7. Specifications

Device Type Housing & Mounting

76mm x 34.5mm x 71mm plastic housing for panel Mounting. Panel cut-out is 71x29mm.

: 1 Joule (IK06) : NEMA 4X (Ip65 at front, Ip20 at rear). Protection Class

Approximately 0.20 Kg.
Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
-30 °C to +80 °C /-20 °C to +70 °C . nmental Ratings

Storage / Operating Temperature Storage / Operating Humidity Installation 90 % max. (None condensing

Fixed installation

Supply Voltage and Power

Temperature Sensor Input

NTC input type PTC input type

Thermocouple input type

Accuracy

Sampling Cycle Control Form

Display LED

9.Optional Accessories



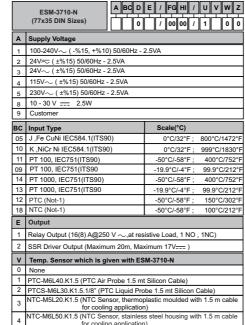
RS-485 Communication Interface

— ⇒Vdc can be applied

⇒Vdc or Vac

Download) by using the parameters.

8.Ordering Information



All order information of ESM-3710-N Temperature 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.

Note-1: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.

Because of limited mechanical life of relay output contact, SSRoutput is recommended which the device use PID control algoritm. The device with ON/OFF control algoritm, hysteresis parameter must be set a suitable value

for your system, to avoid too much relay switching.

Before commissioning the device, parameters must be set in accordance with desired use. Incomplete or incorrect configuration can cause dangerous stiuations.

Controller Temperature

PEMKO

Size N O 77x35

ESM-3710-N

€器照

ESM-3710-N 77 x 35 DIN Size Digital, ON/OFF Temperature Controller

- 4 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 (Must be determined in order.)
- Adjustable temperature offset
 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
- Operation selection of compressor operates continuously, stops or operates periodically in case of sensor defect - Compressor protection delays
- Adjustable internal buzzer according to sensor defect status.
- Password protection for programming section
 Installing parameters using Prokey
- Remote access, data collecting and controlling with Modbus RTU
- Having CE mark according to European Norms

Instruction Manual. ENG ESM-3710-N 01 V11 02/23

unit can be prevented.

A visual inspection of this product for possible damage occurred during 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

The unit is normally supplied without a power supply switch or a fuse. Use power switch and fuse

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent Keep the power off until all of the wiring is completed so that electric shock and trouble with the

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 putting equipment 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

It is your responsibility if this equipment is used in a manner not specified in this instruction

1.4 Warranty

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

1.5 Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.

Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of

these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

1.6 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 : +90 224 261 1900 Fax : +90 224 261 1912

Repair and maintenance service informa

Repair and maintenance service information.

Emiko 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 : +90 224 261 1900 Fax : +90 224 261 1912

1 Preface

ESM-3710N 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

Application Fields Applications Baking Ovens Food

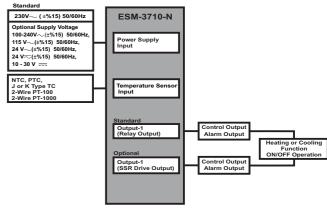
Machine Production Industries Etc.. Etc...

Operating Temperature : -30 to 80 °C

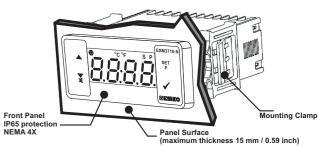
Forbidden Condition Corrosive atmosphere

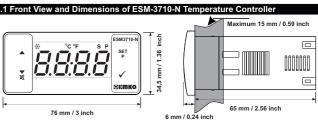
Home applications (The unit is only for industrial applications)

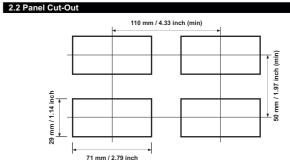
1.2 General Specifications



2. General Description







, office or workplace, none conductive pollution

(Electrical life: 100.000 switching at full load) or

Installation
Overvoltage Category
Pollution Degree
Operating Conditions : 100-240V~ (-%15, +%10) 50/60Hz - 2.5VA

: 230V~ (±%15) 50/60Hz - 2.5VA

: 115V~ (±%15) 50/60Hz - 2.5VA : 24V~ (±%15) 50/60Hz - 2.5VA : 24V (±%15) 50/60Hz - 2.5VA

:10 - 30V=== 2.5W : NTC, PTC, TC, RTD NTC (10 kΩ @25 °C)

: PTC (1000 Ω @25 °C) : J, K (IEC584.1) (ITS 90) : PT-100. PT-1000 (IEC751) (ITS 90) Thermoresistance input type : ± 1 % of full scale for therr

