

# Up/Down Counter/Timer

## DIN size W48 × H48mm, Preset Counter/Timer

### ■ Features

- Count Up, Count Down, Count Up/Down function
- Multi function unit in a small size
- Wide range of input power supply :  
100–240VAC 50/60Hz, 12–24VDC (Option)
- Selectable Counter or Timer function by internal DIP switch
- Counting speed upgrade : 5kcps
- Various Timing ranges programmable  
4Digit type : 0.01sec. ~ 9999hour  
5Digit type : 0.01sec. ~ 9999.9hour
- Available to set a decimal point



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



### ■ Specifications

\*A blacked(□) item is upgraded function.

Model	Single preset		FX4S	_____
	Double preset		_____	FX5S-I
Digit			4	5
Digit size			W4 × H8mm	
Power supply			100–240VAC 50/60Hz, 12–24VDC (Option)	
Allowable voltage range			90 ~ 110% of rated voltage	
Power consumption			<ul style="list-style-type: none"> <li>• Indication type : Approx. 4.7VA (240VAC 60Hz), Approx. 2.8W (24VDC)</li> <li>• single preset : Approx. 5.7VA (240VAC 60Hz), Approx. 3W (24VDC)</li> </ul>	
<b>Max. counting speed for CP1, CP2</b>			<b>Selectable 30cps/5kcps by internal DIP switch</b>	
Min. input signal width	INHIBIT input		Approx. 20ms	
	RESET input			
Input	CP1, CP2 input (INHIBIT)		<b>Input logic is selectable</b> [Voltage input] 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 : Max. 100kΩ	
	RESET input			
<b>One-shot output time</b>			<b>0.05 ~ 5sec</b>	
Control output	Contact	Type	SPDT (1c)	_____
		Capacity	250VAC 3A at resistive load	_____
	Solid-state	Type	NPN open collector	_____
		Capacity	30VDC Max. 100mA Max.	_____
Memory retention			10 years (When using non-volatile semiconductor memory)	
External sensor power			12VDC ±10% 50mA Max.	
Dielectric strength			Min. 100MΩ (at 500VDC)	
Insulation resistance			2000VAC 50/60Hz for 1 minute	
Noise strength	AC power		±2kV the square wave noise (pulse width:1μs) by the noise simulator	
	DC power		±500V the square wave noise (pulse width:1μs) by the noise simulator	
Vibration	Mechanical		0.75mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 1 hour	
	Malfunction		0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10 minutes	
Shock	Mechanical		300m/s <sup>2</sup> (Approx. 30G) in X, Y, Z directions for 3 times	
	Malfunction		100m/s <sup>2</sup> (Approx. 10G) in X, Y, Z directions for 3 times	
Relay life cycle	Mechanical		Min. 10,000,000 times	
	Electrical		Min. 100,000 times (250VAC 3A at resistive load)	
Ambient temperature			-10 ~ +55°C (at non-freezing status)	
Storage temperature			-25 ~ +65°C (at non-freezing status)	
Ambient humidity			35 ~ 85%RH	
Weight			AC type : Approx. 147g, DC type : Approx. 153g	AC type : Approx. 137g, DC type : Approx. 143g
Approval				

