EMKO ESM-1520N DIN Rail Mounting Type Digital Temperature Controller User Guide

Contents

EMKO ESM-1520N DIN Rail Mounting Type Digital Temperature Controller

Product Information

Specifications

- **Model**: ESM-1520-N
- **Input Type:** BC
- **Output-**1: 2 SSR Driver Output (Maximum 20 mA, 17 V Z)
- **Output-2**: 01 Relay Output (resistive load 5 A@250 V V, 1 NO + 1NC)

Product Usage Instructions

Entering Programming Mode and Changing Parameters

To enter the programming mode and change parameters

1. On the operation screen, press the Enter button for 5 seconds until the P led starts to blink.
2. If the programming mode entering password is not 0, the programming mode entering screen will be displayed. Otherwise, the hysteresis screen will be observed.
3. To access the password entering screen, press the Enter button.
4. Use the increment and decrement buttons to enter the programming mode accessing password.
5. Press the Enter button to access the parameters.
6. Press the Set button to show the next parameter.
7. Change the parameter value using the increment and decrement buttons.

Parameter Observation without Changing
To observe the parameters without changing them

1. On the password entering screen, press the Enter button to access the parameters.
2. The parameters can be observed but cannot be changed in this mode.

Automatic Return to Operation Screen
If no operation is performed in the programming mode for 20 seconds, the device will automatically turn to the operation screen.

FAQ

Q: What are the failure messages in ESM-1520N Temperature Controller?
A: The failure messages in ESM-1520N Temperature Controller include probe defect in analogue inputs, wrong sensor connection, or no sensor connection.

Q: How can I order ESM-1520N Temperature Controller?
A: To order ESM-1520N Temperature Controller, follow the ordering information provided

- Choose the appropriate device configuration based on the information and codes given in the table.
- Fill in the order code blanks according to your needs, starting with the supply voltage and then specifying other specifications.
- If your needs are out of the standards, please contact us for assistance.

Q: What are the alarm types in ESM-1520N Temperature Controller?
A: The alarm types in ESM-1520N Temperature Controller include Process High Alarm and Process Low Alarm.

ESM-1520N DIN Rail Mounting Type Digital Temperature Controller

- 3 Digits display
- NTC Input or,
- PTC 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)
- PID or ON/OFF temperature control

- Selectable heating or cooling function
- Selection of operation with hysteresis
- Adjustable temperature offset
- Set value low limit and set value high limit boundaries
- SSR driver output
- Operation selection of compressor operates continuously, stops or operates periodically in case of probe defect
- Compressor protection delays
- Alarm parameters
- Password protection for programming mode
- Having CE mark according to European Norms

Preface
ESM-1520N 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

- Glass
- Food
- Plastic
- Petro-Chemistry
- Textile, Automative
- Machine Production Industries Etc…

Applications

- Heating
- Baking Ovens
- Incubators
- Storages
- Air Conditioning
- Etc…

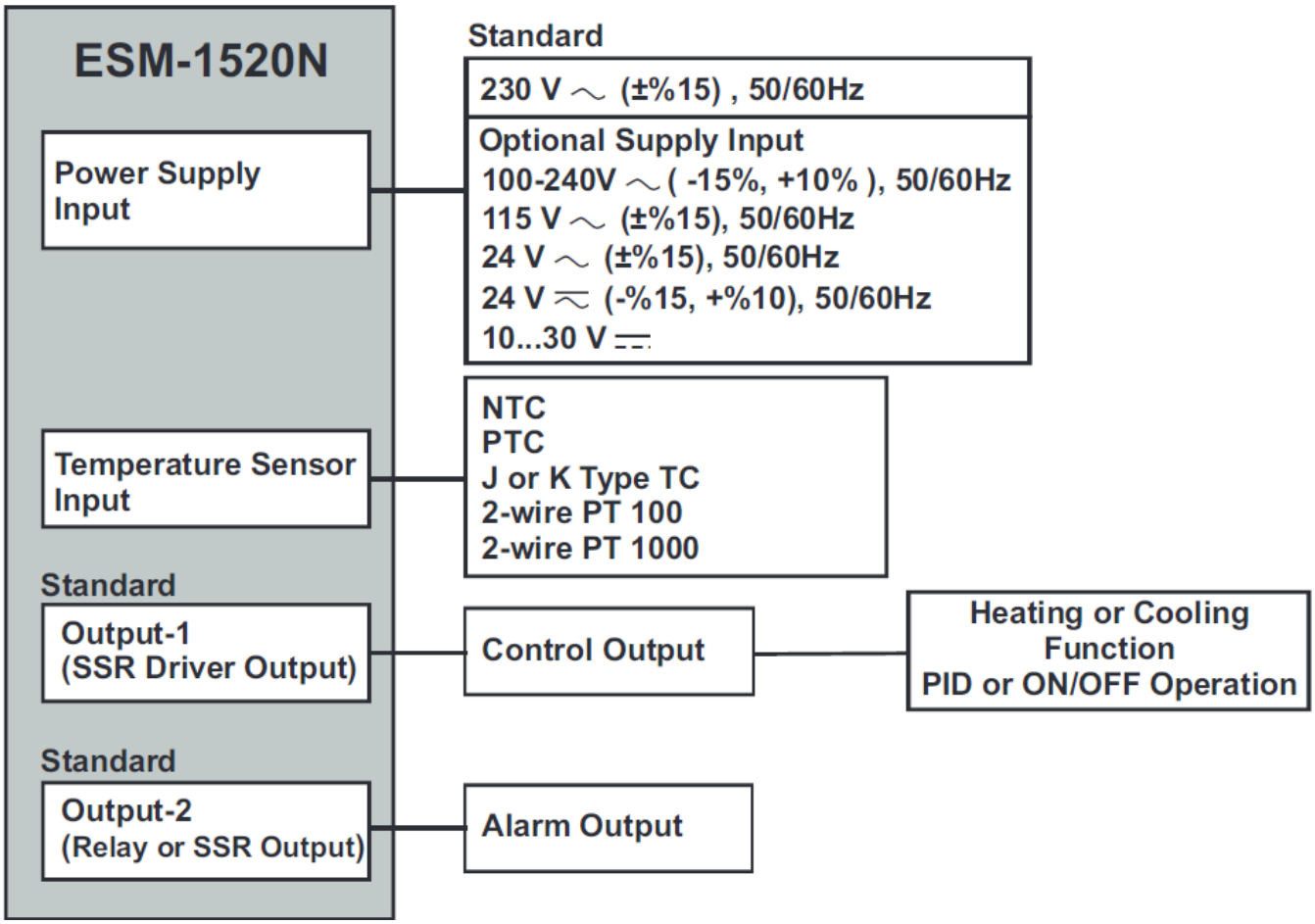
Operating Conditions

-  **Operating Temperature :** -20 to 70 °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)

General Specifications



Installation

- A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.
- If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.
- The unit is normally supplied without a power supply switch or a fuse. Use power switch and fuse as required.
- Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.
- Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.
- Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.
- Do not use the unit in combustible or explosive gaseous atmospheres.
- During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.

