



Read this document carefully before using this device. The guarantee will be expired by device damages if you don't attend to the directions in the user manual. Also we don't accept any compensations for personal injury, material damage or capital disadvantages.

ENDA ECH SERIES UP/DOWN COUNTER & RPM/TACHOMETER

Thank you for choosing ENDA ECH series devices.

- ▶ 48x48mm and 72x72mm sizes.
- ▶ 2x6 digits indicator.
- ▶ Programmable as Counter and RPM/Tachometer.
- ▶ 6 Digits Batch Counter.
- ▶ 9 Digits Total Counter.
- ▶ Period time differences, pulse time, turnover and speed measurement.
- ▶ Easy to use front panel keypad.
- ▶ Counts Up or Down according to input phase difference.
- ▶ Input frequency can be selected.
- ▶ Input signal can be calibrated to the desired value by multiplying between 0.000001 and 99.9999.
- ▶ Decimal point can be set between 1 and 5.
- ▶ Sensor input type can be selected by using keypad (PNP, NPN).
- ▶ Dual setpoint and dual contact relay.
- ▶ SET1 can be selected to dependent on SET2.
- ▶ Output contact relay can be adjusted to continuous output or between 0.01 and 999.9-second intervals.
- ▶ Output delay time can be adjusted in Tachometer Mode.
- ▶ Functional reset selection.
- ▶ 0 - 500000 Offset selection.
- ▶ Parameter access protection.
- ▶ Easy installation.
- ▶ RS485 Modbus communication interface (Specify at order).
- ▶ CE marked according to European Norms.



| Order Code : ECH <input type="text" value="0"/> <input type="text" value="0"/> - <input type="text" value=""/> - <input type="text" value=""/> | | |
|--|--|---|
| 1 | 2 | 3 |
| 1 - Size 4400.....48x48x87mm 7700.....72x72x97mm | 2 - Supply Voltage UV.....90-250V AC LV.....10-30V DC / 8-24V AC | 3 - Modbus RS ...Modbus (Specify at Order) |

TECHNICAL SPECIFICATIONS



RoHS
Compliant

ENVIRONMENTAL CONDITIONS

| | |
|--------------------------------------|--|
| Ambient / Storage Temperature | 0 ... +50°C/-25 ... +70°C (with no icing) |
| Max. relative humidity | 80% Relative humidity for temperatures up to 31°C, decreasing linearly to 50% at 40°C. |
| Rated pollution degree | According to EN 60529 ; Front Panel : IP65, Rear Panel : IP20 |
| Height | Max. 2000m |

⚠ KEEP AWAY device from exposed to corrosive, volatile and flammable gases or liquids and DO NOT USE the device in similar hazardous locations.

ELECTRICAL CHARACTERISTICS

| | |
|----------------------------|---|
| Supply | 90-250V AC 50/60Hz ; 10-30V DC / 8-24V AC SMPS |
| Power Consumption | Max. 5VA |
| Wiring | Power connection : 2.5mm ² screw-terminal, Signal connection : 1,5mm ² screw-terminal connections |
| Data Protection | EEPROM (Min. 10 years) |
| EMC | EN 61326-1: 2013 (Performance criterion B satisfied for EN 61000-4-3 standard). |
| Safety Requirements | EN 61010-1: 2010 |

INPUTS

| | |
|--------------------------------|--|
| Count inputs CPA, CPB | 2 Channels (Max. 50KHz, between 5V and 30V pulses). Can be selected as PNP and NPN input. |
| Counting frequency (Hz) | Can be programmed to 20hz, 50hz, 100Hz,500hz, 1000hz, 5000hz, 10KHz,20KHz, 30KHz and 40KHz. |
| Reset Input | PNP : Positive Reset (Can be adjusted between 1ms and 100ms for 5V and 30V pulses). NPN : GND terminal can be reset by connecting to "RESET IN" terminal. |

OUTPUTS

| | |
|---|--|
| Control Output (OUT1 and OUT2) | ECH4400 : OUT1 250V AC, 10A (for resistive load) NO+NC , OUT2 250V AC , 5A(for resistive load) NO ECH7700 : OUT1 250V AC, 8A (for resistive load) NO+NC |
| SSR1 and SSR2 Output | Open collector output (S.S. OUT) : Max. 30V DC, 50mA |
| Sensor (Auxiliary) Supply Output | 12V DC, Max. 50mA (without regulation) |
| Life expectancy for relay | Without load 5.000.000 switching; 250V AC, 5A (resistive load) 100.000 switching. Without load 30.000.000 switching; 250V AC, 8A (resistive load) 300.000 switching. Without load 30.000.000 switching; 250V AC, 10A (resistive load) 100.000 switching. |
| Accuracy | ± % 0.01 ± 1ms |

⚠ Note : "Relay" and "S.S.OUT" outputs runs simultaneously. i.e, When "OUT1" or "OUT2" relay is operated, "SSR1" or "SSR2" transistor is activated.

HOUSING

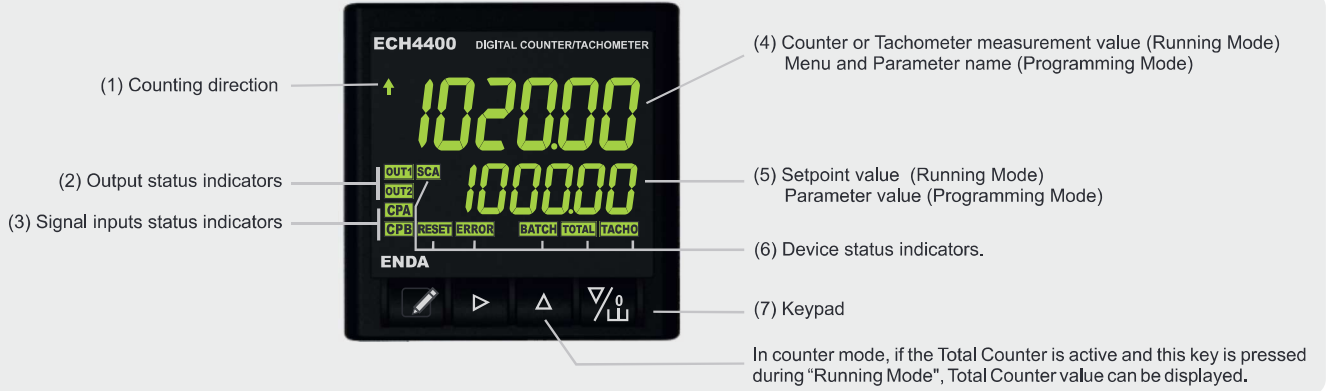
| | |
|---------------------------|---|
| Housing Type | Suitable for flush-panel mounting according to DIN 43 700. |
| Dimensions | ECH4400 : G48xY48xD87mm, ECH7700 : G72xY72xD97mm. |
| Weight | ECH4400 : Approx. 230g (after packing) ECH7700 : Approx. 380g (after packing) |
| Enclosure Material | Self extinguishing plastics |

⚠ Avoid any liquid contact when the device is switched on. DO NOT clean the device with solvent (thinner, gasoline, acid etc.) and / or abrasive cleaning agents.



SISEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.
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TERMS



In counter mode, if the Total Counter is active and this key is pressed during "Running Mode", Total Counter value can be displayed.

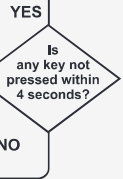
| | |
|------------------------------|---|
| (1) Counting Direction | Up / Down arrows (same as PV indicator color) |
| (2) Output status indicators | Two pieces (same as SV indicator color) |
| (3) Signal inputs indicators | Two pieces (same as SV indicator color) |
| (4) PV Indicators | 7 segment, 6 digits, LCD indicator colors can be selected as red, green and orange. (Character height 10 mm). |
| (5) PV Indicators | 7 segment, 6 digits, LCD indicator colors can be selected as red, green and orange. (Character height 7 mm). |
| (6) Device status indicators | Six pieces (same as SV indicator color) |
| (7) Keypad | Micro switch |

SETTING UP PRESET VALUES



While in "Running Mode", by pressing to key, **Preset1** or **Preset2** setpoint values can be selected. Selected setpoint value displayed on the upper indicator and adjustable digit flashes. If no key is pressed for 4 seconds, "Running Mode" is entered.

PRESSED VALUES



By using key, **Preset1** time is selected and by pressing key desired digit is selected. Selected digit flashes and by using keys desired value adjusted.

For **Preset2**, Same method is applied such as **Preset1** value settings.



If **TachoA** mode is selected and the **INPLYP** parameter is set to **1A-1b** or **1A-1b-1A**, CPA input can be monitored at the bottom display.



If **TachoB** mode is selected and the **INPLYP** parameter is set to **1A-1b** or **1A-1b-1A**, CPB input can be monitored at the bottom display.



COUNTER SETTINGS

⚠ If *dEMode* parameter is selected as *Counter*, following parameters will be activated.

Accessing to "Running Mode" from "Programming Mode":

If no key is pressed within 20 seconds, during "Programming Mode", data is stored automatically and "Running Mode" is entered. Alternatively, the same function occurs first pressing **▶** key and "Programming Mode" is entered. Then **▶** key and "Running Mode" is entered.

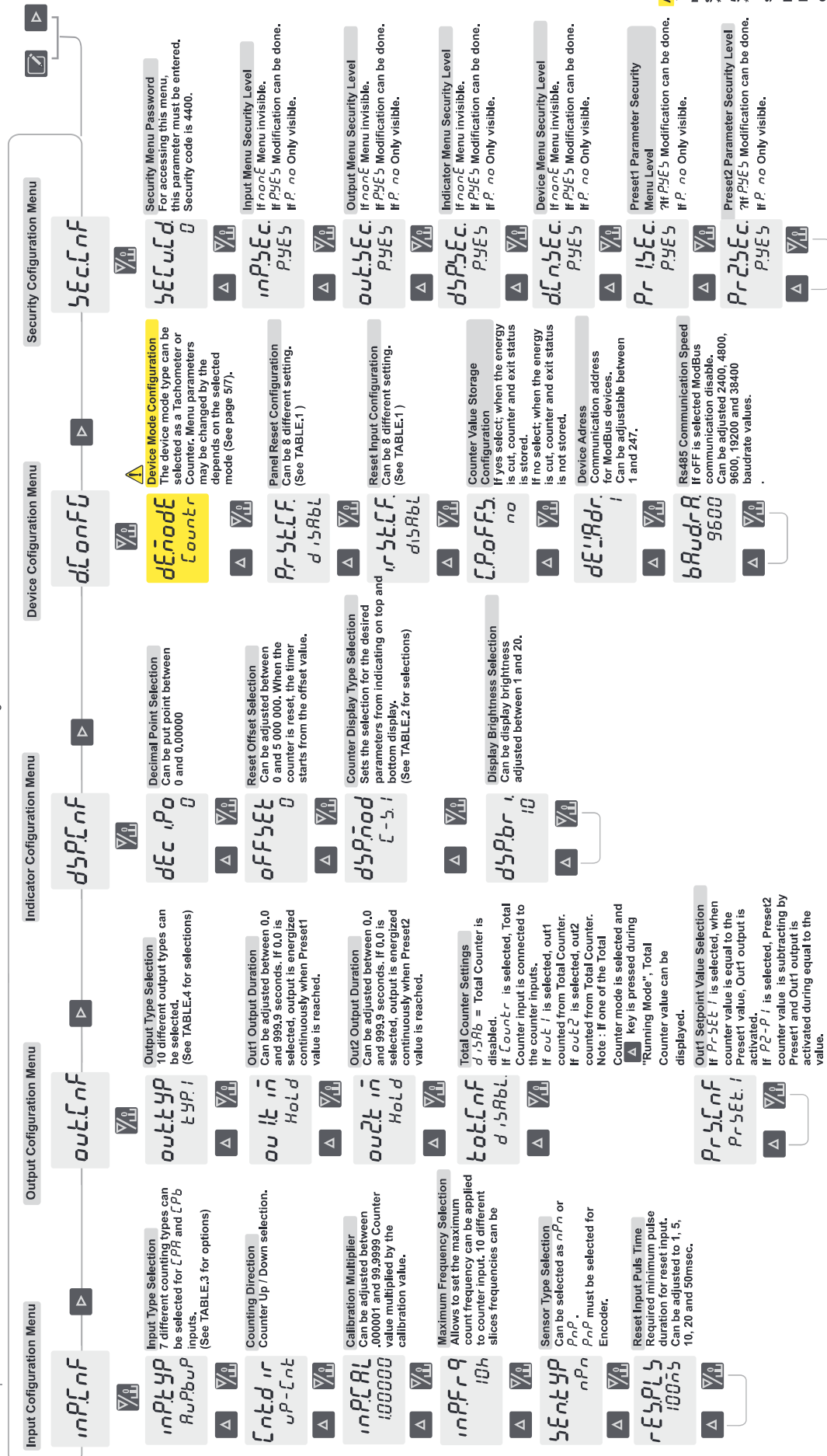


TABLE.1

Reset Configuration Table:

| Parameter Message | action to be taken |
|-------------------|-----------------------------------|
| 0 d15AbL | Reset is not done |
| 1 C-r | Counter Reset On |
| 2 t-r | Total Reset On |
| 3 b-r | Batch Reset On |
| 4 Ct-r | Counter and Total Reset On |
| 5 Cb-r | Counter and Batch Reset On |
| 6 Eb-r | Total and Batch Reset On |
| 7 Ct-b-r | Counter, Total and Batch Reset On |

TABLE.2

Parameter selection table

| dSPMod/CP Parameter value | UPPER Display | LOWER Display |
|---------------------------|---------------|---------------|
| 0 C-5.i | Counter | SET1 |
| 1 C-5.e | Counter | SET2 |
| 2 C-b | Counter | Batch |
| 3 b-5.i | Batch | SET1 |
| 4 b-5.e | Batch | SET2 |
| 5 t-h-tL | Total H | Total L |

Attention!!

