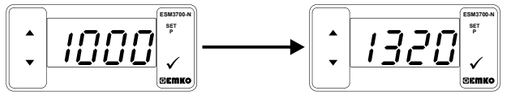
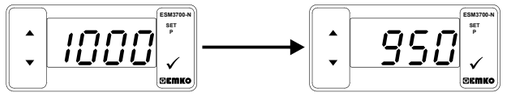
8. ESM-3700-N Front Panel Functions

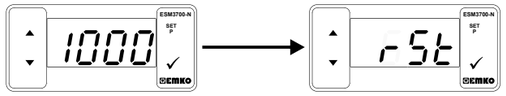
Main Operation Screen



If push the up button, in main operation screen show the maximum measurement process value.



If push the down button, in main operation screen show the minimum measurement process value.



If push together up and down button, in main operation screen show rSt message and minimum and maximum measurement process values are reset.

9. Specifications

Device Type	: Digital Process Indicator
Housing & Mounting	: 77mm x 35mm x 62.5mm Plastic housing for panel mounting. Panel cut-out is 71x29 mm.
Protection Class	: IP65 at front, IP20 at rear.
Weight	: Approximately 0.16 Kg.
Enviromental Ratings	: Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
Storage / Operating Temperature	: -40 °C to +85 °C / 0 °C to +50 °C
Storage / Operating Humidity	: 90 % max. (none condensing)
Installation	: Fixed installation
Overvoltage Category	: II.
Pollution Degree	: II, office and workplace, none conductive pollution
Operating Conditions	: Continuous.
Process Input	: 0..10 V⎓ Input Empedance Approximately 11kΩ Measurement range 0...12 V⎓ 0..1 V⎓ Input Empedance Approximately 11k Ω Measurement range 0...1.2 V⎓ 0..60mV⎓ Input Empedance Approximately 11k Ω Measurement range 0...100 mV⎓ 0..20mA⎓ Input Empedance Approximately 5Ω Measurement range 0...22 mA⎓ 4..20mA⎓ Input Empedance Approximately 5Ω Measurement range 0...22 mA⎓
Accuracy	: ± 5 % of full scale
Sampling Time	: 240ms for 0-20mA⎓ and 4..20mA⎓ process input 150ms for 0-60mV⎓ process input 100ms for 0-1 V⎓ and 0..10V⎓ process input
Supply Voltage and Power	: 230 V∿(-%15;+%15) 50/60 Hz. 1.5 VA 115 V∿ (-%15;+%15) 50/60 Hz. 1.5 VA 24 V∿ (-%15;+%15) 50/60 Hz. 1.5 VA 24 V⎓ (-%15, +%10) 50/60 Hz. 1.5 VA
12V⎓ Voltage Output	: 12 V⎓ (35%Max.30 mA)
Alarm Relay Output	: 5 A@250 V∿ at resistive load Electrical Life: 100 000 operation (full load)
Optional SSR Output	: Maximum 28 mA, Maximum15 V⎓
Display	: 10 mm Red 4 digits LED Display
LEDs	: 1(Red), A(Green), P(Green)
Approvals	: EAC CE

10. Optional Accessories

1.RS-485 Module



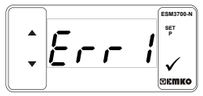
RS-485 Communication Interface

2.PROKEY Programming Module



It is used to upload and download parameters to the device.

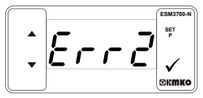
11. Failure Messages in ESM-3700-N Digital Process Indicator



If the equivalent voltage or current applied to the process input while in AdJL or AdJH parameter for user reading adjustment is out of the standard scale, this error message are shown on the display.

Example-1:
For process Input type selected as 0-10 V⎓, If the applied voltage while in AdJL parameter or AdJH parameter is lower than 0 V⎓ or upper than 10 V⎓, when the decrement or increment button is pressed for saving the analog value this errror message is shown on the display and applied voltage value is not saved.

---- Press any button to clear error message from the display and turn to the user reading adjustment analaog value entering screen



If the difference between the equivalent voltage or current applied to the process input while in AdJL and AdJH parameters for user reading adjustment is lower than the %50 of the standard scale, this error message are shown on the display
Example-2:
For process Input type selected as 0-10 V⎓, If the difference between the applied voltages in AdJL and AdJH parameters is lower than the 5 V⎓, when the decrement or increment button is pressed for saving the analog value this errror message is shown on the display and applied voltage value is not saved.

