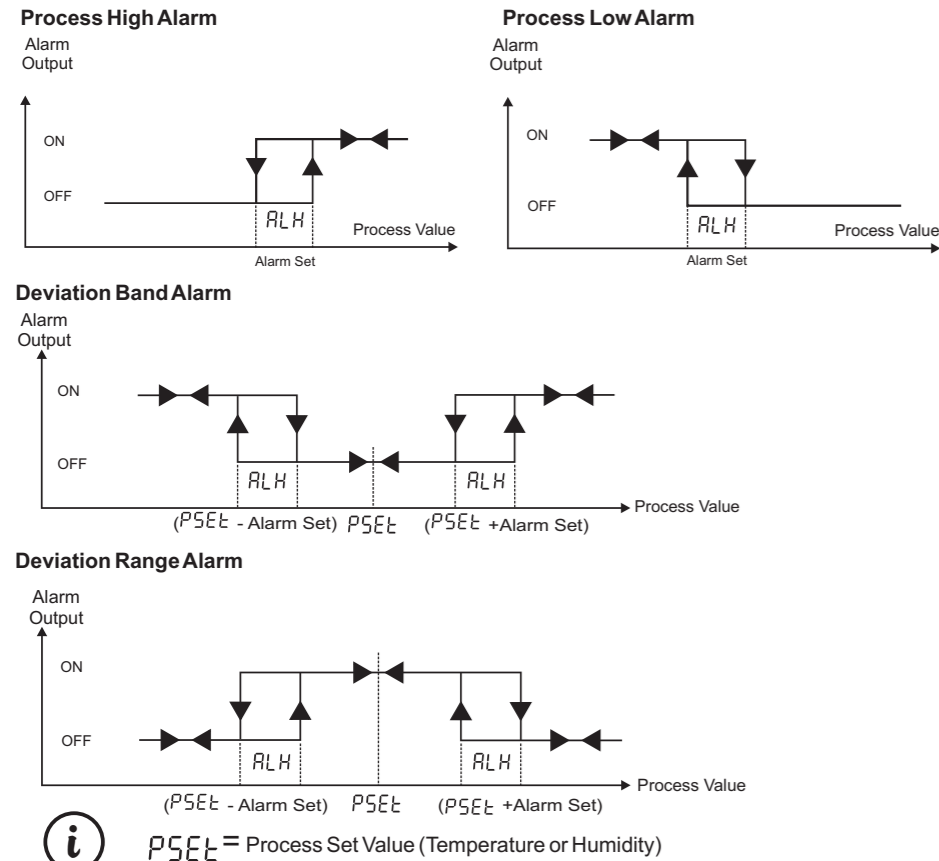


5.2 Alarm Output Graphics of ESM-3723

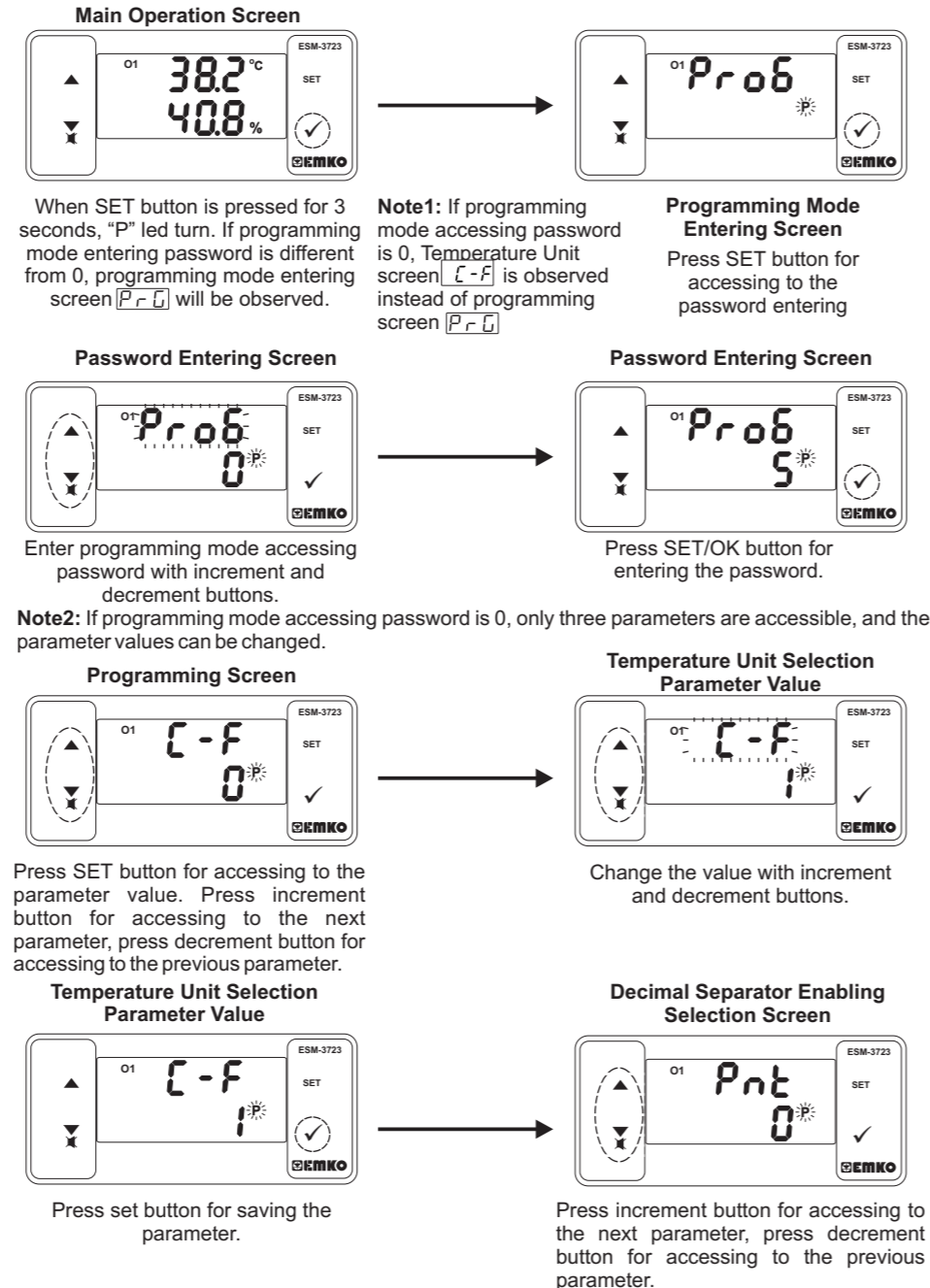


5.3 Failure Messages in ESM-3723

- Screen Blinking Temperature Sensor failure. Sensor connection is wrong or there is no sensor connection. While this message shown on this display, if buzzer function selection [b_u F] is 3, 5, 7 or 8 internal buzzer starts to operate.
- Screen Blinking Humidity Sensor failure. Sensor connection is wrong or there is no sensor connection. While this message shown on this display, if buzzer function selection [b_u F] is 4, 6, 7 or 8 internal buzzer starts to operate.
- In main operating screen if the upper display is blinking, it means that temperature alarm exits and alarm output is active. If buzzer function selection [b_u F] is 1, 5 or 8 internal buzzer starts to operate.
- In main operating screen if the lower display is blinking, it means that humidity alarm exits and alarm output is active. If buzzer function selection [b_u F] is 2, 6 or 8 internal buzzer starts to operate.

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5.5 Entering To The Programming Mode, Changing and Saving Parameter



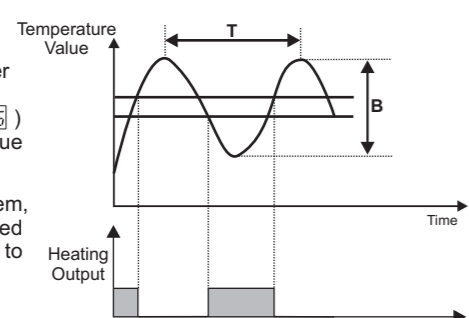
14

6. Auto Tune Metod

Auto Tune method is used for determining PID parameters used by the device.

Starting Auto Tune (Limit Cycle Tuning) Operation by the user:

- Adjust temperature control on/off or PID parameter (P=0)
- Adjust auto tune selection parameter (P_Limit = 1)
- In the main screen "Atun" and Temperature value are should alternately.



If Auto Tune operation is finished without any problem, the device saves the new PID coefficients, calculated using the previously found "T" and "B" values, to memory and continue to run.

Auto Tune parameter is adjusted automatically.

