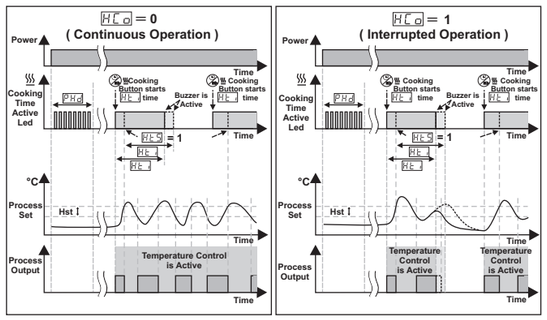
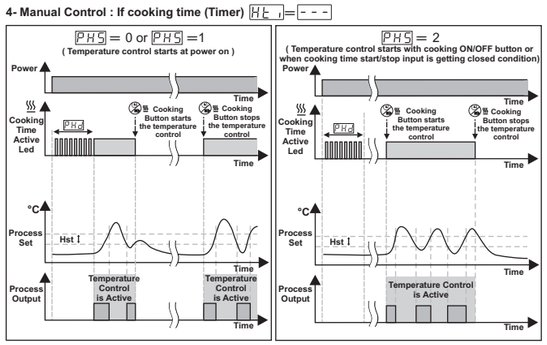
## 6.5 Operation Graphics of ESM3711HN Heating Controller

**3- When cooking time parameter [Ht_] ≥ 1, if selection of temperature control and starting the cooking time parameter [PHS] = 2 ( Temperature control and cooking time (Timer) can be started by pressing cooking ON/OFF button or when cooking time start/stop input is getting closed condition) is selected;**




**4- Manual Control : If cooking time (Timer) [Ht_]=[---]**






## 6.6 Entering To The Programming Mode, Changing and Saving Parameter

**Main Operation Screen**


When SET button is pressed for 5 seconds, "P" led starts to blink. If programming mode entering password is different from 0, programming mode entering screen [PrG] will be observed.

**Note1:** If programming mode accessing password is 0, [C-F] Temperature Unit screen is observed instead of programming screen [PrG]

**Programming Mode Entering Screen**
Press OK button for accessing to the password entering screen.

**Password Entering Screen**


Enter programming mode accessing password with increment and decrement buttons.

Press OK button for entering the password.

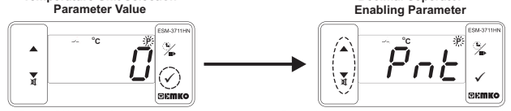
**Note2:** If programming mode accessing password is 0, only three parameters are accessible, and the parameter values can be changed.

**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.

**Temperature Unit Selection Parameter Value**
Change the value with increment and decrement buttons.

**Temperature Unit Selection Parameter Value**




Press OK button for saving the parameter.

**Decimal Seperator Enabling Parameter**
Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter

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



# ESM-3711HN 77x35 DIN Size Heating Controller


## *ESM-3711HN 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
- Adjustable temperature offset
- Set value low limit and set value high limit boundaries
- Relay or SSR driver output
- Digital Input (Cooking Time Start/Stop Input)
- Adjustable cooking time from front panel
- Temperature control according to the cooking time (Timer)
- User can select to start cooking time (Timer) when temperature reaches to the set value
- Temperature control with manual heating function
- Alarm parameters
- Adjustable internal buzzer according to cooking time, sensor defect and Alarm status.
- Button protection
- 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-3711HN 01 V00 11/14

## 1.Preface

ESM-3711HN series heating controllers are designed for measuring and controlling temperature. They can be used in many applications with their easy use, On/ Off control form and cooking time properties. Some application fields which they are used are below:

| Application Fields | Applications |
|---|---|
| Glass | Heating |
| Food | Baking Ovens |
| Plastic | Incubators |
| Petro-Chemistry | Storages |
| Textile, | Automative Air Conditioning |
| Machine Production Industries Etc... | Etc... |