- Montage of the product on a system must be done with it’s fixing clamps. Do not do the montage of the device with inappropriate fixing clamp. Be sure that device will not fall while doing the montage.
- It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

Warranty

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

Maintenance

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

Manufacturer Company

- Manufacturer Information
- Emko Elektronik Sanayi ve Ticaret A.Ş.
- Bursa Organize Sanayi Bölgesi, (Fethiye OSB Mah.)
- Ali Osman Sönmez Bulvarı, 2. Sokak, No:3 16215 BURSA/TÜRKİYE
- **Phone** : (224) 261 1900
- **Fax** : (224) 261 1912
- Repair and maintenance service information
- Emko Elektronik Sanayi ve Ticaret A.Ş.
- Bursa Organize Sanayi Bölgesi, (Fethiye OSB Mah.)
- Ali Osman Sönmez Bulvarı, 2. Sokak, No:3 16215 BURSA/TÜRKİYE
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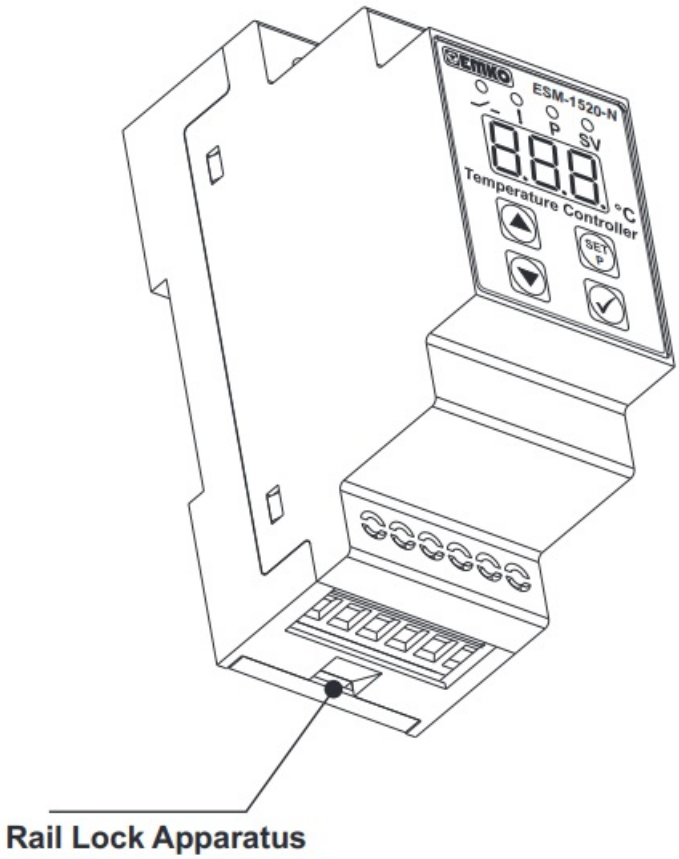
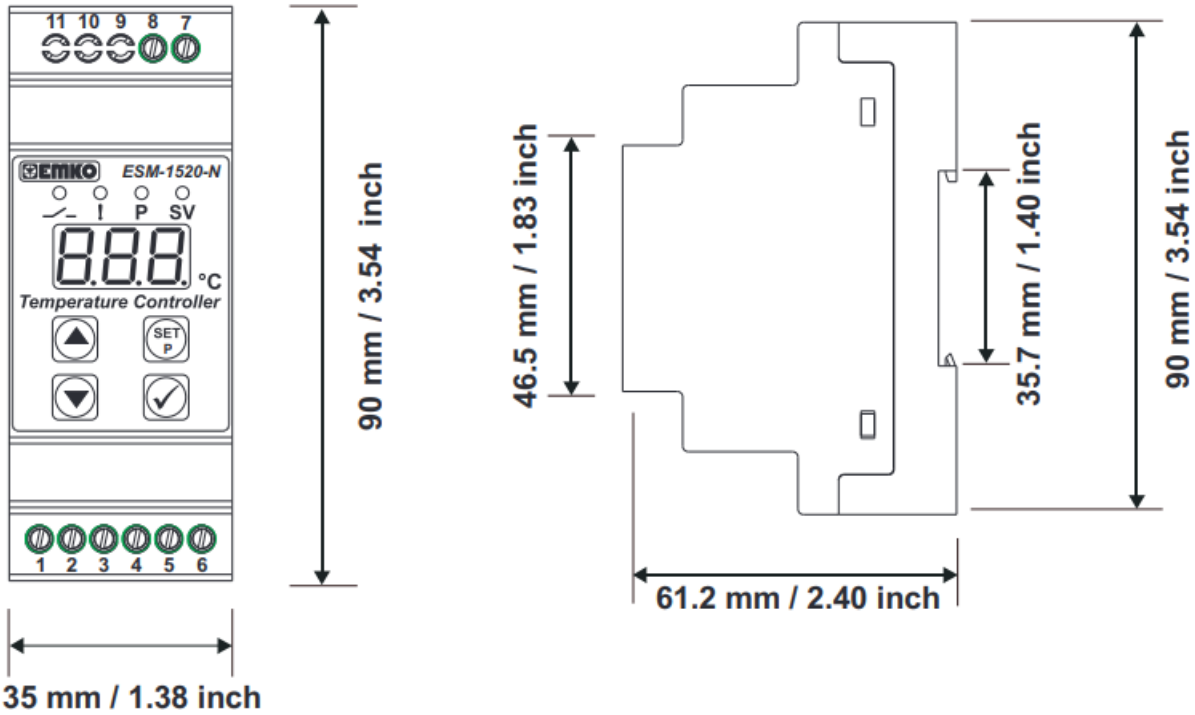
General Description

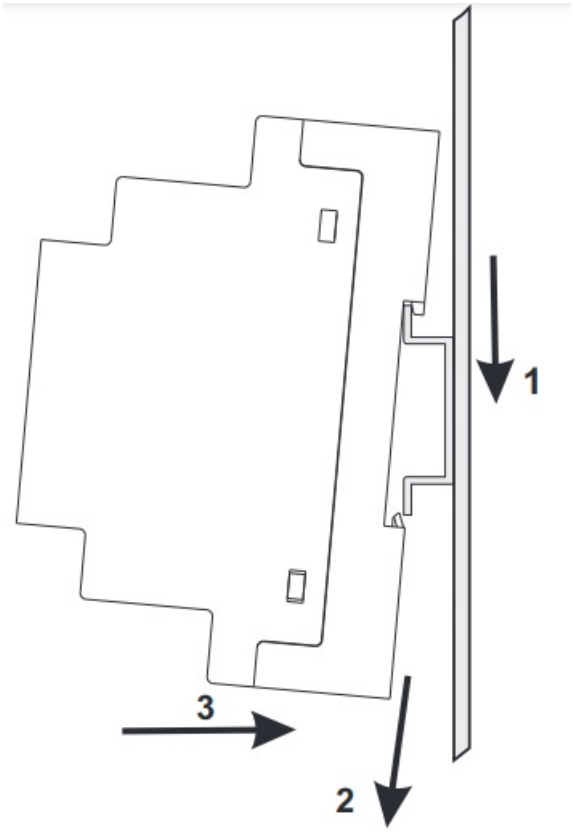


Front View and Dimensions of ESM-1520N Temperature Controller



Installation onto the Rail
The unit is designed for rail mounting.