---- Press any button to clear error message from the display and turn to the user reading adjustment analaog value entering screen

12.Ordering Information

ESM-3700-N
(77 x 35 DIN Size)

A	BC	D	E	/	FG	HI	/	U	V	W	Z
		0		/	00	00	/	0	0	0	0

A	Supply Voltage
2	24 V ≂(-%15, +%10) 50/60 Hz
3	24 V∿ (± 15%) 50/60 Hz
4	115 V∿ (± 15%) 50/60 Hz
5	230 V∿ (± 15%) 50/60 Hz
9	Customer

BC	Alarm Output	Scale
20	Configurable(Table-1)	**Table-1**

E	Alarm Output
0	None
1	Relay Output (Resistive load 5 A@250 V∿,1NO + 1NC)
2	SSR Driver Output (Maximum 28 mA,15 V⎓)

BC	Input Type (⎓ Voltage/Current)	Scale
47	0..60mV⎓	-1999, 9999
46	0..1 V⎓	-1999, 9999
43	0..10 V⎓	-1999, 9999
44	0..20mA⎓	-1999, 9999
45	4..20mA⎓	-1999, 9999

All order information of ESM-3700-N Digital Process Indicator are given on the table at left. User may form appropriate device configuration from information and codes that at the table and convert it to the ordering codes. Firstly, supply voltage then other specifications must be determined. Please fill the order code blanks according to your needs.

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

⚠ Input empedance (current) is 5 Ω . So do not applied voltage to the current input while the device is in current measurement mode.

⚠ ∿ ⟶ Vac
⎓ ⟶ Vdc
≂ ⟶ Vac/dc

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www.emkoelektronik.com.tr

EMKO

ESM-3700-N 77x35 DIN Size Digital Process Indicator



ESM-3700-N 77 x 35 DIN Size Digital Process Indicator

- **4 Digits Display**
- **Easily adjustable from front panel**
- **Between -1999 and 9999 display adjustment scale**
- **Adjustable decimal point**
- **Selectable universal process Input**
  (0-10V⎓ , 0-1V⎓, 0-60mV⎓, 0-20mA ⎓, 4-20mA ⎓)
- **Adjustable input filter**
- **Minimum and maximum measured values in the memory storage**
- **Maximum or minimum measurement value can be shown *continuously on the display***
- **User can be adjust device's reading value for selected input type**
- **Alarm output**
  Relay or SSR driver output (It must be determined in order.)
- **Adjustable alarm set value from front panel**
- **Programming mode password protection**

Instruction Manuel. ENG ESM-3700-N 01 V00 05/18

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

1.Preface

ESM-3700 series Digital Process Indicators are design for measuring the process value.
They can be used in many applications with their easy use, alarm output, universal process input properties.
Some application fields which they are used are below:

Application Fields	Applications
Glass	Transmitter application of temperature,
Flood	Speed measurement of motor driver
Plastic	Current measurement over the shunt
Petro-Chemistry	resistance,
Textile	Food Pressure,humidity etc.
Machine Production Industries...	Etc...

1.1 Environmental Ratings

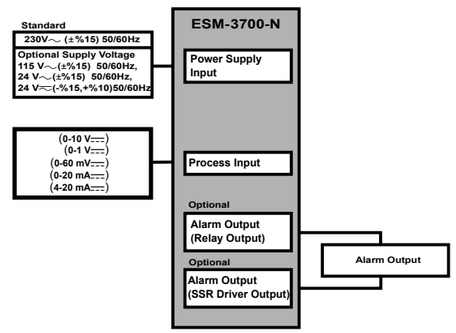
Operating Temperature : 0 ile 50 °C

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

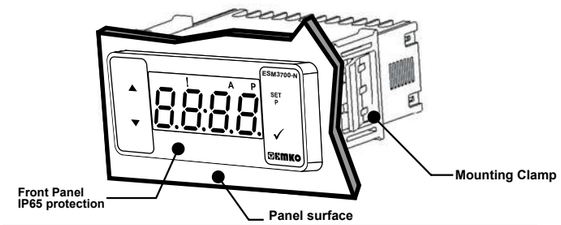
Altitude : Up to 2000 m

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

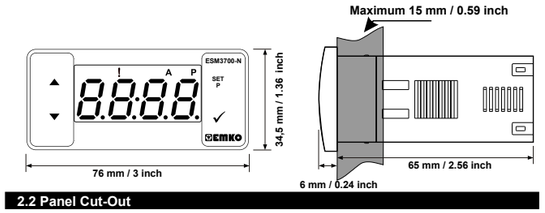
1.2 General Specifications



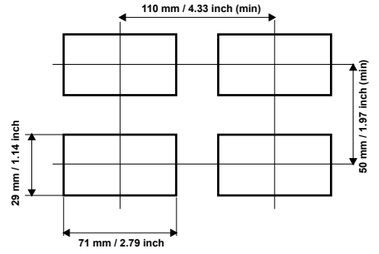
2. General Description



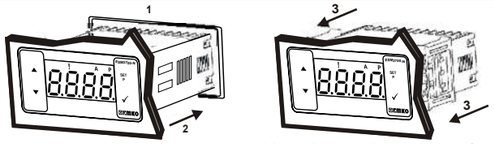
2.1 Front View and Dimensions of ESM-3700 Digital Process Indicator