Cancelling Auto Tune (Limit Cycle Tuning) operation:

- If sensor breaks;
- If auto tune operation can not be completed in 8 hours;
- If user adjusts P_Limit parameter to 0;
- During auto tune operation if the user changes the temperature control from pid to on/off;
- If process set value is changed while auto tune operation is being performed;

Auto tune is canceled. "Atun" is not displayed. Then, without doing any changes in PID parameters, device continues to run with previous PID parameters.

7. Specifications

| | |
|--|---|
| Device Type | : Temperature+Humidity Controller |
| Housing&Mounting | : 76 mm x 34.5 mm x 71 mm Plastic housing for panel Panel cut out is 71 x 29 mm. |
| Protection Clas | : Ip65 at front, Ip20 at rear. |
| Weight | : Approximately 0.2 Kg |
| Enviromental Ratings | : Standart, indoor at an altitude of less than 2000 meters with none condensing humidity. |
| Storage / Operating Temperature | : -40 °C to +80 °C / -30 °C to +80 °C |
| Storage / Operating Humidity | : 90 % max. (None condensing) |
| Installation | : Fixed installation |
| Overvoltage Category | : II |
| Pollution Degree | : II, office or workplace, none conductive pollution |
| Operating Conditions | : Continuous |
| Supply Voltage and Power | : 230V ~ (±15%) 50/60Hz - 1.5VA : 115V ~ (±15%) 50/60Hz - 1.5VA : 24V ~ (±15%) 50/60Hz - 1.5VA : 24V ~ (±15%) 50/60Hz - 1.5VA : 10-30V = 1.5W |
| Temperature Sensor Input | : NTC, PTC, PT-100, 0/2...10V=, 0/4...20mA= or ProNem Mini PMI-P |
| NTC input type | : NTC (10 kΩ @25 °C) |
| PTC input type | : PTC (1000 Ω @25 °C) |
| Termoreistance input type | : PT-100 IEC751 (ITS90) |
| Humidity input type | : 0/2...10V=, 0/4...20mA= or ProNem Mini PMI-P |
| Accuracy | : ± 1 % of full scale |
| Sensor Break Protection | : Upscale |
| Control Form | : PID or ON / OFF |

