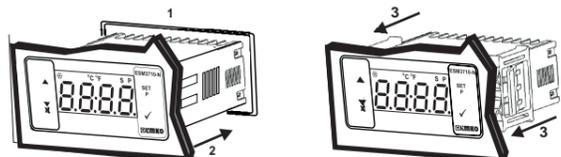
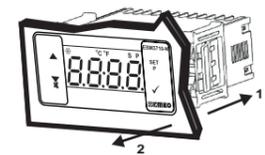


2.3 Panel Mounting



1-Before mounting the device in your panel, make sure that the cut-outs of the right size.
2-Insert the device through the cut-out. If the mounting clamps are on the unit, put 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

2.4 Removing from 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. Using Prokey

TO USE PROKEY, VALUE OF THE PrC PARAMETER MUST BE '0'. IF PrC=1 AND P BUTTON IS PRESSED [PrC] 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

- The device is programmed by using the parameters.
- Energize the device then put in PROKEY and press [P] button. [PrC] Message is shown on the display. When the loading has finished, [PrC] message is shown.
- Press any button to turn back to main operation screen.
- Remove the PROKEY.

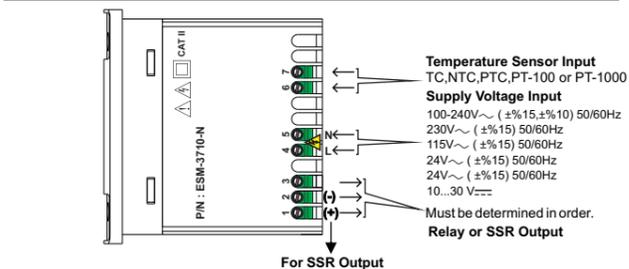
NOTE: [PrC] message is shown when an error occurs while programming. If you want to reload, put in PROKEY and press [P] button. If you want to quit, remove PROKEY and press [P] button. The device will turn back to main operation screen.

DOWNLOADING FROM PROKEY TO DEVICE

- Switch off the device.
- Put in PROKEY then energize the device.
- When the device is energized, the parameter values in PROKEY, start downloading to the device automatically. At first, [PrC] message is shown on the display, when loading has finished, [PrC] message is shown.
- After 10 seconds device starts to operate with new parameter values.
- Remove the PROKEY.

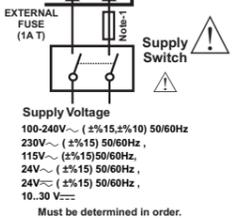
NOTE: [PrC] message is shown when an error occurs while programming. If you want to reload, switch off the device and put in PROKEY then energize the device. If you want to quit remove PROKEY and press [P] button. The device will turn back to main operation screen.

4. Electrical Wiring Diagram



4.1 Supply Voltage Input Connection of the Device

Power Supply Connection
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.

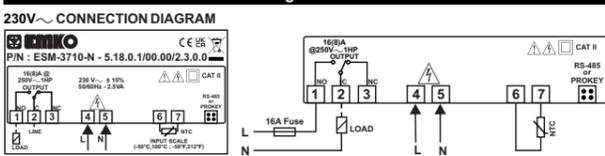


Note-1: External fuse is recommended.

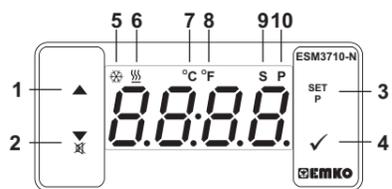
Note-2: Stranded cable cross-section: 1.5mm². Solid cable cross-section: 2.5mm². The stripping length is 7 to 9 mm.