- * If Batch counter mode is not selected, mode 2, mode 3 and mode 4 can not be selected
- * If the Total Counter is disabled, mode 5 can not be selected.
- * If one of the Total Counter mode is selected and mode 5 is not selected, by pressing **▶** key during "Running Mode", Total Counter value can be displayed.
- * While Total Counter displayed, by pressing **▶** key, Total Counter value can be reset.

PARAMETER SETTINGS



The selected parameter of the digit will flash when the **▶** key is pressed. Value can be changed by using **▶** navigation keys. The next digit can be selected with the **▶** key and the same method can be applied as the previous step. If the decimal point of the selected parameter can also be adjusted, the message -dP appears on the display during the digit selection. While this message is displayed, the decimal point is brought to the desired place with the **▶** keys. If the **▶** key (Up) is pressed continuously for 0.6 seconds, the value to be increasing rapidly. The same method applies to the decrement (Down) key.

TABLE 3 COUNTER INPUT TYPE TABLE

| | $uP-Cnt$ | Cnt | $dn-Cnt$ |
|--------------------|----------|-------|----------|
| 0 RUPBP | | | |
| 1 RUPBt | | | |
| 2 RUPBn | | | |
| 3 RUPB i | | | |
| 4 uPBP i | | | |
| 5 uPBP2 | | | |
| 6 uPBP4 | | | |

NOTE: 1

| Input Symbol | INPUT TYPE |
|--------------|--|
| H | NPN input (Voltage input no) PNP input (Voltage input) |
| L | input short circuit input open circuited |

Input frequency must not exceed the specified value. If input frequency exceed the specified value, the device does not make accurate count.

TABLE 4

COUNTER OUT TYPE TABLE

| | UP COUNTER $inPLUP = RUPBP, RUPBt, RUPBn, RUPB i, uPBP i, uPBP2, uPBP4$ Cnt | DOWN COUNTER $inPLDP = RUPBP, RUPBt, RUPBn, RUPB i, uPBP i, uPBP2, uPBP4$ Cnt | UP/DOWN COUNTER $inPLUP = RUPBP, RUPBt, RUPBn, RUPB i, uPBP i, uPBP2, uPBP4$ $inPLDP = RUPBP, RUPBt, RUPBn, RUPB i, uPBP i, uPBP2, uPBP4$ Cnt | UP / DOWN COUNTER $inPLUP = RUPBP, RUPBt, RUPBn, RUPB i, uPBP i, uPBP2, uPBP4$ $inPLDP = RUPBP, RUPBt, RUPBn, RUPB i, uPBP i, uPBP2, uPBP4$ Cnt |
|--------------------|---|---|--|--|
| 0 outLUP | | | | |
| 1 outLUP | | | | |
| 2 outLUP | | | | |
| 3 outLUP | | | | |
| 4 outLUP | | | | |
| 5 outLUP | | | | |
| 6 outLUP | | | | |

While $brLch$ counter mode is selected, decimal point is invisible. Because, $Pr5Et2$ and $brLch$ values are integer.

- If $ouLr$ and $ou2Lr$ is adjusted between 0.01 and 999.9 sec, pulse output is obtained
- If $ouLr$ and $ou2Lr$ is adjusted between 0.0 and 999.9 sec, continuous output is obtained.



Input frequency must not exceed the specified value. If input frequency exceed the specified value, the device does not make accurate count.

REVSPEED MEASURING MODE PROGRAMMING DIAGRAM

If **↵** key is pressed while holding **▶** key, "Programming Mode" is entered.

⚠ If **dE_nodE** parameter is selected as **tRc_ho**, following parameters will be activated.

Accessing to "Running Mode" from "Programming Mode":
if no key is pressed within 20 seconds, during "Programming Mode", data is stored automatically and "Running Mode" is entered. Alternatively, the same function occurs first pressing **▶** key and "Programming Mode" is entered. Then **↵** keys are pressing together, data is recorded and "Running Mode" is entered.

