

FXS Series

DIN W48×H48mm, Compact Counter/Timer

■ Features

- Upgraded counting speed: 1cps/30cps/2kcps/5kcps
- Selectable voltage input (PNP) or No-voltage input (NPN)
- Addition of Up/Down input mode
- Available to set a decimal point (fixed decimal point of display)
- Wide range of input power supply: 100-240VAC 50/60Hz
12-24VAC 50/60Hz, 12-24VDC universal
- Selectable Counter/Timer by internal DIP switch
- Various time range: Built-in micro computer (Micom)




⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering Information

| | | | | | | |
|-----------|----------|----------|----------|--------|---------|-----------------|
| FX | 4 | S | I | Output | No mark | 1-stage preset |
| | | | | Size | I | Indicator |
| | | | | Digit | S | DIN W48×H48mm |
| | | | | | 4 | 9999 (4-digit) |
| | | | | | 5 | 99999 (5-digit) |
| | | | | | FX | Counter/Timer |

■ Specifications

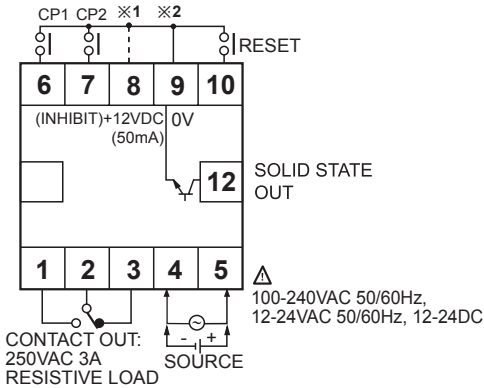
| | | | |
|----------------------------------|--------------------------|---|---|
| Model | 1-stage preset | FX4S | — |
| | Indicator | — | FX5S-I |
| Digit | | 4-digit | 5-digit |
| Digit size | | W3.8×H7.6mm | W4×H8mm |
| Power supply | AC voltage | 100-240VAC 50/60Hz | |
| | AC/DC voltage | 12-24VAC 50/60Hz, 12-24VDC | |
| Allowable voltage range | | 90 to 110% of rated voltage | |
| Power consumption | AC voltage | • Indicator: Max. 4.7VA | • 1-stage preset: Max. 5.7VA (100-240VAC 50/60Hz) |
| | AC/DC voltage | • Indicator: Max. 4.5VA | • 1-stage preset: Max. 5.6VA (12-24VAC 50/60Hz) |
| | | • Indicator: Max. 2.8W | • 1-stage preset: Max. 3W (12-24VDC) |
| Max. counting speed for CP1, CP2 | | Selectable 1cps/30cps/2kcps/5kcps by internal DIP switch | |
| Min. input signal width | INHIBIT input | Approx. 20ms | |
| | RESET input | | |
| Input | CP1, CP2 input (INHIBIT) | Input logic is selectable [Voltage input] Impedance: 5.4kΩ "H" level: 5-30VDC, "L" level: 0-2VDC [No-voltage input] Impedance at short-circuit: Max. 1kΩ, Residual voltage at short-circuit: Max. 2VDC, Impedance at open-circuit: Min. 100kΩ | |
| | RESET input | | |
| | | | |
| One-shot output time | | 0.05 to 5sec | — |
| Control output | Contact | Type | SPDT (1c) |
| | | Capacity | 250VAC 3A at resistive load |
| | Solid state | Type | NPN open collector |
| | | Capacity | Max. 30VDC, 100mA |
| Memory protection | | Approx. 10 years (when using non-volatile semiconductor memory) | |
| External power | | Max. 12VDC±10% 50mA | |
| Insulation resistance | | Over 100MΩ (at 500VDC megger) | |
| Dielectric strength | | 2,000VAC 50/60Hz for 1 minute | |
| Noise immunity | AC voltage | ±2kV the square wave noise (pulse width: 1μs) by the noise simulator | |
| | DC voltage | ±500V the square wave noise (pulse width: 1μs) by the noise simulator | |
| Vibration | Mechanical | 0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour | |
| | Malfunction | 0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min | |
| Shock | Mechanical | 300m/s ² (approx. 30G) in each X, Y, Z direction for 3 times | |
| | Malfunction | 100m/s ² (approx. 10G) in each X, Y, Z direction for 3 times | |
| Relay life cycle | Mechanical | Min. 10,000,000 operations | |
| | Electrical | Min. 100,000 operations (250VAC 3A at resistive load) | |
| Environment | Ambient temp. | 10 to 55°C, storage: -25 to 65°C | |
| | Ambient humi. | 35 to 85%RH | |
| Approval | | e  us | |
| Unit weight | | Approx. 153g | Approx. 143g |