## 1.1 Environmental Ratings

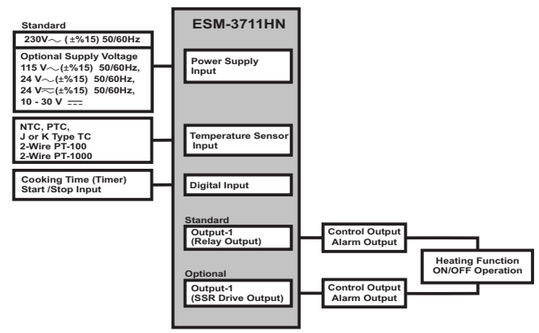
**Operating Temperature** : 0 to 50 °C

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

**Altitude** : Up to 2000 m.

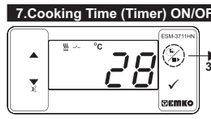
**Forbidden Conditions:**
**Corrosive atmosphere**
**Explosive atmosphere**
**Home applications (The unit is only for industrial applications)**

## 1.2 General Specifications



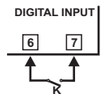



## 7.Cooking Time (Timer) ON/OFF Operation




In main operation screen, If cooking button is pressed for 3 seconds, then cooking time (Timer) is started and cooking time active led becomes active. While cooking time (Timer) continues if cooking button is pressed for 3 seconds, cooking time (Timer) is finished and cooking time active led lights off.
If button protection parameter [Prt] = 4 cooking time (Timer) ON/OFF operation is performed when button is pressed.

## 7.1 Cooking Time (Timer) ON/OFF Operation with Cooking Time Start/Stop Input




When K switch that is connected to the cooking time start/stop input, getting closed condition, cooking time (Timer) is started and cooking time active led becomes active. While cooking time (Timer) continues if K switch getting open condition, cooking time (Timer) is finished and cooking time active led lights off.

## 8. Specifications

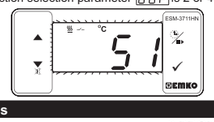
| | |
|---|---|
| **Device Type** | : Heating Controller |
| **Housing & Mounting** | : 76mm x 34.5mm x 71mm plastic housing for panel Mounting. Panel cut-out is 71x29mm. |
| **Protection Class** | : Ip65 at front, Ip20 at rear. |
| **Weight** | : Approximately 0.20 Kg. |
| **Environmental Ratings** | : Standard, 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<br>: 115V~ ( ±%15) 50/60Hz - 1.5VA<br>: 24V~ ( ±%15) 50/60Hz - 1.5VA<br>: 24V⎓ ( ±%15) 50/60Hz - 1.5VA<br>:10 - 30V⎓ 1.5W |
| **Temperature Sensor Input** | : NTC, PTC, TC, RTD |
| **NTC input type** | : NTC (10 kΩ @25 °C ) |
| **PTC input type** | : PTC (1000 Ω @25 °C ) |
| **Thermocouple input type** | : J, K (IEC584.1) (ITS 90) |
| **Thermoresistance input type** | : PT-100, PT-1000 (IEC751) (ITS 90) |
| **Accuracy** | : ± 1 % of full scale for 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 Outputs** | : 16(8) A@250 V~ for Resistive load (Compressor output) (Electrical life : 100.000 switching at full load) |
| **Optional SSR Drive Output** | : Maximum 20mA, Maximum 17V⎓ |
| **Display** | : 14 mm Red 4 digits LED Display |
| **LED** | : S (Green), P (Green), °C (Yellow), °F(Yellow), Compressor Output (Red), Heating Output (Red) |
| **Internal Buzzer** | : ≥83dB |
| **Approvals** | : EAC , CE |



## 9. Failure Messages in ESM-3711HN Heating Controller

1- [Sbr] Screen Blinking
Sensor failure . Sensor connection is wrong or there is no sensor connection. If buzzer function selection parameter [buF] is 3 or 4, internal buzzer starts to operate.

2- Main Screen Value is Blinking.
Example : If alarm function selection parameter [AL1] in programming section is 1 (Absolute Alarm) and maximum alarm parameter [AuH] is 50 When temperature is above 50 °C, value on the screen starts to blink. Also buzzer function selection parameter [buF] is 2 or 4, then internal buzzer is on.