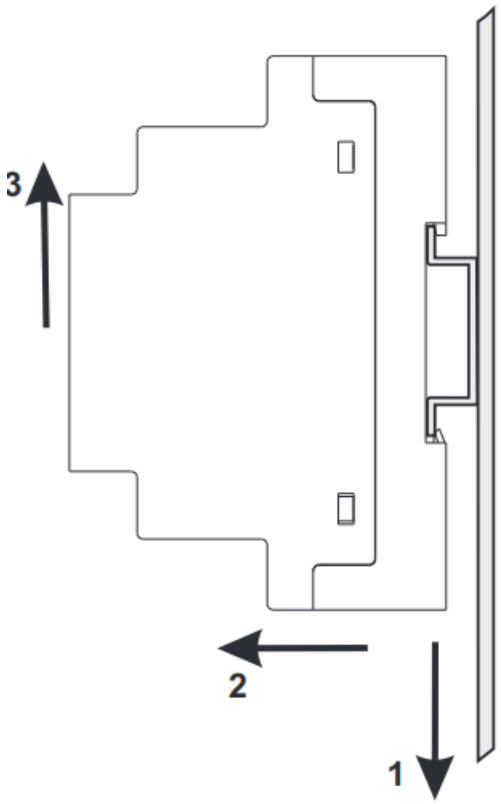
1. Put into the unit upper side of the rail properly.
2. Pull down the rail lock apparatus via a screw driver.
3. Push the unit from the underside for mounting to the rail.



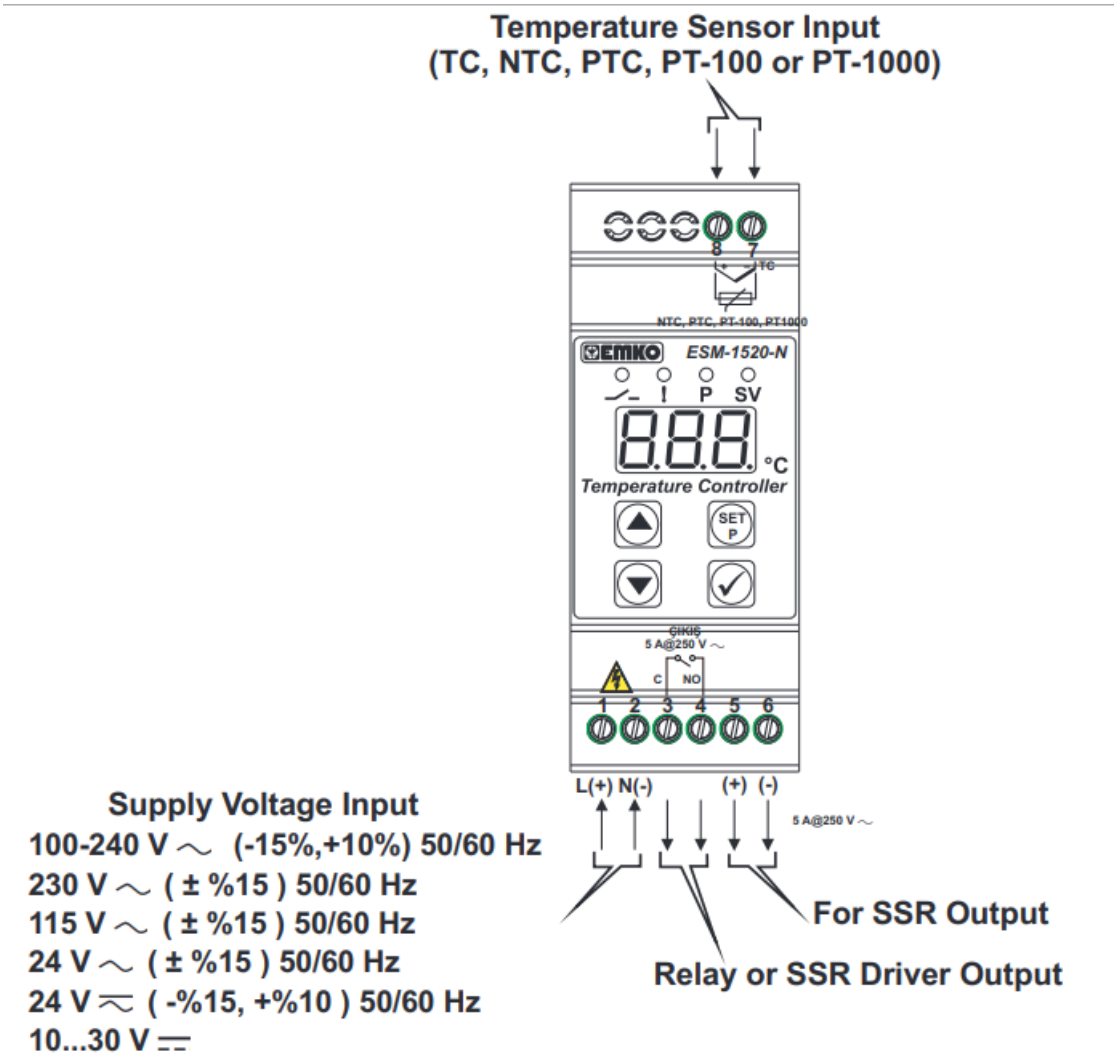
During installation onto the rail, care should be taken to avoid injury from mechanical part of the system. These precautions for the safety of the person who does the rai mounting.

Removing from the Rail
Before starting to remove the unit from the rail, power off the unit and the related system.

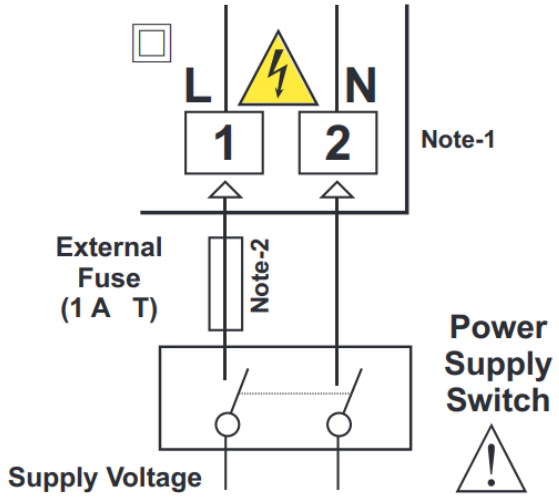
1. Pull down the rail lock apparatus via a screw driver.
2. Pull the unit from the underside to seperate the rail lock apparatus from the rail
3. Full up the unit to remove from the rail.



Electrical Wiring Diagram



Supply Voltage Input Connection of the Device



Supply Voltage

100-240 V ~ (-15%,+10%) 50/60 Hz
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
10...30 V ⎓

Note-1: "L" is (+), "N" is (-) for 10...30V ⎓ and 24V ⎓ Supply Voltage

Note-2: External Fuse is recommended

Note-3: External fuse must be on phase connection in ~ supply input.

Note-4: External fuse must be on (+) line connection in ⎓ supply input.

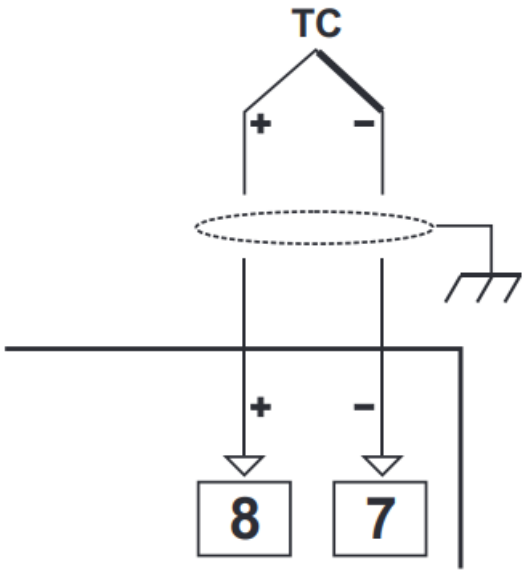
Note-5: Stranded cable cross section: 1,5mm², Solid cable cross-section: 2,5mm² The stripping length is 7 to 9 mm.