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Relay Outputs

: 5 A@250 V ~ at Resistive Load (Heating Output)
: 3 A@250 V ~ at Resistive Load ((Heating , (Heating Alarm), (Humidifier), (Humidifier Alarm))

Optional SSR Driver Output

Temperature Display: 8 mm Red 4 digit LED Display
Humidity Display: 8 mm Green 4 digit LED Display
LED Displays: P (Green), % (Green), °C (Red), °F (Red), Humidifier Output (Red), Humidifier Alarm Output (Red), Heating Output (Red), Heating Alarm (Red)

Internal Buzzer

Approvals: >83dB, CE

8. Other Informations

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|------------------------------------|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESM-3723 (Printed on Board) | | | | | | | | | | | | | | | | | | | | | | | | | |
| A Power Supply Voltage | | | | | | | | | | | | E Heating Output | | | | | | | | | | | | | |
| 1 24V~ (±15%) 50/60Hz - 1.5VA | | | | | | | | | | | | 1 Relay Output (5 A@250 V ~ at Resistive Load ,1 NO) | | | | | | | | | | | | | |
| 2 24V~ (±15%) 50/60Hz - 1.5VA | | | | | | | | | | | | 2 SSR Drive Output (Maximum 30mA, Maximum 15V) | | | | | | | | | | | | | |
| 3 115V~ (±15%) 50/60Hz - 1.5VA | | | | | | | | | | | | F Humidifier Output | | | | | | | | | | | | | |
| 4 230V~ (±15%) 50/60Hz - 1.5VA | | | | | | | | | | | | 01 Relay Output (3A@250 V ~, at Resistive Load , 1 NO) | | | | | | | | | | | | | |
| 5 10-30V = 1.5W | | | | | | | | | | | | H1 Heating Alarm Output | | | | | | | | | | | | | |
| B Temperature Sensor Input | | | | | | | | | | | | 01 Relay Output (3A@250 V ~, at Resistive Load , 1 NO) | | | | | | | | | | | | | |
| 1 PT-100, IEC751 (ITS90) | | | | | | | | | | | | U Humidifier Alarm Output | | | | | | | | | | | | | |
| 2 PTC (Not-1) | | | | | | | | | | | | 1 Relay Output (3A@250 V ~, at Resistive Load , 1 NO) | | | | | | | | | | | | | |
| 3 NTC (Not-1) | | | | | | | | | | | | 0 None | | | | | | | | | | | | | |
| 4 0/2...10Vdc Voltage Input | | | | | | | | | | | | 1 PTC-M6L40.K1.5 (PTC Air Probe 1.5 m silicon cable) | | | | | | | | | | | | | |
| 5 0/4...20mA Current Input | | | | | | | | | | | | 2 PTC-M6L30.K1.5 (PTC Liquid Probe with 1.5 m silicon cable) | | | | | | | | | | | | | |
| 6 ProNem Mini PMI-P | | | | | | | | | | | | 3 NTC-M5L20.K1.5 (NTC Probe thermoplastic moulded with 1.5m cable for cooling application) | | | | | | | | | | | | | |
| C Humidity Sensor Input | | | | | | | | | | | | V Temp. Sensor which is given with ESM-3723 | | | | | | | | | | | | | |
| 1 0/2...10Vdc Voltage Input | | | | | | | | | | | | 0 None | | | | | | | | | | | | | |
| 2 0/4...20mA Current Input | | | | | | | | | | | | 1 PTC-M6L40.K1.5 (PTC Air Probe 1.5 m silicon cable) | | | | | | | | | | | | | |
| 3 ProNem Mini PMI-P | | | | | | | | | | | | 2 PTC-M6L30.K1.5 (PTC Liquid Probe with 1.5 m silicon cable) | | | | | | | | | | | | | |
| D Temperature Scale (°C/°F) | | | | | | | | | | | | 3 NTC-M5L20.K1.5 (NTC Probe thermoplastic moulded with 1.5m cable for cooling application) | | | | | | | | | | | | | |
| 1 0°C/32°F, -100°C/212°F | | | | | | | | | | | | 4 NTC-M6L50.K1.5 (NTC Probe stainless steel housing with 1.5m cable for cooling application) | | | | | | | | | | | | | |
| 2 0°C/32°F, -100°C/212°F | | | | | | | | | | | | 5 Customer | | | | | | | | | | | | | |
| 3 0°C/32°F, -100°C/212°F | | | | | | | | | | | | | | | | | | | | | | | | | |

All order information of ESM-3723 Temperature+Humidity Controller are given on the table at above. 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 Note-1: If input type is selected PTC or NTC (BC=2, 3), 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.

Before commissioning the device, parameters must be set in accordance with desired use. Incomplete or incorrect configuration can cause dangerous situations.
Because of limited mechanical life of relay output contact, SSR output is recommended which the device use PID control algorithm. The device with ON/OFF control algorithm, hysteresis parameter must be set a suitable value for your system, to avoid too much relay switching.

