ENDA ETS762 TACHO LINE/SPEED METER

Thank you for choosing ENDA ETS762 TACHOMETER.

* 72x72mm sized.
* 2x6 digits display.
* Easy to use by front panel keypad.
* On and Off times of the input pulses can be selected.
* Sensor type can be selected as PNP or NPN.
* Sampling time can be adjusted between 0.2s and 16.0s.
* Selectable functional reset.
* Double set-points control is made by 2 relays outputs.
* Output can be energized while process value is greater or lower than the preset value.
* Time delay can be included to the output operation.
* Output can be energized continuously or just for a time interval of 0.1 to 999.9 seconds.
* Decimal point can be adjusted between 1. and 5. digits.
* Prescaler factor can be adjusted between 0.00001 and 999.999 for calibration.
* Display configuration can be adjusted.
* Parameter access protection on 3 levels.
* Easy connection by removable screw terminals.
* CE marked according to European Norms.

Order Code : ETS762-□□□□□
<u>1</u>

Supply Voltage
230VAC...230V AC
24VAC.....24V AC
SM...........9-30V DC / 7-24V AC

TECHNICAL SPECIFICATIONS

ENVIRONMENTAL CONDITIONS

Ambient/storage temperature	0 ... +50°C/-25 ... +70°C (with no icing)
Max. relative humidity	80% up to 31°C decreasing linearly 50% at 40°C.
Rated pollution degree	According to EN 60529 Front panel : IP65 Rear panel : IP20
Height	Max. 2000m

⚠ Do not use the device in locations subject to corrosive and flammable gases.

ELECTRICAL CHARACTERISTICS

Supply	230V AC +10% -20%, 50/60Hz or 24V AC ±10%, 50/60Hz or optional 9-30V DC / 7-24V AC ±10% SMPS
Power consumption	Max. 7VA
Wiring	2.5mm² screw-terminal connections
Date retention	EEPROM (Min. 10 years)
EMC	EN 61326-1: 2006
Safety requirements	EN 61010-1: 2010 (pollution degree 2, overvoltage category II)

INPUTS

Counting inputs (INA, INB)	3 channels (5V to 30V pulses)
Minimum On and Off times for pulses	40ms, 20ms, 10ms, 1ms, 0.5ms, 0.1ms, 50μs (selectable by programming)
Sampling time	Adjustable between 0.2s and 16.0s.
RESET and HOLD inputs	PNP: 5V to 30V pulse with adjustable pulse time between 2ms and 50ms. NPN: GND terminal is connected to the RESET IN or HOLD IN terminal.

OUTPUTS

Control output (OUT1)	Relay : 250V AC, 2A (for resistive load), NO+NC
	Open collector output (S.S. OUT1): Max. 30V DC, 100mA.
Control output (OUT2)	Relay : 250V AC, 2A (for resistive load), NO+NC
	Open collector output (S.S. OUT2): Max. 30V DC, 100mA.
Auxiliary power supply	12V DC, Max. 50mA (without regulation)
Accuracy	±0.1%
Life expectancy for relays	Mechanical 30.000.000 operation; Electrical 300.000 operation.

Note : Relay and S.S.OUT outputs are in synchronization . When OUT1 relay is energized S.S. OUT1 transistor goes into saturation. Similarly, when OUT2 relay is energized S.S. OUT2 transistor goes into saturation.

HOUSING

Housing type	Suitable for flush-panel mounting according to DIN 43 700.
Dimensions	W72xH72xD97mm
Weight	Approx. 405g (after packing)
Enclosure material	Self extinguishing plastics

⚠ While cleaning the device, solvents (thinner, benzine, acid etc.) or corrosive materials must not be used.

TERMS
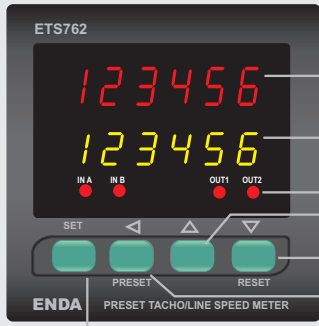
(1) The value of the measurement selected by $input\ type$ parameter during run mode.
Parameter name during programming mode.

(2) The value of the parameter selected by $Set\ dSP$ / $conf\ ig$ parameter during run mode.
Parameter value during programming mode.

(3) State indicators shows the state of the device.

(4) Used for adjusting the preset values in the run mode.
Increment or parameter selection key during programming mode.

(5) Decrement or reset key in the run mode.
Decrement or parameter selection key during programming mode

(6) Used for selecting preset1, preset2 or user defined message in the run mode.
Used for selecting $opt\ ion.$ s or parameter to be changed in the programming mode.

