

9. Specifications



Device Type	: Digital Tachometer
Housing&Mounting	: 77mm x 35mm x 62/5mm plastic housing for panel Mounting. Panel cut-out is 71x29mm.
Protection Class	: Ip65 at front, Ip20 at rear
Weight	: Approximately 0.16 Kg.
Environmental 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 or workplace, none conductive pollution
Operating Conditions	: Continuous
Sensor Supply Voltage	: 12 V _{DC} @ 30 mA (±%35)
Process Input	: Maximum Applicable Voltage : 24 V _{DC}
Logic 1 minimum level	: 3 V _{DC}
Logic 0 maximum level	: 2 V _{DC}
Accuracy	: 0.01 % of full scale
Supply Voltage and Power	: 230 V _{AC} (-%15;+%15) 50/60 Hz. 1.5 VA 115 V _{AC} (-%15;+%15) 50/60 Hz. 1.5 VA 24 V _{AC} (-%15;+%15) 50/60 Hz. 1.5 VA 24 V _{DC} (-%15, +%10) 50/60 Hz. 1.5 VA
Optional Relay Output	: 5 A@250 V _{AC} at resistive load(Electrical. Life :100 000 Operation(Full Load))
Optional SSR Output	: Maximum 28 mA, Maximum 15 V _{DC}
Display	: 10 mm Red 4 digits LED Display
LED Device with alarm Output	: I (Red), II (Green), A (Green), P (Red)
Device without alarm Output	: P (Red) 3 mm
Approvals	: ENEC, CE

10. Ordering Information

ERM-3770-N (77 x 35 DIN Size)									
A	B	C	D	E	F	G	H	I	J
00	0	/	00	/	0	0	0	0	0
A Supply Voltage									
2	24 V _{AC} (-%15, +%10) 50/60 Hz								
3	24 V _{AC} (± 15%) 50/60 Hz								
4	115 V _{AC} (± 15%) 50/60 Hz								
5	230 V _{AC} (± 15%) 50/60 Hz								
9	Customer								
E Alarm Output									
0	None								
1	Relay Output (resistive load 5 A@250 V _{AC} , 1NO + 1NC)								
2	SSR Driver Output (Maximum 28 mA, 15 V _{DC})								

All order information of ERM-3770N Digital Tachometer 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.

11. Optional Accessories

1.RS-485 Module	2.PROKEY Programming Module
	
RS-485 Communication Interface	The device is programmed(Upload or Download)by using the parameters.
	<ul style="list-style-type: none"> ~ Vac, == Vdc ~ Vdc or Vac can be applied

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www.emkoelektronik.com.tr

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ERM-3770-N 77x35 DIN Size Digital Tachometer



ERM-3770-N 77 x 35 DIN Size Digital Tachometer

- 4 Digits display
- NPN or PNP Input Type
- Working with Process Set and Alarm Set Value
- Alarm output
- Relay or SSR driver output (It must be determined in order.)
- Alarm set value boundary
- Adjustable decimal point
- Division Rate
- 0,07Hz to 10000Hz input signal
- Automatic sampling (1 sec. to 16 sec.)
- Programming mode password protection





Instruction Manual. ENG ERM-3770-N 01 V01 04/18

1. Preface

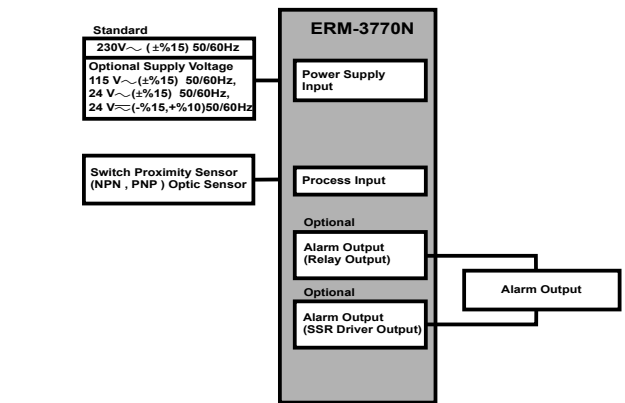
ERM-3770-N series Digital Tachometers are design for measuring the period in Industry. They can be used in many applications with their easy use, alarm output, universal process input properties. You can easily adapt them to automation systems and mechanical process. Some application fields which they are used are below:

Application Fields	Applications
Glass	Period measurement
Food	Frequency measurement
Plastic	Band Speed measurement
Petro-Chemistry	Linear or circular movement
Textile,	Instantaneous Flow rate
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



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 result 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.