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

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ESM-3723 77x35 DIN Size

Temperature+Humidity



ESM-3723 77 x 35 DIN Size Digital Temperature+Humidity Controller

- 4 Digits for Temperature Display
- 4 Digits for Humidity Display
- Temperature Sensor Input: NTC, PTC, PT-100, 0/2...10V, 0/4...20mA or ProNem Mini PMI-P (Must be determined in order.)
- Humidity Sensor Input: 0/2...10V, 0/4...20mA or ProNem Mini PMI-P (Must be determined in order.)
- 4 Output: Heating Control Output, Heating Alarm Output, Humidification Control Output, Humidification Alarm Output
- Relay or SSR Outputs (Must be determined in order.)
- Selectable Temperature Control (PID or ON / OFF)
- Auto-Tune PID
- Set value boundaries
- Alarm parametereters
- Adjustable internal buzzer according to the alarm situations
- Password protection for programming mode.
- Having CE mark according to European Norms

Instruction Manual. ENG ESM-3723 01 V03 04/16

3

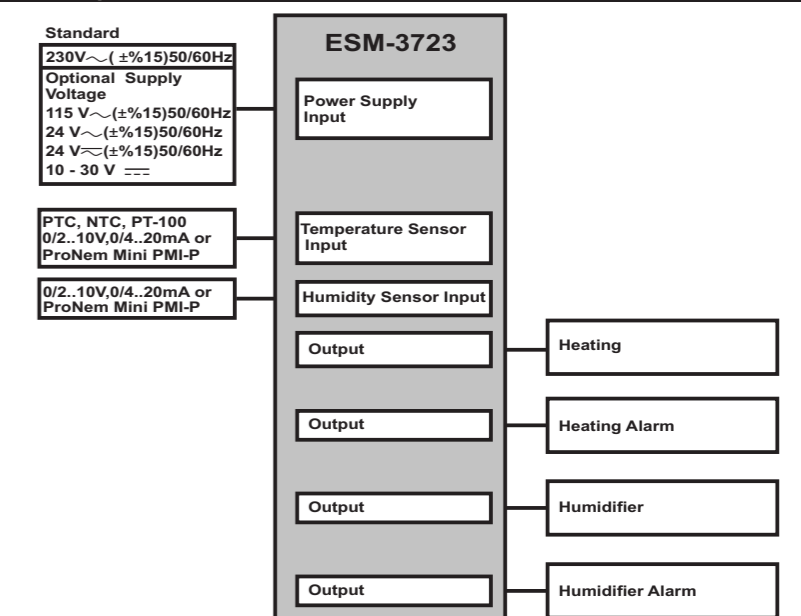
1. Preface

ESM-3723 series Temperature + Humidity control devices, are designed for the control of industrial processes. PID or On / Off control form under the control of the process is a device that can respond to your special needs.

1.1 Environmental Ratings

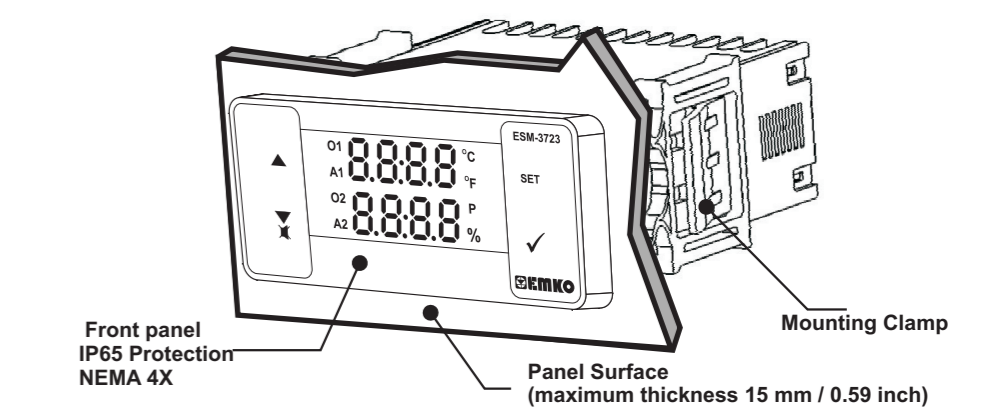
- Operating Temperature**: 0 to 50 °C
- Max. Operating Humidity**: 90% Rh (non-condensing)
- Altitude**: Up to 2000 m.
- Forbidden Conditions:** Corrosive atmosphere, Explosive atmosphere, Home applications (The unit is only for industrial applications)