※Environment resistance is rated at no freezing or condensation.

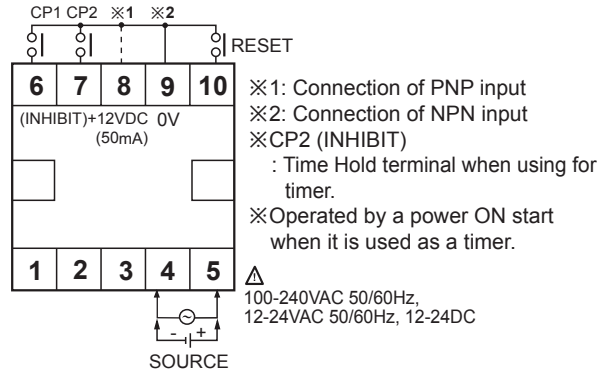
Compact, Thumbwheel Switch Setting Type Up-Down Counter/Timer

■ Connections

● FX4S

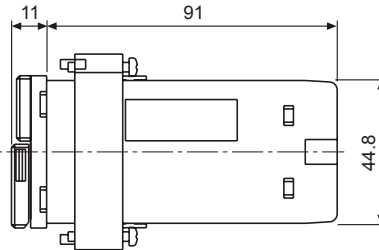
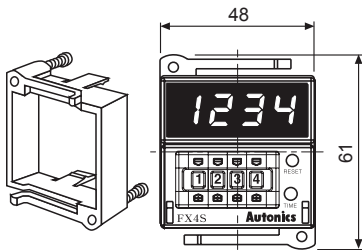


● FX5S-I

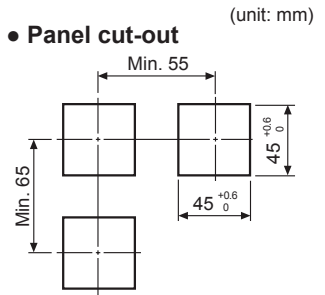


■ Dimensions

● Bracket



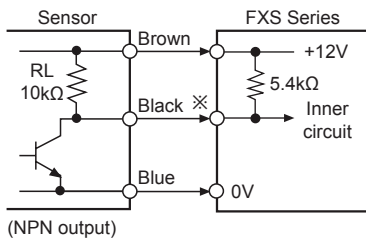
● Panel cut-out



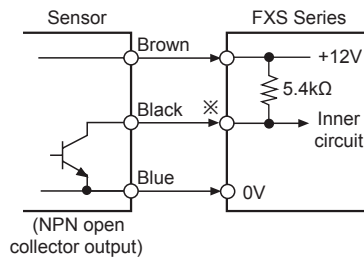
■ Input Connections

○ Input logic: No-voltage (NPN) input

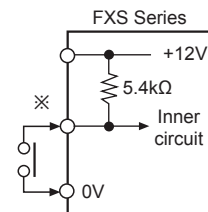
● Solid-state input (standard sensor: NPN output type sensor)