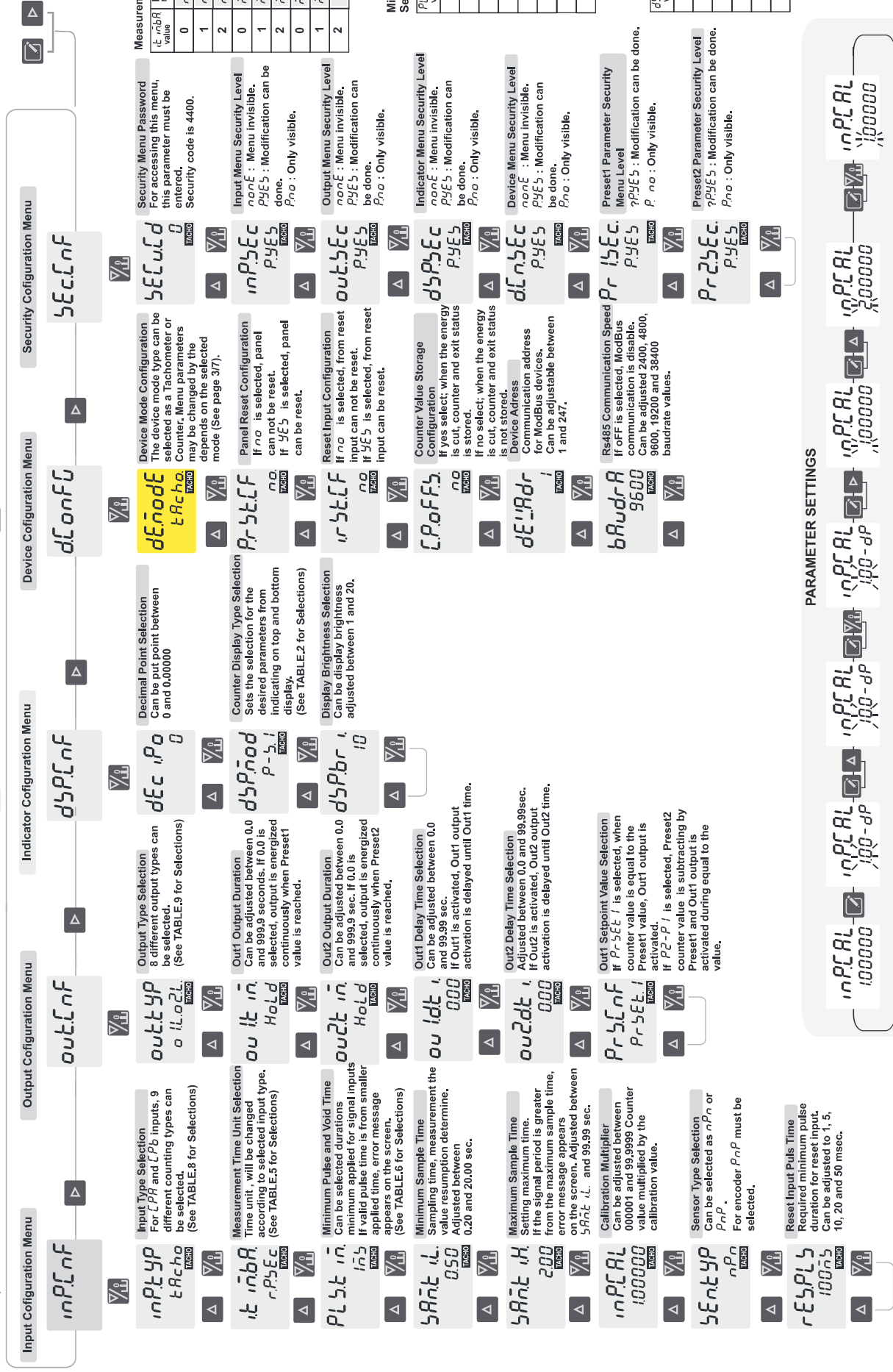


TABLE.5 Measurement Time Unit Selection Table

| Parameter message | Explanation |
|-------------------|------------------|
| 0 rP5E.C | Puls in 1 second |
| 1 rP5.M | Puls in 1 minute |
| 2 rP5.hou.r | Puls in 1 hour |
| 0 nP5E.C | meter / second |
| 1 nP5.M | meter / minute |
| 2 nP5.hou.r | metre / hour |
| 0 n.c5E.C | microseconds |
| 1 nL5E.C | milliseconds |
| 2 i00n5 | 100 milliseconds |

TABLE.6 Minimum Pulse Void Time Selection Table

| Parameter message | Explanation |
|-------------------|-------------|
| 0 40n5 | 40 msec |
| 1 20n5 | 20 msec |
| 2 i0n5 | 10 msec |
| 3 i5n5 | 5 msec |
| 4 05n5 | 0.5 msec |
| 5 0.i5n5 | 0.1 msec |
| 6 0.05n5 | 0.05 msec |
| 7 0.01n5 | 0.01 msec |

TABLE.7 Parameter Selection Table to Display

| Parameter message | UPPER Display | LOWER Display |
|-------------------|---------------|---------------|
| 0 P-5.1 | Measuring | SET1 |
| 1 P-5.2 | Measuring | SET2 |
| 2 P-R5.1 | Measuring | On SET1 |
| 3 P-t.P | Measuring | Total Rev |
| 4 | | |
| 5 | | |

PARAMETER SETTINGS



The selected parameter of the digit will flash when the **↵** key is pressed. Value can be changed by using **▶** / **◀** navigation keys. The next digit can be selected with the **▶** key and the same method can be applied as the previous step. If the decimal point of the selected parameter can also be adjusted, the message **-dP** appears on the display during the digit selection. While this message is displayed, the decimal point is brought to the desired place with the **▶** / **◀** keys. If the **▶** key (Up) is pressed continuously for 0.6 seconds, the value to be increasing rapidly. The same method applies to the decrement (Down) key.

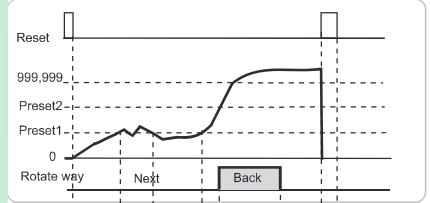
TABLE.8 PULSE MEASUREMENT INPUT TYPE TABLE

TABLE.9 PULSE MEASURED OUTPUTS TYPE TABLE

| | |
|--|---|
| tRch.a tRcd.ir R.ibr.R L.in5P.d PEr.iad t.in.mt. PL.tt.in C.nPEPL C.nPECY R-ib | <p>0 Pulse Measurement Method (rps: pulse/second, rpm: pulse/minute, rph : pulse/hour)</p> <p>CPA input H L second CPB(HOLD)input H L second $t_{in} \cdot n_{BR} = r \cdot P_{in}$ Process value Previous value (Calibration/T1x60) rpm (Calibration/T2x60) rpm (Calibration/T3x60) rpm Attention: Pulse and void times input signal appropriate must be selected.</p> |
| | <p>1 Phase Difference Input Pulse Measurement Method (rps: pulse/second, rpm: pulse/minute, rph : pulse/hour) Direction Indicator</p> <p>CPA Input H L second CPB Input H L second $t_{in} \cdot n_{BR} = r \cdot P_{in}$ Process value Previous value (Calibration/T1x60) rpm (Calibration/T2x60) rpm (Calibration/T3x60) rpm Attention: Pulse and void times input signal appropriate must be selected.</p> |
| | <p>2 CPA With CPB Inputs Puls Rate Finding Method</p> <p>CPA input H L second CPB input H L second Process value Previous value $(1/Ta) / (1/Tb)$</p> |
| | <p>3 Speed Measurement Method (m/s : meter / second, m/m : meter / minute, m/h : meter / hour) Can Be Selected</p> <p>CPA input H L second CPB input H L second Process value Previous value (Calibration value / T1)m/s (Calibration value / T2)m/s (Calibration value / T3)m/s Attention: Pulse and void times input signal appropriate must be selected.</p> |
| | <p>4 Period Measurement Method</p> <p>CPA input H L second CPB(HOLD)input H L second Process value Previous value $(T1+T2+ \dots +Tn)/n$ Attention: Pulse and void times input signal appropriate must be selected.</p> |
| | <p>5 Time Difference Measurement Method</p> <p>CPA input H L second CPB input H L second Process value Önceki değer T1 T2 T3 Attention: Pulse and void times input signal appropriate must be selected.</p> |
| | <p>6 Puls Width Measurement Value</p> <p>CPA input H L second CPB(HOLD) input H L second Process Value Previous value T1 T2 T4 Attention: Pulse and void times input signal appropriate must be selected.</p> |
| | <p>7 Pulse Census Method</p> <p>CPA input H L second CPB input H L second RESET IN input H L second Process value Previous value counting value: 9 sayma değeri: 10 SIFIR Attention: Pulse and void times input signal appropriate must be selected. (Counting values Calibration = for 1)</p> |
| | <p>8 Pulse Census Method</p> <p>CPA input H L second CPB input H L second RESET IN input H L second Process value Previous value counting value: 9 counting value: 13 ZERO Attention: Pulse and void times input signal appropriate must be selected. (Counting values Calibration = for 1)</p> |
| <p>9 CHA with CHB Inputs Pulse Difference Finding Method</p> <p>CPA input H L second CPB input H L second $t_{in} \cdot n_{BR} = r \cdot P_{in}$ Process value Previous value $((1/Ta) - (1/Tb)) \times 60$ rpm $((1/Ta) - (1/Tb)) \times 60$ rpm $((1/Ta) - (1/Tb)) \times 60$ rpm ATTENTION! If this method selected, measured pulse from CPA input must be greater or equal from CPB inputs pulse If CPA small CPB; $mP_{u}b$ this error message is visible. H, Gb</p> | |