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Proximity sensor

(J) Photo electric sensor

(K) Pressure sensor

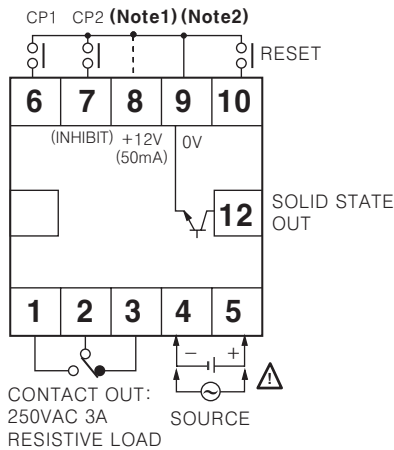
(L) Rotary encoder

(M) 5-Phase stepping motor & Driver & Controller

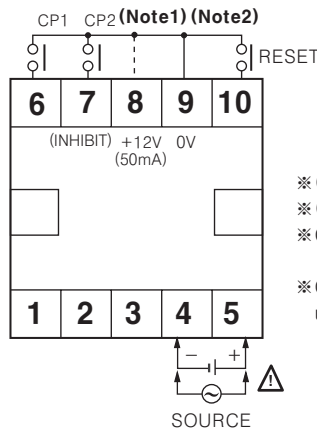
# FXS Series

## Connections

### ●FX4S



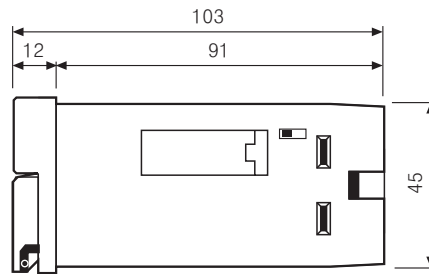
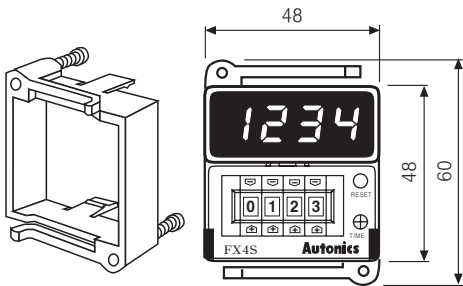
### ●FX5S-I



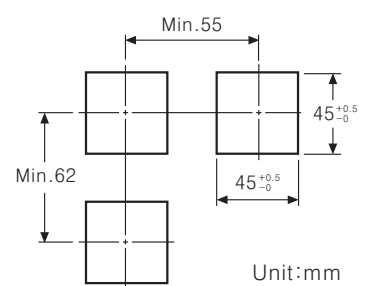
- ※ (Note1) : PNP input
- ※ (Note2) : NPN input
- ※ CP2(INHIBIT): Time Hold terminal when using for timer.
- ※ Operated by a power ON start when it is used as a timer.

## Dimensions

### ●Bracket



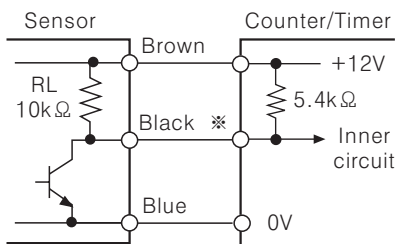
### ●Panel cut-out



## Input connections

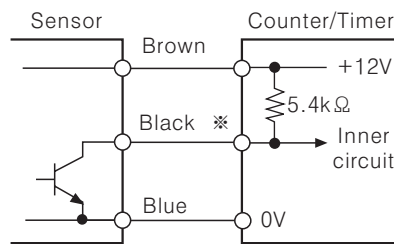
### ◎Input logic : No-voltage(NPN) input

#### ●Solid state input(Standard sensor : NPN output type sensor)



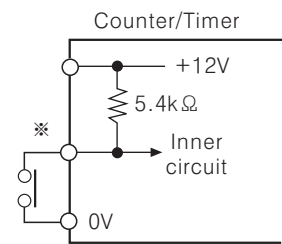
- Transistor ON → Counting
- NPN output type sensor

※CP1, CP2(INHIBIT), RESET input



- Transistor ON → Counting
- NPN open collector output type sensor

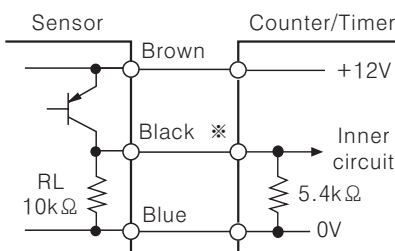
#### ●Contact input



- Contact ON → Counting
- Counting speed : 30cps setting(Counter)

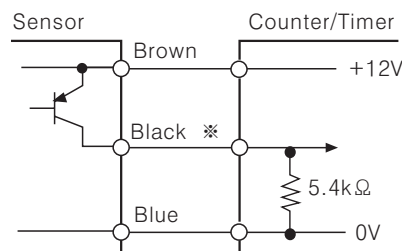
### ◎Input logic : Voltage(PNP) input

#### ●Solid state input(Standard sensor : PNP output type sensor)



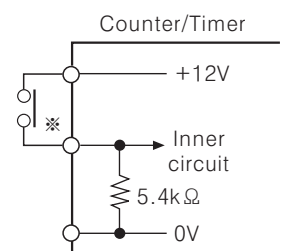
- Transistor ON → Counting
- PNP output type sensor