※CP1, CP2 (INHIBIT), RESET input



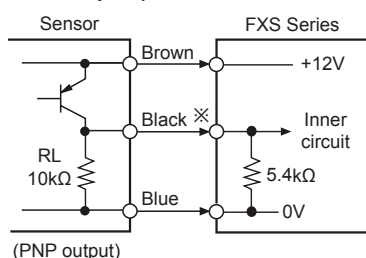
● Contact input



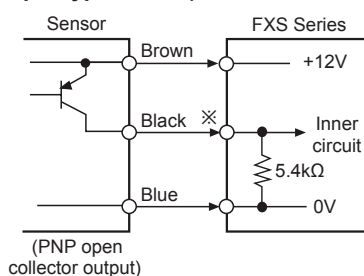
※Counting speed:
1 or 30cps setting (counter)

○ Input logic: Voltage (PNP) input

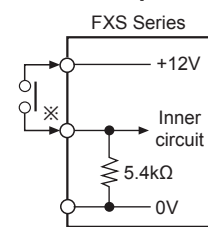
● Solid-state input (standard sensor: PNP output type sensor)



※CP1, CP2 (INHIBIT), RESET input



● Contact input



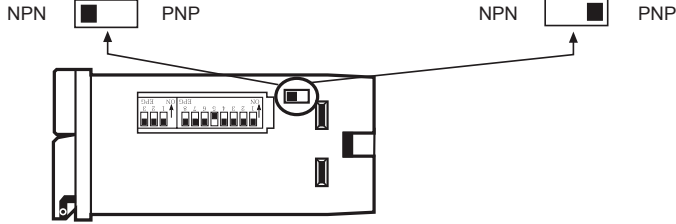
※Counting speed:
1 or 30cps setting (counter)

| |
|---|
| (A) Photoelectric Sensors |
| (B) Fiber Optic Sensors |
| (C) Door/Area Sensors |
| (D) Proximity Sensors |
| (E) Pressure Sensors |
| (F) Rotary Encoders |
| (G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets |
| (H) Temperature Controllers |
| (I) SSRs / Power Controllers |
| (J) Counters |
| (K) Timers |
| (L) Panel Meters |
| (M) Tacho / Speed / Pulse Meters |
| (N) Display Units |
| (O) Sensor Controllers |
| (P) Switching Mode Power Supplies |
| (Q) Stepper Motors & Drivers & Controllers |
| (R) Graphic/ Logic Panels |
| (S) Field Network Devices |
| (T) Software |

FXS Series

Input Logic Selection

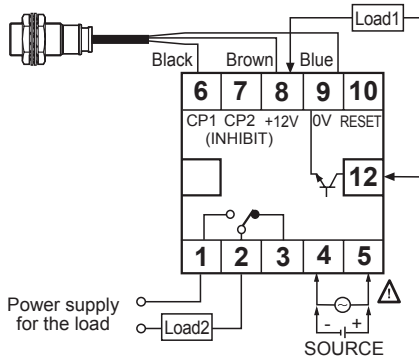
- Select NPN (No-voltage input) (factory default)
- Select PNP (voltage input)



※Please be sure to turn OFF the power before changing input logic.

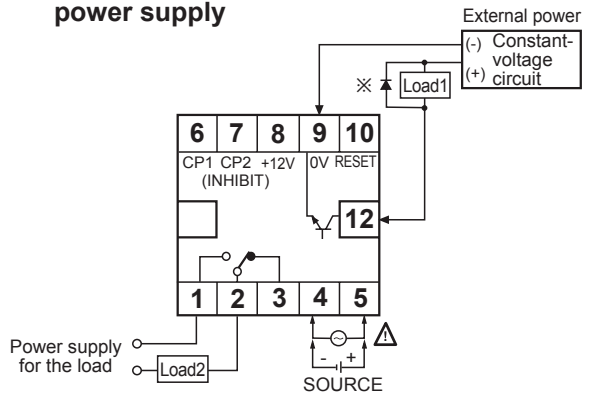
Input & Output Connections

- In case of operating the load by power supply of the sensor



- Please select proper capacity of load, because total current consumption should not be exceed current capacity. (Max. 50mA)
- Contact capacity: Max. 250VAC 3A