Note-6: Supply cables must comply with the requirements of IEC 60277 or IEC 60245.

- 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.

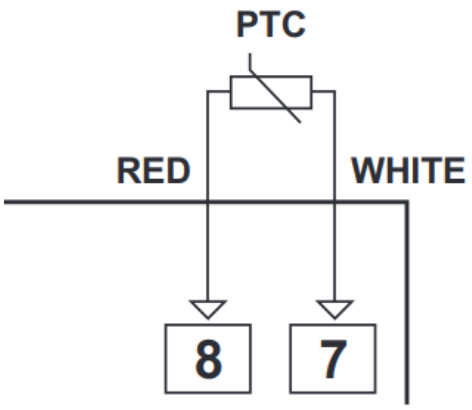
Temperature Sensor Input Connection

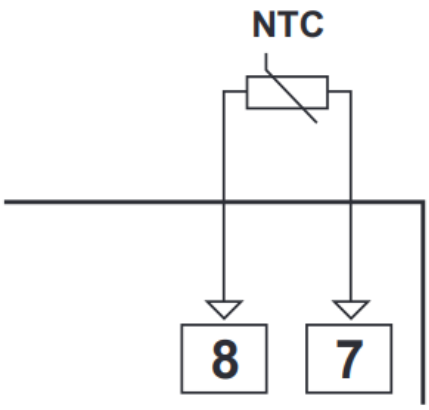
TC (Thermocouple) Connection



- 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 W.

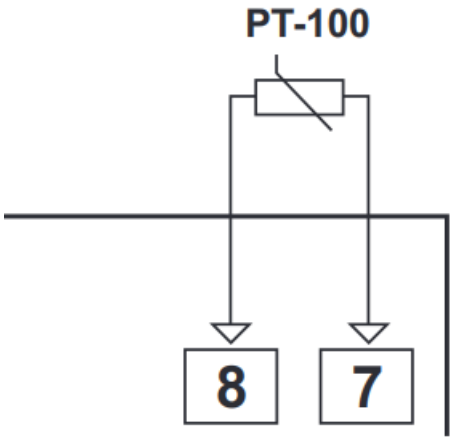
PTC and NTC Connection

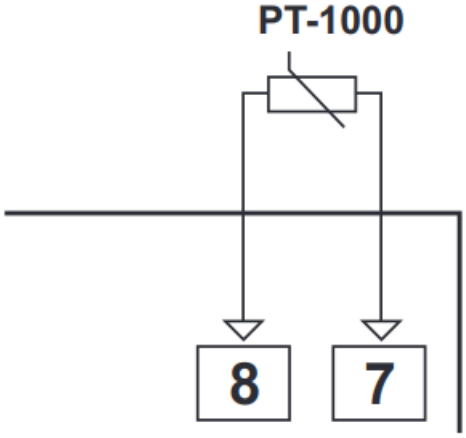




- Input resistance is greater than 10M W.
- Pay attention the cable colours of PTC probe while doing the PTC probe connection.

