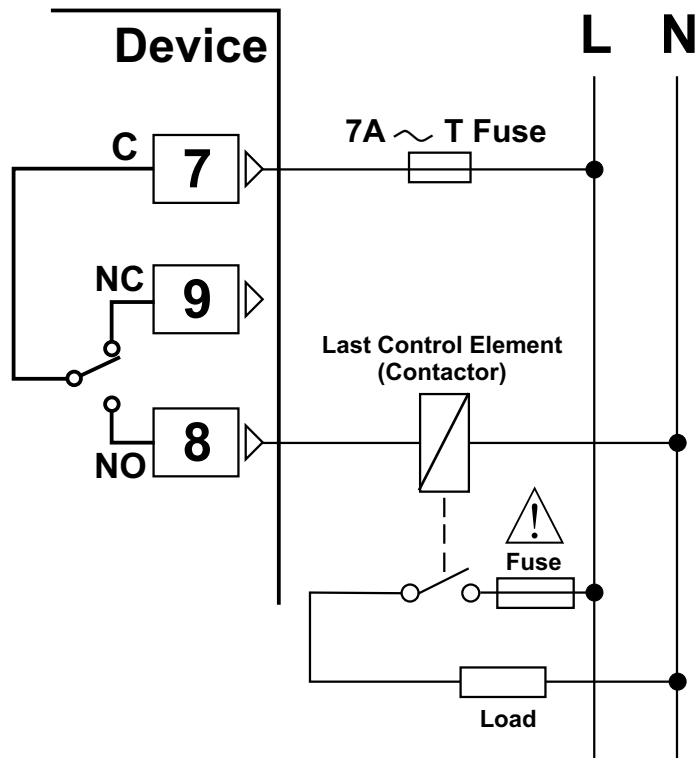
3.7 Galvanic Isolation Test Values of ESM-9910 Temperature Controller

2000V $\sim$ (For ESM-9910.5...,ESM-9910.4....)
500V $\sim$ (For ESM-9910.3....,ESM-9910.2....)
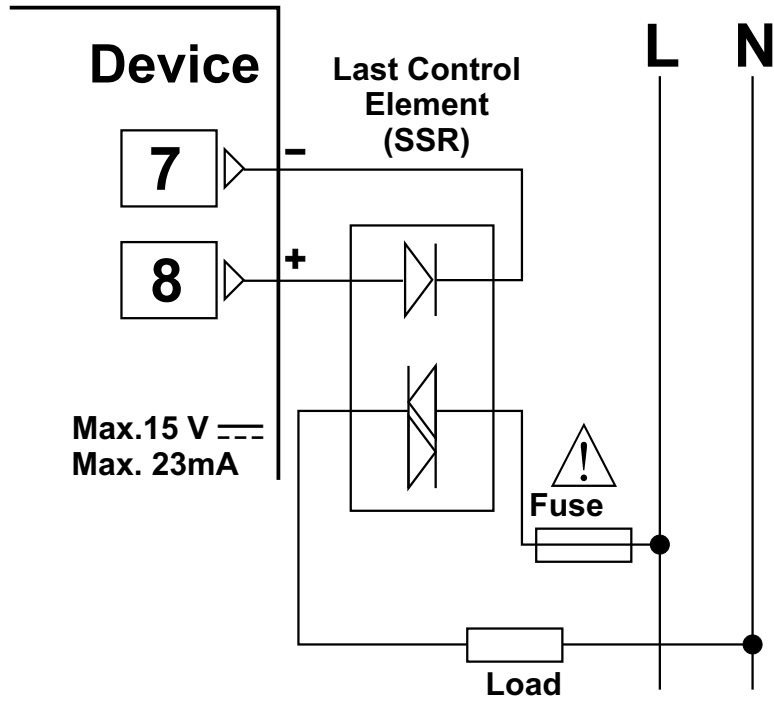

3.8 Output-1 Connection

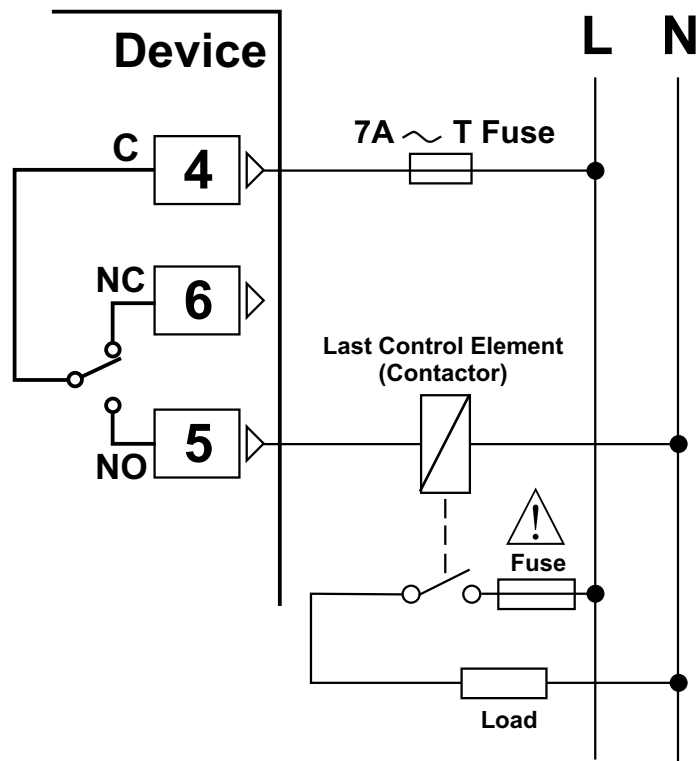## 3.8.1 Output-1 (Relay Output) Connection

⚠ **Fuses must be selected according to the application**
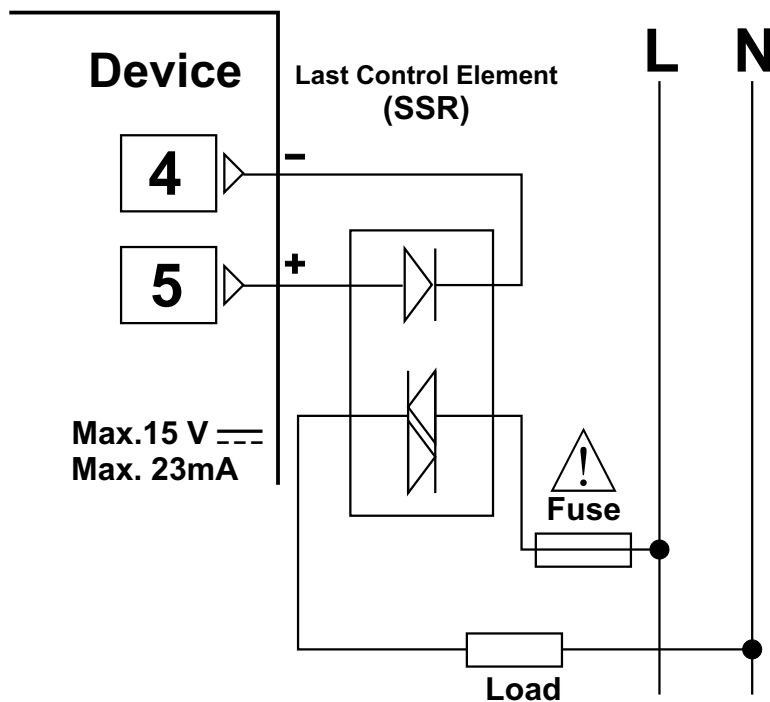
3.8.2 SSR Driver Output-1 Connection

Device

Last Control Element (SSR)

L N

7 –

8 +

Max.15 V ⎓
Max. 23mA

Fuse

Load

3.9 Output-2 Connections

3.9.1 Output-2 (Relay Output) Connection

Device

L **N**

C **4**   7A ∿ T Fuse

NC **6**

Last Control Element
(Contactor)