- In case of operating the load by external power supply

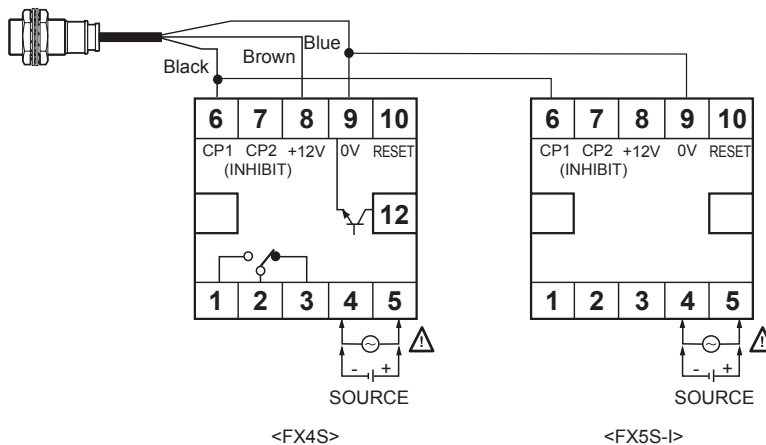


- The capacity of Load1 must not be exceed Max. 30VDC, Max. 100mA of the switching capacity of the transistor.
- Please do not supply the reverse polarity voltage.
- ※Please connect the surge absorber (Diode) at both terminals of Load1, in case of using the inductive load. (Relay, etc.)

- Using 2 counters with one sensor

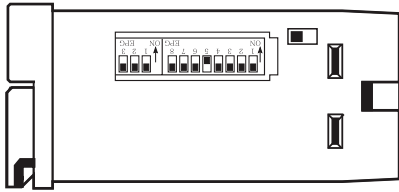
It is available to use 2 counters with one sensor.

Please connect as the power of sensor is supplied from only one way of counters and design input logic with same way.

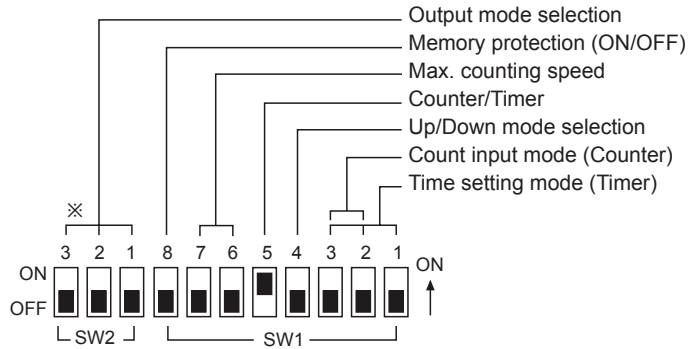


Compact, Thumbwheel Switch Setting Type Up-Down Counter/Timer

■ Description Of Inner DIP Switches



- ※ Inner selection switch is changed from 10pin to 11pin with upgrade of counting speed.
- ※ There is no output operation mode in Indicator (FX5S-I) and SW2 selection switch.



● Up/Down mode

| SW1 | Function | |
|-----|--|-----------|
| 4 | ON <input type="checkbox"/> OFF <input type="checkbox"/> | Down mode |
| | ON <input type="checkbox"/> OFF <input type="checkbox"/> | Up mode |

● Counter/Timer selection

| SW1 | Function | |
|-----|--|---------|
| 5 | ON <input type="checkbox"/> OFF <input type="checkbox"/> | Counter |
| | ON <input type="checkbox"/> OFF <input type="checkbox"/> | Timer |

● Memory protection

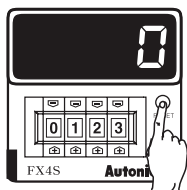
| SW1 | Function | |
|-----|--|-------------------------------|
| 8 | ON <input type="checkbox"/> OFF <input type="checkbox"/> | Disable the memory protection |
| | ON <input type="checkbox"/> OFF <input type="checkbox"/> | Enable the memory protection |