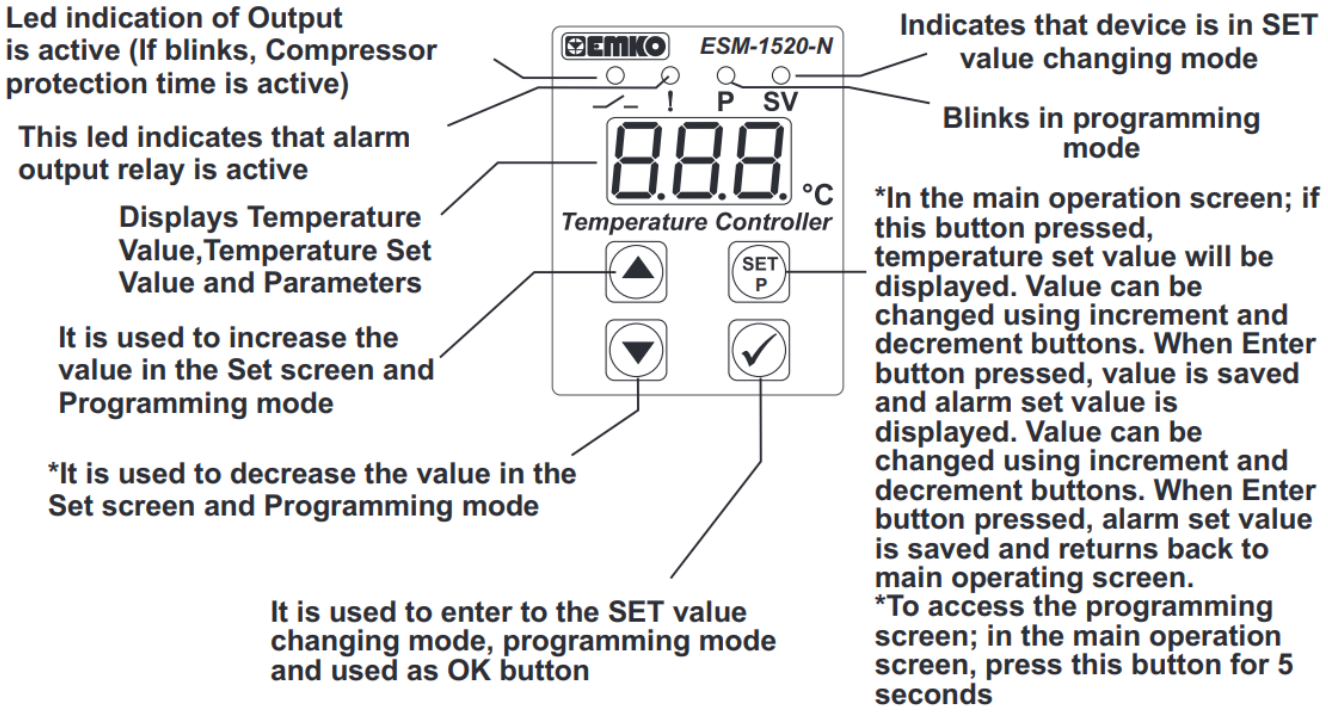
PT-100 and PT-1000 Connection





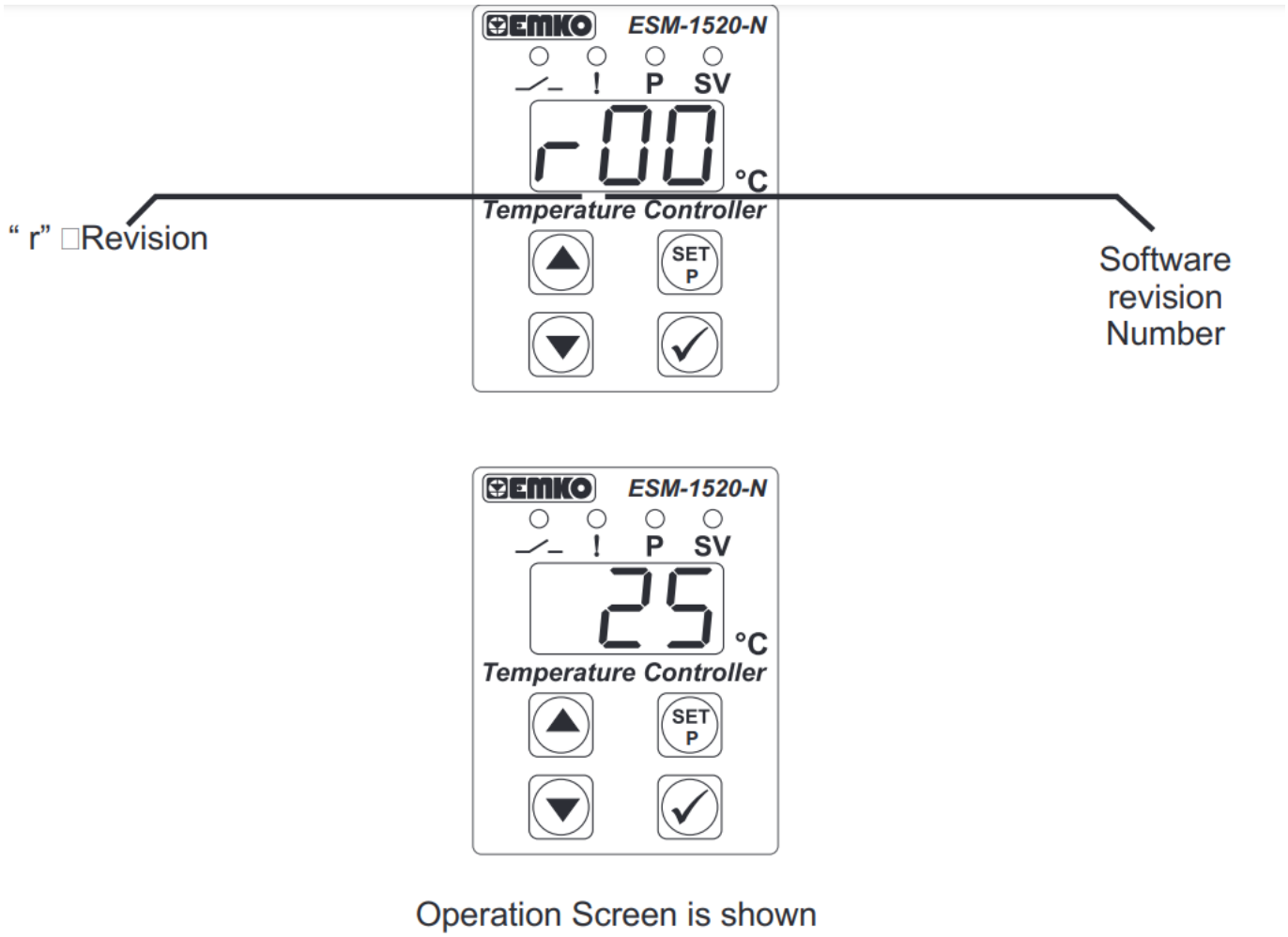
- Input resistance is greater than 10M W.

Front Panel Definition and Accessing to the Menus



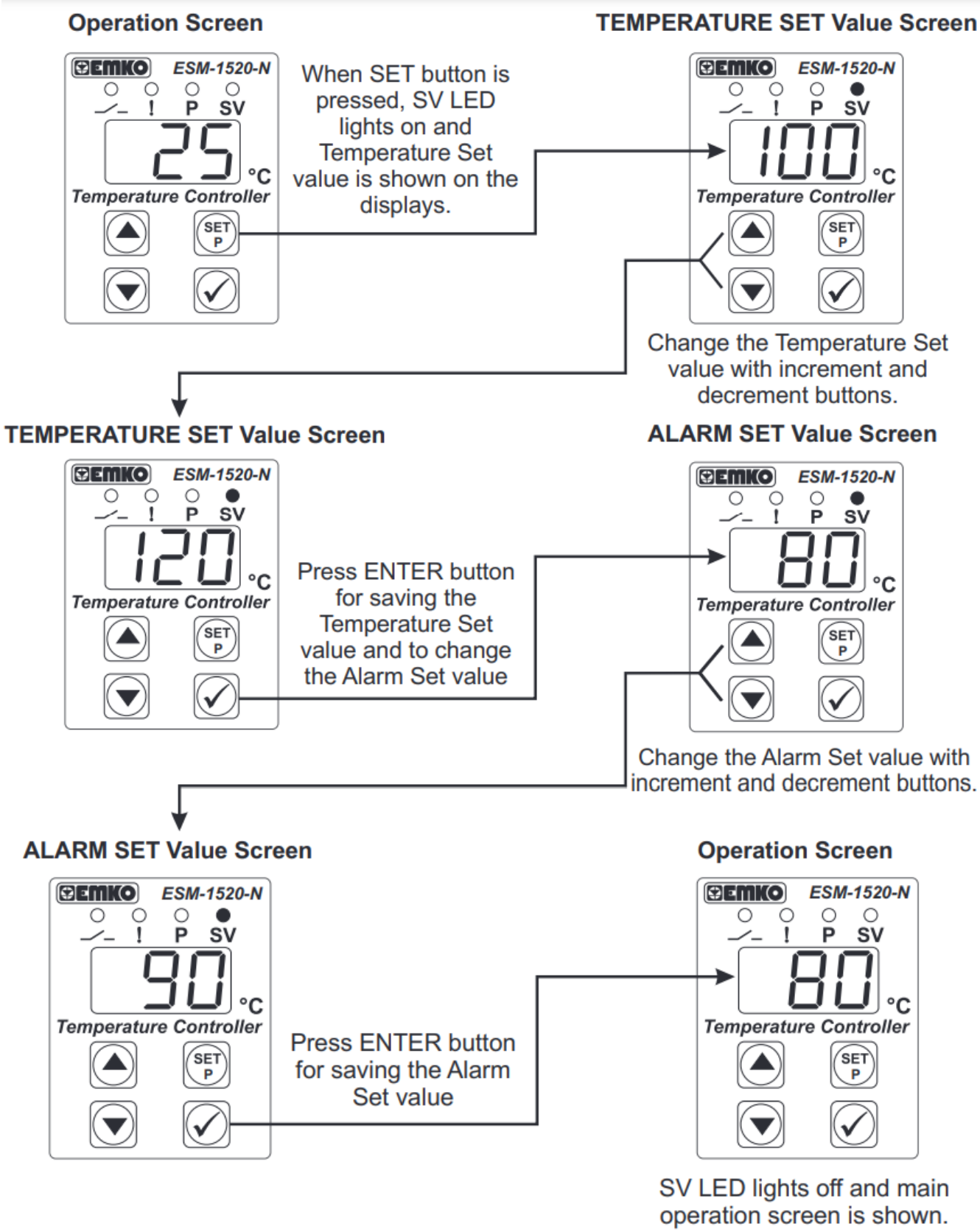
Observation of Software Revision on the Displays

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



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

Changing and Saving Temperature Set Value / Alarm Set Value



Program Parameters

- PnE Decimal Seperator Enabling Parameter (Default = 0)

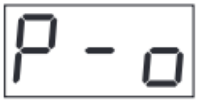
0	Disable.
1	Enable.

Note : If sensor input type is selected PTC or NTC (BC= 12 or 18) is observed.

Note : When Pnt parameter is changed, change Set, hSt, SuL, SuH, oFt parameters with appropriate values.