## 10.Optional Accessories

**1.RS-485 Module**


RS-485 Communication Interface

**2.PROKEY Programming Module**


The device is programmed(Upload or Download) by using the parameters.

## 11.Ordering Information

| ESM-3711HN (77x35 DIN Sizes) | A | BC | D | E | / | FG | HI | / | U | V | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | | | / | 00 | 00 | / | 1 | | 0 | 0 |

| A | Supply Voltage |
|---|---|
| 2 | 24V⎓ ( ±%15) 50/60Hz - 1.5VA |
| 3 | 24V~ ( ±%15) 50/60Hz - 1.5VA |
| 4 | 115V~ ( ±%15) 50/60Hz - 1.5VA |
| 5 | 230V~ ( ±%15) 50/60Hz - 1.5VA |
| 8 | 10 - 30 V ⎓ |

| BC | Input Type | Scale(°C) |
|---|---|---|
| 05 | J ,Fe CuNi IEC584.1(ITS90) | 0°C/32°F ; 800°C/1472°F |
| 10 | K ,NiCr Ni IEC584.1(ITS90) | 0°C/32°F ; 999°C/1830°F |
| 11 | PT 100, IEC751(ITS90) | -50°C/-58°F ; 400°C/752°F |
| 09 | PT 100, IEC751(ITS90 | -19.9°C/-4°F ; 99.9°C/212°F |
| 14 | PT 1000, IEC751(ITS90) | -50°C/-58°F ; 400°C/752°F |
| 13 | PT 1000, IEC751(ITS90 | -19.9°C/-4°F ; 99.9°C/212°F |
| 12 | PTC (Not-1) | -50°C/-58°F ; 150°C/302°F |
| 18 | NTC (Not-1) | -50°C/-58°F ; 100°C/212°F |

| E | Output-1 |
|---|---|
| 1 | Relay Output (16(8) A@250 V~,at resistive Load, 1 NO ) |
| 2 | SSR Driver Output (Maximum 20m, Maximum 17V⎓ ) |

| V | Temp. Sensor which is given with ESM-3711HN |
|---|---|
| 0 | None |
| 1 | PTC-M6L40.K1.5 (PTC Air Probe 1.5 mt Silicon Cable) |
| 2 | PTCS-M6L30.K1.5.1/8" (PTC Liquid Probe 1.5 mt Silicon Cable) |
| 3 | NTC-M5L20.K1.5 (NTC Sensor, thermoplastic moulded with 1.5 m cable for cooling application) |
| 4 | NTC-M6L50.K1.5 (NTC Sensor, stainless steel housing with 1.5 m cable for cooling application) |
| 9 | Customer |

~ ⇒Vac,
⎓ ⇒Vdc
≂ ⇒Vdc or Vac can be applied

All order information of ESM-3711HN Heating 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 standards.

**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.**

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



## 1.3 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 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 montage.

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

## 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

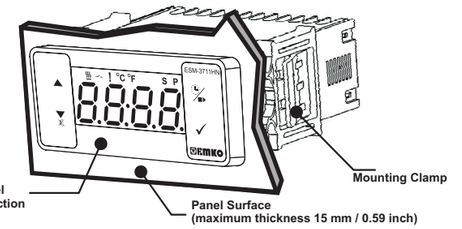
Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.
Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth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

## 1.6 Manufacturer Company

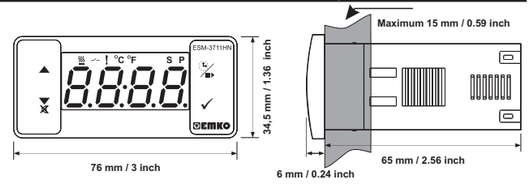
**Manufacturer Information:**
Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369 BURSA/TURKEY
Phone : +90 224 261 1900
Fax : +90 224 261 1912
**Repair and maintenance service information:**
Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369 BURSA /TURKEY
Phone : +90 224 261 1900
Fax : +90 224 261 1912