(7) Used for selecting run or programming modes or for adjusting parameters.

(1) Digital display	6 digits, 7 segment red LED	
(2) Digital display	6 digits, 7 segment yellow LED	
Character height	Digital display (1) :	9.1mm
	Digital display (2) :	7.1mm
(3) State indicators	4 red LEDs	
(4),(5),(6),(7) Keypad	Micro switch	

DIMENSIONS

Depth
97mm
2

Connection cables

Flush mounting clamp

Panel

Rubber packing
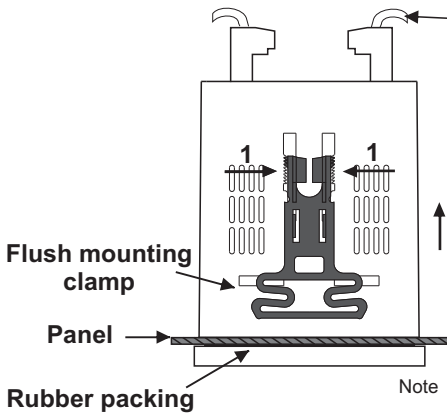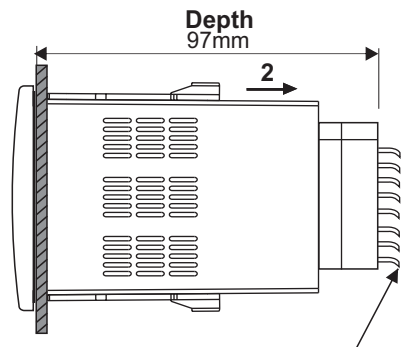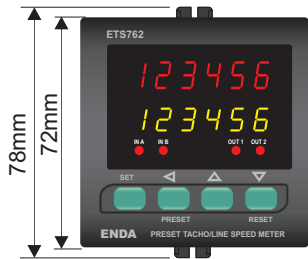
For removing mounting clamps:
- Push the flush-mounting clamp in direction **1** as shown in the figure left.
- Then, pull out the clamp in direction **2.**
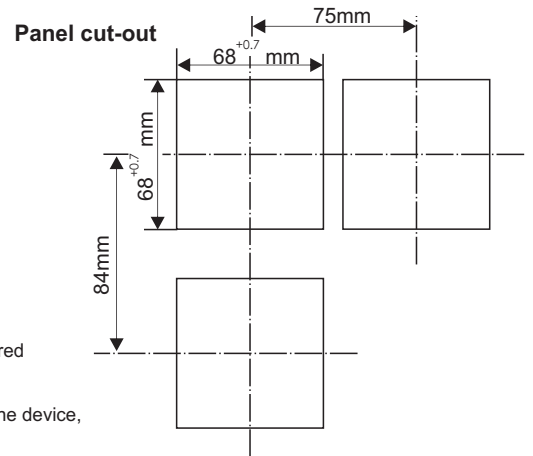
Note 1) While panel mounting, additional distance required for connection cables should be considered.
2) Panel thickness should be maximum 10mm.
3) If there is no 90mm free space at back side of the device, it would be difficult to remove it from the panel.

Panel cut-out

75mm
68 $^{+0.7}$ mm
68 $^{+0.7}$ mm
84mm

CONNECTION DIAGRAM

ENDA ETS762 is intended for installation in 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 energy. The device must be protected against inadmissible humidity, vibrations, severe soiling and 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 on by a qualified staff and must be according to the relevant locally applicable regulations.

NOTE :
SUPPLY :

Fuse
F 100 mA
250V AC
Switch

184-253V AC ⑪   ← Line
50/60Hz 7VA ⑫   ← Neutral

Fuse should be connected.

230V AC Supply
Cable size: 1,5mm²
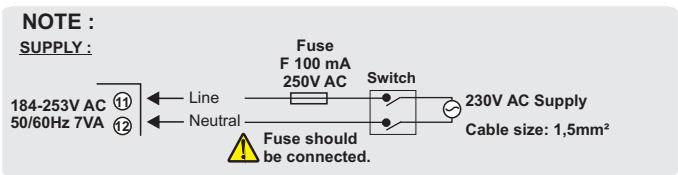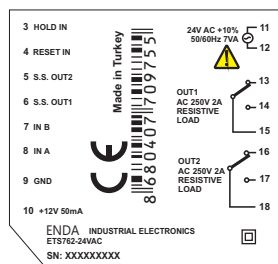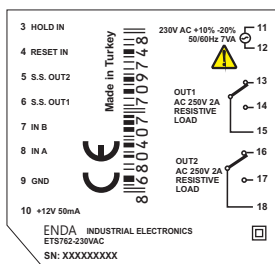
Note : 1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

Holding screw 0.4-0.5Nm

Equipment is protected throughout by DOUBLE INSULATION.