※CP1, CP2(INHIBIT), RESET input



- Transistor ON → Counting
- PNP open collector output type sensor

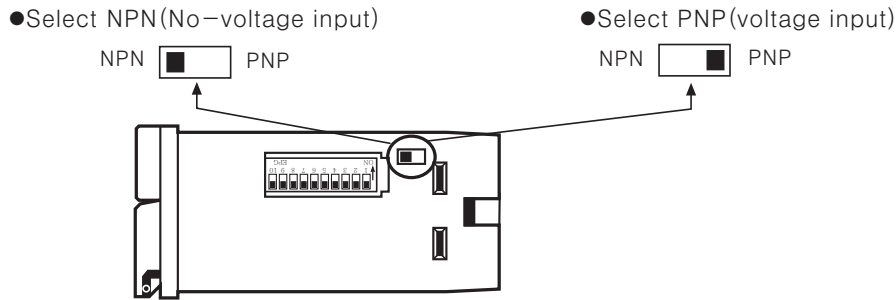
#### ●Contact input



- Contact ON → Counting
- Counting speed : 30cps setting(counter)

# Up/Down Counter/Timer

## Input logic selection

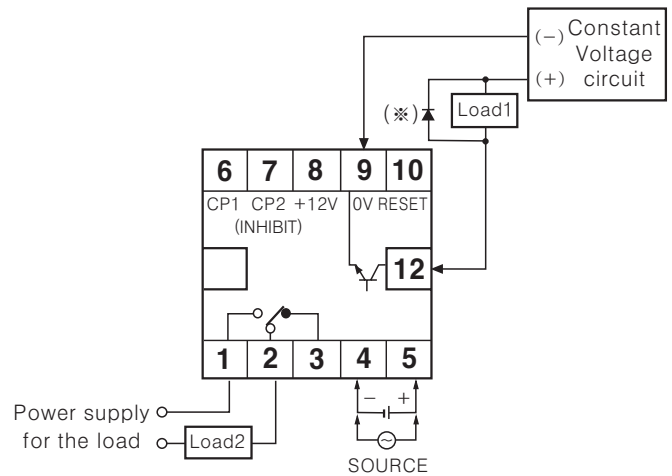
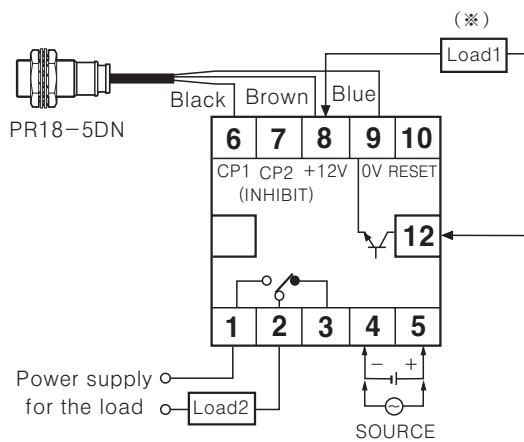


※Please be sure to turn OFF the power before changing input logic.

## Input & Output connections

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

◎In case of operating the load by external power supply

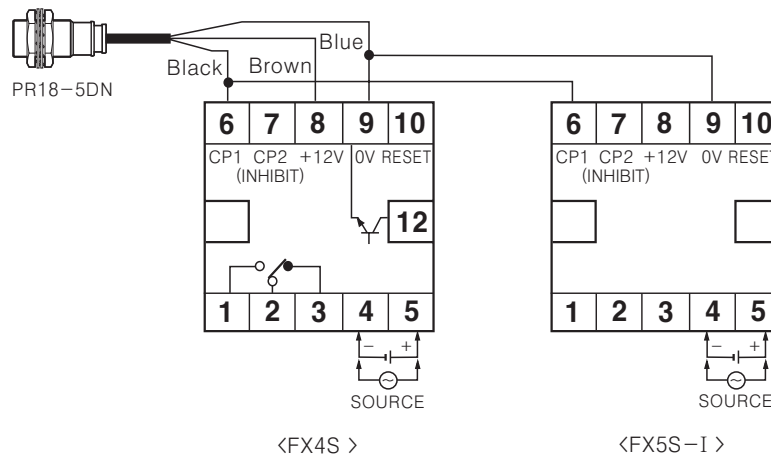


- (※)Please select proper capacity of load, because total current consumption should not be exceed current capacity. (Max. 50mA)
- Contact capacity : Max. 250VAC 3A

- 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. The power of sensor must be connected to only one of counter.