1.2. General Specifications

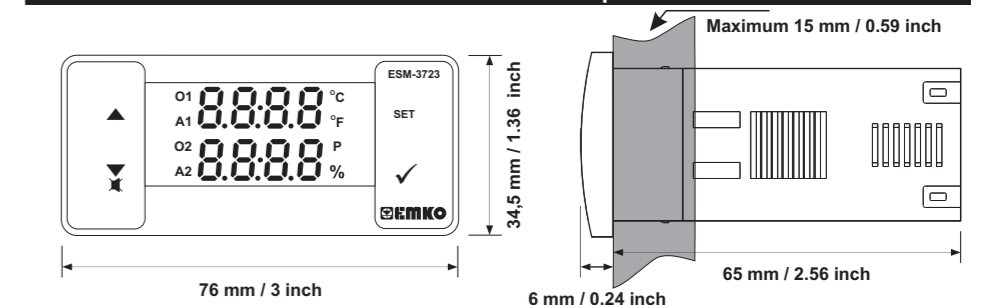


2

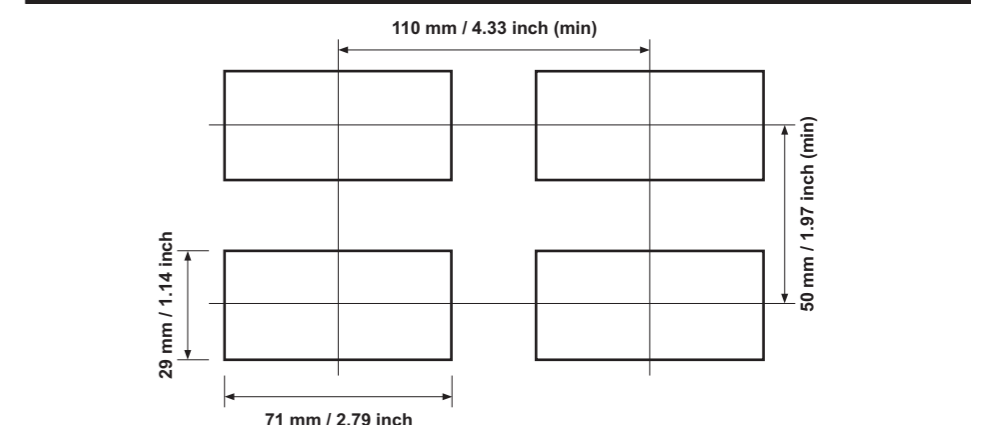
2. General Description



2.1 Front View and Dimensions of ESM-3723 Temperature Controller

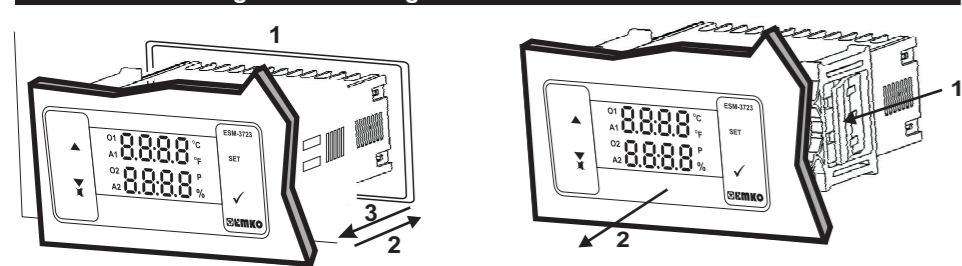


2.2 Panel Cut-Out



4

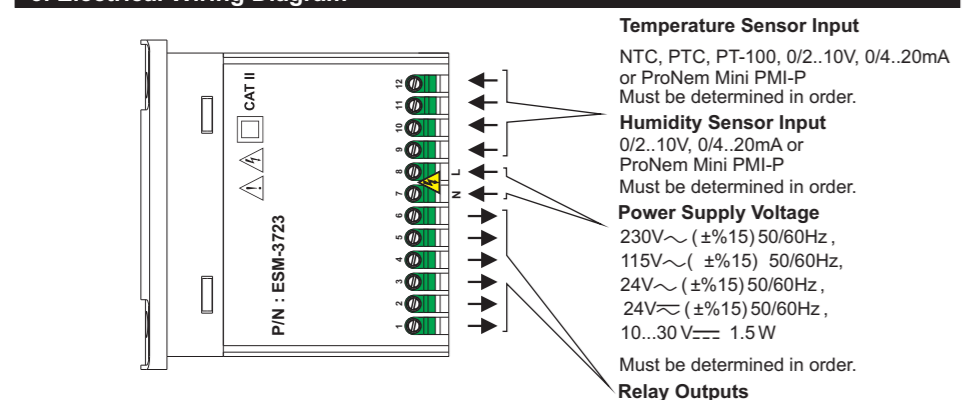
2.3 Panel Mounting and Removing



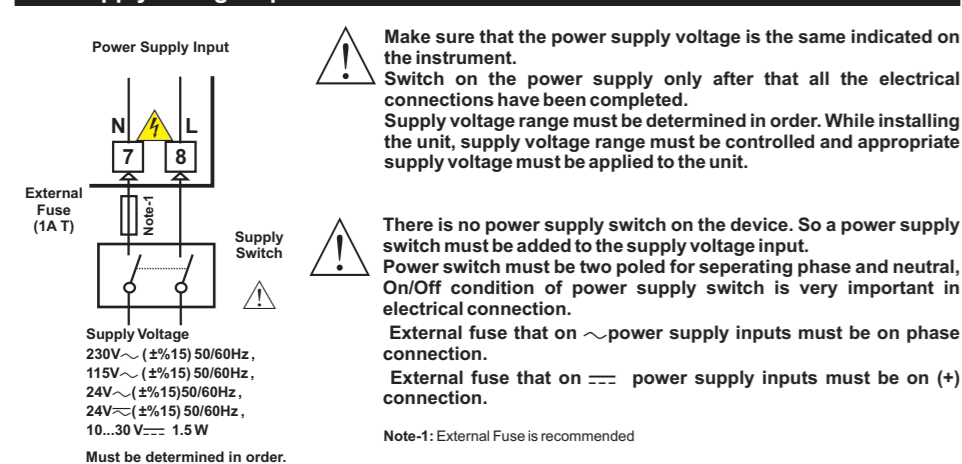
- 1-Before mounting the device in your panel, make sure that the cut-out is of the right size.
- 2-Insert the device through the cut-out. If the mounting clamps are on the unit, put out them before inserting the unit to the panel.
- 3- Insert the mounting clamps to the fixing sockets that located left and right sides of device and make the unit completely immobile within the panel.