Run mode

Process value defined by the `ınPut tYPE` parameter is shown on the top display.

```
99999
100000
```

Variable selected by the `SEt dSP. conF ıG.` parameter is shown on the bottom

```
PrSEt 1
100000
```
Preset value for `out 1`.
See NOTE 1 for programming.

```
PrSEt2
150000
```
Preset value for `out2`.
See NOTE 1 for programming.

PRESET

Decision: `ınPut tYPE = ınA ınb ?`

Yes →
```
tAcho.A
3000
```
If input type `ınA ınb` is selected, revolution of input A appears.

```
tAcho.b
2000
```
If input type `ınA ınb` is selected, revolution of input B appears.

WARNING!!!! First, The machine must be switched on if it's needed to be programmed when mode `tAcho.A` or `tAcho.b` display mode is chosen.

No ↓

SET & PRESET — if `PRESET` key is pressed while holding `SET` key, the programming mode is entered.

PARAMETER TABLE

`ınPut tYPE`	`tAcho.`	`ınA- ınb. rAt ıo`	`L ınE SPEEd.`	`PEr ıod`	`t ımE ıntEr.`	`PULS t ımE`	`Count. PEr.PLS.`	`Count. PEr.CYc.`	`ınA -ınb.`
`ınPut tbASE`	`rotAtE PEr.SEc.`	`rotAtE PEr.mın.`	`rotAtE PEr.hr.`	Ölçüm metodu `tAcho. ın 1- ın2. ınA` seçilir ise görülür. `rAt ıo -ınb.`					
	`mEtEr PEr.SEc.`	`mEtEr PEr.mın.`	`mEtEr PEr.hr.`	Ölçüm metodu `L ınE SPEEd` seçilir ise görülür.					
	`mıcro SEcond`	`mılı SEcond`	`0.1 SEcond`	Ölçüm metodu `PEr ıod t ımE PuLS` seçilir ise görülür. `ıntEr t ımE`					
`PuLS t ımE`	`0.04 SEcond`	`0.02 SEcond`	`0.01 SEcond`	`0.001 SEcond`	`0.0005 SEcond`	`0.0001 SEcond`	`0.00005 SEcond`	
`SEnSor tYPE`	`nPn`	`PnP`							
`SAMPLE t ımE`	`0.2`	`16.0`							
`L ımıt t ımE`	`1`	`100`							
`rESEt PuLS`	`0.002 SEcond`	`0.005 SEcond`	`0.010 SEcond`	`0.020 SEcond`	`0.050 SEcond`				
`dEc ı. Po ınt`	`0`	`0.0`	`0.00`	`0.000`	`0.0000`	`0.00000`			
`d ıSP. CAL`	`0.00001`	___	`999999`						
`SEt dSP. conF ıG.`	`PrSEt 1`	`PrSEt2`	`USEr dEF ınE`						
`USEr dEF ınE`	Measurement unit, a message, a constant etc. entered by the user appears.								

`outPut conF ıG`	`out 1Lo. out2Lo.`	`out 1H ı. out2H ı.`	`out 1H ı. out2Lo.`	`out 1Lo. out2H ı.`		
`out 1 PULSt ı.`	`000.0`	___	`999.9`			
`out2 PULSt2`	`000.0`	___	`999.9`			
`out 1 dELt ı`	`000.0`	___	`999.9`			
`out2 dELt2`	`000.0`	___	`999.9`			
`PrSEt 1 EQu.`	`PrSEt 1`	`Pr2.Sub Pr 1`				
`Error Contr`	`EnAbLE`	`d ıSAbLE`				
`SEcur. codE`	`1111`					
`ınP.oPt. SECur.`	`nonE`	`ProG. no`	`ProG. YES`			
`out.oPt. SECur.`	`nonE`	`ProG. no`	`ProG. YES`			
`dSP.oPt. SECur.`	`nonE`	`ProG. no`	`ProG. YES`			
`d ıSP. rESEt`	`no`	`PAnEL rESEt`	`rESEt ınPut`	`rESEt both`	
`dEFAuL SEt.`	`no`	`YES`				

A nPut oPtA on. / outPut oPtA on. / dA SP. oPtA on. / SEcur. oPtA on.