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

4.2 Device Label and Connection Diagram



5. Front Panel Definition and Accessing to the Menus



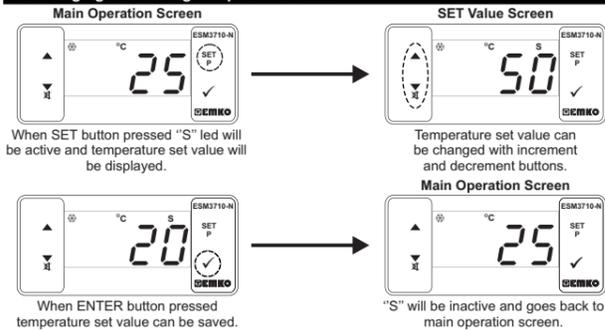
BUTTON DEFINITIONS

- Increment Button:** It is used to increase the value in the Set screen and Programming mode.
- 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.
- 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.
- Enter Button:** It is used to saving value in the Set screen and programming screen.

LED DEFINITIONS

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

6. Changing and Saving Temperature Set Value



Temperature set value parameter (Default=50) MODBUS ADDRESS:40001
Temperature set value, can be programmed between minimum temperature set value [SuL] and maximum temperature set value [SuH].

6.1 Programming Mode Parameter List

- [C-F]** Temperature Unit Selection Parameter (Default = 0) MODBUS ADDRESS:40002
0 °C selected.
1 °F selected.
- [Pnt]** Decimal Separator Enabling Parameter (Default = 0) MODBUS ADDRESS:40003
0 Disable.
1 Enable.

Note: If sensor input type is selected J, K, PT-100 or PT-1000 (BC=05,10,11 or 14) [Pnt] parameter is skipped.

[HSt] Hysteresis Parameter for Compressor Output (Default = 1) 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 K Type 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),
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),
from 0.1 to 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),
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.

[SuL] Minimum Temperature Set Value Parameter (Default = Minimum Value of Device Scale) MODBUS ADDRESS:40005
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 [SuH].

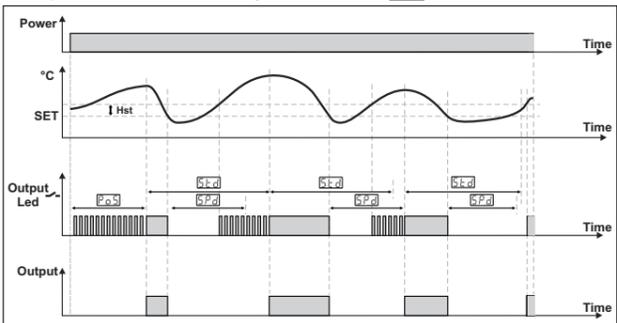
[SuH] Maximum Temperature Set Value Parameter (Default = Maximum Value of Device Scale) MODBUS ADDRESS:40006
Temperature set value can not be bigger than this value. This parameter value can be adjusted from minimum temperature set value parameter [SuL] to maximum value of the device scale.

[oFt] 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 K 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),
from -36 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 (-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 PT-100 (-19.9°C, 99.9°C),
from -18.0 to 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).

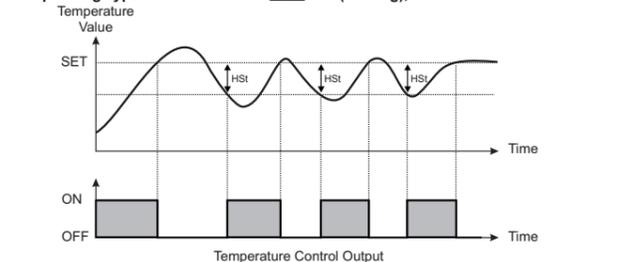
[HCS] Operating Type Parameter (Default = 0) MODBUS ADDRESS:40008
If parameter value is '0' device skips to [SuF] parameter
0 Heating
1 Cooling

6.3 Operation Graphics of ESM-3710-N Temperature Controller

1-If Operating Type Parameter Value [HCS] = 1 (Cooling), Switch On Delay After Power On Parameter Value [Pos] ≥ 1, Compressor Stop/Start Time Delay Parameter Value [SPd] ≥ 1 and Compressor Start/Start Time Delay Parameter Value [Std] ≥ 1;



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



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 above.

6.4 Failure Messages in ESM-3710-N Temperature Controller

[buF] 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.