2.2 Panel Cut-Out



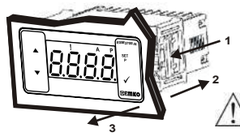
2.3 Panel Mounting



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 unit in the panel cut-out from the front side. 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-Push mounting clamps in direction of arrow.
2-Pull mounting clamps from left and right fixing sockets.
3-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.

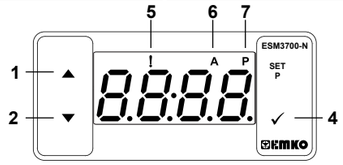
NOTE: Err message is shown when an error occurs while programming. If you want to reload, put in PROKEY and press ▼ button. If you want to quit, remove PROKEY and press ▼ button. The device will turn back to main operation screen.

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 main operation screen show the maximum measurement process value.
2. Decrement Button :
*It is used to decrease the value, in main operation screen show the minimum measurement process value.
**If PRC=0, it used to download parameters from device to prokey.
3. Set Button :
*It is used to enter to the Alarm Set Value Changing Mode.
**It is used to enter to the Parameter Mode (pressed for 5 seconds).
4. Enter Button :
*It is used to OK and save button.

LED DEFINITIONS

5. Alarm Active Led :
*Alarm output active led.
6.Alarm Set Led :
*Led Indication of Alarm Set Value Changing Mode is Active.
7.Program Led :
*Led Indication of Programming Mode is Active.

6. Changing and Saving Alarm Set Value

Main Operation Screen



When SET button is pressed, A led lights on and alarm set value is shown on the display.

Alarm Set Value Screen



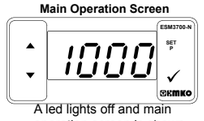
Change the alarm set value with increment and decrement buttons.

Alarm Set Value Screen



Press SETbutton for saving the alarm set value

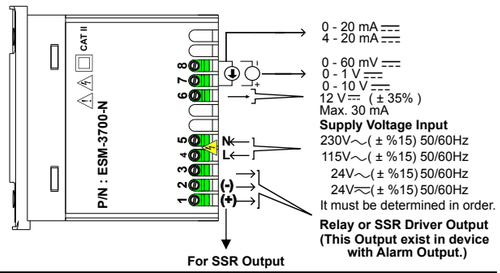
Main Operation Screen



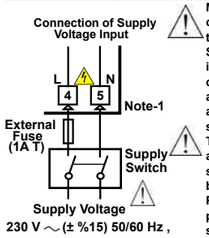
A led lights off and main operation screen is shown.

Alarm Set Parameter (Default=2000) MODBUS ADDRESS:40001

4. Electrical Wiring Diagram



4.1 Supply Voltage Input Connection of the Device



Make sure that the power supply voltage is same indicated on the instrument.Switch on the power supply only after that all the electrical connection have been completed. Supply voltage range must be determined in order. While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit. Controlling prevents damages in unit and system and possible accidents as a result of incorrect supply voltage.

There is no power supply switch or fuse on the device. So a power supply switch and a fuse must be added to the supply voltage input. Power supply switch and fuse must be put to a place where user can reach easily.

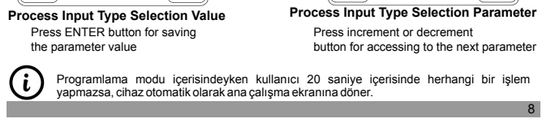
Power supply switch must be two poled for seperating phase and neutral. On/Off condition of power supply switch is very important in electrical connection. On/Off condition of power supply switch must be signed for preventing the wrong connection.

External fuse must be on phase connection in supply input.
External fuse must be on (+) line connection in supply input.

Note-1 : External fuse is recommended.

4.2 Device Label and Connection Diagram

230V~ CONNECTION DIAGRAM

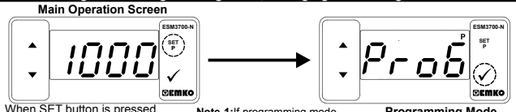


Alarm set value can be adjusted from low reading adjustment EPoL value parameter to up reading adjustment EPoH value parameter.
(Alarm set value changingmode is active in devices with alarm output.)