- 1-Pull mounting clamps from left and right fixing sockets.
 - 2-Pull the unit through the front side of the panel
- Before starting to remove the unit from panel, power off the unit and the related system.**

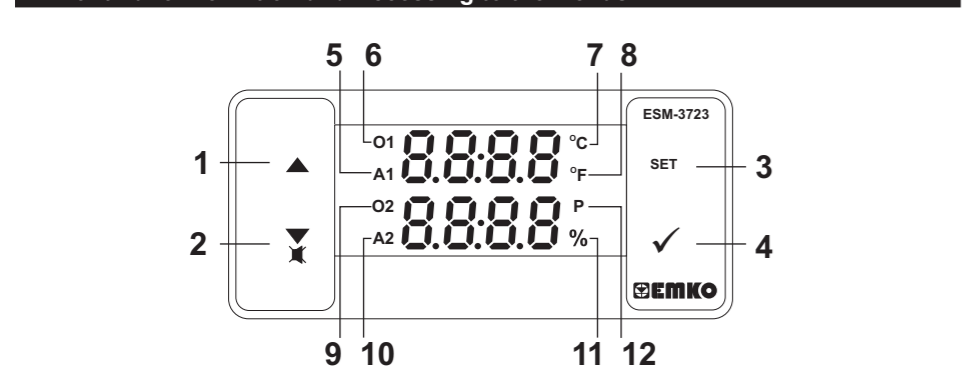
3. Electrical Wiring Diagram



3.1 Supply Voltage Input Connection of the Device



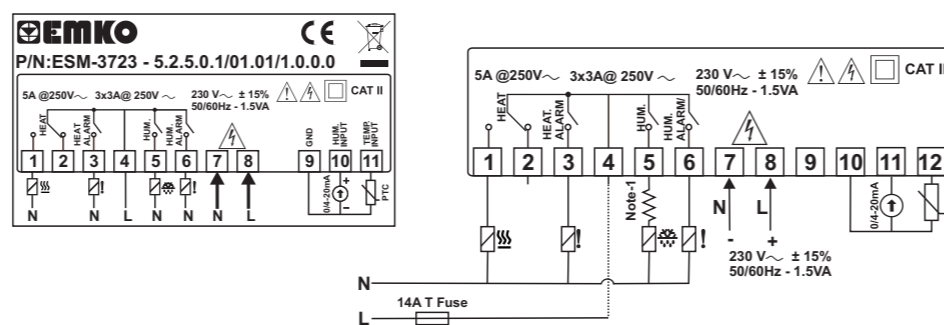
4.Front Panel Definition and Accessing to the Menus