NO **5**

⚠ **Fuse**

Load

⚠ **Fuses must be selected according to the application**

ⓘ **Output-2 exists in device with two relays**
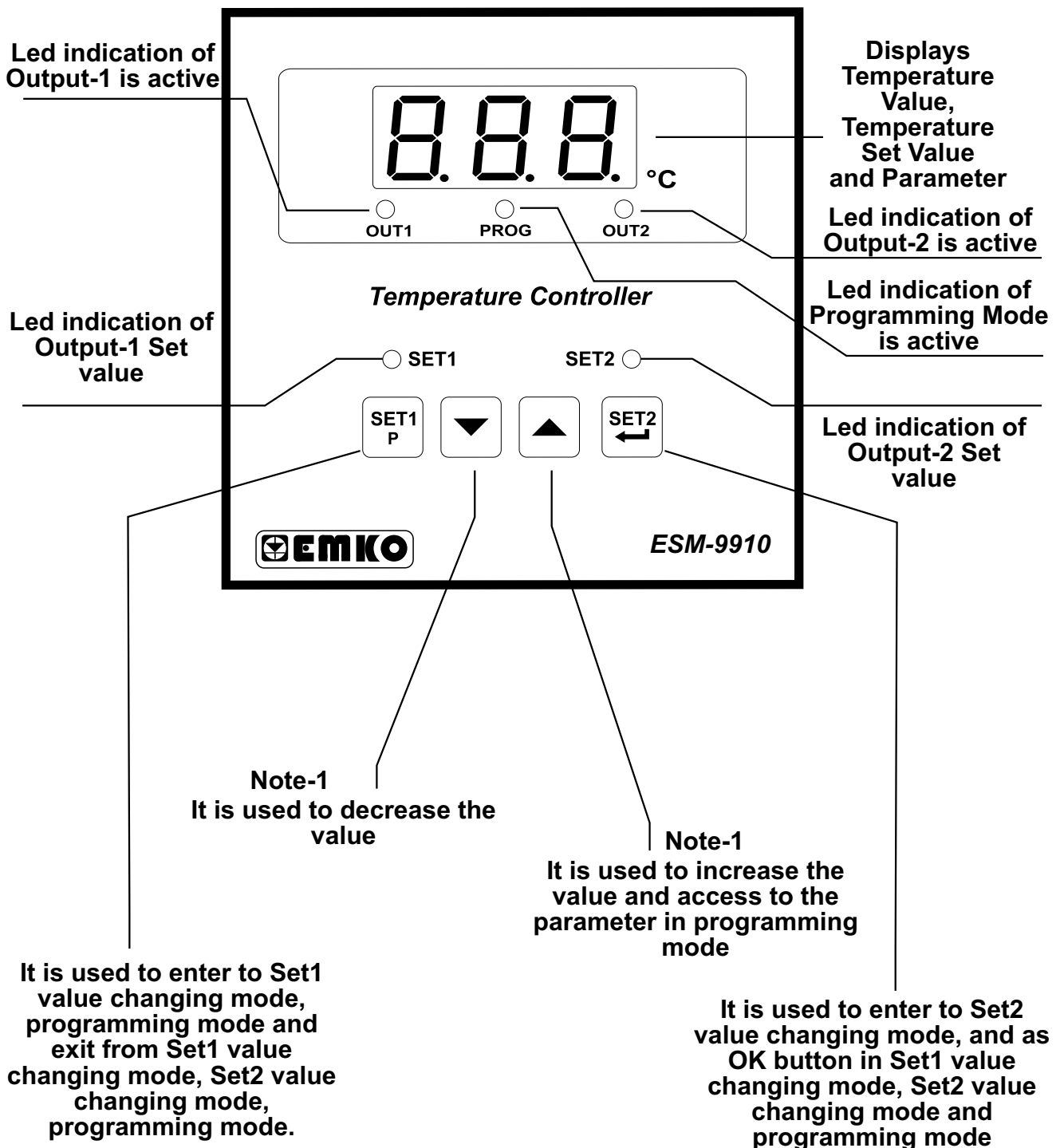
3.9.2 SSR Driver Output-2 Connection

Device   Last Control Element
(SSR)

L **N**

4 **–**

5 **+**

Max.15 V ⎓
Max. 23mA

⚠ **Fuse**

Load

4.1 Front Panel Definition for ESM-9910 with One Relay

Led indication of Output is active

Displays Temperature Value, Temperature Set Value and Parameters

OUT   PROG

°C

Temperature Controller

Led indication of Programming Mode is active

Led indication of Output Set value

SET

SET P

EMKO

ESM-9910

Note-1
It is used to decrease the value

It is used to change the Set value, enter to and exit from the programming mode

Note-1
It is used to increase the value and access to the parameter in programming mode

It is used to change the Set value and confirm the parameter in programming mode

Note-1: In Set value or programming mode while changing the parameter, 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.

Led indication of Output-1 is active

Displays Temperature Value, Temperature Set Value and Parameter

Temperature Controller

Led indication of Output-2 is active

Led indication of Programming Mode is active

Led indication of Output-1 Set value

Led indication of Output-2 Set value

SET1

SET2

SET1 P

SET2

OUT1   PROG   OUT2

°C

EMKO

ESM-9910

**Note-1
It is used to decrease the value**

**Note-1
It is used to increase the value and access to the parameter in programming mode**

It is used to enter to Set1 value changing mode, programming mode and exit from Set1 value changing mode, Set2 value changing mode, programming mode.

It is used to enter to Set2 value changing mode, and as OK button in Set1 value changing mode, Set2 value changing mode and programming mode

Note-1: In Set value or programming mode while changing the parameter, 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.

When power is applied to the device, software revision number is momentarily shown on the display.

" r"⎵ Revision **Software Revision number**
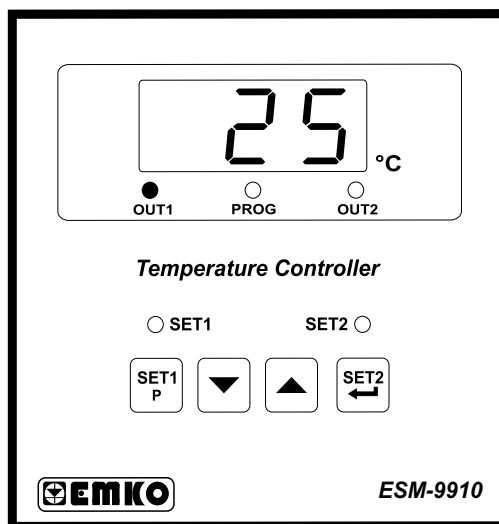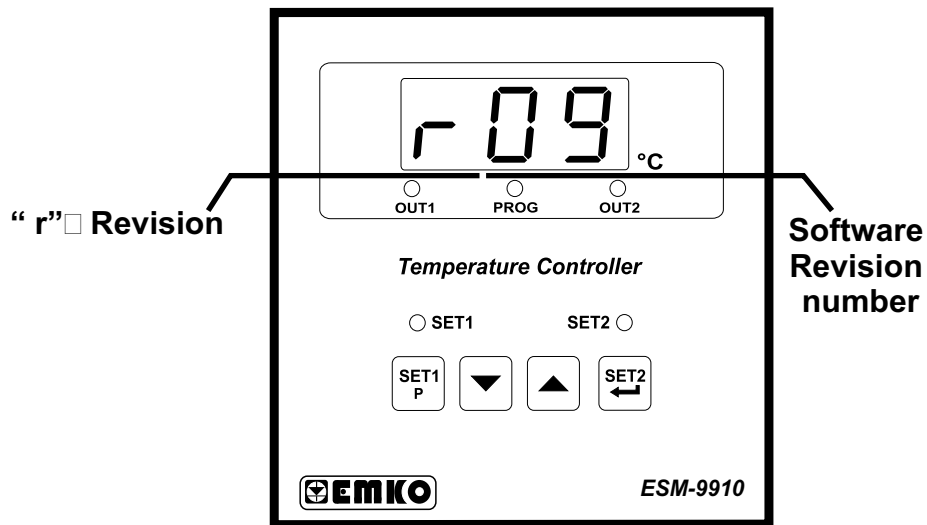
Main operation screen is shown

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

4.4 Changing and Saving Set Values

4.4.1 ESM-9910 with One Relay

Main Operation Screen

$$25 \ °C$$

OUT ● PROG ○

When SET button is pressed, SET led lights on and SET value is seen on display.

○ SET

SET P | ▼ | ▲ | ←

SET Value Screen

$$100 \ °C$$

OUT ● PROG ○

● SET

SET P | ▼ | ▲ | ←

SET value can be changed with increment and decrement buttons.

SET Value Screen

$$160 \ °C$$

OUT ● PROG ○

● SET

Press SET button again to exit without saving SET value.

SET P | ▼ | ▲ | ←

Press Enter button for saving SET value.

Main Operation Screen

$$25 \ °C$$

OUT ● PROG ○

For both conditions, SET led lights off and it turns to main operation screen.

○ SET

SET P | ▼ | ▲ | ←

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

Adjustment of SET1 value

Main Operation Screen

25 °C
OUT1   PROG   OUT2

○ SET1   SET2 ○

SET1/P   ▼   ▲   SET2
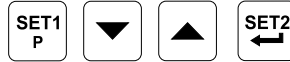
When SET1 button is pressed, SET1 led lights on and SET1 value is seen on display.

SET1 Value Screen

100 °C
OUT1   PROG   OUT2
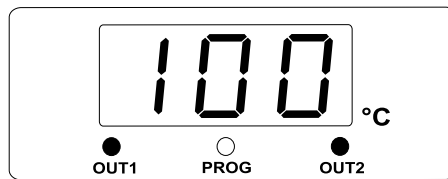
● SET1   SET2 ○

SET1/P   ▼   ▲   SET2

SET1 value can be changed with increment and decrement buttons.