| | |
|--|---|
| out.tYP. o.ILo2L. o.IHo2L. o.ILo2H. o.IHo2H. o.ILo2F. o.IHo2F. | <p>0</p> <p>Out1 $ou\ idt\ i$ $ou\ 2dt\ i$ Out2 $ou\ idt\ i$ $ou\ 2dt\ i$</p> |
| | <p>1</p> <p>Out1 $ou\ idt\ i$ Out2 $ou\ idt\ i$ $ou\ 2dt\ i$</p> |
| | <p>2</p> <p>Out1 $ou\ idt\ i$ $ou\ idt\ i$ Out2 $ou\ idt\ i$ $ou\ 2dt\ i$</p> |
| | <p>3</p> <p>Out1 $ou\ idt\ i$ Out2 $ou\ idt\ i$</p> |
| | <p>4</p> <p>Out1 $ou\ idt\ i$ $ou\ idt\ i$ Out2 (Way out) $ou\ idt\ i$</p> |
| | <p>5</p> <p>Out1 $ou\ idt\ i$ Out2 (Way out) $ou\ idt\ i$ $ou\ 2dt\ i$</p> |
| | <p>7</p> <p>Out1 $ou\ idt\ i$ Out2 (Way out) $ou\ idt\ i$ $ou\ 2dt\ i$</p> |

! If $inP.tYP. = tRcd.ir.$ is selected, following output types will be activated.

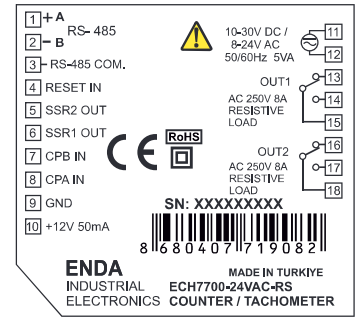
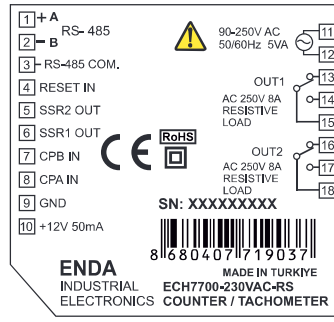
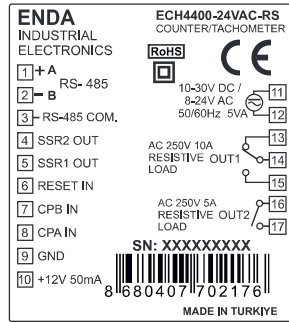
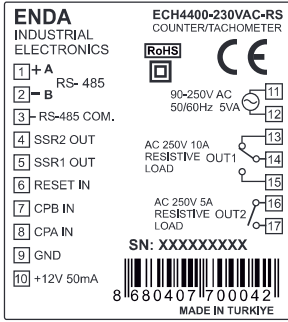


NOTE: 1 INPUT TYPE

| Input Symbol | NPN input (Voltage input not) | PNP input (Voltage input) |
|--------------|-------------------------------|---------------------------|
| H | Input shourchange | 4,5V - 30V DC |
| L | Input open circuit | 0V - 2V DC |

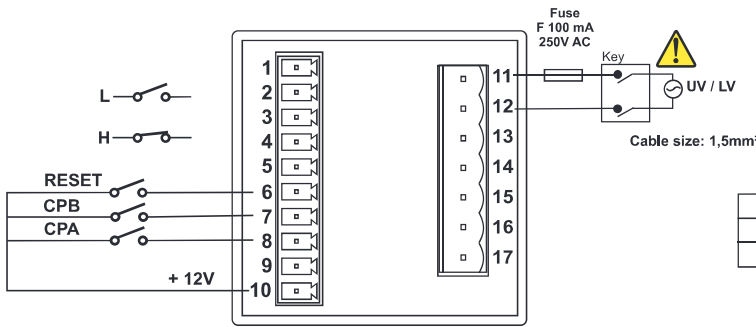
■ If $ou\ idt\ i$ and $ou\ 2dt\ i$ is adjusted between 0.01 and 999.9 sec. pulse output is obtained.
 □ If $ou\ idt\ i$ and $ou\ 2dt\ i$ is adjusted between 0.0 sec. (Hold) continuous output is obtained.
 $ou\ idt\ i$ and $ou\ 2dt\ i$ is adjusted between 0.0 and 999.9 sec. Output delayed of until adjusted time . When set 0 output is instantly taken

CONNECTION DIAGRAM

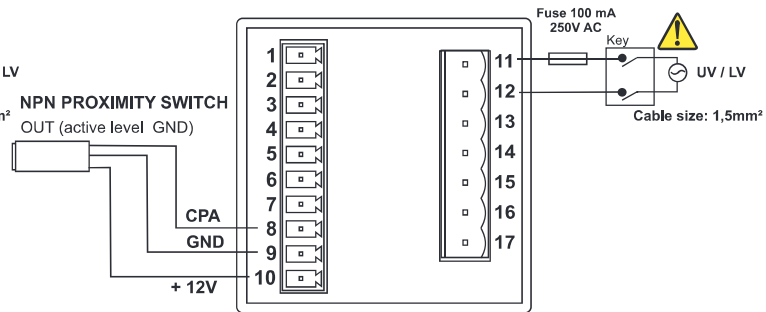
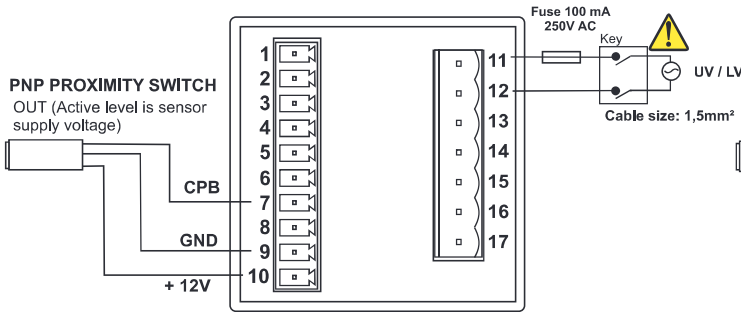
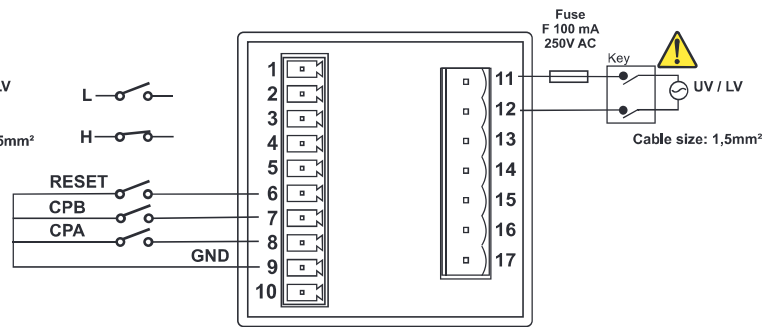


SENSOR CONNECTION SAMPLES

Connection samples for PNP sensor type



Connection samples for NPN sensor type

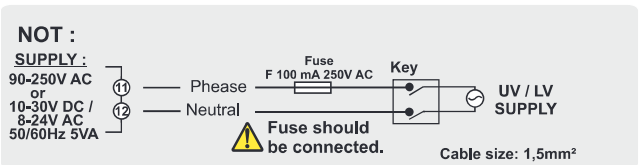


! Logic output of the device is not electrically isolated.