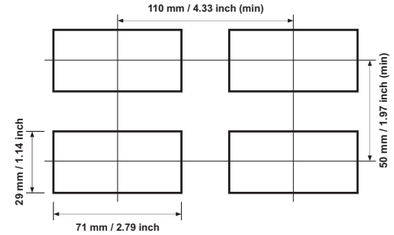
## 2. General Description



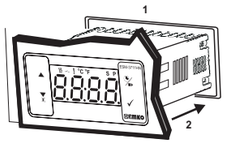

## 2.1 Front View and Dimensions of ESM-3711HN Temperature Controller




## 2.2 Panel Cut-Out

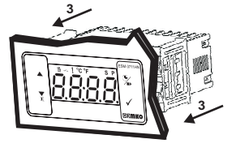


## 2.3 Panel Mounting



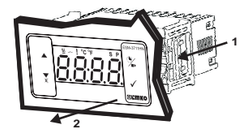

1-Before mounting the device in your panel, make sure that the cut-out is of the right size.

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

## 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 ▼BUTTON IS PRESSED Err 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. UPL Message is shown on the display. When the loading has finished, End 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 device will turn back to main operation screen.

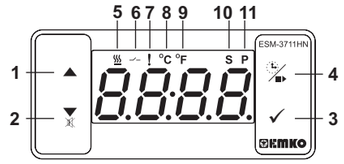
**DOWNLOADING FROM PROKEY TO DEVICE**

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, dOL message is shown on the display, when loading has finished, End message is shown.
4.After 10 seconds device starts to operate with new parameter values.
5.Remove the PROKEY.

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**

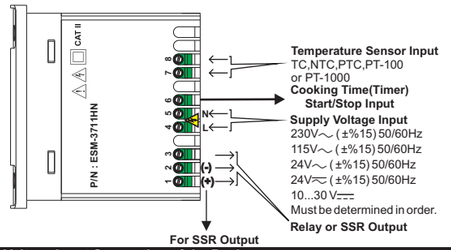
**1. Increment Button :**
** It is used to increase the value in the Set screen and Programming mode.
**2. Decrement, Silencing Buzzer and Downloading to Prokey Button :**
** It is used to decrease the value in the Set screen and Programming mode.
** It is used to silence the buzzer.
** If Prc = 0, it 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.
** It is used to saving value in the Set screen and programming screen.
**4. Cooking Button :**
** In the main operation screen; if this button pressed, cooking time value will be displayed.
**In the main operation screen; if this button pressed for 3 seconds, cooking time starts.

**LED DEFINITIONS**

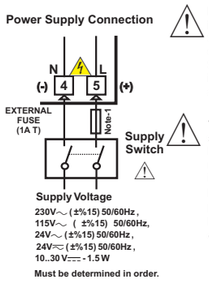
**5. Cooking Time led :**
** This led indicates that cooking time is active.
** Blinks (5 Hz) while entering Cooking time value.
**6. Output led :**
** This led indicates that heating control is selected and process output relay is active.
**7.Alarm led :**
** It is active when low alarm and high alarm statuses.
**8.Celcius led :**
** Indicates that device is in °C mode.
**9.Fahrenheit led :**
** Indicates that device is in °F mode.
**10.Set led :**
** Indicates that device is in Set value changing mode.
**11.Program led :**
**Blinks in programming mode .



## 4. Electrical Wiring Diagram




## 4.1 Supply Voltage Input Connection of the Device



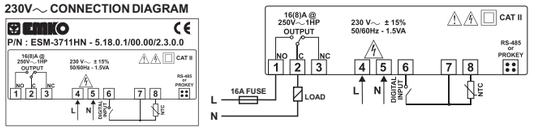

**Make sure that the power supply voltage is the same indicated on the instrument.**
**Switch on the power supply only after that all the electrical connections have been completed.**
**Supply voltage range must be determined in order. While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit.**

**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 neutral, On/Off condition of power supply switch is very important in electrical connection.**
**External fuse that on ~power supply inputs must be on phase connection.**
**External fuse that on ⎓power supply inputs must be on (+) connection.**

**Note-1 :** External fuse is recommended.

## 4.2 Device Label and Connection Diagram

**230V~ CONNECTION DIAGRAM**






## 6. Changing and Saving Temperature Set Value

**Main Operation Screen**


When SET button pressed ''S'' led will be active and temperature set value will be displayed.