Input options (`ınPut oPtA on.`)

- `ınPut tYPE` — There are nine different input types. Measurement methods for different input types are on the next page. See NOTE 2 for adjustment.
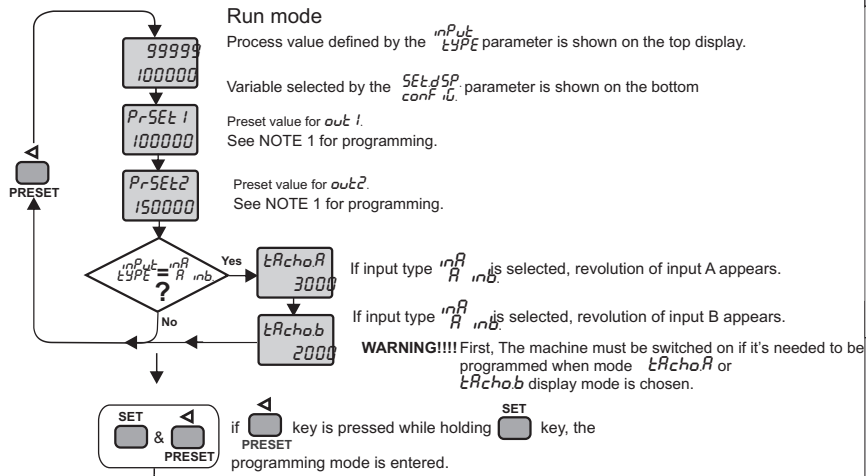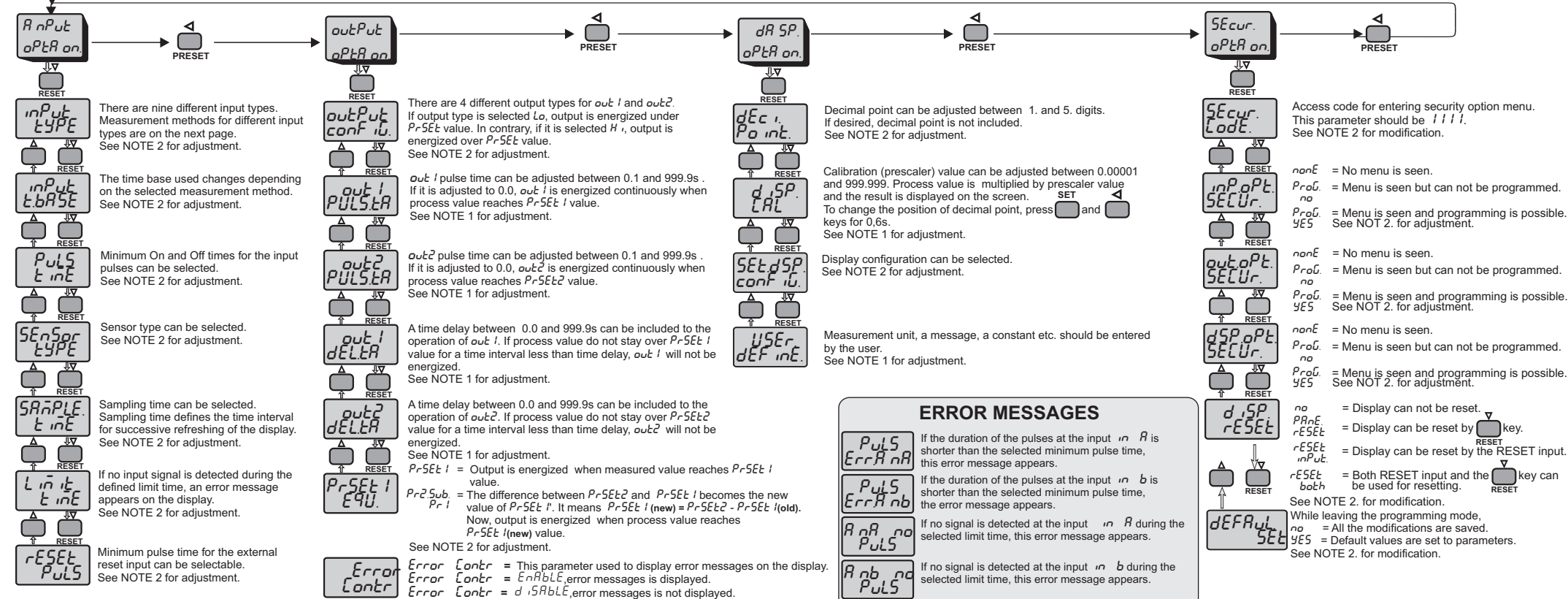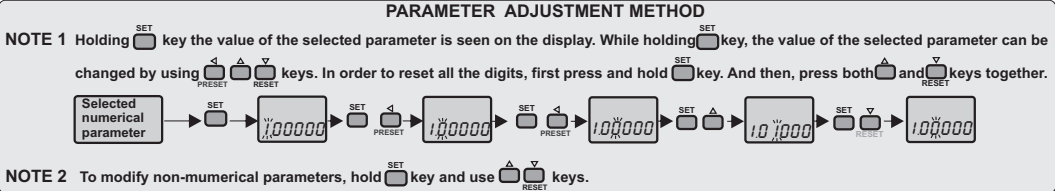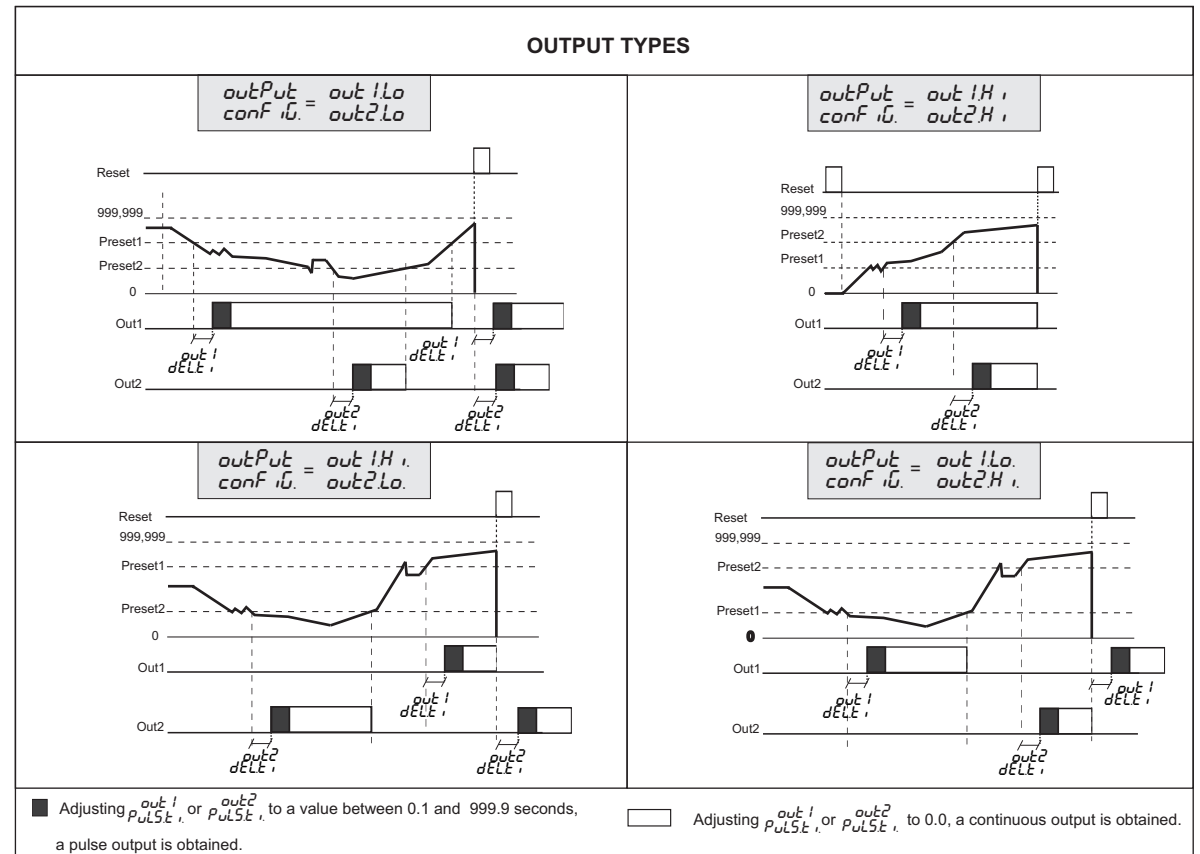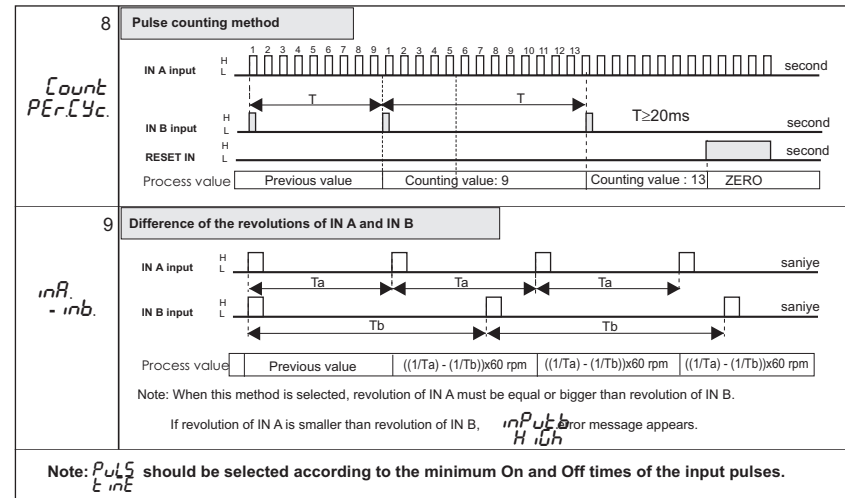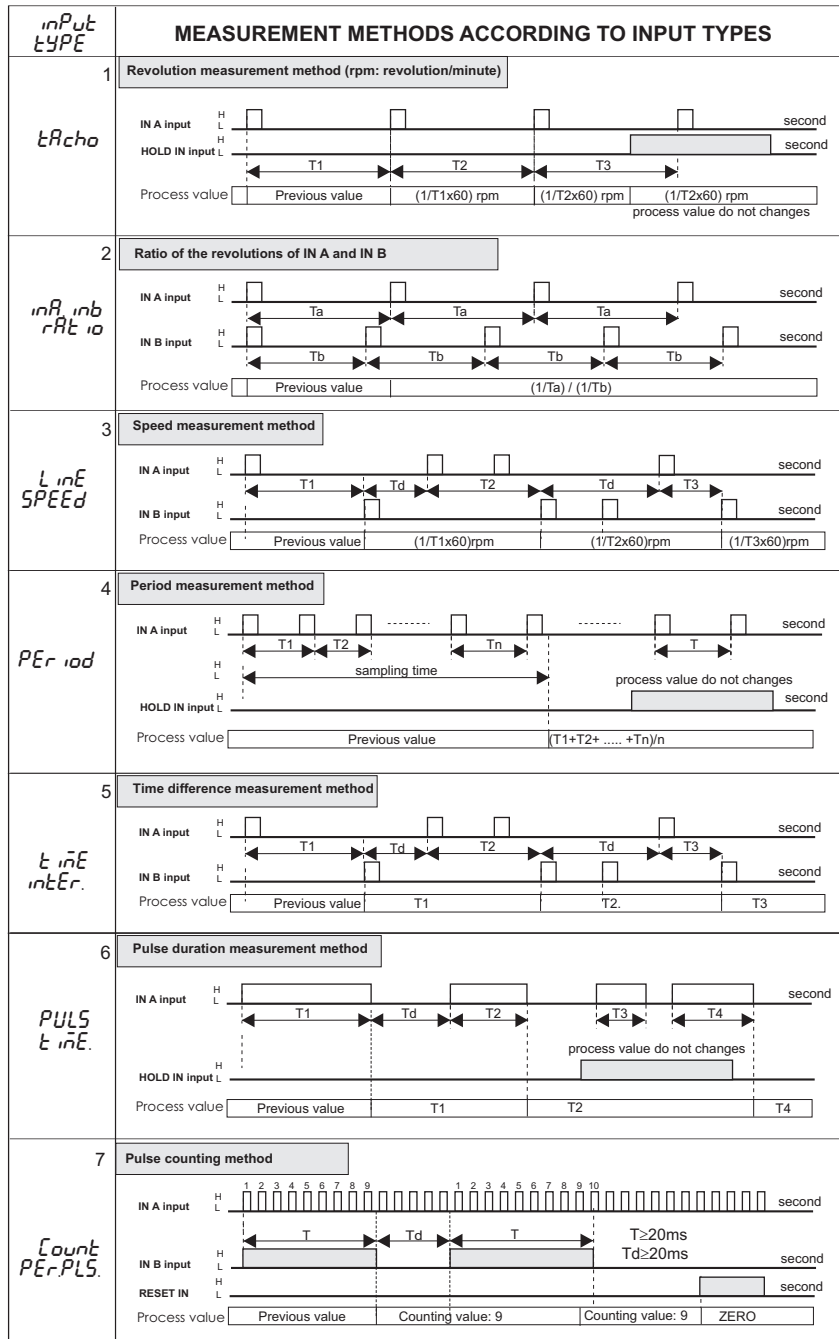- `ınPut t.bASE` — The time base used changes depending on the selected measurement method. See NOTE 2 for adjustment.
- `PuLS t ımE` — Minimum On and Off times for the input pulses can be selected. See NOTE 2 for adjustment.
- `SEnSor tYPE` — Sensor type can be selected. See NOTE 2 for adjustment.
- `SAMPLE t ımE` — Sampling time can be selected. Sampling time defines the time interval for successive refreshing of the display. See NOTE 2 for adjustment.
- `L ımıt t ımE` — If no input signal is detected during the defined limit time, an error message appears on the display. See NOTE 2 for adjustment.
- `rESEt PuLS` — Minimum pulse time for the external reset input can be selectable. See NOTE 2 for adjustment.