● Max. counting speed

| SW1 | CP1, CP2 |
|---|----------|
| 6 ON <input type="checkbox"/> OFF <input type="checkbox"/> 7 ON <input type="checkbox"/> OFF <input type="checkbox"/> | 1cps |
| 6 ON <input type="checkbox"/> OFF <input type="checkbox"/> 7 ON <input type="checkbox"/> OFF <input type="checkbox"/> | 30cps |
| 6 ON <input type="checkbox"/> OFF <input type="checkbox"/> 7 ON <input type="checkbox"/> OFF <input type="checkbox"/> | 2kcps |
| 6 ON <input type="checkbox"/> OFF <input type="checkbox"/> 7 ON <input type="checkbox"/> OFF <input type="checkbox"/> | 5kcps |

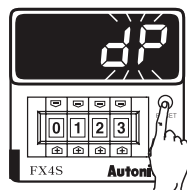
■ Setting Function Of Decimal Point

Displays the decimal point.

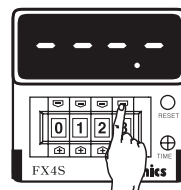


RUN mode

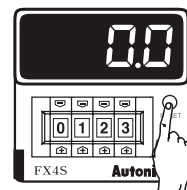
- ※If pressing RESET button for over 3sec, it advanced to decimal point setting mode.



- ※When "dP" flashes, touch RESET button once.



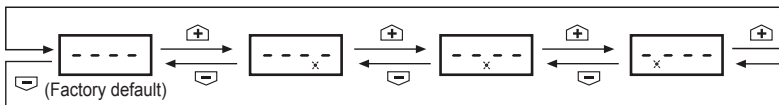
- ※Set the position of decimal point using (+), (-) buttons of digital switch.



Return to RUN mode

- ※It returns to RUN mode by press RESET button over 3sec

● Changing the decimal point



- ※It returns to RUN mode if no RESET button or digital switch is applied for 60sec in decimal point setting status.
- ※The decimal point setting is not existed in Indicator.

- (A) Photoelectric Sensors
- (B) Fiber Optic Sensors
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Input Operation Mode (Counter)

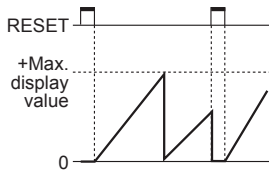
| Input mode | SW1 | No-voltage input (NPN) | Voltage input (PNP) | | |
|----------------------------|--|--|---------------------------------------|--|--|
| Count up mode | ON <input type="checkbox"/> 4 OFF <input checked="" type="checkbox"/> | Up/Down-A (Command input) | | | |
| | | Up/Down-B (Individual input) | | | |
| | | Up/Down-C (Phase difference input) | | | |
| | | Up (Count up input) | | | |
| | | | | | |
| | Count down mode | ON <input checked="" type="checkbox"/> 4 OFF <input type="checkbox"/> | Up/Down-D (Command input) | | |
| | | | Up/Down-E (Individual input) | | |
| | | | Up/Down-F (Phase difference input) | | |
| Down (Count down input) | | | | | |
| | | | | | |

※⊙: Over Min. signal width, ⊙: Over 1/2 of Min. signal width. Counting miss by one (± 1) occurs if the signal width of or is less than min. signal width.