SET1 Value Screen

160 °C
OUT1   PROG   OUT2

● SET1   SET2 ○

SET1/P   ▼   ▲   SET2

Press SET2/Enter button for saving SET1 value.

Press SET1 button again to exit without saving SET1 value.

Main Operation Screen

25 °C
OUT1   PROG   OUT2

For both conditions SET1 led lights off and it turns to main operation screen.

○ SET1   SET2 ○

SET1/P   ▼   ▲   SET2

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

Adjustment of SET2 value

Main Operation Screen

```
 25 °C
OUT1  PROG  OUT2
```

○ SET1   SET2 ○

[SET1/P] [▼] [▲] [SET2/↵]
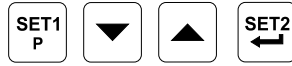
When SET2 button is pressed, SET2 led lights on and SET2 value is seen on display.

SET2 Value Screen

```
150 °C
OUT1  PROG  OUT2
```

○ SET1   SET2 ●

[SET1/P] [▼] [▲] [SET2/↵]

SET2 value can be changed with increment and decrement buttons.

SET2 Value Screen

```
130 °C
OUT1  PROG  OUT2
```

○ SET1   SET2 ●

[SET1/P] [▼] [▲] [SET2/↵]

Press SET1 button to exit without saving SET2 value.

Press SET2/Enter button for saving SET2 value.

Main Operation Screen

```
 25 °C
OUT1  PROG  OUT2
```

○ SET1   SET2 ○

[SET1/P] [▼] [▲] [SET2/↵]

For both conditions, SET2 led lights off and it turns to main operation screen.

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

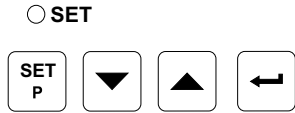## 4.5 Entering to Programming Mode, Changing and Saving Parameters

4.5.1 ESM-9910 with One Relay

Main Operation Screen

When SET button is pressed for 10 seconds, "PROG" led starts to blink. If programming mode entering password is different from 0, programming mode entering screen P r G will be observed

Note: If programming mode accessing password is 0, hysteresis screen H5 I is observed instead of P r G programming screen accessing password

Programming Mode Entering Screen

In programming mode entering screen, press SET button to exit from programming mode and turn to the main operation screen.

Press increment button for accessing to the password entering screen

Parameters can be observed by pressing Enter button, but parameters can not be changed.

Password Entering Screen

In password entering screen, press SET button to return the programming mode entering screen

Enter programming mode accessing password with increment and decrement buttons

Parameters can be observed by pressing Enter button, but parameters can not be changed.

Programming Mode Entering Screen

Press SET button to exit programming mode.

Password Entering Screen

In password entering screen, press SET button to return the programming mode entering screen
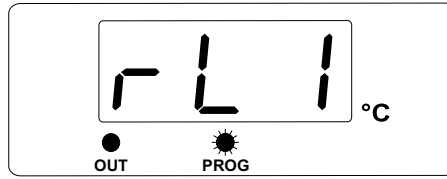
Press Enter button for accessing to the parameters

Main Operation Screen

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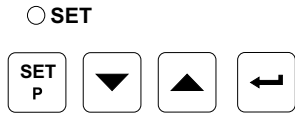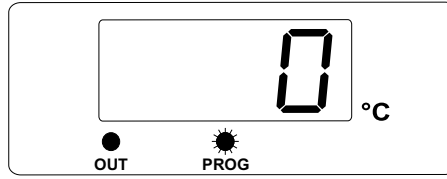
Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

```
H 5 1  °C
● OUT   ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```

Hysteresis Parameter

Parameter value can be observed by pressing increment button.

If Enter button is pressed next parameter is shown.
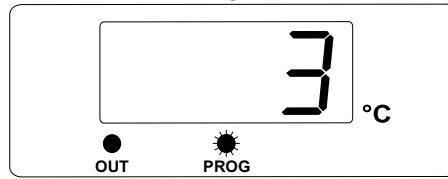
Hysteresis Value

If Enter button is pressed next parameter is shown.

```
3  °C
● OUT   ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```

In programming screen, Press SET button to exit from programming mode and turn to the main operation screen.

Parameter can be changed with increment and decrement buttons.

Programming Screen

```
H 5 1  °C
● OUT   ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```

```
1 5  °C
● OUT   ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```
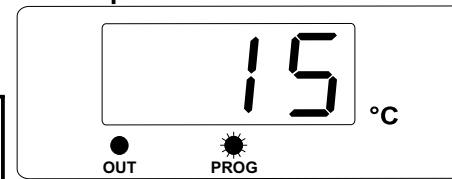
Hysteresis Value

Press SET button to exit from programming mode.

Press SET button to turn to the programming screen without saving the parameter.

Press Enter button for saving parameter value.

```
2 5  °C
● OUT   ○ PROG
○ SET
[SET P] [▼] [▲] [←]
```
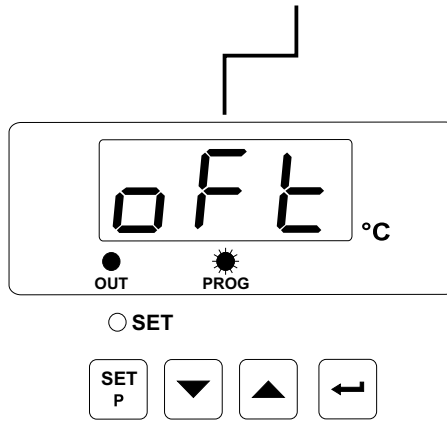
Main Operation Screen

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

Operation Type Selection for Output

Parameter value can be observed by pressing increment button.

If Enter button is pressed next parameter is shown.

```
r L 1    °C
  ●        ☀
 OUT     PROG
  ○ SET
[SET P] [▼] [▲] [←]
```

Value of Operation Type Selection for Output

Heating is selected

If Enter button is pressed next parameter is shown.

Parameter can be changed with increment and decrement buttons.

```
        0  °C
  ●        ☀
 OUT     PROG
  ○ SET
[SET P] [▼] [▲] [←]
```

In programming screen, Press SET button to exit from programming mode and turn to the main operation screen.

Programming Screen

```
r L 1    °C
  ●        ☀
 OUT     PROG
  ○ SET
[SET P] [▼] [▲] [←]
```

Value of Operation Type Selection for Output

```
        1  °C
  ●        ☀
 OUT     PROG
  ○ SET
[SET P] [▼] [▲] [←]
```
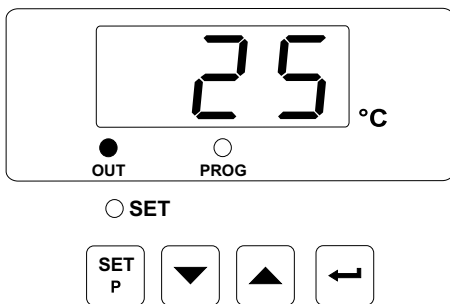
Press SET button to exit from programming mode.
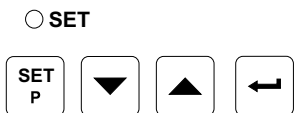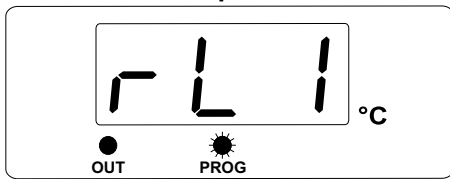
Press SET button to turn to the programming screen without saving the parameter.
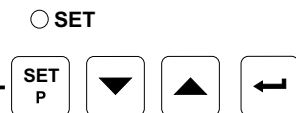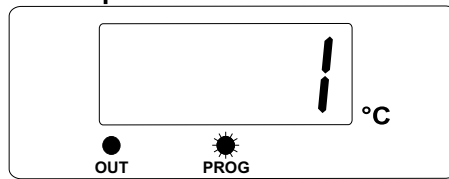
It is changed as cooling

Press Enter button for saving parameter value.

```
      2 5  °C
  ●        ○
 OUT     PROG
  ○ SET
[SET P] [▼] [▲] [←]
```

Main Operation Screen

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

oFt °C
OUT PROG
○ SET

SET P | ▼ | ▲ | ↵

Process Offset Parameter

Parameter value can be observed by pressing increment button.

If Enter button is pressed, next parameter is shown.

0 °C
OUT PROG
○ SET

SET P | ▼ | ▲ | ↵
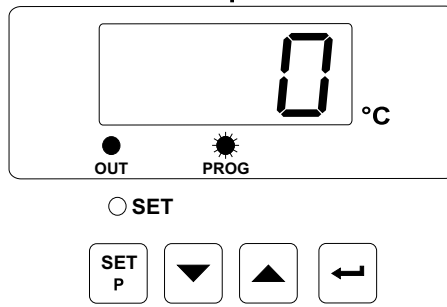
Process Offset Value

If Enter button is pressed, next parameter is shown.