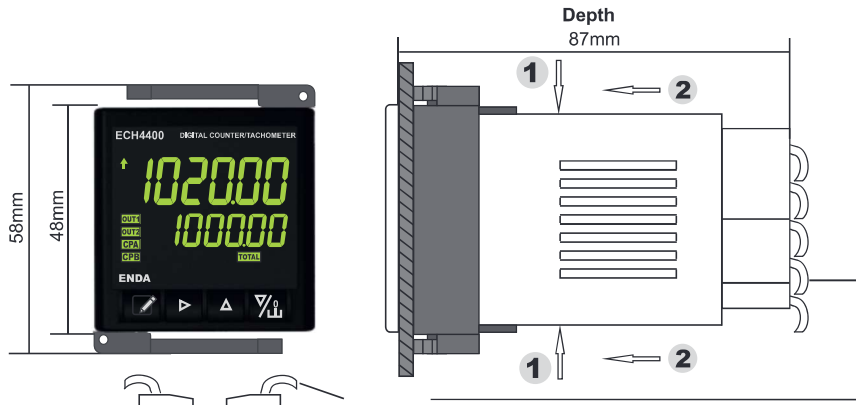
- Note :**
- 1) Mains supply cords shall meet the requirements of IEC60227 or IEC60245.
 - 2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

Holding screw 0,4-0,5Nm

Equipment is protected throughout by DOUBLE INSULATION.



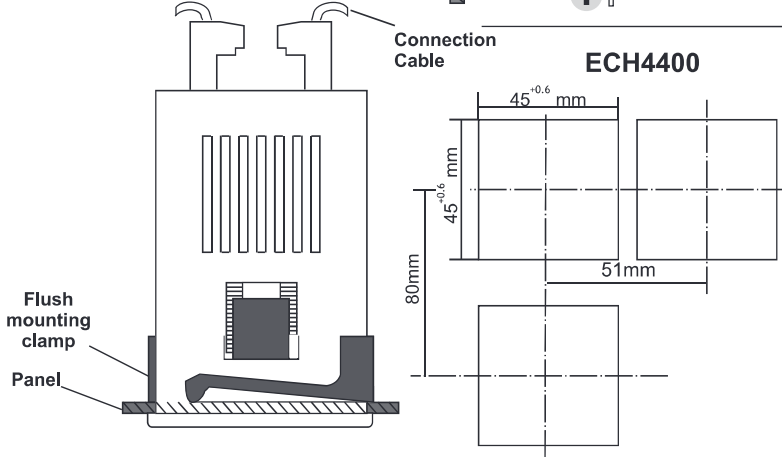
DIMENSIONS



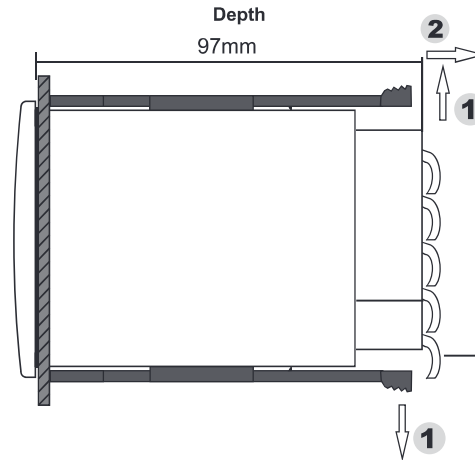
To removing the device from the panel:
 - While pressing both side of the device in direction **1** and push it in direction **2** .

NOTE:

- 1) While performing panel mounting, additional space should be allocated for cables.
- 2) Panel thickness should be maximum **9mm**.
- 3) If there is no **100mm** free space at back side of the device, it would be difficult to remove it from the panel.



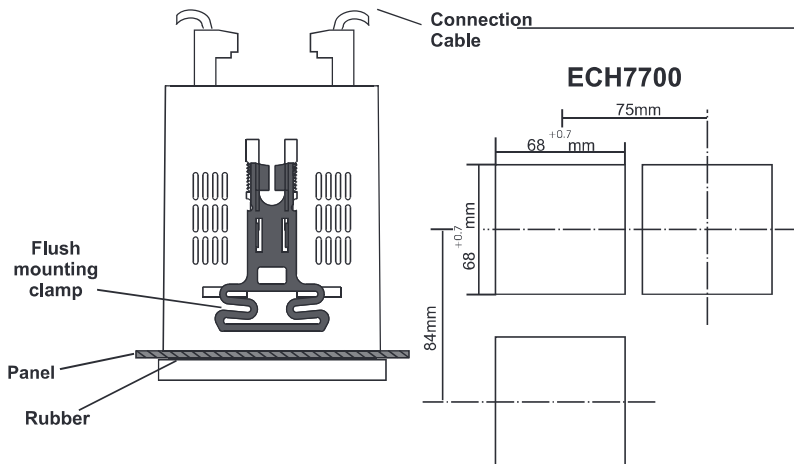
ENDA ECH Series are intended for installation within control panels. Make sure that the device is used only for intended purpose. The shielding must be grounded on the instrument side. During an installation, all of the cables that are connected to the device must be free of electrical power. The device must be protected against inadmissible humidity, vibrations, severe soiling. Make sure that the operation temperature is not exceeded. All input and output lines that are not connected to the supply network must be laid out as shielded and twisted cables. These cables should not be close to the power cables or components. The installation and electrical connections must be carried out by a qualified staff and must be according to the relevant locally applicable regulations.



To removing the device from the panel:
 - While pressing both side of the device in direction **1** and push it in direction **2** .

NOTE:

- 1) While performing panel mounting, additional space should be allocated for cables.
- 2) Panel thickness should be maximum **9mm**.
- 3) If there is no **100mm** free space at back side of the device, it would be difficult to remove it from the panel.