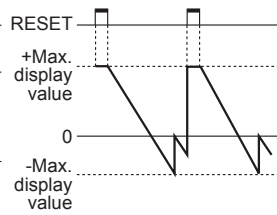
Compact, Thumbwheel Switch Setting Type Up-Down Counter/Timer

Counting Operation Of Indicator (Counter)

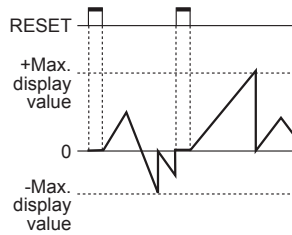
Up input mode



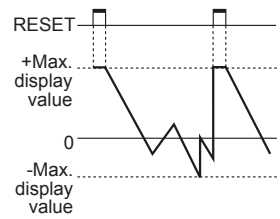
Down input mode



Up/Down-A, B, C input mode

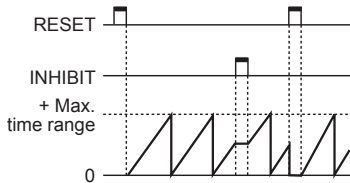


Up/Down-D, E, F input mode

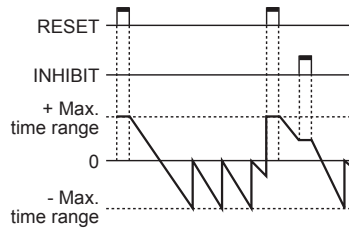


Time Operation Of Indicator (Timer)

Up input mode



Down input mode



Time Setting Mode (Timer)

| SW1 | 4-digit | 5-digit |
|---------------------------------------|--------------|-------------------|
| ON OFF 1 2 3 [ON] [ON] [ON] | 99.99sec | 9999.9sec |
| ON OFF 1 2 3 [ON] [OFF] [ON] | 999.9sec | 99999sec |
| ON OFF 1 2 3 [ON] [ON] [OFF] | 9999sec | 9min 59.99sec |
| ON OFF 1 2 3 [ON] [ON] [ON] | 99min 59sec | 99min 59.9sec |
| ON OFF 1 2 3 [ON] [ON] [ON] | 999.9min | 9999.9min |
| ON OFF 1 2 3 [ON] [ON] [ON] | 99hour 59min | 9hour 59min 59sec |
| ON OFF 1 2 3 [ON] [ON] [ON] | 999.9hour | 999hour 59min |
| ON OFF 1 2 3 [ON] [ON] [ON] | 9999hour | 9999.9hour |

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

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(S) Field Network Devices

(T) Software

Output Operation Mode (By Internal DIP Switch)

■ ← One-shot output (0.05 to 5sec)

□ ← Retained output

| Output mode (SW2) | SW1 ON OFF <input checked="" type="checkbox"/> Up mode | | SW1 ON OFF <input checked="" type="checkbox"/> Down mode | | Operation after count up |
|-------------------|---|--------------------------------|---|--------------------------------|--|
| | Up, Up / Down-A, B, C | | Up, Up / Down-D, E, F | | |
| F | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | <ul style="list-style-type: none"> The display value continues until reset signal is applied then output is held. Retained output will be maintained until reset signal is applied. |
| N | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Display value and retained output are maintained until Reset signal is applied. |
| C | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | The display value returns to reset start status as soon as display value is reached to preset value. |
| R | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | The display value is held until output is OFF then returns to reset start status. |
| K | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | The display value continues until reset signal is applied. |
| P | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | The display value is held during one-shot output time, counting process is returned to reset start status as soon as output is ON. |
| Q | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | The display value continues during one-shot output time. |
| S | Up input | Down input | Up input | Down input | <ul style="list-style-type: none"> Up, UP/Down-A, B, C input mode -Output is ON when (Display value) \geq (Preset value) Down, UP/Down-D, E, F input mode -Output is ON when (Display value) \leq (Zero) |
| Counter | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | |
| S | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | The output turns ON after the setting time and then turns OFF after the setting time. This operation is repeated sequentially. (Flicker operation) |
| Timer | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | Reset Preset 0 Output | |

※One-shot output time is set by front TIME adjuster.

Compact, Thumbwheel Switch Setting Type Up-Down Counter/Timer

■ Proper Usage

○ Reset function

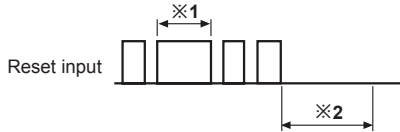
● Reset

In case of changing the input mode after supplying the power, please take external reset or manual reset.