Parameter can be changed with increment and decrement buttons.

Press SET button to turn to the programming screen without saving the parameter.

Programming Screen

oFt °C
OUT PROG
○ SET

SET P | ▼ | ▲ | ↵

Press SET button to exit from programming mode.

2 °C
OUT PROG
○ SET

SET P | ▼ | ▲ | ↵
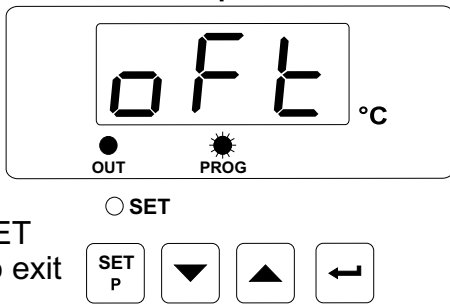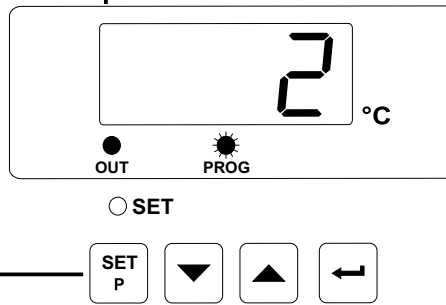
Process Offset Value

Press SET button to turn to the programming screen without saving the parameter.

Press Enter button for saving parameter value.

25 °C
OUT PROG
○ SET

SET P | ▼ | ▲ | ↵

Main Operation Screen

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

```
rLt  °C
● OUT    ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```
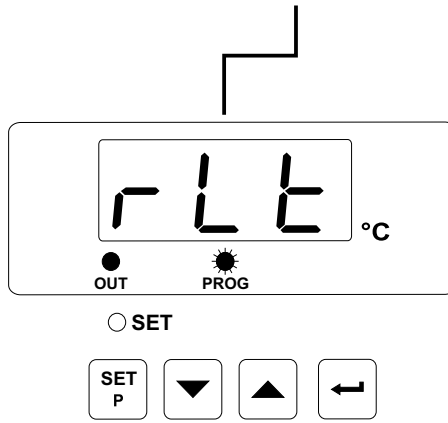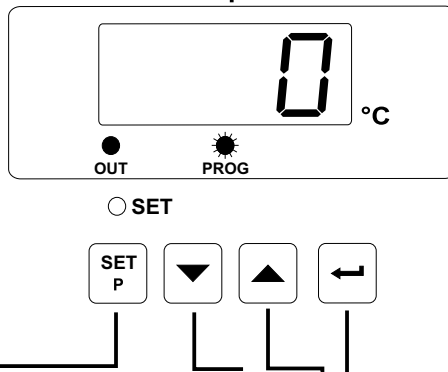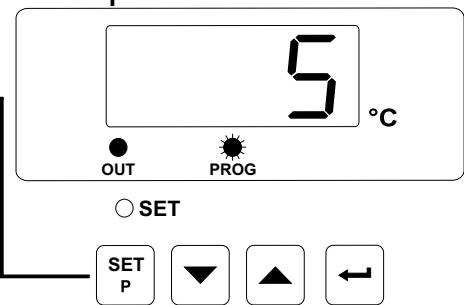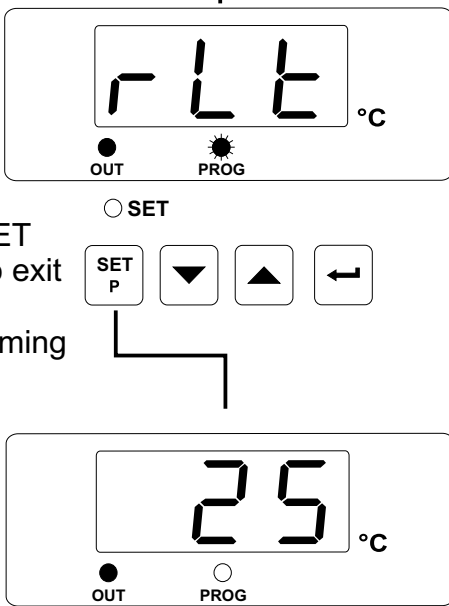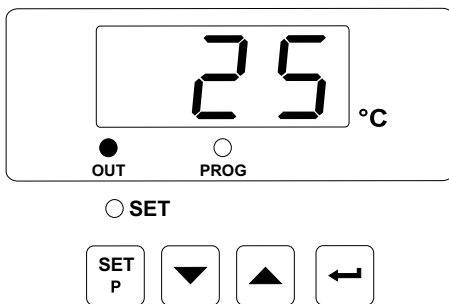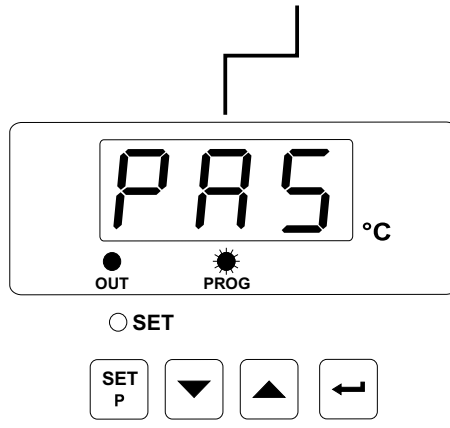
Minimum Pulling Time for Output Parameter

Parameter value can be observed by pressing increment button.

If Enter button is pressed, next parameter is shown.

```
0  °C
● OUT    ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```

Value of Minimum Pulling Time for Output

If Enter button is pressed, next parameter is shown.

Parameter can be changed with increment and decrement buttons.

Press SET button to turn to the programming screen without saving the parameter.

Programming Screen

```
rLt  °C
● OUT    ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```

```
5  °C
● OUT    ☀ PROG
○ SET
[SET P] [▼] [▲] [←]
```

Value of Minimum Pulling Time for Output

Press SET button to exit from programming mode.

```
25  °C
● OUT    ○ PROG
○ SET
[SET P] [▼] [▲] [←]
```

Main Operation Screen

Press SET button to turn to the programming screen without saving the parameter.

Press Enter button for saving parameter value.

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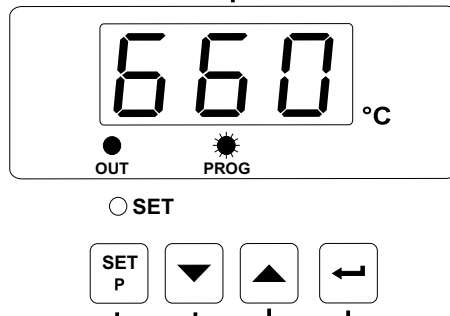
Programming Screen

Programming Mode Accessing Password

Parameter value can be observed by pressing increment button.

If Enter button is pressed, next parameter is shown.

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.
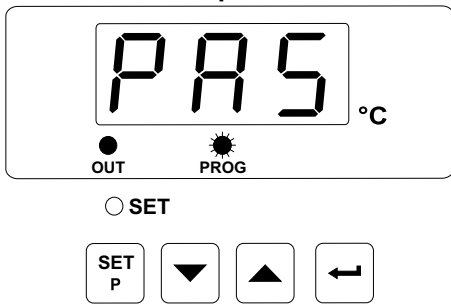
PAS °C

OUT PROG

SET

SET P ▼ ▲ ←

Programming Mode Accessing Password Value

If Enter button is pressed, next parameter is shown.

Parameter can be changed with increment and decrement buttons.

660 °C

OUT PROG

SET

SET P ▼ ▲ ←

Press SET button to turn to the programming screen without saving the parameter.

Programming Screen

PAS °C

OUT PROG

SET

SET P ▼ ▲ ←

Press SET button to exit from programming mode.
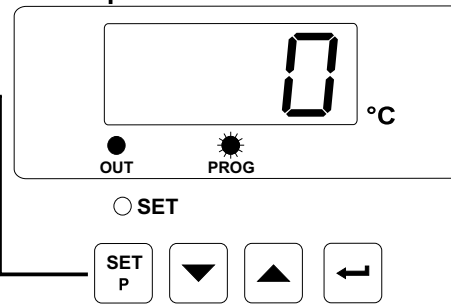
Programming Mode Accessing Password Value

Press Enter button for saving parameter value.

0 °C

OUT PROG

SET

SET P ▼ ▲ ←

Press SET button to turn to the programming screen without saving the parameter.

Programming Screen

Hysteresis Parameter

It turns to beginning of the programming mode

HSI °C

OUT PROG

SET

SET P ▼ ▲ ←

Continue to press SET2/Enter button for accessing to the parameters.

25 °C

OUT PROG

SET

SET P ▼ ▲ ←

Main Operation Screen

Press SET button to exit from programming section

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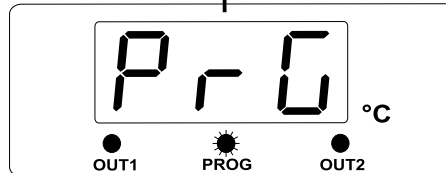
Main Operation Screen

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 $\boxed{P_{\Gamma}\square}$ will be observed

Note: If programming mode accessing password is 0, hysteresis screen $\boxed{H\square I}$ is observed instead of $\boxed{P_{\Gamma}\square}$ programming screen accessing password

Programming Mode Entering Screen

In programming mode entering screen, press SET1 button to exit from programming mode and turn to the main operation screen.
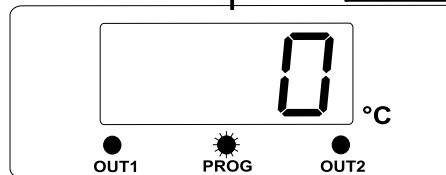
Press increment button for accessing to the password entering screen

Parameters can be observed by pressing SET2/Enter button, but parameters can not be changed.

Password Entering Screen

In password entering screen, press SET1 button to return the programming mode entering screen

Enter programming mode accessing password with increment and decrement buttons
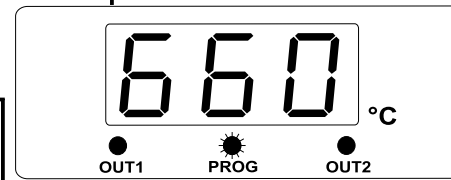
Parameters can be observed by pressing SET2/Enter button, but parameters can not be changed.

Programming Mode Entering Screen

Press SET1 button to exit programming mode.

Password Entering Screen

In password entering screen, press SET1 button to return the programming mode entering screen

Press SET2/Enter button for accessing to the parameters

Main Operation Screen

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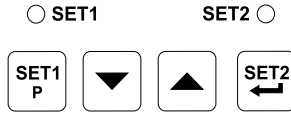
Programming Screen

Hysteresis-1 Parameter

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