->83dB

: **C €**, ĽK, [H[

Cold Junction Compensation : Automatically ± 0.1°C / ± 1°C Sensor Break Protection : Upscale 3 samples per second

: ON / OFF : 16(8) A@250 V ~ for Resistive load Relay Output

30(15)A@240 V ∼ for Resistive load (Electrical life: 100.000 switching at full load) Optional SSR Drive Output : Maximum 20mA. Maximum 17V— : 14 mm Red 4 digits LED Display
: S (Green), P (Green), °C (Yellow), °F(Yellow),
Compressor Output (Red), Heating Output (Red)

Internal Buzze

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

for cooling application)

Please contact us, if your needs are out of the standards.

Incubators Storages

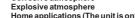
Automative Air Conditioning

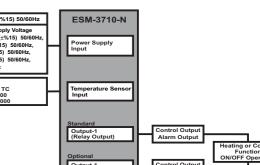
1.1 Environmental Ratings

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

Petro-Chemistry

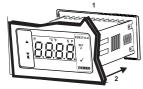
Altitude : Up to 2000 m.





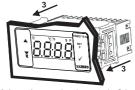
2.1 Front View and Dimensions of ESM-3710-N Temperature Controller

2.3 Panel Mounting



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

2-Insert the device through the cut-out. If the



- 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

mounting clamps are on the unit, put out them before inserting the unit to the panel.

2.4 Removing from the Panel



1-Pull mounting clamps from left and right fixing

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

Before starting to remove the unit from nanel power off the unit and the related

3. Using Prokey

TO USE PROKEY, VALUE OF THE PrC PARAMETER MUST BE '0' IF PrC=1 AND ▼BUTTON IS PRESSED ☐☐ MESSAGE WILL BE SHOWN. 10s. LATER DEVICE TURNS BACK TO THE MAIN OPERATION SCREEN OR YOU CAN PRESS SET BUTTON TO TURN BACK TO MAIN OPERATION SCREEN.

DOWNLOADING FROM DEVICE TO PROKEY

- 1.The device is programmed by using the parameters.

 2.Energize the device then put in PROKEY and press ▼ button. □PL Message is shown on the display. When the loading has finished, ☐nd message is shown.

 3.Press any button to turn back to main operation screen.
- 4 Remove the PROKEY

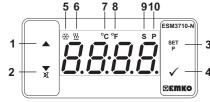
NOTE: Err message is shown when an error occurs while programming. If you want to reload, put in PROKEY and press ▼ button. If you want to quit, remove PROKEY and press ▼ button. The

DOWNLOADING FROM PROKEY TO DEVICE

- 1.Switch off the device.
 2.Put in PROKEY then energize the device.
- 3. When the device is energized, the parameter values in PROKEY, start downloading to the device automatically. At first, and message is shown on the display, when loading has finished, First shown. message is shown.
- 4.After 10 seconds device starts to operate with new parameter values.

NOTE: Err message is shown when an error occurs while programming. If you want to reload, switch off the device and put in PROKEY then energize the device. If you want to quit remove PROKEY and press ▼ button. The device will turn back to main operation screen.

5.Front Panel Definition and Accessing to the Menus



BUTTON DEFINITIONS

- * It is used to increase the value in the Set screen and Programming mode.
- 2. Decrement, Silencing Buzzer and Downloading to Prokey Button:
 *** It is used to decrease the value in the Set screen and Programming mode.
- ** It is used to silence the buzzer
- ** If Prc =0, it is used to download from device to prokey.
- 3. Set Button:
- ** In the main operation screen; if this button pressed, set value will be displayed. Value can be changed using increment and decrement buttons. When Enter button pressed, value is saved and returns back to main operating screen.
- To access the programming screen; in the main operation screen, press this button for 5 seconds.
- 4. Enter Button:
 ** It is used to saving value in the Set screen and programming screen.