ENDA ECHxx00 COUNTER/TACHOMETER MODBUS ADDRESS MAP

1.1 Counter/Tachometer Memory Map for Timer Holding Registers

| Parameter Number | Holding Register Address Decimal (Hex) | Data Type | Data Content | Read /Write | Factory Settings | | |
|---|--|---------------|---------------|--|--|--------|---|
| | | | | Permissions | | | |
| Counter/Tachometer Configuration Parameters | H0 | 0000d (0000h) | Dword | Setpoint for Preset1 value. (Adjustable between 0-999999d. Format :32 Bit Hex = 0-999999d) First word LSW, second word MSW Sample: Adjusting for 550000d (86470h): LSW = 6470h, MSW = 0008h | R W | 100000 | |
| | H2 | 0002d (0002h) | Dword | Setpoint for Preset2 value. (Format must be as in the H0 parameter) | R W | 200000 | |
| | H4 | 0004d (0004h) | Word | Counter input type selection. (See TABLE.3 for adjustment) | R W | 0 | |
| | H5 | 0005d (0005h) | Word | Counter input frequency selection. 0 = 20Hz, 1 = 50Hz, 2 = 100Hz, 3 = 500Hz, 4 = 1000Hz, 5 = 5Khz 6 = 10Khz, 7 = 20Khz, 8 = 50Khz, 9 = 80Khz | R W | 0 | |
| | H6 | 0006d (0006h) | Word | Counter counting direction selection, 0 = Up counting, 1 = Down counting | R W | 0 | |
| | H7 | 0007d (0007h) | Word | Sensor type selection. 0 = NPN, 1 = PNP | R W | 0 | |
| | H8 | 0008d (0008h) | Word | Reset input pulse time selection, 0 = 1ms, 1 = 5ms, 2 = 20ms, 3 = 50ms, 4 = 100ms | R W | 0 | |
| | H9 | 0009d (0009h) | Dword | Setpoint for Calibration. (Adjustable between Format :32 Bit BCD = 1-999999) First word LSW second word MSW Sample: Adjustable between 150000 BCD (0150000h); LSW = 0000h, MSW = 0150h | R W | 100000 | |
| | H11 | 0011d (000Bh) | Word | Decimal point selection for Calibration. (0 = .000000, 1 = 0.00000, 2 = 00.0000) | R W | 1 | |
| | H12 | 0012d (000Ch) | Word | Tachometer input type selection. (See TABLE.8 for adjustment) | R W | 0 | |
| | H13 | 0013d (000Dh) | Word | Tachometer time base selection. (See TABLE.5 for setting) | R W | 0 | |
| | H14 | 0014d (000Eh) | Word | Tachometer pulse time selection. (See TABLE.6 for adjustment) | R W | 3 | |
| | H15 | 0015d (000Fh) | Word | Tachometer sampling time selection. Selectable between 0.20 s with 20.0 s. | R W | 50 | |
| | H16 | 0016d (0010h) | Word | Tachometer maximum sample time selection. Selectable between H8 and 99.99 s | R W | 200 | |
| | H17 | 0017d (0011h) | Word | Counter output type selection. (See TABLE.4 for adjustment) | R W | 0 | |
| | Output Parameters | H18 | 0018d (0012h) | Word | Total Counter configuration selection. 0 = Total Counter disable, 1 = Counter input connects: Total Counter 2 = OUT1 output connects: Total Counter, 3 = OUT2 output connects: Total Counter | R W | 0 |
| | | H19 | 0019d (0013h) | Word | Setpoint value selection for OUT1 0 = Preset1 OUT1 output value, 1 = Preset2 - Preset1 OUT1 output value | R W | 0 |
| H20 | | 0020d (0014h) | Word | OUT1 output time setting. Adjustable between 0.0 and 999.9 sec. 0= continuously activated | R W | 0 | |
| H21 | | 0021d (0015h) | Word | OUT2 output time setting. Adjustable between 0.0 and 999.9 sec. 0= continuously activated | R W | 0 | |
| H22 | | 0022d (0016h) | Word | Tachometer output type select (See TABLE.9 for adjusment) | R W | 0 | |
| H23 | | 0023d (0017h) | Word | Tachometer OUT1 output delay time. Adjustable between 0.0 and 999.9 sec. | R W | 0 | |
| H24 | | 0024d (0018h) | Word | Tachometer OUT2 output delay time. Adjustable between 0.0 and 999.9 sec. | | 0 | |
| H25 | | 0025d (0019h) | Dword | Decimal point selection parameter. 0 = Decimal point no, 1 = 0.0 , 2 = 0.00 , 3 = 0.000, 4 = 0.0000, 5 = 0.00000 | R W | 10 | |
| H27 | | 0027d (001Bh) | Word | Offset value (Format must be as in the H0 parameter) | R W | 0 | |
| H28 | | 0028d (001Ch) | Word | Counter display configuration selection. (See TABLE.2 for adjustment) | R W | 0 | |
| Display Configuration Parameters | H29 | 0029d (001Dh) | Word | Tachometer display configuration selection. (Seen TABLE.7 for adjustment) | R W | 0 | |
| | H30 | 0030d (001Eh) | Word | Display brightness setting parameter. Adjustable between 1 and 20 . | R W | 10 | |
| | H31 | 0031d (001Fh) | Word | Counter/Tachometer selection parameter.(0 = Counter mode, 1 = Tachometer mode). | R W | 0 | |
| | H32 | 0032d (0020h) | Word | Counter panel reset configuration selection. (See TABLE.1 for adjusment) | R W | 0 | |
| | H33 | 0033d (0021h) | Word | Counter reset input configuration selection. (See TABLE.1 for adjusment) | R W | 0 | |
| | H34 | 0034d (0022h) | Word | Tachometer panel reset configuration selection. (0 = No, 1 = Yes) | R W | 0 | |
| | H35 | 0035d (0023h) | Word | Tachometer reset input configuration selection. (0 = No, 1 = Yes) | R W | 0 | |
| | H36 | 0036d (0024h) | Word | When the energy is cut, measurement value stored. (0 = No, 1 = Yes) | R W | 0 | |
| | H37 | 0037d (0025h) | Word | Device address value for Modbus (Adjustable between 1 and 247) | R W | 1 | |
| | H38 | 0038d (0026h) | Word | Connection speed for Modbus: 0 = 1200 bps, 1 = 2400 bps, 2 = 4800 bps, 3 = 9600 bps, 4 = 14400 bps, 5 = 19200 bps, 6 = 38400 bps, 7 = 57600 bps | R W | 3 | |
| Device Configuration | H39 | 0039d (0027h) | Word | Counter/Tachometer configuration menu security parameter. Adjustable between 0 and 2. 0 = Menu invisible, 1 = Menu parameters is programmable, 2 = Menu parameters is only visible | R W | 1 | |
| | H40 | 0040d (0028h) | Word | Output parameters menu security parameter. Adjustable between 0 and 2 0 = Menu invisible, 1 = Menu parameters is programmable, 2 = Menu parameters is only visible | R W | 1 | |
| | H41 | 0041d (0029h) | Word | Display configuration menu security parameter. Adjustable between 0 and 2 0 = Menu invisible, 1 = Menu parameters is programmable, 2 = Menu parameters is only visible | R W | 1 | |
| | H42 | 0042d (002Ah) | Word | Device configuration menu security parameter. Adjustable between 0 and 2 0 = Menu invisible, 1 = Menu parameters is programmable, 2 = Menu parameters is only visible | R W | 1 | |
| | H43 | 0043d (002Bh) | Word | Preset 1 (H0) parameter security parameter. Adjustable between 1 and 2 1 = Menu parameters is programmable, 2 = Menu parameters is only visible | R W | 1 | |
| | H44 | 0044d (002Ch) | Word | Preset 2 (H2) parameter security parameter. Adjustable between 1 and 2 1 = Menu parameters is programmable, 2 = Menu parameter is only visible | R W | 1 | |
| | H45 | 0045d (002Dh) | Word | Function control parameter If (23040d (5A00h) value is entered, device is returned to factory settings. If 23041d (5A01h) value is entered, must be reset according to H33 value. If 23042d (5A02h) value is entered, counting value is reset. If 23043d (5A03d) value is entered, Total Counter reset If 23044d (5A04h) value is entered, Batch counter reset If 23045d (5A05h) value is entered, Tachometer values is reset | R W | 0 | |
| | Security Parameters | | | | | | |