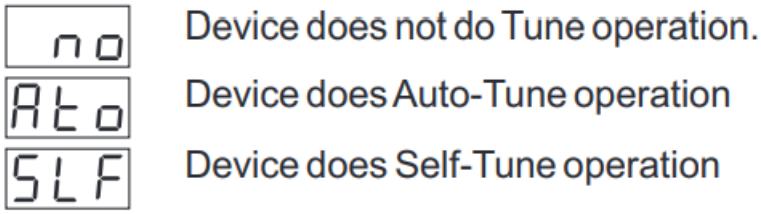
-  **Operating Type Parameter (Default = 0)**

Note: If operating type is selected cooling  parameter and PID parameters are skipped Device operates with .On-Off control.

-  Temperature Control Selection Parameter On/Off or PID (Default = 0)

Note: If this parameter is select 0, PID parameters will be not observed.If this parameter select 1, will be not observed.

-  **Tune Selection Parameter (Default = no)**



Note-1: If this parameter is select  the temperature must be lower than temperature set value. If this condition is not okey  is seen on the main screen for 10 seconds.

Note-2: If this parameter is select  the temperature must be greater than temperature set value at least 5% of the full scale. If this condition is not okey  is seen on the main screen for 10 seconds.

-  **PID – Proportional Control Parameter (Default = 10.0)**

This parameter can be adjusted from %1.0 to %99.9

-  **PID-Integral Parameter(Default = 100)**

This parameter value can be adjusted from 0 to 999

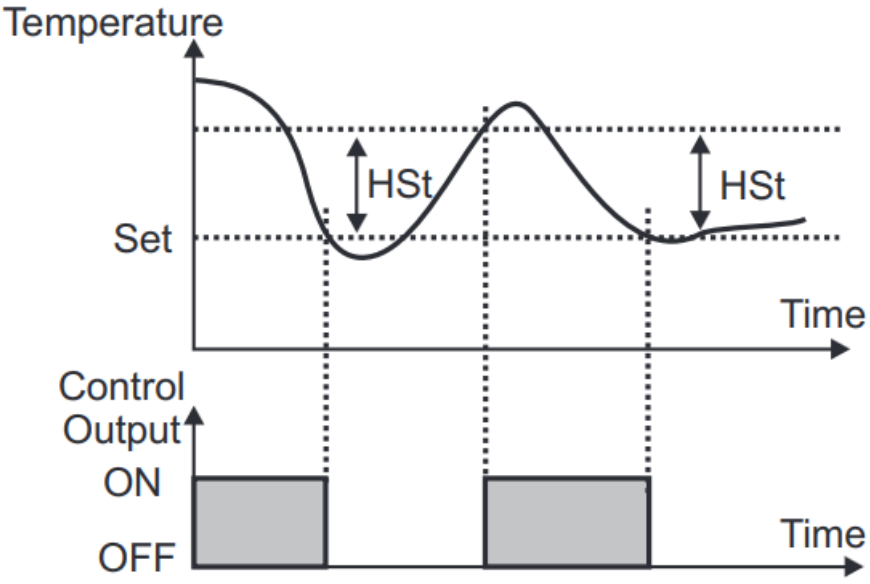
-  **PID-Derivativel Parameter (Default = 25.0)**

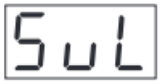
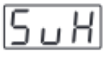
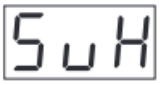
This parameter value can be adjusted from 0.0 to 99.9

-  **PID-Period parameter(Default = 10)**

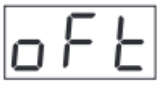
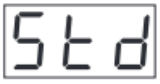
This parameter value can be adjust from 0 to 150 second.

-  Operation Scale Minimum Parameter (Default = Minimum Value of Device Scale)
  This parameter value can be adjusted from minimum value of device scale to operation scale maximum parameter 
-  Operation Scale Maximum Parameter (Default = Maximum Value of Device Scale)
  This parameter value can be adjusted from operation scale minimum parameter to maximum value of the device scale  .
-  Hysteresis Parameter for Compressor Output (Default = 3) from 1 to 20°C for NTC (-50°C, 100°C) or PTC (-50°C, 150°C) or J Type TC (0°C, 800°C) or K Type TC (0°C, 999°C or PT-100 Type (-50°C,400°C) or PT-1000 Type (-50°C,400°C) from 0.1 to 10.0°C for NTC(-19.9°C,99.9°C) or PTC (-19.9°C,99.9°C) or PT-100 (-19.9°C,99.9°C) or PT-1000 (-19.9°C,99.9°C)
  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.



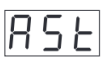
-  **Minimum Set Value Parameter (Default =Minimum value of device scale)**
  Set value can not be lower than this value. This parameter value can be adjusted from minimum value of device scale to maximum set value parameter  .
-  **Maximum Set Value Parameter (Default = Maximum value of device scale)**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

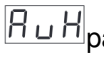
maximum value of the device scale  .

-  Sensor Offset Parameter (Default = 0) from -20 to 20 °C for NTC(-50°C, 100°C) or PTC(-50°C, 150°C) or J Type TC (0°C,800°C) or K Type TC (0°C,999°C) or PT-100(-50°C, 400°C)or PT-1000 (-50°C, 400°C) from -10.0 to 10.0°C for NTC(-19.9°C,99.9°C) or PTC(-19.9°C,99.9°C) or PT-100 (-19.9°C,99.9°C) or PT-1000 (-19.9°C,99.9°C)
-  Compressor Start Delay at Power On Parameter (Default = 0)
  When power is first applied to the device, compressor is on when this time delay is expired. It can be adjusted from 0 to 20 minutes.
-  Compressor Stop-Start Delay Parameter (Default = 0)
  When compressor is inactive, this time delay must be expired for activation of the compressor. It can be adjusted from 0 to 20 minutes.
-  **Compressor Start-Start Delay Parameter (Default = 0)**
  This time delay must be expired between two activation of the compressor. It can be adjusted from 0 to 20 minutes.
-  **Sensor Defect Parameter (Default = 0)**

  
  Compressor is OFF in case of sensor defect.
  Compressor is ON in case of sensor defect.
  Compressor operates periodically according to  and  Time periods in case of sensor defect.
-  **Compressor is active during this time period in case of probe defect (Default = 0)**
  If probe defect parameter is  2, then this parameter is observed. It can be adjusted from 0 to 99 minutes.
-  Compressor is active during this time period in case of probe defect (Default = 0)
  If probe defect parameter  is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes.
-  TemperatureAlarm Function Selection Parameter (Default =1)
  - Alarm function is inactive.
  - Process High alarm selected.
  - Process Low alarm selected.
  - Deviation High alarm selected.
  - Deviation Low alarm selected.
  - Deviation Band alarm selected.
  - Deviation Range alarm selected.

- Deviation Range High alarm selected.

- **Note:** If this parameter is select 0  ,      , parameters will be not observed.
-  TemperatureAlarm Set Parameter (Default =80)

  This parameter value can be programmed between temperature minimum alarm set  parameter and temperature alarm set maximum  parameter.
-  Temperature Alarm Hysteres is Parameter (Default =3)

  This parameter value can be adjusted form 0.1 to %50 of the device scale if Pnt parameter is 1, 1 to%50 of the device scale if Pnt parameter is 0.
-  Temperature Minimum Alarm Parameter (Default =Minimum Value of Device Scale)

  If temperature alarm  is active, this parameter value can be adjusted from operation scale minimum parameter to temperature  alarm set maximum parameter value .
-  Temperature Alarm Maximum Parameter (Default = Maximum Value of Device Scale)

  If temperature  alarm is active, this parameter value can be adjusted from temperature alarm set value parameter  to operation scale maximum parameter
-  Temperature Alarm On Delay Time Parameter(Default = 0)

  Temperature alarm on delay time can be defined with this parameter.