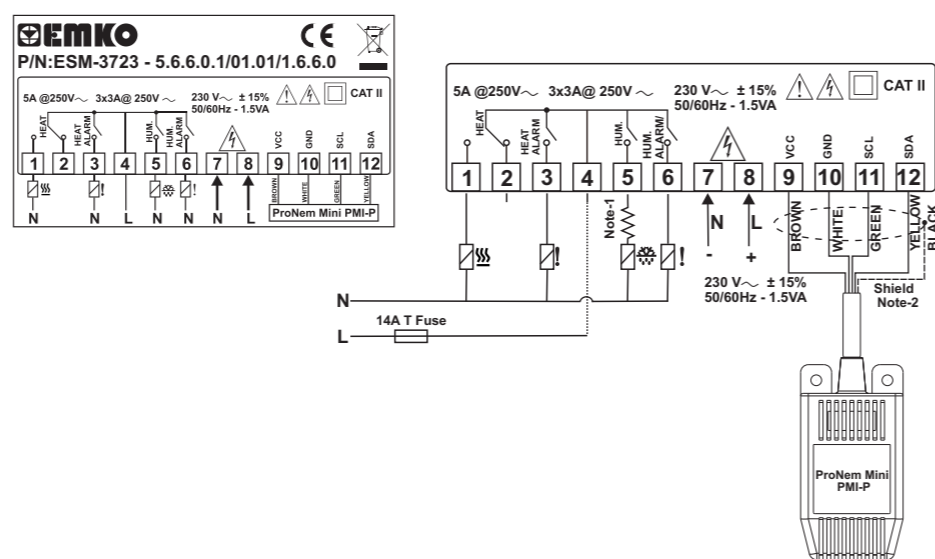
3.2 Device Label and Connection Diagram

230V~ CONNECTION DIAGRAM

PTC Temperature and 0/4...20mA Humidity Sensor Input connection



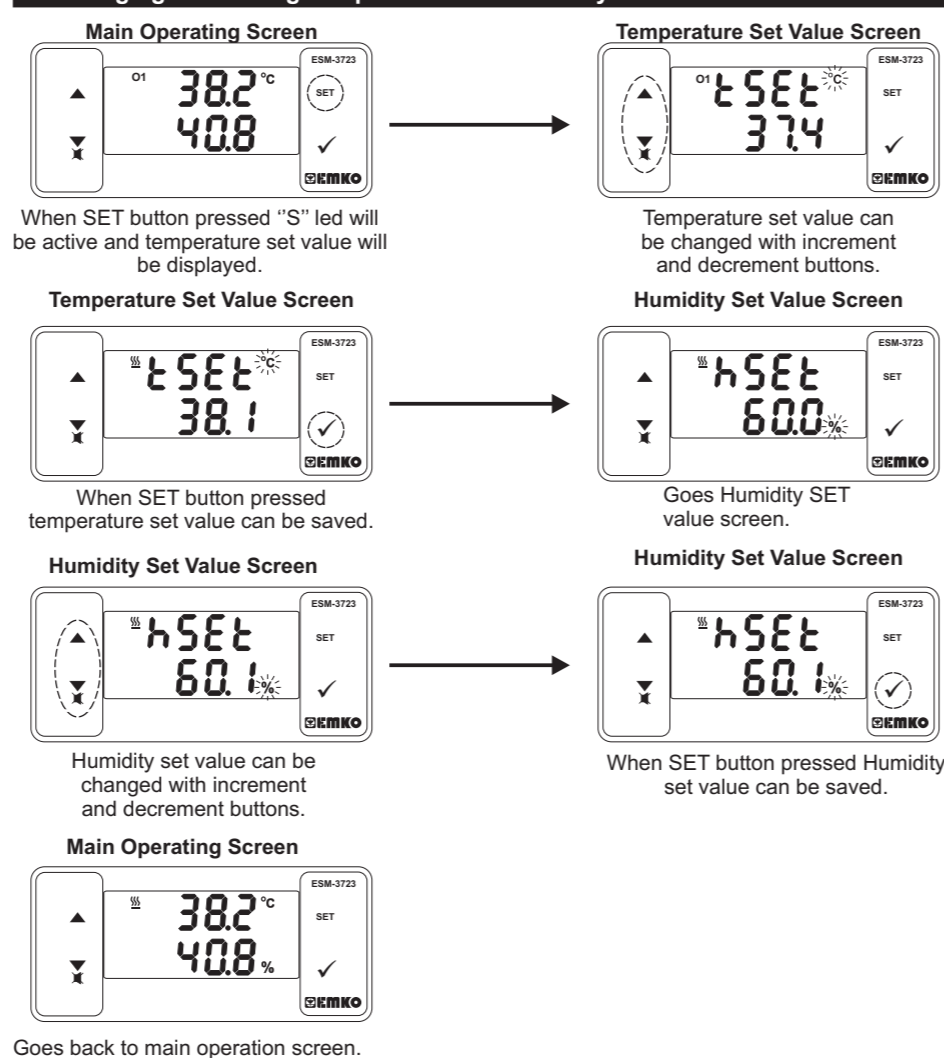
ProNem Mini PMI-P Temperature and Humidity Sensor Input Connection



Note-1 : User must be connected the resistor which is inside the box serially as shown in connection diagram when use the ultrasonic humidifier(30W...50W power supply) to protect the relay output contact problem.

Note-2 : Shield (Black) pin must be connected to number 10 (GND) of the terminal block.

5. Changing and Saving Temperature and Humidity Set Value



Temperature set value parameter (Default =50 °C)
Temperature set value, can be programmed between minimum temperature set value $\overline{k5UL}$ and maximum temperature set value $\overline{k5UH}$.

Nem Set Parametresi (Default = 60%)
Humidity set value, can be programmed between minimum Humidity set value $\overline{k5UL}$ and maximum temperature set value $\overline{k5UH}$.

If no operation is performed in Humidity set value changing mode and temperature set value changing mode for 20 seconds, device turns to main operation screen automatically.