Output options (`outPut oPtA on.`)

- `outPut conF ıG.` — There are 4 different output types for `out 1` and `out2`. If output type is selected `Lo`, output is energized under `PrSEt` value. In contrary, if it is selected `H ı`, output is energized over `PrSEt` value. See NOTE 2 for adjustment.
- `out 1 PULS.tA` — `out 1` pulse time can be adjusted between 0.1 and 999.9s. If it is adjusted to 0.0, `out 1` is energized continuously when process value reaches `PrSEt 1` value. See NOTE 1 for adjustment.
- `out2 PULS.tA` — `out2` pulse time can be adjusted between 0.1 and 999.9s. If it is adjusted to 0.0, `out2` is energized continuously when process value reaches `PrSEt2` value. See NOTE 1 for adjustment.
- `out 1 dELtA` — A time delay between 0.0 and 999.9s can be included to the operation of `out 1`. If process value do not stay over `PrSEt 1` value for a time interval less than time delay, `out 1` will not be energized. See NOTE 1 for adjustment.
- `out2 dELtA` — A time delay between 0.0 and 999.9s can be included to the operation of `out2`. If process value do not stay over `PrSEt2` value for a time interval less than time delay, `out2` will not be energized. See NOTE 1 for adjustment.
- `PrSEt 1 EQu.`:
  - `PrSEt 1` = Output is energized when measured value reaches `PrSEt 1` value.
  - `Pr2.Sub Pr 1` = The difference between `PrSEt2` and `PrSEt 1` becomes the new value of `PrSEt 1`. It means `PrSEt 1 (new) = PrSEt2 - PrSEt 1 (old)`. Now, output is energized when process value reaches `PrSEt 1 (new)` value. See NOTE 2 for adjustment.
- `Error Contr`:
  - `Error Contr` = This parameter used to display error messages on the display.
  - `Error Contr` = `EnAbLE`, error messages is displayed.
  - `Error Contr` = `d ıSAbLE`, error messages is not displayed.

Display options (`dA SP. oPtA on.`)

- `dEc ı. Po ınt.` — Decimal point can be adjusted between 1. and 5. digits. If desired, decimal point is not included. See NOTE 2 for adjustment.
- `d ıSP. CAL` — Calibration (prescaler) value can be adjusted between 0.00001 and 999.999. Process value is multiplied by prescaler value and the result is displayed on the screen. To change the position of decimal point, press `SET` and `◁` keys for 0,6s. See NOTE 1 for adjustment.
- `SEt dSP. conF ıG.` — Display configuration can be selected. See NOTE 2 for adjustment.
- `USEr dEF ınE` — Measurement unit, a message, a constant etc. should be entered by the user. See NOTE 1 for adjustment.

Security options (`SEcur. oPtA on.`)

- `SEcur. CodE.` — Access code for entering security option menu. This parameter should be `1111`. See NOTE 2 for modification.
- `ınP.oPt. SECur.`:
  - `nonE` = No menu is seen.
  - `ProG. no` = Menu is seen but can not be programmed.
  - `ProG. YES` = Menu is seen and programming is possible. See NOT 2. for adjustment.
- `out.oPt. SECur.`:
  - `nonE` = No menu is seen.
  - `ProG. no` = Menu is seen but can not be programmed.
  - `ProG. YES` = Menu is seen and programming is possible. See NOT 2. for adjustment.
- `dSP.oPt. SECur.`:
  - `nonE` = No menu is seen.
  - `ProG. no` = Menu is seen but can not be programmed.
  - `ProG. YES` = Menu is seen and programming is possible. See NOT 2. for adjustment.
- `d ıSP. rESEt`:
  - `no` = Display can not be reset.
  - `PAnE. rESEt` = Display can be reset by `RESET` key.
  - `rESEt ınPut.` = Display can be reset by the RESET input.
  - `rESEt both` = Both RESET input and the `RESET` key can be used for resetting. See NOTE 2. for modification.
- `dEFAuL SEt.` — While leaving the programming mode,
  - `no` = All the modifications are saved.
  - `YES` = Default values are set to parameters. See NOTE 2. for modification.