**SET Value Screen**


Temperature set value can be changed with increment and decrement buttons.

**SET Value Screen**


When ENTER button pressed temperature set value can be saved.

**Main Operation Screen**


''S'' will be inactive and goes back to main operation screen.

**Temperature set value parameter (Default = 10) MODBUS ADDRESS:40001**
Temperature set value, can be programmed between minimum temperature set value SuL and maximum temperature set value SuH.

## 6.1 Changing and Saving Cookıng Time (Timer) Parameter Value

**Main Operating Screen**


When defrost button is pressed, cooking time is shown and cooking time led starts to fast blink (5 Hz).

**Cooking Time (Timer) Value Screen**


Change the cooking time with increment and decrement buttons.

**Cooking Time (Timer) Value Screen**


Press set button for saving the cooking time

**Main Operating Screen**


Cooking time is saved, cooking time led active led lights off, main operation screen is shown.

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



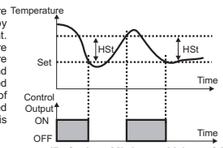
## 6.2 Programming Mode Parameter List

**C-F** **Temperature Unit Selection Parameter ( Default = 0 ) MODBUS ADDRESS:40002**
0 °C selected.
1 °F selected.

**Pnt** **Decimal Seperator 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 becomes passive and can not be changed.

**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 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),
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 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),

**PHd** **Temperature Control Delay at Power On ( Default = 0 ) MODBUS ADRES : 40008**
It can be adjusted from 0 to 99 minutes.



**APd** **Temperature Alarm Delay After Power On Parameter ( Default = 0 ) MODBUS ADDRESS:40017**
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.

**buF** **Buzer Fonksiyon Seçimi Parametresi ( Default = 1 ) MODBUS ADDRESS:40018**
0 Buzzer is inactive.
1 Buzzer is active at the end of the cooking time.
2 Buzzer is active if an alarm occurs.
3 Buzzer is active during sensor failures.
4 Buzzer is active at the end of the cooking time, alarm or sensor failures.

**bon** **Buzzer is active during this time ( Default = --- ) MODBUS ADDRESS:40019**
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.

**Prt** **Button Protection Parameter ( Default = 0 ) MODBUS ADDRESS: 40020**
0 There is no protection
1 Cooking time(Timer) can not be changed. Cooking ON/OFF operation is not performed.
2 SET value can not be changed.
3 Cooking time (Timer) and set value can not be changed. Cooking ON/OFF operation is not performed.
4 Cooking time (Timer) and set value can not be changed. Cooking ON/OFF operation is performed when ⏻ button is pressed.

**PrC** **Communication Mode Selection Parameter ( Default = 0 ) MODBUS ADDRESS: 40021**
0 PROKEY communication selected.
1 RS-485 communication selected.

**SAd** **Slave ID Parameter ( Default = 1 ) MODBUS ADDRESS=40022**
Device communication address parameter (1 to 247).

**PAS** **Programming Section Accessing Password ( Default = 0 ) MODBUS ADDRESS: 40023**
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.

## 6.3 Modbus Adresses of Device Status Parameters (Read Input Register)

| | |
|---|---|
| **MODBUS ADDRESS:30001** | **Temperature Value** |
| **MODBUS ADDRESS:30002** | **Led Status : 0.bit °C Led,6.bit OutputLed, 7.bit Alarm Led, 13.bit Program Led, 14.bit Set Led** |
| **MODBUS ADDRESS:30003** | **Device Status : 0.bit Alarm Status 1.bit Buzzer Status 2.bit Sensor Break Status** |
| **MODBUS ADDRESS:30004** | **Output Status 0.Bit Output** |
| **MODBUS ADDRESS:30005** | **Device Type and Device Version** |



**HtI** **Cooking Time (Timer) Parameter ( Default = 45 ) MODBUS ADDRESS : 40009**
It can be adjusted from 1 to 999 minutes. When it is 1, --- can be observed by pressing decrement button on the display. So Manual Control is selected. In Manual control, user can start and stop temperature controlling with cooking ON/OFF button or cooking time start/stop input.