5.1 Programming Mode Parameter List

- C-F** **Temperature Unit Selection Parameter (Default = 0)**
0 °C selected.
1 °F selected.
 - Pnt** **Decimal Separator Enabling Parameter (Default =0)**
0 None.
1 Only Temperature parameters with decimal separator.
2 Only Humidity parameters with decimal separator.
3 Only Temperature and Humidity parameters with decimal separator.
- Note :** When value of $\overline{C-F}$ or \overline{Pnt} parameters are changed, the values of $\overline{k5FE}$, $\overline{k5SE}$, $\overline{k5UL}$, $\overline{k5UH}$, $\overline{k5E}$, $\overline{k5S}$, $\overline{k5L}$, $\overline{k5H}$, $\overline{k5F}$, $\overline{k5R}$, $\overline{k5A}$, $\overline{k5B}$, $\overline{k5C}$, $\overline{k5D}$, $\overline{k5E}$, $\overline{k5F}$, $\overline{k5G}$, $\overline{k5H}$, $\overline{k5I}$, $\overline{k5J}$, $\overline{k5K}$, $\overline{k5L}$, $\overline{k5M}$, $\overline{k5N}$, $\overline{k5O}$, $\overline{k5P}$, $\overline{k5Q}$, $\overline{k5R}$, $\overline{k5S}$, $\overline{k5T}$, $\overline{k5U}$, $\overline{k5V}$, $\overline{k5W}$, $\overline{k5X}$, $\overline{k5Y}$, $\overline{k5Z}$ parameters should be changed accordingly.
- Note :** $\overline{k5SL}$, $\overline{k5PL}$ and $\overline{k5Lol}$ parameters are shown, if the Temperature sensor analogue input type (0/2...10V or 0/4...20mA) is selected.
- k5SL** **Temperature Sensor Scale Selection Parameter (Default = 0)**
Analogue (Temperature) input range is determined with this parameter.
0 0...10V $\overline{(1)}$ or 0...20mA $\overline{(2)}$
1 2...10V $\overline{(1)}$ or 4...20mA $\overline{(2)}$
 - k5Lol** **Temperature Sensor Scale Low Limit Parameter : (Default = 0)**
It can be adjusted from -1999 to ($\overline{k5PL} + 1$). At this value analogue input becomes; If $\overline{k5SL} = 0$, according to the device type 0V $\overline{(1)}$ or 0mA $\overline{(2)}$. If $\overline{k5SL} = 1$, according to the device type 2V $\overline{(1)}$ or 4mA $\overline{(2)}$.
 - k5PL** **Temperature Sensor Scale High Limit Parameter : (Default = 100)**
It can be adjusted from ($\overline{k5Lol} + 1$) to 9999. At this value analogue input becomes; According to the device type 10V $\overline{(1)}$ or 20mA $\overline{(2)}$.
- Note :** $\overline{k5Lol}$, $\overline{k5PL}$ parameters are shown, if the Temperature sensor analogue input type is selected.
- P-o** **Temperature Control Selection Parameter On/Off or PID (Default = 0)**
0 On - Off selected.
1 PID selected.
- Note:** If this parameter is select 0, PID parameters ($\overline{k5UA}$, $\overline{k5B}$, $\overline{k5C}$, $\overline{k5D}$, $\overline{k5E}$) will be not observed. If this parameter select 1, $\overline{k5HSt}$ parameter will be not observed.
- k5tun** **Auto Tune (Limit Cycle Tuning) Selection Parameter (Default = 0)**
0 Device does not do(Limit cycle Tuning) operation.
1 Device does operation.
 - P** **PID -Proportional Control Parameter (Default =50)**
This parameter value can be adjusted form 0 to 100.
 - I** **PID -Integral Parameter(Default = 1000)**
This parameter value can be adjusted form 0 to 3600.
 - D** **PID -Derivative Parameter (Default = 250)**
This parameter value can be adjusted form 0 to 3600.
 - t** **PID -Period Time Parameter (Default = 1)**
This parameter value can be adjusted form 1 to 50 second.
1 It is valid, if the device type 0/2...10V = Temperature Sensor Input.
2 It is valid, if the device type 0/4...20mA = Temperature Sensor Input.

- k5St** **Hysteresis Parameter for Temperature (Default = 0.1 °C)**
From 1 to 10°C for NTC,PTC,PT-100 (0°C, 100°C)
From 1 to 18°F for NTC,PTC,PT-100 (32°F, 212°F)
From 0.1 to 10.0°C for NTC, PTC, PT-100 (0.0°C, 100.0°C)
From 0.1 to 18.0°F for NTC, PTC, PT-100 (32.0°F, 212.0°F)
From 1 to 10°C for ProNem Mini PMI-P (-20°C, 80°C), From 1 to 18°F for ProNem Mini PMI-P (-4°F, 176°F), From 0.1 to 10.0°C for ProNem Mini PMI-P (-20.0°C, 80.0°C)
From 0.1 to 18.0°F for ProNem Mini PMI-P (-4.0°F, 176.0°F).
- 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.
-
- k5UL** **Minimum Temperature Set Value Parameter (Default = 10.0°C)**
Temperature set value can not be lower than this value. This parameter value can be adjusted from minimum value of device scale to maximum temperature set value parameter $\overline{k5UH}$.
 - k5UH** **Maximum Temperature Set Value Parameter (Default = 40.0 °C)**
Temperature set value can not be greater than this value. This parameter value can be adjusted from minimum temperature set value parameter $\overline{k5UL}$ to maximum value of the device scale.
 - k5oFt** **Temperature Sensor Offset Parameter (Default = 0)**
From -10 to 10°C, NTC,PTC,PT-100 (0°C, 100°C)
From -18 to 18°F, NTC,PTC,PT-100 (32°F, 212°F)
From -10.0 to 10.0°C, NTC, PTC, PT-100 (0.0°C, 100.0°C)
From -18.0 to 18.0°F, NTC, PTC, PT-100 (32.0°F, 212.0°F)
From -10 to 10°C, ProNem Mini PMI-P (-20°C, 80°C), From -18 to 18°F, ProNem Mini PMI-P (-4°F, 176°F), From -10.0 to 10.0°C, ProNem Mini PMI-P (-20.0°C, 80.0°C), From -18.0 to 18.0°F, ProNem Mini PMI-P (-4.0°F, 176.0°F).
 - k5SL** **Humidity Sensor Scale Selection Parameter (Default = 0)**
Humidity input range is determined with this parameter.
0 0...10V $\overline{(1)}$ or 0...20mA $\overline{(2)}$
1 2...10V $\overline{(1)}$ or 4...20mA $\overline{(2)}$
- Note :** $\overline{k5SL}$ parameter ProNem Mini PMI-P type device are not observed.
- k5hSt** **Hysteresis Parameter for Humidity (Default = 1)**
From 1 to 10 for Humidity Sensor (0%RH, 100%RH)
From 0.1to 10.0 for Humidity Sensor (0.0%RH, 100.0%RH)
- In ON/OFF control algorithm, Humidity 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.
-
- 1 It is valid, if the device type 0/2...10V = Humidity Sensor Input.
 - 2 It is valid, if the device type 0/4...20mA = Humidity Sensor Input.