  It can be adjusted from 0 to 99 minutes.
-  Temperature Alarm Off Delay Time Parameter(Default = 0)

  Temperature alarm off delay time can be defined with this parameter.

  It can be adjusted from 0 to 99 minutes. If it is higher than 99 is seen on the screen and alarm latching output is selected. In alarm latching output mode, in order to make passive alarm output, press DECREMENT button at main screen.
-  Temperature Alarm Delay After Power On Parameter (Default = 0)

  When power is first applied to the device, this time delay must be expired for activation of temperature alarm. It can be adjusted from 0 to 99 minutes.

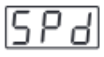
-  Increment/Decrement Mode Selection Parameter (Default = 0)

  Mode-1 (The increase or decrease in values firstly occurs one by ones, then ten by tens, and finally hundred by hundreds.

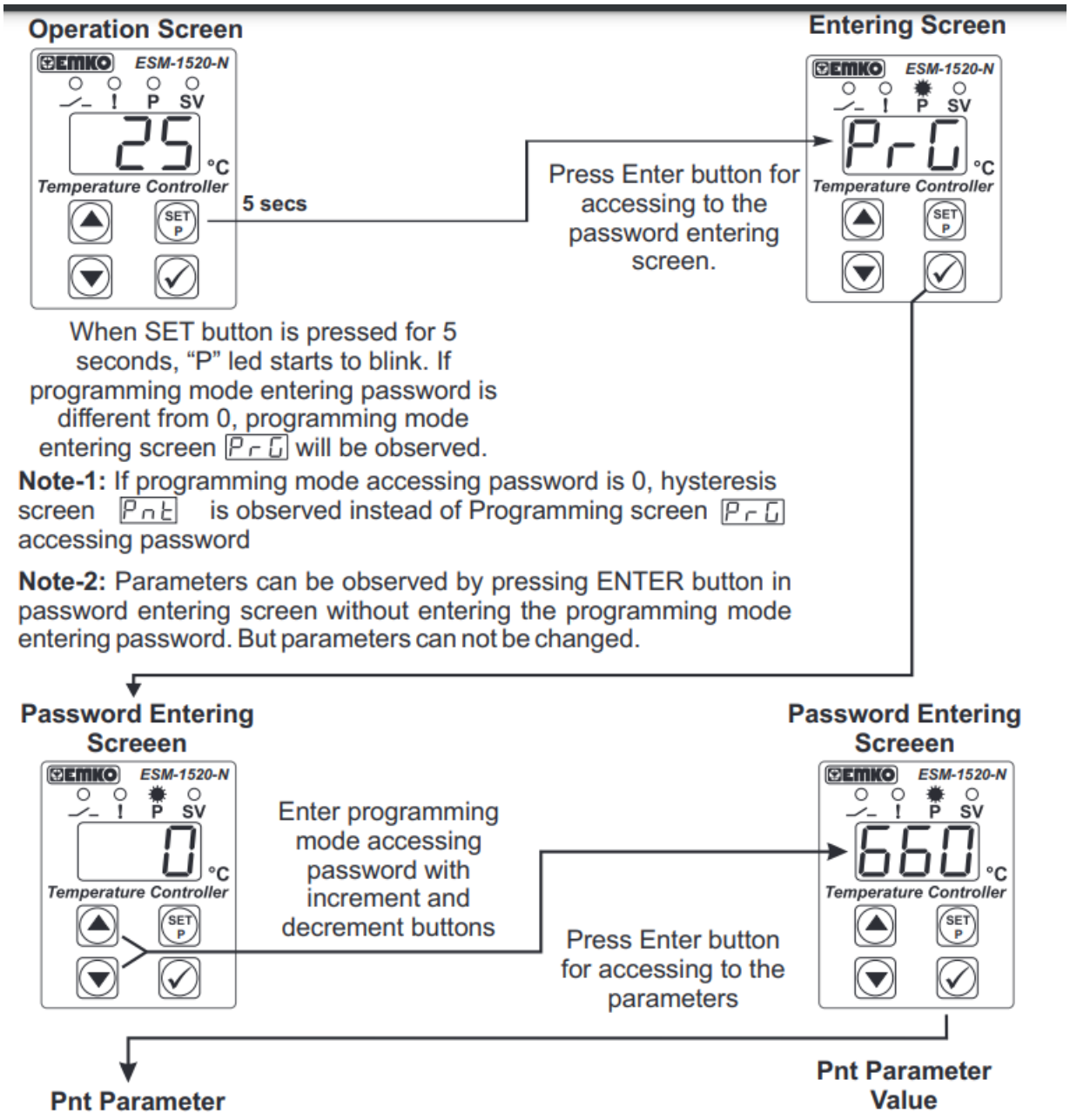
  Mode-2 (The rate of increase or decrease of the values accelerates over time.)

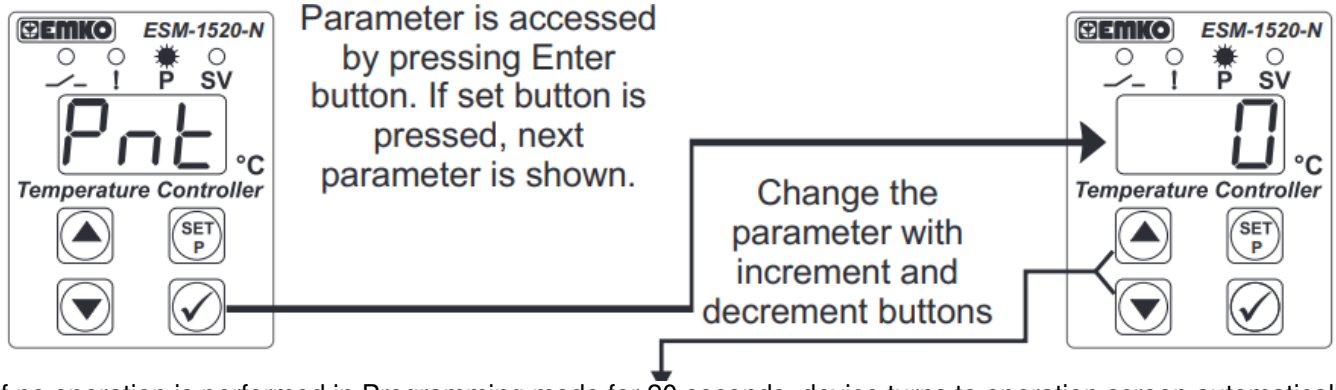
  Programming SectionAccessing Password

-  It is used for accessing to the programming section. It can be adjusted from 0 to 9999. If it is selected 0, password will not be asked

 ,  ,  ,  ,  and  Parameters are observed if Operation type is selected “Cooling”.