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

6.1 Entering To The Programming Mode, Changing and Saving Parameter

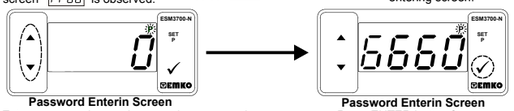
Main Operation Screen



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 Prob is observed.

Note-1: If programming mode accessing password is 0, process input type selection parameter Prob screen is observed instead of programming mode accessing screen uASL

Programming Mode Accessing Screen
Press ENTER button for accessing to the password entering screen.

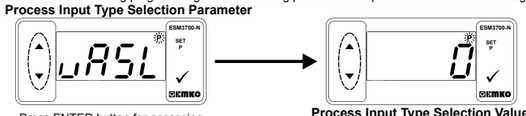


Password Enterin Screen
Enter programming mode accessing password with increment and decrement buttons

Password Enterin Screen
Press ENTER button for accessing to the parameters

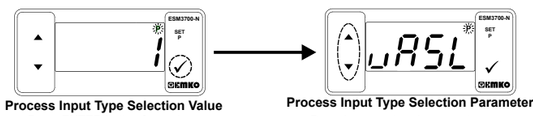
Note-2 : Parameters can be observed by pressing ENTER button in programming mode accessing screen without entering programming mode accessing password. But parameters can not be changed.

Process Input Type Selection Parameter



Press ENTER button for accessing to the parameter value.

Process Input Type Selection Value
Change the value with increment and decrement buttons



Process Input Type Selection Value
Press ENTER button for saving the parameter value

Process Input Type Selection Parameter
Press increment or decrement button for accessing to the next parameter

Programlama modu içerisindeyken kullanıcı 20 saniye içerisinde herhangi bir işlem yapmazsa, cihaz otomatik olarak ana çalışma ekranına döner.

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

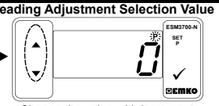
6.2 Universal Input User Reading Adjustment Operation

Reading Adjustment Selection Parameter



Press ENTER button for accessing to the parameter value. Press increment button for accessing to the next parameter

Reading Adjustment Selection Value



Change the value with increment and decrement buttons

Reading Adjustment Selection Value



Press ENTER button for saving the parameter value

Reading Adjustment Selection Parameter



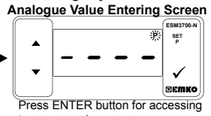
Press increment button for accessing to the next parameter

User Reading Adjustment Low Limit Analogue Value Parameter



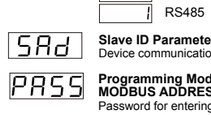
Press ENTER button for accessing to the user reading adjustment low limit analogue value entering screen.
At this state, the equivalent voltage or current for low reading adjustment value parameter EPoL is applied to process input of the devices. When decrement button is press, display starts to blink. It means, the analogue value at process input is saved as a user reading adjustment low limit value.

User Reading Adjustment Low Limit Analogue Value Entering Screen



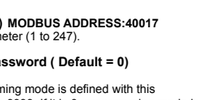
Press ENTER button for accessing to programming screen

User Reading Adjustment Low Limit Analogue Value Parameter



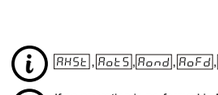
Press increment button for accessing to the next parameter

User Reading Adjustment High Limit Analogue Value Parameter



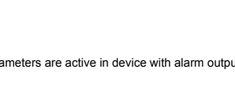
Press ENTER button for accessing to the parameter value.

User Reading Adjustment High Limit Analogue Value Entering Screen



Press ENTER button for accessing to programming screen

User Reading Adjustment High Limit Analogue Value Parameter



Press increment button for accessing to the next parameter

At this state, the equivalent voltage or current for high reading adjustment value parameter EPoH is applied to process input of the devices. When increment button is press, display starts to blink. It means, the analogue value at process input is saved as a user reading adjustment high limit value.

AdJL **User ReadingAdjustment Low Limit Analogue Value Parameter**
MODBUS ADDRESS : 40009
In this parameter, the equivalent voltage or current for low reading adjustment value EPoL parameter is determined.

AdJH **User Reading Adjustment High Limit Analogue Value Parameter**
MODBUS ADDRESS : 40010
In this parameter, the equivalent voltage or current for up reading adjustment value EPoH parameter is determined.