LED DEFINITIONS

- ** This led indicates that cooling control is selected and process output relay is active. If any of compressor protection time active, this led blinks.
- 6.Heating led :
- * This led indicates that heating control is selected and process output relay is active. 7.Celcius led :
- 8. Fahrenheit led:
- * Indicates that device is in °C mode
- ** Indicates that device is in °F mode.
- Indicates that device is in Set value changing mode.
- 10.Program led:
- *Blinks in programming mode

4. Electrical Wiring Diagram Temperature Sensor Input TC.NTC.PTC.PT-100 or PT-1000 Supply Voltage Input 100-240V∼ (±%15,±%10) 50/60Hz 230V~ (±%15) 50/60Hz 115V~ (±%15) 50/60Hz 24V ... (+%15) 50/60Hz 24V~ (±%15) 50/60Hz 10...30 V--- Must be dete Relay or SSR Output For SSR Output

and appropriate supply voltage must be applied to the unit.

neutral, On/Off condition of power supply switch is very

External fuse that on ~power supply inputs must be on

External fuse that on ___power supply inputs must be on (+)

4.1 Supply Voltage Input Connection of the Device Make sure that the power supply votage is and 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. Make sure that the power supply voltage is the same

Power Supply Connection (·) 4 5 There is no power supply switch on the device. So a power supply switch must be added to the supply voltage input. Power switch must be two poled for seperating phase and

100-240V~ (±%15,±%10) 50/60F 230V~ (±%15) 50/60Hz , 115V~ (±%15) 50/60Hz , 24V~ (±%15) 50/60Hz , 24V~ (±%15) 50/60Hz , 10..30 V---

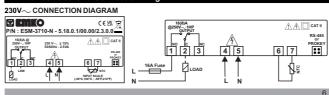
Note-1 : External fuse is recommended

 $\label{Note-2:Stranded} \textbf{Note-2:} Stranded cable cross-section: 1,5mm^2, Solid cable cross-section: 2,5mm^2 \\ The stripping length is 7 to 9 mm.$

Note-3: Supply cables must comply with the requirements of IEC 60277 or IEC 60245.

4.2 Device Label and Connection Diagram

6. Changing and Saving Temperature Set Value



SET Value Screen 25 When SET button pressed "S" led will be active and temperature set value will Temperature set value can be changed with increment be displayed. and decrement buttons. Main Operation Screen

When ENTER button pressed temperature set value can be saved

"S" will be inactive and goes back to

Temperature set value parameter (Default=50) MODBUS ADDRESS:40001

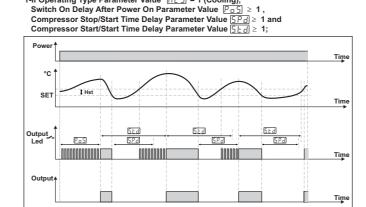
Temperature set value, can be programmed between minimum temperature set value Sulland maximum temperature set value Sulland

6.1 Programming Mode Parameter List erature Unit Selection Parameter (Default = 0) MODBUS ADDRESS:40002 °C selected Decimal Seperator Enabling Parameter (Default = 0) MODBUS ADDRESS:40003 Enable. sor input type is selected J, K, PT-100 or PT-1000 (BC =05,10,11 or 14) Hysteresis Parameter for Compressor Output (Default =1) MODBUS ADDRESS:40004 MODBUS ADDRESS:40004 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 KType TC (0°C, 1000°C or PT-100 Type (-50°C,400°C) or PT-1000 Type (-50°C,400°C) or PT-100 Type (-20°C,100°C), or P1-100 type(-2-0 C,100 C), from 1 to 36°F for NTC (-58°F, 212°F) or PTC (-58°F, 302°F) or J Type TC (32°F,1472°F) or K Type TC (32°F,1830°F) or PT-100 Type (-58°F,752°F) or PT-1000 Type (-58°F,752°F) or PT-100 Type (-4°F,212°F) from 0.1 to 10.0°C for NTC(-50.0°C,100.0°C) or PTC (-50.0°C,150.0°C) or PT-100 (-19.9°C.99.9°C). om 0.1 to 18.0°F for NTC (-58.0°F,212.0°F) or PTC (-58.0°F,302.0°F) or from 0.1 to 18.0°F for NTC (-58.0°F,212.0°F) or PT-100 (-4.0°F,212.0°F). In ON/OFF control algorithm, temperature Tempe 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, athreshold zone is formed below or around set value and this zone is named hysteresis. Minimum Temperature Set Value Parameter (Def Scale) MODBUS ADDRESS:40005 Temperature set value can not be lower than this value. eter (Default = Minimum Value of Device This parameter value can be adjusted from minimum value of device scale to maximum temperature set value parameter [5_1] Maximum Temperature Set Value Parameter (Default = Maximum Value of Device Scale) MODBUS ADDRESS:40006 Sensor Offset Parameter (Default = 0) MODBUS ADDRESS:40007 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 J Type TC (0°C,1000°C) or PT-100(-50°C, 400°C) or PT-1000 (-50°C, 150°C) or PT-100 (-20°C, 100°C). PI-100 (-20°C, 100°C), from -36 to 36 °F for NTC(-58°F, 212°F) or PTC(-58°F, 302°F) or JType TC (32°F,1472°F) or or KType TC (32°F,1830°F) or PT-100(-58°F,752°F) or PT-1000(-58°F,752°F) or PT-100(-4°F, 212°F), from-10.0 to 10.0°C for NTC(-50.0°C,100.0°C) or PTC(-50.0°C,150.0°C) or Thr-100 (-19.9°C,99.9°C), From -18.0b (18.0°F for NTC(-58.0°F,212.0°F) or PTC(-58.0°F,302.0°F) or PT-100 (-4.0°F,212.0°F), Operating Type Parameter (Default=0) MODBUS ADDRESS:40008 If parameter value is 10' device skins to the Chapter of the Chapter eter value is '0' device skips to 🔓 🕡 🗐 paramete Heating