```
H51 °C
 ● OUT1   ☀ PROG   ● OUT2
  ○ SET1        SET2 ○
[SET1 P] [▼] [▲] [SET2 ↵]
```

Parameter value can be observed by pressing increment button.

If SET2/Enter button is pressed, next parameter is shown.

Hysteresis-1 Value

If SET2/Enter button is pressed, next parameter is shown.

```
3 °C
 ● OUT1   ☀ PROG   ● OUT2
  ○ SET1        SET2 ○
[SET1 P] [▼] [▲] [SET2 ↵]
```

Press SET1 button to exit without saving parameter value.

Parameter can be changed with increment and decrement buttons.

Programming Screen

```
H51 °C
 ● OUT1   ☀ PROG   ● OUT2
  ○ SET1        SET2 ○
[SET1 P] [▼] [▲] [SET2 ↵]
```

Hysteresis-1 Value

```
10 °C
 ● OUT1   ☀ PROG   ● OUT2
  ○ SET1        SET2 ○
[SET1 P] [▼] [▲] [SET2 ↵]
```

Press SET1 button to exit from programming mode.

```
25 °C
 ● OUT1   ○ PROG   ● OUT2
  ○ SET1        SET2 ○
[SET1 P] [▼] [▲] [SET2 ↵]
```

Main Operation Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the operation screen.

Press SET2/Enter button for saving parameter value.

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

Hysteresis-2 Parameter

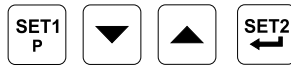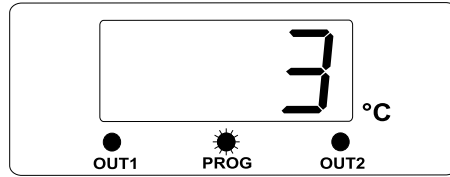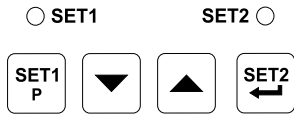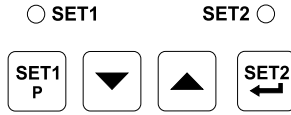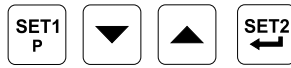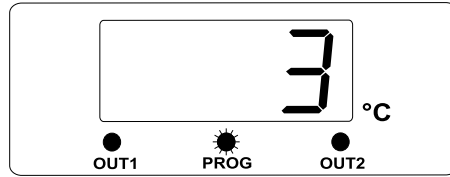Parameter value can be observed by pressing increment button.

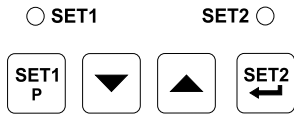If SET2/Enter button is pressed, next parameter is shown.

`H 5 2` °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Hysteresis-2 Value

If SET2/Enter button is pressed, next parameter is shown.

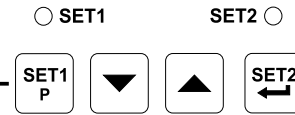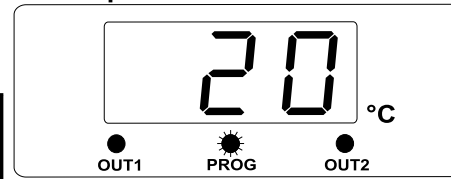Parameter can be changed with increment and decrement buttons.

`3` °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Press SET1 button to exit without saving parameter value.

Programming Screen

`H 5 2` °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Hysteresis-2 Value

`2 0` °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Press SET1 button to exit from programming mode.

`2 5` °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Main Operation Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the operation screen.

Press SET2/Enter button for saving parameter value.

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

Programming Screen

```
 r L 1
        °C
 ● ☀ ●
OUT1 PROG OUT2
○ SET1    SET2 ○
[SET1 P] [▼] [▲] [SET2 ←]
```
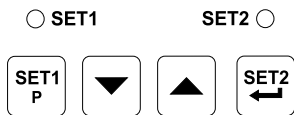
In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

Operation Type Selection for Output-1

Parameter value can be observed by pressing increment button.

If SET2/Enter button is pressed, next parameter is shown.

Value of Operation Type Selection for Output-1

```
         0
        °C
 ● ☀ ●
OUT1 PROG OUT2
○ SET1    SET2 ○
[SET1 P] [▼] [▲] [SET2 ←]
```

Heating is selected

If SET2/Enter button is pressed, next parameter is shown.

Parameter can be changed with increment and decrement buttons.

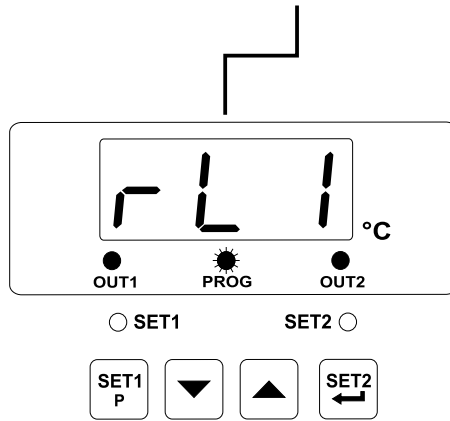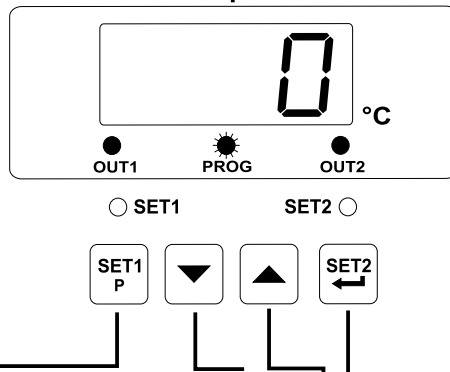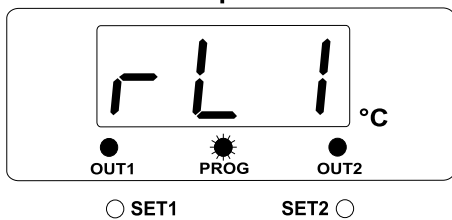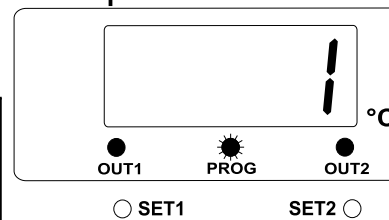In programming screen, Press SET1 button to exit from programming mode and turn to the operation screen.

Programming Screen

```
 r L 1
        °C
 ● ☀ ●
OUT1 PROG OUT2
○ SET1    SET2 ○
[SET1 P] [▼] [▲] [SET2 ←]
```

Press SET1 button to exit from programming mode.

Value of Operation Type Selection for Output-1

```
         1
        °C
 ● ☀ ●
OUT1 PROG OUT2
○ SET1    SET2 ○
[SET1 P] [▼] [▲] [SET2 ←]
```

In programming screen, Press SET1 button to exit from programming mode and turn to the operation screen.

Cooling is selected

Press SET2/Enter button for saving parameter value.