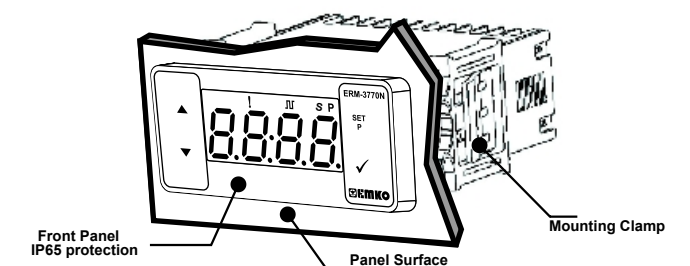
Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

1.6 Manufacturer Company

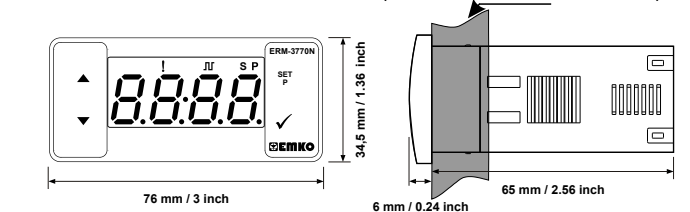
Manufacturer Information:
Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369 BURSA/TURKEY
Phone : +90 224 261 1900
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Repair and maintenance service information:
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Demirtaş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

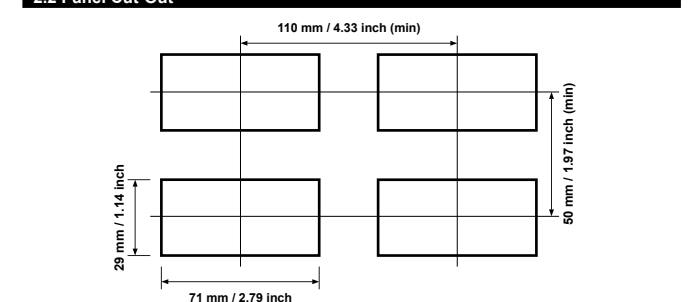
2. General Description



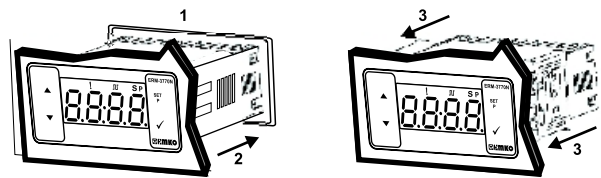
2.1 Front View and Dimensions of ERM-3770-N Digital Process Indicator (maximum thickness 15 mm / 0.59 inch)



2.2 Panel Cut-Out



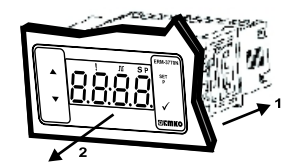
2.3 Panel Mounting



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

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 [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

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

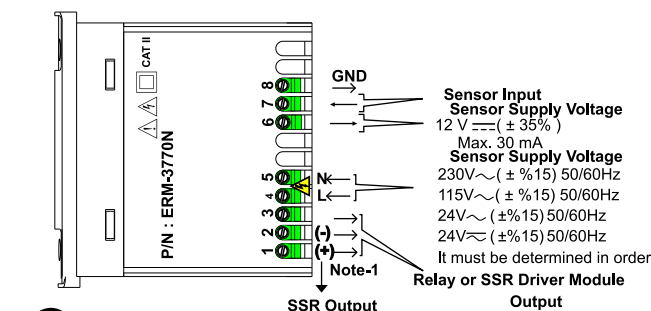
NOTE: [PrC] message is shown when an error occurs while programming. If you want to reload, put in PROKEY and press ▼ button. If you want to quit, remove PROKEY and press ▼ button. The device will turn back to main operation screen.