If reset is not executed, the counter will be working as previous mode.

● Reset signal width

It is reset perfectly when the reset signal is applied during **min. 20ms** regardless of the contact input & solid-state input.



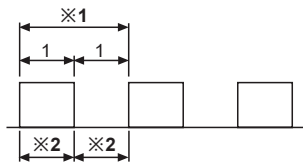
※1: In case of a contact reset, it is reset perfectly if the ON time of reset signal is applied during min. 20ms even though a chattering occurs.

※2: It can be input the signal of CP1, CP2 after min. 50ms from closing time of reset signal.

○ Sensor power

The power 12VDC which is provided to sensor is built in it. Please use it under Max. DC50mA.

○ Min. signal width



※1: Please make duty ratio (ON/OFF) 1:1

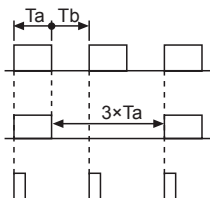
※2: Min. signal width

- 1cps: Min. 500ms
- 30cps: Min. 16.7ms
- 2kcps: Min. 0.25ms
- 5kcps: Min. 0.1ms

○ Max. counting speed

This is a response speed per 1 sec when the duty ratio (ON:OFF) of input signal is 1:1.

If the duty ratio is not 1:1, the width between ON and OFF should be over min. signal width and the response speed will getting slower against input signal. And one of ON width and OFF width is under min. signal width, this product may not respond.

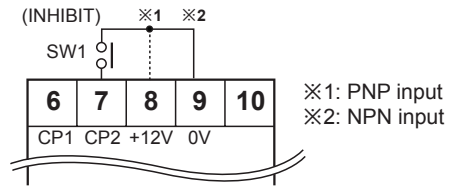


Width of T_a (ON) and T_b (OFF) must be larger than Min. signal width.

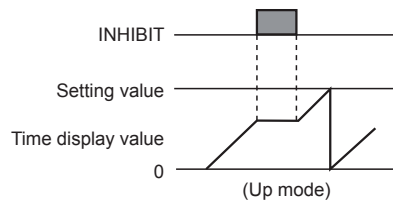
Max. counting speed is 1/2 value of rated spec. when duty ratio is 1:3.

It can not respond if it is smaller than min. signal width (T_a).

○ INHIBIT (for timer)



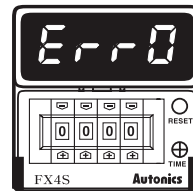
- If SW1 is ON, it becomes INHIBIT. (Time Hold)
- When power is applied, it starts to progress and INHIBIT mode is used to stop the time is under the progress at the moment.
- When SW1 is OFF, timer starts to progress again.



○ Error display

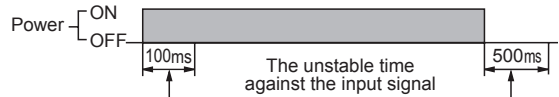
| Error signal | Error description | Returning method |
|--------------|---------------------|---|
| Err 0 | Zero setting status | Change the setting value to non zero status |

- ※When Error is displayed, the output continues OFF state.
- ※There is no Error function in indicator.

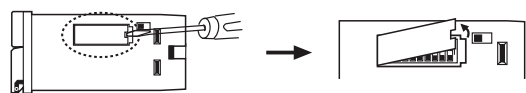


○ Power

The inner circuit voltage starts to rise up for the first 100ms after power on, the input may not work at this time. And also the inner circuit voltage drops down for the last 500ms after power off, the input may not work at this time.



○ DIP switch detachment



Push a lock part to front direction and widen it simultaneously.

※Please be careful of the injury caused by tools.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(K) Timers

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

(R) Graphic/ Logic Panels

(S) Field Network Devices

(T) Software