ENDA ECHxx00 COUNTER/TACHOMETER MODBUS ADDRESS MAP

1.2 Memory Map For Input Registers

| Parameter Number | Input Register address Decimal (Hex) | Data Type | Data Content | Read / Write Permission |
|------------------|--------------------------------------|-----------|--|-------------------------|
| I0 | 0000d (0000h) | Dword | Counter counting values (Format :32 Bit Hex = Adjustable between -999999 and 999999d) First word LSW, second word MSW Sample: Reading value for 550000d (86470h); LSW = 6470h, MSW = 0008h. | R |
| I2 | 0002d (0002h) | Dword | Batch counter counting value (Format :32 Bit Hex = Adjustable 0 and 999999d) First word LSW, second word MSW Sample: If reading value is 550000d (86470h); LSW = 6470h, MSW = 0008h | R |
| I4 | 0004d (0004h) | Dword | Total Counter counting value (Format :32 Bit Hex = Adjustable between -999,999,999 and 999,999,999d) First word LSW, second word MSW | R |
| I6 | 0006d (0006h) | Dword | Counter hold value (Format is as in the I0 input register) | R |
| I8 | 0008d (0008h) | Dword | Active Preset1 value (Format is as in the I2 input register) | R |
| I10 | 0010d (000Ah) | Dword | Tachometer measurement value (Format is as in the I2 input register) | R |
| I12 | 0012d (000Ch) | Dword | CPA pulse value (Format is as in the I2 input register) | R |
| I14 | 0014d (000Eh) | Dword | CPB pulse value (Format is as in the I2 input register) | R |

1.3 Memory Map for Input Registerlers

| Parameter Number | Holding Register addresses Decimal (Hex) | Data Type | Data Content | Read / Write Permission |
|------------------|--|-----------|---|-------------------------|
| I0 | 0000d (0000h) | Word | Timer1 time value (Must be read according to BCD format) | R |
| I1 | 0001d (0001h) | Word | Timer2 time value (Format is as in the I0 parameter) | R |
| I2 | 0002d (0002h) | Word | Out1 pulse time value (Must be read according to BCD format. Sensitivity 0.00sn) | R |
| I3 | 0003d (0003h) | Word | Out2 pulse time value (Format is as in the I2 parameter) | R |

1.4 Memory Map for Output Status Indicator Bits

| Parameter Number | Discrete input addresses | Data Type | Data Content | Read / Write Permission |
|------------------|---|-----------|--|-------------------------|
| D0 | (0000)h | Bit | OUT1 Output status (0 = OFF ,1 = ON) | R |
| D1 | (0001)h | Bit | OUT2 Output status (0 = OFF , 1 = ON) | R |
| D2 | (0002)h | Bit | Panel reset key status (0 = Reset key inactive, 1 = Reset key is active) | R |
| D3 | (0003)h | Bit | Reserve | R |
| D4 | (0004)h | Bit | Reset input status (0 = Reset input inactive, 1 = Reset input is active) | R |
| D5 | (0005)h | Bit | Gate input status (0 = Gate input inactive, 1 = Gate input is active) | R |
| D6 | (0006)h | Bit | Start input status (0 = Start input inactive, 1 = Start input is active) | R |
| D7-D15 | 0007d (0007h) 0015d (000Fh) | Bit | Reserve | R |

1.5 Memory Map for Software Revision Input Registers

| Software Revision | 0920d (0398h) | 14 Word | Software name and update date is in ASCII format and 14 word. Example : EM4400-01 28 Feb 2015. Memory Format : Word Word Word Word Word Word Word Word Word Word Word Word Word Word Word 1 2 3 4 5 6 7 8 9 10 11 12 13 14 CE444000-11 42Agu210.6 | R |
|---|---------------|---------|---|---|
| NOTE : To view each word correctly by changing the byte sequences should be displayed as ASCII TEXT | | | | |

2. MODBUS ERROR MESSAGES

Modbus protocol has two types error, communication error and operating error. Reason of the communication error is data corruption in transmission. Parity and CRC control should be done to prevent communication error. Receiver side checks parity and CRC of the data. If they are wrong, the message will be ignored. If format of the data is true but function doesn't perform for any reason, operating error occurs. Slave realizes error and sends error message. Most significant bit of function is changed '1' to indicate error in error message by slave. Error code is sent in data section. Master realizes error type via this message.

ModBus Error Codes

| Error Code | Name | Meaning |
|------------|----------------------|--|
| 01 | ILLEGAL FUNCTION | The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it. |
| 02 | ILLEGAL DATA ADDRESS | The data address received in the query is not an allowable address for the slave. |
| 03 | ILLEGAL DATA VALUE | A value contained in the query data field is not an allowable value for the slave. |

Message example;

Structure of command message (Byte Format)

| | | |
|-----------------------------|-----|-------|
| Device Address | | (0A)h |
| Function Code | | (01)h |
| Beginning address of coils. | MSB | (04)h |
| | LSB | (A1)h |
| Number of coils (N) | MSB | (00)h |
| | LSB | (01)h |
| CRC DATA | LSB | (AC)h |
| | MSB | (63)h |

Structure of response message (Byte Format)

| | | |
|----------------|-----|-------|
| Device Address | | (0A)h |
| Function Code | | (81)h |
| Error Code | | (02)h |
| CRC DATA | LSB | (B0)h |
| | MSB | (53)h |

As you see in command message, coil information of (4A1)h = 1185 is required but there isn't any coil with 1185 address. Therefore error code with number (02) (Illegal Data Address) sends.