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

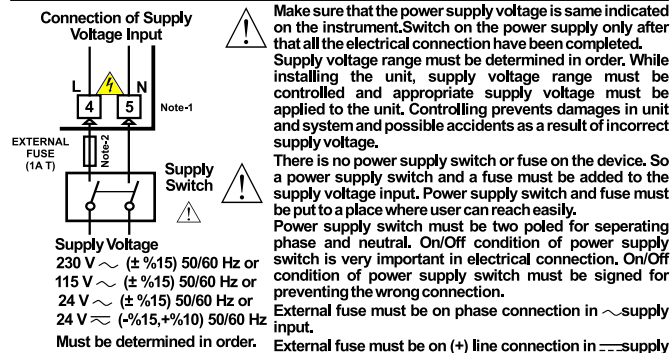
NOTE: [PrC] message is shown when an error occurs while programming. If you want to reload, switch off the device and put in PROKEY then energize the device. If you want to quit remove PROKEY and press ▼ button. The device will turn back to main operation screen.

4. Electrical Wiring Diagram



Note-1: The Output exist in device with Alarm Output.

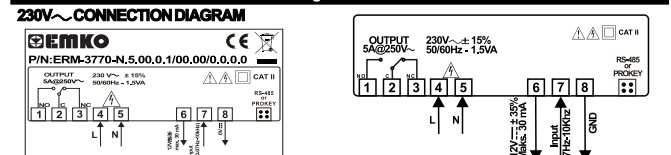
4.1 Supply Voltage Input Connection of the Device



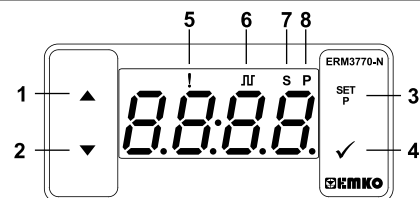
Note-1: "L" is (+), "N" is (-) for 24V supply Voltage

Note-2: External fuse is recommended.

4.2 Device Label and Connection Diagram



5. Front Panel Definition and Accessing to the Menus



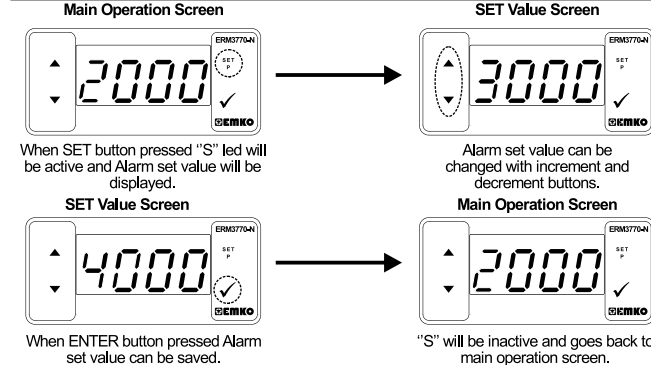
BUTTON DEFINITIONS

- 1. Increment Button:** ** It is used to increase the value in the Set screen and Programming mode.
- 2. Decrement Button:** ** It is used to decrease the value in the Set screen and Programming mode.
- 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

- 5. Alarm Output Active Led:** ** Alarm Output Active Led is active, when the device exist Alarm output.
- 6. Signal Led:** ** When the input signal is received, the signal led is active.
- 7. Set led:** ** Indicates that device is in Set value changing mode.
- 8. Program led:** ** Blinks in programming mode.

6. Changing and Saving Alarm Set Value



Alarm Set Value changing mode is active, when the device exist Alarm output.