```
        25
        °C
 ● ○ ●
OUT1 PROG OUT2
○ SET1    SET2 ○
[SET1 P] [▼] [▲] [SET2 ←]
```
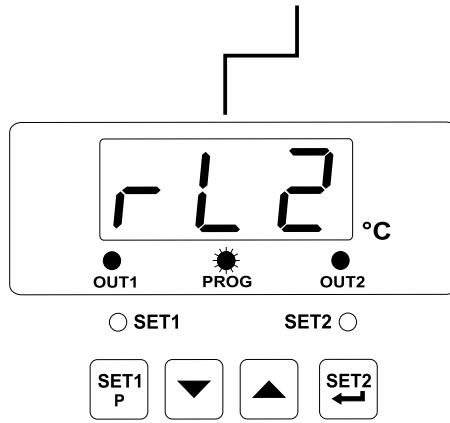
Main Operation Screen

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

```
r L 2  °C
● OUT1   ☀ PROG   ● OUT2
○ SET1        SET2 ○
[SET1 P]  [▼]  [▲]  [SET2 ←]
```
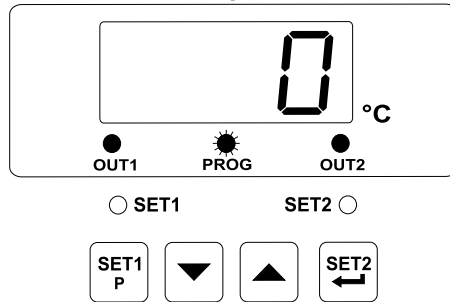
Operation Type Selection for Output-2

Parameter value can be observed by pressing increment button.

If SET2/Enter button is pressed, next parameter is shown.

Press SET1 button to turn to the programming screen without saving the parameter.
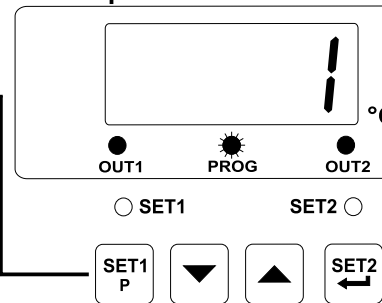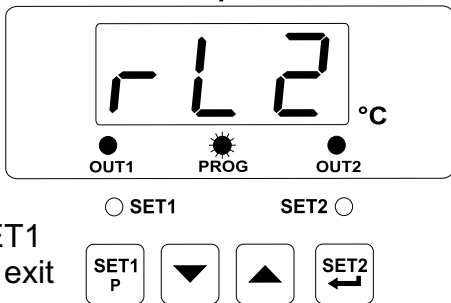
```
0  °C
● OUT1   ☀ PROG   ● OUT2
○ SET1        SET2 ○
[SET1 P]  [▼]  [▲]  [SET2 ←]
```

Value of Operation Type Selection for Output-2
Heating is selected

If SET2/Enter button is pressed, next parameter is shown.

Parameter can be changed with increment and decrement buttons.

Programming Screen

```
r L 2  °C
● OUT1   ☀ PROG   ● OUT2
○ SET1        SET2 ○
[SET1 P]  [▼]  [▲]  [SET2 ←]
```

Press SET1 button to exit from programming mode.

```
1  °C
● OUT1   ☀ PROG   ● OUT2
○ SET1        SET2 ○
[SET1 P]  [▼]  [▲]  [SET2 ←]
```

Value of Operation Type Selection for Output-2

Press SET1 button to turn to the programming screen without saving the parameter.

Cooling is selected

Press SET2/Enter button for saving parameter value.