**PHS** **Selection of Temperature Control and Starting Cooking Time (Timer) Parameter (Default = 0 ) MODBUS ADDRESS : 40010**
0 Temperature control and cooking time (Timer) starts at power on.
1 Temperature control starts at power on. Cooking time (Timer) can be started by pressing cooking ON/OFF button or when cooking time start/stop input is getting closed condition.
2 Temperature control and cooking time (Timer) can be started by pressing cooking ON/OFF button or when cooking time start/stop input is getting closed condition.

**HtS** **Cooking Time Starting Conditions Parameter ( Default = 0 ) MODBUS ADDRESS: 40011**
This parameter can be observed if cooking time (Timer) HtI is ≥ 1.
0 Cooking time (Timer) is started with cooking ON/OFF button or when cooking time start/stop input is getting closed condition.
1 Cooking time (Timer) is started when temperature reaches to the process set value after pressing cooking ON/OFF button or when cooking time start/stop input is getting closed condition.

**HCo** **Temperature Controlling Continuity Selection Parameter ( Default = 0 ) MODBUS ADDRESS : 40012**
Temperature controlling can be continues or stopped according to the selection. This parameter can be observed if cooking time (Timer) HtI is ≥ 1
0 **Continuous Operation :** Temperature control starts after the temperature control starting delay at power on PHd is expired and continues. If buzzer function selection parameter buF is 1 or 5, at the end of the cooking time, (Timer) internal buzzer operates to indicate cooking time has finished.
1 **Interrupted Operation :** Temperature control starts after temperature control starting delay at power on PHd is expired. Temperature control can be stopped at the end of the cooking time (Timer) or by pressing cooking ON/OFF button or when cooking time start/stop input is getting open condition. Temperature control does not start till cooking ON/OFF button is pressed again or when cooking time start/stop input is getting closed condition again.

**ALS** **Temperature Alarm Function Selection Parameter ( Default = 0 ) MODBUS ADDRESS : 40013**
0 Alarm function is inactive.
1 Absolute alarm is selected. If temperature lower than AuL and higher than AuH, then alarm is on.
2 Relative alarm is selected. Alarm operates according to the set value. If temperature is below (Set - AuL) or above ( Set + AuH ), alarm occurs.

**AuL** **Minimum Alarm Parameter ( Default = Input Type Minimum Scale ) MODBUS ADDRESS : 40014**
It can be adjusted from minimum scale of the device to maximum alarm value AuH.

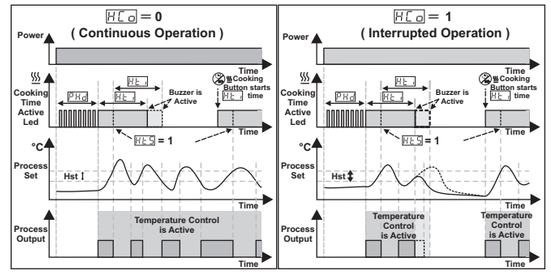
**AuH** **Maximum Alarm Parameter (Default = Input Type Maximum Scale) MODBUS ADDRESS : 40015**
It can be adjusted from minimum alarm value AuL to maximum scale of the device.

**AdL** **Alarm Delay Parameter ( Default = 0 ) MODBUS ADDRESS : 40016**
If an alarm occurs, delay can be defined with this parameter. It can be adjusted from 0 to 99 minutes.



## 6.5 Operation Graphics of ESM3711HN Heating Controller

**1- When cooking time parameter HtI ≥ 1, if selection of temperature control and starting the cooking time parameter PHS = 0 ( Temperature control and cooking time starts at power on) is selected;**




**2- When cooking time parameter HtI ≥ 1, if selection of temperature control and starting the cooking time parameter PHS = 1 ( Temperature control starts at power on. Cooking time (Timer) can be started by pressing cooking ON/OFF button or when cooking time start/stop input is getting closed condition) is selected;**