[Pos] Compressor Start Delay after Power On Parameter (Default = 0) MODBUS ADDRESS:40009
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.
[SPd] Compressor Stop-Start Delay Parameter (Default = 0) MODBUS ADDRESS: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.
[Std] Compressor Start-Start Delay Parameter (Default = 0) MODBUS ADDRESS:40011
This time delay must be expired between two activation of the compressor. It can be adjusted from 0 to 20 minutes.

[Pnt] Sensor Defect Parameter (Default = 0) MODBUS ADDRESS:40012
0 Compressor is OFF in case of sensor defect.
1 Compressor is ON in case of sensor defect.
2 Compressor operates periodically according to [Pon] and [Pof] Time periods in case of sensor defect.

[Pon] Compressor is active during this time period in case of probe defect (Default = 0) MODBUS ADDRESS:40013
If probe defect parameter [Pnt] is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes.
[Pof] Compressor is inactive during this time period in case of probe defect (Default = 0) MODBUS ADDRESS:40014
If probe defect parameter [Pnt] is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes.

[buF] Buzzer Function Selection Parameter (Default = 0) MODBUS ADDRESS:40015
0 Buzzer is inactive.
1 Buzzer is active during sensor failures.

[bon] Buzzer is active during this time (Default = -) MODBUS ADDRESS:40016
If buzzer function selection parameter value [buF]=0, this parameter can not be observed. Buzzer stays active during this time. It can be adjusted from 1 to 99 minutes. When this parameter is 1, if decrement button is pressed, [-] is observed. In this condition buzzer is active till buzzer silence button is pressed.

[PrC] Communication Mode Selection Parameter (Default = 0) MODBUS ADDRESS:40017
0 PROKEY communication selected.
1 Rs485 communication selected.

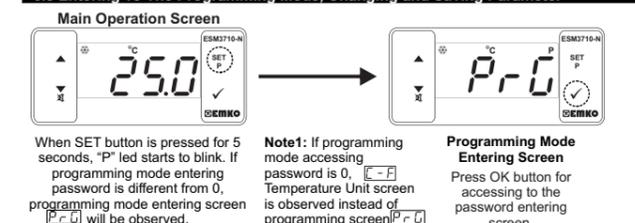
[SAd] Slave ID Parameter (Default = 1) MODBUS ADDRESS:40018
Device communication address parameter (1 to 247).

[PAS] 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.
[i] [Pos], [SPd], [Std], [Pnt], [Pon] and [Pof] Parameters are observed if Operation type is selected "Cooling". If operation type is selected "Heating", skip to the [buF] parameter.

6.2 Modbus Addresses of Device Status Parameters (Read Input Register)

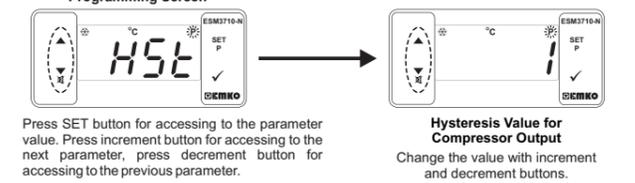
MODBUS ADDRESS:30001	Temperature Value
MODBUS ADDRESS:30002	Led Status : 0, bit °C Led, 6, bit Compressor Led, 13, bit Program Led, 14, bit Set Led
MODBUS ADDRESS:30003	Device Status : 1, bit Buzzer Status, 2, bit Sensor Lost Status
MODBUS ADDRESS:30004	Output Status
MODBUS ADDRESS:30005	Device Type and Device Version

6.5 Entering To The Programming Mode, Changing and Saving Parameter



Programming Mode Entering Screen
Enter programming mode accessing password with increment and decrement buttons. Press OK button for entering the password.
Note1: If programming mode accessing password is 0, [C-F] Temperature Unit screen is observed instead of programming screen [PrC] will be observed.

Programming Screen
Press SET button for accessing to the parameter value. Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter.
Note2: If programming mode accessing password is 0, only three parameters are accessible, and the parameter values can be changed.



Hysteresis Value for Compressor Output
Change the value with increment and decrement buttons.
Hysteresis Parameter for Compressor
Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter.

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