```
2 5  °C
● OUT1   ○ PROG   ● OUT2
○ SET1        SET2 ○
[SET1 P]  [▼]  [▲]  [SET2 ←]
```

Main Operation Screen

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

oFt °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Process Offset Parameter

Parameter value can be observed by pressing increment button.

If SET2/Enter button is pressed, next parameter is shown.

---

0 °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Process Offset Value

If SET2/Enter button is pressed, next parameter is shown.

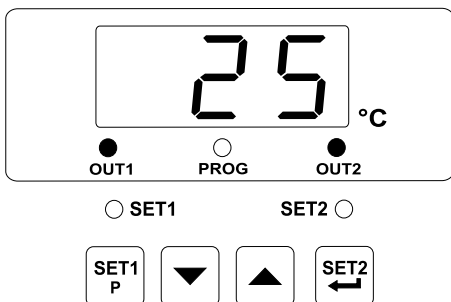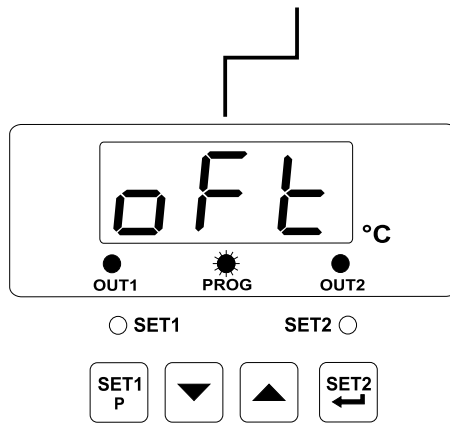Parameter can be changed with increment and decrement buttons.

Press SET1 button to turn to the programming screen without saving the parameter.

Programming Screen

oFt °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Process Offset Value

5 °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Press SET1 button to exit from programming mode.

Press SET1 button to turn to the programming screen without saving the parameter.

Press SET2/Enter button for saving parameter value.

25 °C

OUT1 PROG OUT2

○ SET1   SET2 ○

[SET1 P] [▼] [▲] [SET2 ↵]

Main Operation Screen

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

Programming Screen

Minimum Pulling Time for Output-1

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

Parameter value can be observed by pressing increment button.

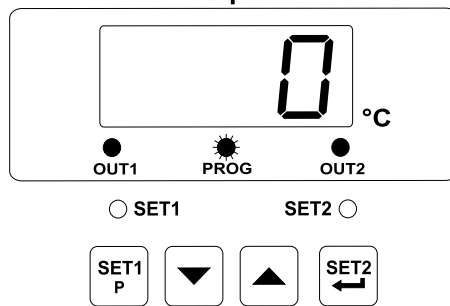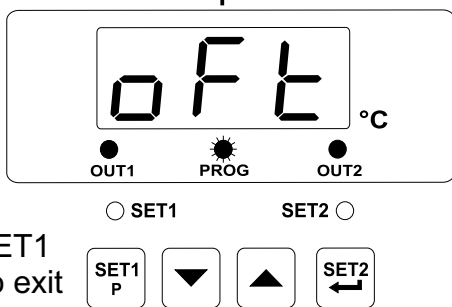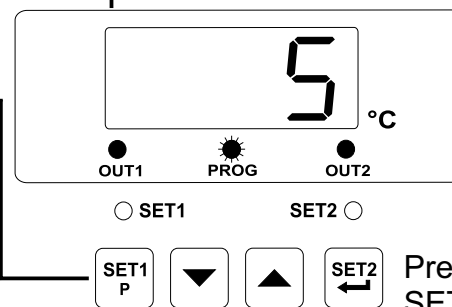If SET2/Enter button is pressed, next parameter is shown.

Value of Minimum Pulling Time for Output-1

Press SET1 button to turn to the programming screen without saving the parameter.

If SET2/Enter button is pressed, next parameter is shown.

Parameter can be changed with increment and decrement buttons.

Programming Screen

Value of Minimum Pulling Time for Output-1
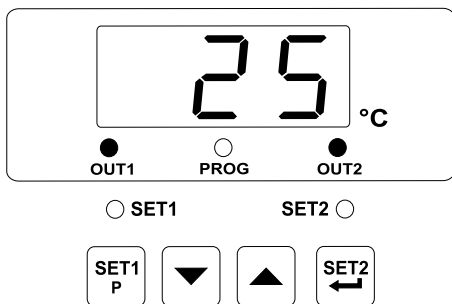
Press SET1 button to exit from programming mode.

Press SET1 button to turn to the programming screen without saving the parameter.

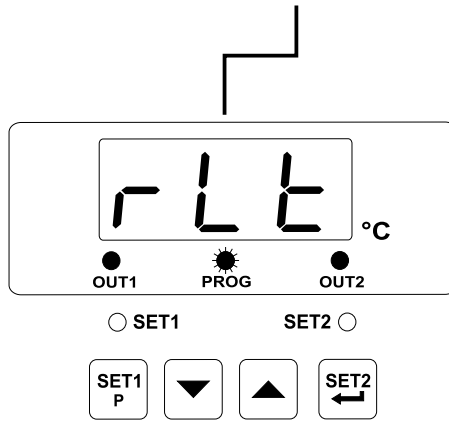Press SET2/Enter button for saving parameter value.

Main Operation Screen

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

Programming Screen

In programming screen, Press SET1 button to exit from programming mode and turn to the main operation screen.

PAS °C
OUT1 • PROG ☀ OUT2 •
○ SET1   SET2 ○
[SET1 P] [▼] [▲] [SET2 ⏎]

Minimum Pulling Time for Output-1

Parameter value can be observed by pressing increment button.

If SET2/Enter button is pressed, next parameter is shown.

Press SET1 button to turn to the programming screen without saving the parameter.

660 °C
OUT1 • PROG ☀ OUT2 •
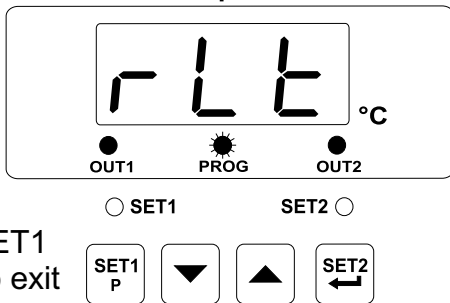○ SET1   SET2 ○
[SET1 P] [▼] [▲] [SET2 ⏎]

Value of Minimum Pulling Time for Output-1

If SET2/Enter button is pressed, next parameter is shown.

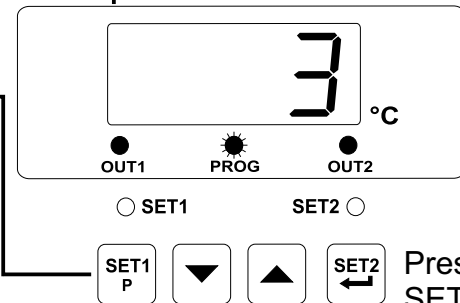Parameter can be changed with increment and decrement buttons.

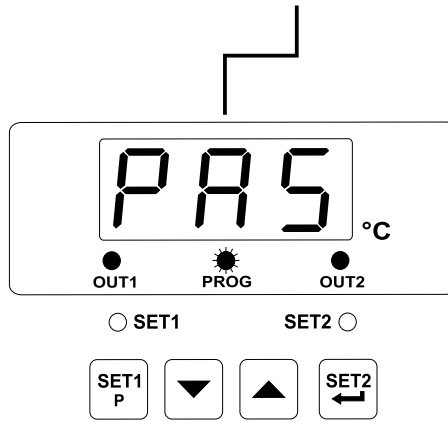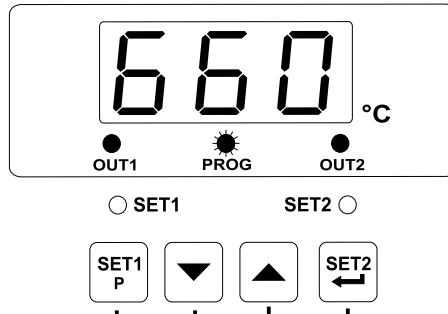
Programming Screen

PAS °C
OUT1 • PROG ☀ OUT2 •
○ SET1   SET2 ○
[SET1 P] [▼] [▲] [SET2 ⏎]

Press SET1 button to exit from programming mode.

Press SET1 button to turn to the programming screen without saving the parameter.

0 °C
OUT1 • PROG ☀ OUT2 •
○ SET1   SET2 ○
[SET1 P] [▼] [▲] [SET2 ⏎]
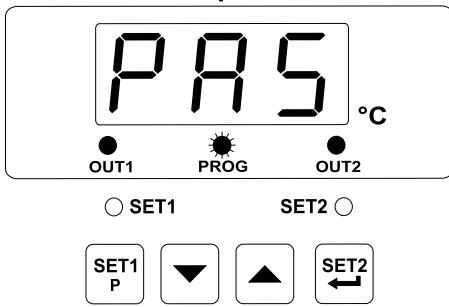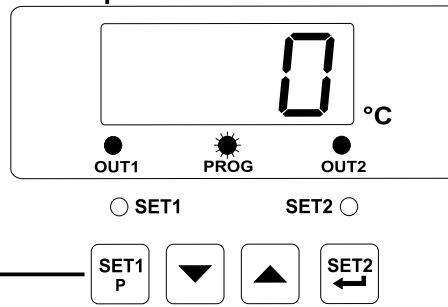
Value of Minimum Pulling Time for Output-1

Press SET2/Enter button for saving parameter value.
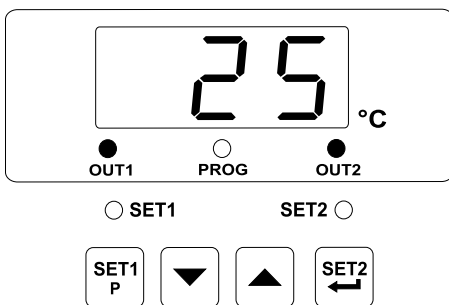
---

25 °C
OUT1 • PROG ○ OUT2 •
○ SET1   SET2 ○
[SET1 P] [▼] [▲] [SET2 ⏎]

Main Operation Screen

Programming Screen

HS1 °C
OUT1 • PROG ☀ OUT2 •
○ SET1   SET2 ○
[SET1 P] [▼] [▲] [SET2 ⏎]
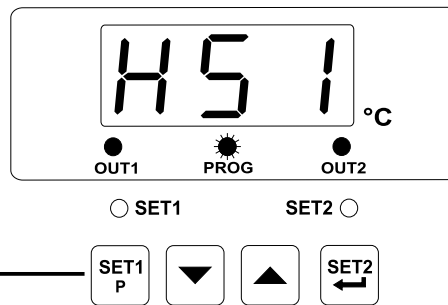
Press SET1 button to exit from programming mode.

Continue to press SET2/Enter button for accessing to the parameters.

Hysteresis-1 Parameter

It turns to beginning of the programming mode

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

5. Parameters

Parameters are divided into two groups as SET and PROGRAM parameters.

5.1 Set Parameters

SET1

SET value for Output-1. Control of output-1 relay is done according to this value.

This value can be adjusted according to input type, minimum and maximum of scale.

SET2

SET value for Output-2. Control of output-2 relay is done according to this value.

This value can be adjusted according to input type, minimum and maximum of scale.

THIS PARAMETER IS NOT ACTIVE IN DEVICES WITH ONE RELAY.

5.2 Program Parameters

| H5 1

Hysteresis Parameter for Output-1 (Default = 3)
1 to 100 °C for TC Type Devices,
1 to 100 °C for PT-100 (0°C , 400°C),
1.0 to 10.0 °C for PT-100 (-19.9°C, 99.9°C),
1 to 100 °C for PTC (-50°C, 150°C),
1.0 to 10.0 °C for PTC (-19.9°C, 99.9°C) and NTC (-19.9°C, 99.9°C)
1 to 20 °C for NTC (-50°C, 100°C)

| H5 2

Hysteresis Parameter for Output-2 (Default = 3)
1 to 100 °C for TC Type Devices,
1 to 100 °C for PT-100 (0°C , 400°C),
1.0 to 10.0 °C for PT-100 (-19.9°C, 99.9°C),
1 to 100 °C for PTC (-50°C, 150°C),
1.0 to 10.0 °C for PTC (-19.9°C, 99.9°C) and NTC (-19.9°C, 99.9°C)
1 to 20 °C for NTC (-50°C, 100°C)

| rL 1

Operation Type Selection parameter for 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 "COOLING". Normally de-energised.

ⓘ **"Hs2"** and **"rL2"** PARAMETERS ARE ACTIVE IN DEVICES WITH TWO RELAYS.

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

rL2

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 (Default = 0).
This parameter is offset for the process value. This defined value is added to the process value.

-10 to 10 °C for TC Type Devices,
-10 to 10 °C for PT-100 (0°C , 400°C),
-10.0 to 10.0 °C for PT-100 (-19.9°C, 99.9°C),
-10 to 10 °C for PTC (-50°C, 150°C),
-10.0 to 10.0 °C for PTC (-19.9°C, 99.9°C) and NTC (-19.9°C, 99.9°C)
-10 to 10 °C for NTC (-50°C, 100°C)

rLt

Minimum Pulling Time Parameter for Output-1 (Minimum Off Time) (Default = 0)
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

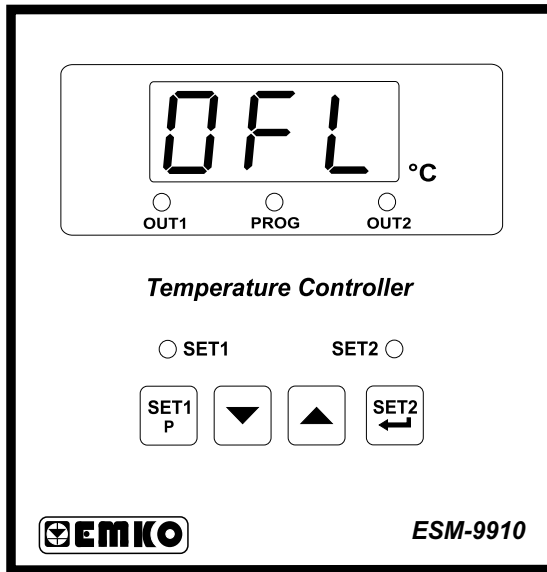**Programming Mode Accessing Password (Default =0)**
It is used for accessing to the programming mode. It can be adjusted from 0 to 999. If it is selected 0, password is not entered for accessing to the parameters.

i **"Hs2"** and **"rL2"** PARAMETERS ARE ACTIVE IN DEVICES WITH TWO RELAYS.

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