ERROR MESSAGES

Message	Description
`PuLS ErrA nA`	If the duration of the pulses at the input `ın A` is shorter than the selected minimum pulse time, this error message appears.
`PuLS ErrA nb`	If the duration of the pulses at the input `ın b` is shorter than the selected minimum pulse time, the error message appears.
`A nA no PuLS`	If no signal is detected at the input `ın A` during the selected limit time, this error message appears.
`A nb no PuLS`	If no signal is detected at the input `ın b` during the selected limit time, this error message appears.
`A nAA nb no.PuLS`	If both `ın A` and `ın b` are required in a measurement methods and no signal is detected at the both inputs during the selected limit time, this error message appears.
`HA GH. ınPut`	Overflow error. Indicates that process value was greater than 999 999.
`ınPutb H ıGh`	If input type `ınAA ınb` is selected and revolution of input A is smaller than revolution of input B, this error message appears.

PARAMETER ADJUSTMENT METHOD

NOTE 1 Holding `SET` key the value of the selected parameter is seen on the display. While holding `SET` key, the value of the selected parameter can be changed by using `◁ PRESET` `▽ RESET` keys. In order to reset all the digits, first press and hold `SET` key. And then, press both `△ PRESET` and `▽ RESET` keys together.

Selected numerical parameter → `SET` → `1̈00000` → `SET ◁ PRESET` → `1̈0̈0000` → `SET ◁ PRESET` → `10̈0̈000` → `SET ◁ PRESET` → `10.̈0̈00` → `SET ▽ RESET` → `10.0̈00` → `SET ▽ RESET` → `100.̈000`

NOTE 2 To modify non-mumerical parameters, hold `SET` key and use `△ △ RESET` keys.

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MEASUREMENT METHODS ACCORDING TO INPUT TYPES

inPut tyPE

1 **Revolution measurement method (rpm: revolution/minute)**

tAcho

Process value	Previous value	$(1/T1\times60)$ rpm	$(1/T2\times60)$ rpm	$(1/T2\times60)$ rpm

process value do not changes

2 **Ratio of the revolutions of IN A and IN B**

inA inb rAt io

Process value	Previous value	$(1/Ta)/(1/Tb)$

3 **Speed measurement method**

L inE SPEEd

Process value	Previous value	$(1/T1\times60)$rpm	$(1/T2\times60)$rpm	$(1/T3\times60)$rpm

4 **Period measurement method**

PEr iod

sampling time

process value do not changes

Process value	Previous value	$(T1+T2+.....+Tn)/n$

5 **Time difference measurement method**

t inE intEr.

Process value	Previous value	T1	T2.	T3

6 **Pulse duration measurement method**

PULS t inE.

process value do not changes

Process value	Previous value	T1	T2	T4

7 **Pulse counting method**

Count PEr.PLS.

$T\geq20ms$
$Td\geq20ms$

Process value	Previous value	Counting value: 9	Counting value: 9	ZERO

8 **Pulse counting method**

Count PEr.CYc.

$T\geq20ms$

Process value	Previous value	Counting value: 9	Counting value : 13	ZERO

9 **Difference of the revolutions of IN A and IN B**

inA. - inb.

Process value	Previous value	$((1/Ta)-(1/Tb))\times60$ rpm	$((1/Ta)-(1/Tb))\times60$ rpm	$((1/Ta)-(1/Tb))\times60$ rpm

Note: When this method is selected, revolution of IN A must be equal or bigger than revolution of IN B.

If revolution of IN A is smaller than revolution of IN B, **inPut H iGh** error message appears.

Note: PuLS t inE should be selected according to the minimum On and Off times of the input pulses.

OUTPUT TYPES

outPut = out 1.Lo
conF iG. out2.Lo

outPut = out 1.H i
conF iG. out2.H i

outPut = out 1.H i.
conF iG. out2.Lo.

outPut = out 1.Lo.
conF iG. out2.H i.

■ Adjusting PuLSt i out 1 or PuLSt i out2 to a value between 0.1 and 999.9 seconds, a pulse output is obtained.

□ Adjusting PuLSt i out 1 or PuLSt i out2 to 0.0, a continuous output is obtained.

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TERMINAL CONNECTIONS

TYPICAL SENSOR CONNECTIONS

Fuse
F 100 mA
250V AC

Switch

230V AC Supply

Cable size: 1,5mm²

PNP PROXIMITY SWITCH

OUT
GND
+ 12V

Fuse
F 100 mA
250V AC

Switch

230V AC Supply

Cable size: 1,5mm²

PNP PROXIMITY SWITCH

OUT
OUT
GND
+ 12V

PNP PROXIMITY SWITCH

GND
+ 12V

NOTE: NPN PROXIMITY SWITCH connection is the same as PNP PROXIMITY SWITCH connection.

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