6.1 Programming Mode Parameter List

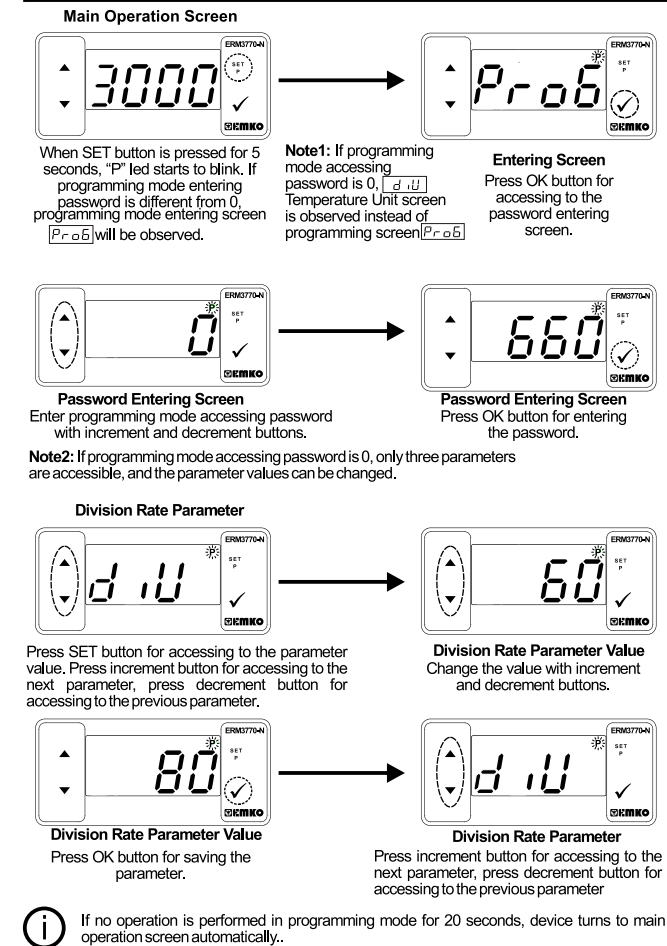
- dIU** Division Rate Parameter (Default = 60) MODBUS ADDRESS:40002
It can be adjusted from 1 to 999.
Pulse that is applied to the process input of ERM-3770N Digital Tachometer unit is shown according to this parameter. Revolution Per Minute is shown on the screen by dividing with this parameter value. By changing division rate, pulse between 0,07 Hz to 10000 Hz can be observed.
$$\text{div (Division rate)} = \frac{\text{Revolution Per Minute}}{\text{Value on the Screen}}$$
- inty** Input Type Selection Parameter (Default = npn) MODBUS ADDRESS:40003
NPN type operation is choosen.
PNP type operation is choosen.
- RHSE** Alarm Hysteresis Parameter (Default = 0) MODBUS ADDRESS:40004
Hysteresis value of Alarm Output. It can be adjusted from 0 to 5000.
- RoTS** Alarm Type Selection Parameter (Default = 1) MODBUS ADDRESS:40005
1 Proses High Alarm
2 Proses Low Alarm
3 Deviation High Alarm
4 Deviation Low Alarm
5 Deviation Band Alarm
6 Deviation Range Alarm
- ALoL** Alarm Set Value Low Limit Parameter (Default = 1) MODBUS ADDRESS:40006
Alarm set value can not be adjusted under this parameter value. This parameter can be adjusted from process set value low limit (1) to alarm set value up limit parameter value.