```
 _____
|   _____     |
|  |           |    |
|  |  O F L    |    |
|  |        °C |    |
|  |  O   O  O |    |
|  |OUT1 PROG OUT2| |
|  |_____|    |
|                   |
|  Temperature Controller |
|                   |
|  O SET1   SET2 O  |
|  [SET1][▼][▲][SET2]|
|  [ P ]        [↵] |
|                   |
|  EMKO    ESM-9910 |
|_____|
```

Sensor failure in analogue inputs. It means sensor connection is wrong or there is no sensor.
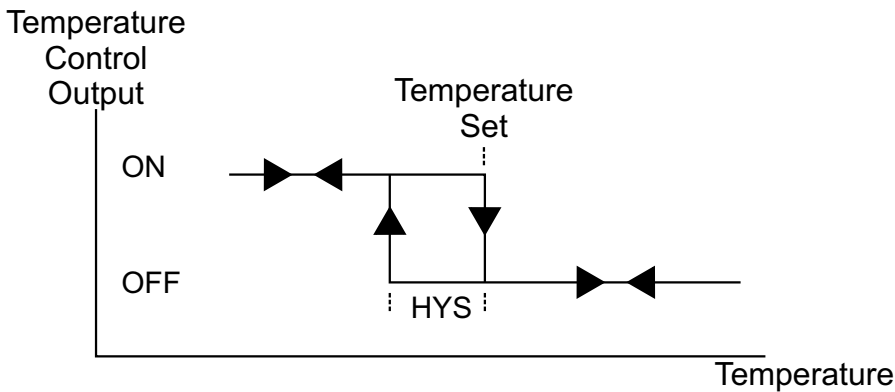
7.1 ON/OFF Control

In ON/OFF control algorithm, temperature value is tried to keep equal to set value by opening or closing the last control element. ON/OFF controlled system, temperature value oscillates continuously. Temperature value's oscillation period or amplitude around set value changes according to controlled system. For reducing oscillation period of temperature value, a threshold zone is formed below or around set value and this zone is named hysteresis. Action of control output is described with figures below.
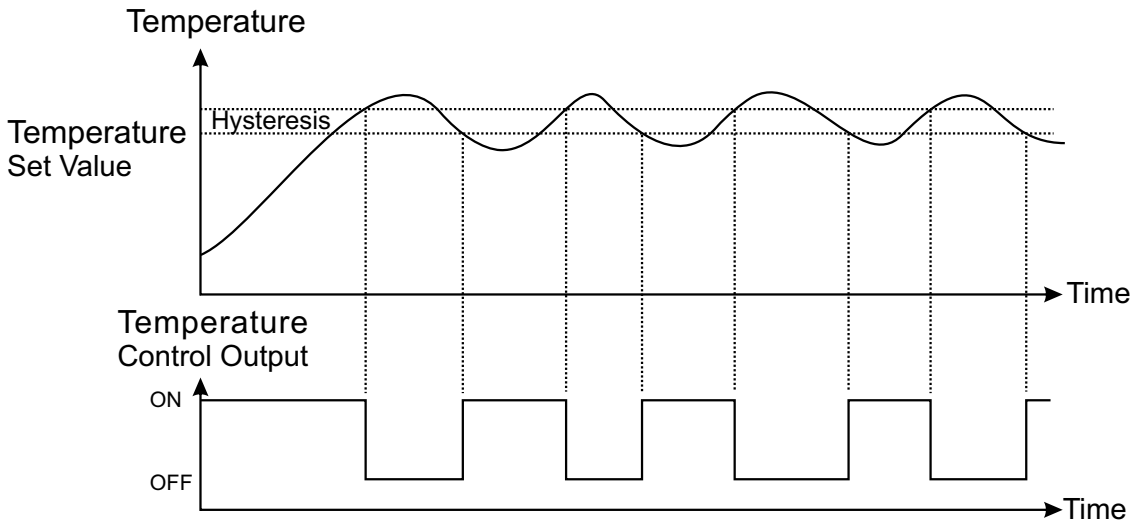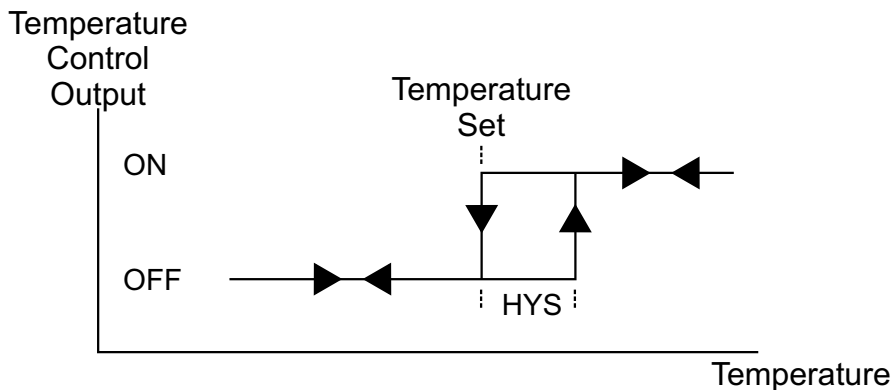

7.1.1 ON/OFF Control in ESM-XX10 Temperature Controller

ON/OFF control form in temperature control output which has heating function

ON/OFF control form in temperature control output which has cooling function

8. Specifications

Device Type	: Temperature Controller
Housing&Mounting	: 96 mm x 96 mm x 96 mm 1/4 DIN 43700 plastic housing for panel mounting. Panel cut-out is 92 x 92 mm Type-1 Enclosure Mounting
Protection Class	: NEMA 4X (IP65 at front, IP20 at rear)
Weight	: Approximately 0.28 Kg.
Environmental Ratings	: Standard, indoor at an altitude of less then 2000 meters with non-condensing humidity.
Storage/Operating Temperature	: -40 $^\circ$C to +85 $^\circ$C / 0 $^\circ$C to +50 $^\circ$C
Storage/Operating Humidity	: 90 % max. (Non-condensing)
Installation	: Fixed installation
Over Voltage Category	: II
Pollution Degree	: II, office or workplace, none conductive pollution
Operating Conditions	: Continuous
Supply Voltage and Power	: 230 V $\sim$ (±15%) 50/60 Hz. 3 VA
	115 V $\sim$ (±15%) 50/60 Hz. 3 VA
	24 V $\sim$ (±15%) 50/60 Hz. 3 VA
	24 V $\overline{\sim}$ (-%15, +%10) 50/60 Hz. 3 VA
Temperature Inputs	: NTC, PTC, TC, RTD
NTC Input Types	: NTC (10 kΩ @.25 °C)
PTC Input Types	: PTC (1000 Ω @.25 °C)
Thermocouple Input Types	: J, K (IEC584.1)(ITS90)
Thermoresistance Input Type	: PT 100 (IEC751(ITS90)
Accuracy	: ± 1% of FS for Thermocouple, Thermoresistance
Cold Junction Compensation	: Automatically ± 0.1°C/1°C
Line Compensation	: Maximum 10 Ω
Sensor Break Protection	: Upscale
Sampling Cycle	: 3 samples per second
Control Forms	: ON / OFF
Relay Outputs	: 7 A@250 V $\sim$ at resistive load (Electrical Life : 100.000 Operation (Full Load))
Optional SSR Driver Outputs	: Maximum 23 mA, Maximum 15 V $=$
Display	: 14 mm Red 3 digits LED display
Led Indicators	: For ESM-9910-A.BC.0.1/00.00; SET (Green), OUT (Red), PROG (Red) 3 mm For ESM-9910-A.BC.0.1/01.00; SET1(Green), SET2(Green), OUT1 (Red), OUT2 (Red), PROG (Red) 3 mm
Approvals	: UL Recognized Component (File No : E 254103), EHI , C€

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

EMKO
Your Technology Partner

Thank you very much for your preference to use Emko Elektronik Products.

www.emkoelektronik.com.tr