AHSt **Alarm Hysteresis Parameter (Default = 0) MODBUS ADDRESS : 40011**
Alarm hysteresis value.
It can be adjusted from 0 to (EPoH - EPoL) / 2

AotS **Alarm Type Selection Parameter (Default = 1) MODBUS ADDRESS : 40012**
1 Process High Alarm
2 Process Low Alarm

Aond **AlarmOnDelay Time Parameter (Default = 0) MODBUS ADDRESS : 40013**
It can be adjusted from 0 to 99 minutes.

AofD **Alarm Off Delay Time Parameter (Default = 0) MODBUS ADDRESS : 40014**
It can be adjusted from 0 to 99 minutes.
When this parameter is 99, if increment button is pressed, LtCH is observed and alarm latching output is selected. To make the alarm latching output passive, decrement button must be pressed in main operation screen.

AoPd **Alarm Delay Parameter After PowerOn (Default = 0)**
MODBUS ADDRESS:40015
This parameter defines the delay for the alarm is being active after power on.
It can be adjusted from 0 to 99 minutes.

PrC **Communication Mode Selection Parameter (Default = 0)**
MODBUS ADDRESS:40016
0 PROKEY
1 RS485

SAd **Slave ID Parameter (Default = 1) MODBUS ADDRESS:40017**
Device communication address parameter (1 to 247).

PASS **Programming Mode Acessing Password (Default = 0)**
MODBUS ADDRESS:40018
Password for entering to the programming mode is defined with this parameter. It can be adjusted from 0 to 9999. If it is 0, programming mode is accessed without entering password.

AHSt, AotS, Aond, AofD, AoPd parameters are active in device with alarm output.

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

6.3 Programming Mode Parameter List

uASL **Process Input Type Selection Parameter(Default = 0) MODBUS ADDRESS:40002**
Proses giriş tipi bu parametre ile belirlenir. 0 ile 4 arasında bir değer tanımlanabilir.
0 0...10 V ⎓ (-1999 ; 9999)
1 0...1 V ⎓ (-1999 ; 9999)
2 0...60 mV ⎓ (-1999 ; 9999)
3 0...20 mA ⎓ (-1999 ; 9999)
4 4...20 mA ⎓ (-1999 ; 9999)

iFLt **Process Input Filter Selection Parameter(Default = 0) MODBUS ADDRESS:40003**
Process Input filter is determined with this parameter. It can be adjusted from 0 to 4.
240ms for 0-20mA⎓ and 4..20mA⎓ process input
150ms for 0-60mV⎓ process input
100ms for 0-1 V⎓ and 0..10V⎓ process input
0 The last measurement value is shown.
1 The average of last 2 measurement value is shown.
2 The average of last 4 measurement value is shown.
3 The average of last 8 measurement value is shown.
4 The average of last 16 measurement value is shown.

HoLd **Display Function Selection Parameter(Default = 0) MODBUS ADDRESS:40004**
In main operation screen displayed process value is determined with this parameter.
It can be adjusted from 0 to 2.
0 The measurement process value is shown on the display.
1 The minimum measurement process value is shown continuously on the display.
2 The maximum measurement process value is shown continuously on the display

dPnt **Decimal Point Position Parameter(Default = 0) MODBUS ADDRESS : 40005**
Decimal point position is determined with this parameter. It can be adjusted from 0 to 3.
0 No point.
1 0.0
2 0.00
3 0.000

tPoL **Low Reading Adjustment Value Parameter(Default = -1999) MODBUS ADDRESS : 40006**
It defines minimum value for dual point reading adjustment.
It can be adjusted -1999 to (EPoH -1)

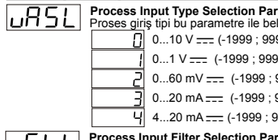
tPoH **High Reading Adjustment Value Parameter(Default = 9999) MODBUS ADDRESS : 40007**
It defines maximum value for dual point reading adjustment.
It can be adjusted (EPoL +1) to 9999.

AdJS **Reading Adjustment Selection Parameter(Default = 0) MODBUS ADDRESS : 40008**
It defines which reading adjustment type is active. It can be adjusted from 0 to 1.
0 Selected process input type is read according to the standard reading adjustment.
1 Selected process input type is read according to the user reading adjustment.

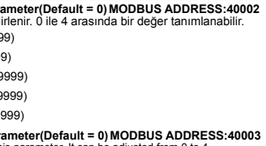
AdJL and AdJH parameters are observed if reading adjustment selection parameter AdJS = 1, otherwise these parameters are can not be observed.

7. Operation Graphics of Alarm Output and Alarm Types

Process High Alarm



Process Low Alarm



ASEt = Alarm Set Value