6.1 Programming Mode Parameter List

- RuPL** Alarm Set Value Up Limit Parameter (Default = 9999) MODBUS ADDRESS:40007
Alarm set value can not be adjusted over this parameter value. This parameter can be adjusted from alarm set value low limit parameter value to proses set value up limit (9999) value.
- ALrt** Alarm Operation type Selection Parameter (Default = 0) MODBUS ADDRESS:40008
0 The unit starts to control the alarm output, when the power on.
1 The unit starts to control the alarm output at the end of the [RoPd] Parameter value.
After the power on and if alarm condition does not seem any more, the unit starts to control the alarm output.
- RoNd** Alarm On Delay Time Parameter (Default = 0) MODBUS ADDRESS:40009
It can be adjusted from 0 to 99 minutes.
- RoFd** Alarm Off Delay Time Parameter (Default = 0) MODBUS ADDRESS:40010
It can be adjusted from 0 to 99 minutes.
When this parameter is 99, if increment button is pressed, [LECH] is observed and alarm latching output is selected. To make the alarm latching output passive, decrement button must be pressed in main operation screen.
- RoPd** Alarm Delay Parameter After Power On (Default = 0) MODBUS ADDRESS:40011
This parameter defines the delay for the alarm is being active after power on. It can be adjusted from 0 to 99 minutes.
- ASET** Alarm Set Value Parameter (Default = 1000) MODBUS ADDRESS:40012
Alarm output controlled by this parameter. If the [RoTS] parameter is adjusted 1 or 2, then Alarm Set Value can be adjusted from Alarm Set Value Low Limit [ALoL] To Alarm Set Value Up Limit [RuPL]. If the [RoTS] parameter is adjusted 3, 4, 5 or 6 then Alarm Set Value can be adjusted from 0 to Alarm Set Value Up Limit [RuPL] Parameter.
- REn** Alarm Selection Parameter After Power On (Default = 0) MODBUS ADDRESS:40013
This parameters defines the first alarm selection after power on. It can be adjusted 0 and 1.
0 The alarm output will not be activated until the device has signaled to the sensor input.
1 The alarm output is activated without signaling to the sensor input.
- dPnt** Decimal Point Position Parameter (Default = 0) MODBUS ADDRESS:40014
Decimal Point Position is determined by this parameter. It can be adjusted from 0 to 3.
0 No point "0".
1 Between first and second digits "0.0"
2 Between second and third digits "0.00"
3 Between third and fourth digits "0.000"
- PrC** Communication Mode Selection Parameter (Default = 0) MODBUS ADDRESS:40015
0 PROKEY communication selected.
1 Rs485 communication selected.
- SAd** Slave ID Parameter (Default = 1) MODBUS ADDRESS=40016
Device communication address parameter (1 to 247).
- PASS** Programming Mode Accessing Password (Default = 0) MODBUS ADDRESS:40017
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.

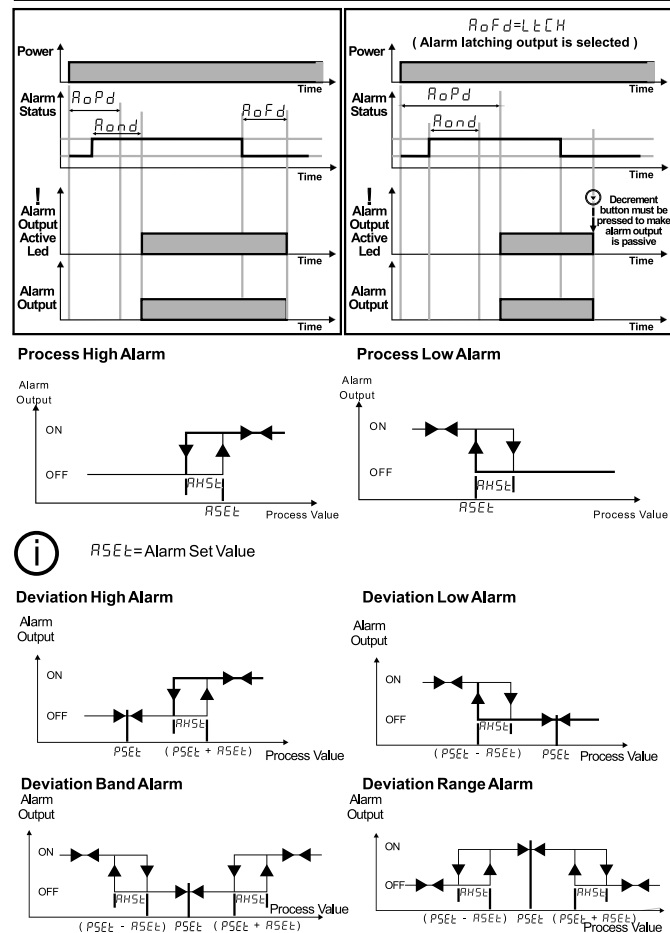
If the process is not exist Alarm output, then [RHSE], [ALrt], [ALoL], [RuPL], [ALrt], [RoNd], [RoFd], [RoPd] and [ASET] parameters is not shown.

6.3 Entering To The Programming Mode, Changing and Saving Parameter



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

7. Operation Graphics of Alarm Output and Alarm Types



8. ERM-3770-N Dijital Takometre Cihazındaki Hata Mesajları