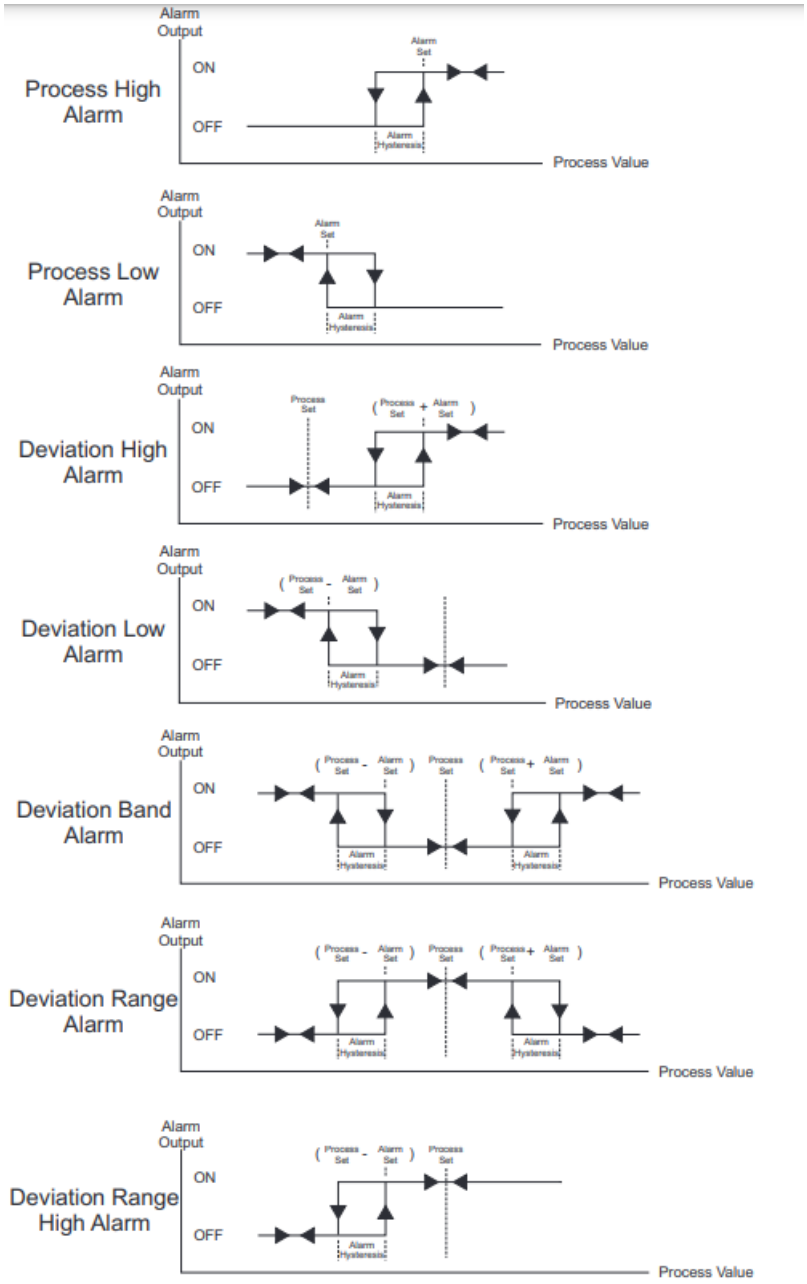
Entering To The Programming Mode, Changing and Saving Parameters





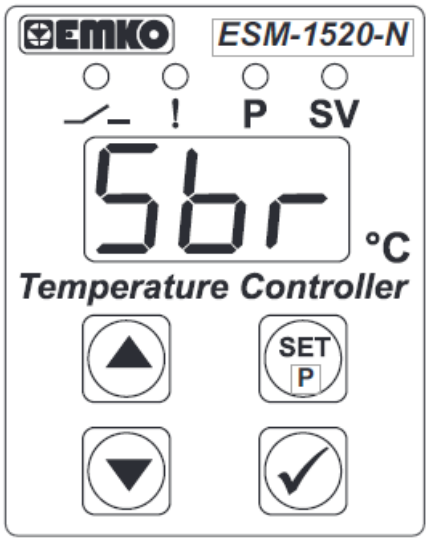
If no operation is performed in Programming mode for 20 seconds, device turns to operation screen automatically

Alarm Types



Failure Messages in ESM-1520N Temperature Controller

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



Ordering Information

ESM-1520N (77x35 DIN Size)	A	BC	D	E	/	FG	HI	/	U	V	W	Z
			0	2	/		00	/	2		0	0

A	Supply Voltage
1	100-240V ~ (-15%, +10%) 50/60Hz - 2.5VA
2	24V ≂ (-15%,+10%) 50/60Hz - 2.5VA
3	24V ~ (± 15%) 50/60Hz - 2.5VA
4	115V ~ (± 15%) 50/60Hz - 2.5VA
5	230V ~ (± 15%) 50/60Hz - 2.5VA
8	10...30 V ⎓ - 2.5W
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) (Note-2)	-50°C	150°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) (Note-2)	-50°C	100°C

All order information of ESM-1520N 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.

- **Note-1** : Selectable decimal type for PTC and NTC via parameter (Scale : -19,9…99,9°C)
- **Note-2** : If input type is selected PTC or NTC (BC = 12, 18), Temperature sensor is given with the device. For this reason,
  - If input type is selected as PTC, sensor type (V = 0,1 or 2) or
  - If input type is selected as NTC, sensor type (V = 0,3 or 4) must be declared in ordering information.

E	Output-1
2	SSR Driver Output (Maximum 20 mA, 17 V ⎓)

FG	Output-2
01	Relay Output (resistive load 5 A@250 V ~ , 1 NO + 1NC)
02	SSR Driver Output (Maximum 20 mA, 17 V ⎓)

V	Temp. Sensor which is given with ESM 1520N
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-1520N 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

Specifications

Device Type	: Temperature Controller
Housing&Mounting	: 90mm x 35mm x 61.2mm plastic housing for Rail Mounting.
Protection Against Mechanical Impacts	: 1Joule (IK06)
Protection Class	: IP20.
Weight	: Approximately 0.14 Kg.
Environmental Ratings	: Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
Storage / Operating Temperature	: -30 °C to +80 °C / -20 °C to +70 °C
Storage / Operating Humidity	: 90 % max. (None condensing)
Installation	: DIN Rail Mounting
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 - 2.5 VA 230 V ~ (± 15%) 50/60 Hz - 2.5 VA 115 V ~ (± 15%) 50/60 Hz - 2.5 VA 24 V ~ (± 15%) 50/60 Hz - 2.5 VA 24 V ⎓ (- 15%, + 10%) 50/60 Hz - 2.5 VA 10...30 V ⎓ - 2.5 W
Temperature Sensor Inputs	: NTC, PTC, TC, RTD
NTC Input Type	: NTC (10 kΩ @.25 °C)
PTC Input Type	: PTC (1000 Ω @.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 5 A@250 V ~ (Electrical Life : 100.000 operation (Full Load)
SSR Output	: Maximum 28 mA, Maximum 15 V ⎓
Display	: 9 mm Red 3 digits LED Display
Leds	: SV (Orange),P(Red),Control OUT (Red),Alarm OUT (Red)
Approvals	: EAC, CE, UKCA

Thank you very much for your preference to use Emko Elektronik products, please visit our web page to download user manual. www.emkoelektronik.com.tr

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Documents / Resources

	**EMKO ESM-1520N DIN Rail Mounting Type Digital Temperature Controller** [pdf] User Guide ESM-1520N DIN Rail Mounting Type Digital Temperature Controller, ESM-1520N, DIN Rail Mounting Type Digital Temperature Controller, Rail Mounting Type Digital Temperature Controller, Mounting Type Digital Temperature Controller, Digital Temperature Controller, Temperature Controller, Controller

References

- **Emko Elektronik - TecrÃ¼beyi GÃ¼venle BuluÅŸturan Teknoloji**
- **User Manual**