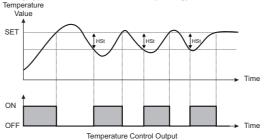
Cooling

6.3 Operation Graphics of ESM-3710-N Temperature Controller

1-If Operating Type Parameter Value H[5] = 1 (Cooling)



2-If Operating Type Parameter Value H[5] = 0 (Heating),



In ON/OFF control algorithm, temperature value is tried to keep equa 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 above.

6.4 Failure Messages in ESM-3710-N Temperature Controller

56 - Screen Blinking

Sensor failure . Sensor connection is wrong or there is no sensor connection. If buzzer function selection parameter buF is 1, internal buzzer starts to operate.

Compressor is ON in case of sensor defect. Compressor is active during this time period in case of probe defect (Default = 0) MODBUS ADRES:40013 If probe defect parameter Par is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes. Compressor is inactive during this time period in case of probe defect (Default = 0)MODBUS ADRES:40014 f probe defect parameter P.JF is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes. $\underline{\textbf{Buzzer}} \, \textbf{Function Selection Parameter (Default = 0) MODBUS ADDRESS:} 40015$ ☐ Buzzer is inactive. Buzzer is active during sensor failures. Buzzer is active during this time (Default = ---) MODBUS ADDRESS:40016
If buzzer function selection parameter value \[\begin{align*} \begin $Communication\,Mode\,Selection\,Parameter\,(\,Default\,=\,0\,)\,MODBUS\,ADDRESS:40017$ PROKEY communication selected. Rs485 communication selected. Slave ID Parameter (Default = 1) MODBUS ADDRESS=40018
Device communication address parameter (1 to 247). Programming Section Accessing Password (Default = 0) MODBUS ADDRESS:40019 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. Pos 5Pd 5Ed Por Por and Pos Parameters are observed if Operation type is selected "Cooling". If operation type is selected "Heating", skip to the buf parameter. 6.2 Modbus Adresses of Device Status Parameters (Read Input Register) MODBUS ADDRESS:30001 Temperature Value Led Status : 0.bit °C Led, 6.bit Compressor Led, 13.bit Program Led, 14.bit Set Led Device Status: 1.bit Buzzer Status MODBUS ADDRESS:30002 MODBUS ADDRESS:30003 MODBUS ADDRESS:30004 MODBUS ADDRESS:30005 Output Status Device Type and Device Version 6.5 Entering To The Programming Mode, Changing and Saving Parameter Main Operation Screen

Compressor Start Delay at Power On Parameter (Default = 0) MODBUS ADDRESS:40009

Sensor Defect Parameter (Default = 0) MODBUS ADRES:40012

Compressor is OFF in case of sensor defect.

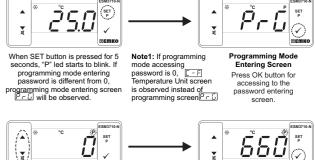
adjusted from 0 to 20 minutes.

When power is first applied to the device, compressor is on when this time delay is expired. when power is instapplied to the device, compressor is only mentinis linie delay is expired. It can be adjusted from 0 to 20 minutes.

Compressor Stop-Start Delay Parameter (Default = 0) MODBUS ADRES:40010 When compressor is inactive, this time delay must be expired for activation of the compressor. It can be adjusted from 0 to 20 minutes.

This time delay must be expired between two activation of the compressor. It can be

Compressor Start-Start Delay Parameter (Default = 0) MODBUS ADRES:40011

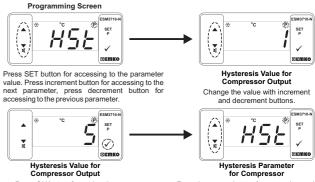




Enter programming mode accessing password with increment and decrement buttons.

Press OK button for entering the password.

Note2: If programming mode accessing password is 0, only three parameters are accessible, and the parameter values can be changed



Press OK button for saving the

Press increment button for accessing to the



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