(A)  
Counter

(B)  
Timer

(C)  
Temp.  
controller

(D)  
Power  
controller

(E)  
Panel  
meter

(F)  
Tacho/  
Speed/  
Pulse  
meter

(G)  
Display  
unit

(H)  
Sensor  
controller

(I)  
Proximity  
sensor

(J)  
Photo  
electric  
sensor

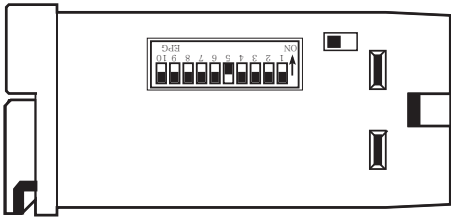
(K)  
Pressure  
sensor

(L)  
Rotary  
encoder

(M)  
5-Phase  
stepping  
motor &  
Driver &  
Controller

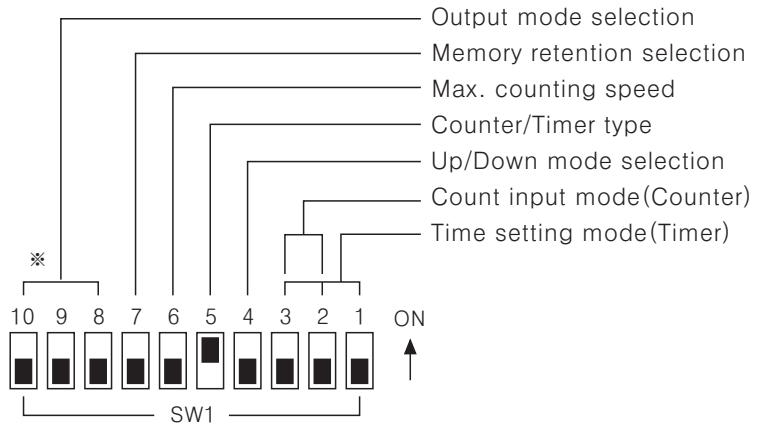
# FXS Series

## ■ Selection by DIP switches



※The direction of DIP S/W is reverse on this product. If S/W is up, it will be ON. If S/W is down, it will be off.

※There is no output operation mode in indication type(FX5S-I) so 7 Pin DIP S/W is built in.



### ●Up/Down mode

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

### ●Max. counting speed

SW1	CP1, CP2
ON <input type="checkbox"/>	<b>5kcps</b>
OFF <input type="checkbox"/>	
ON <input type="checkbox"/>	30cps
OFF <input type="checkbox"/>	

### ●Counter/Timer

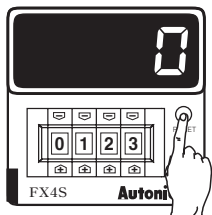
SW1	Function
ON <input type="checkbox"/>	Counter
OFF <input type="checkbox"/>	
ON <input type="checkbox"/>	Timer
OFF <input type="checkbox"/>	

### ●Memory retention

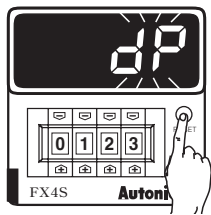
SW1	Function
ON <input type="checkbox"/>	No memory retention
OFF <input type="checkbox"/>	
ON <input type="checkbox"/>	Memory retention
OFF <input type="checkbox"/>	

## ■ Decimal point setting

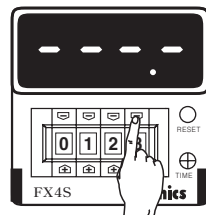
Display the decimal point.



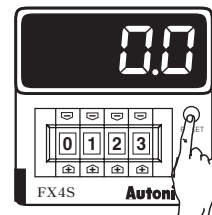
RUN mode



※When "dp" is flickering, one touch the Reset button.



※If pressing one of digital switch buttons (↑, ↓) in decimal point setting mode, decimal point will be moved to Up(+) direction.

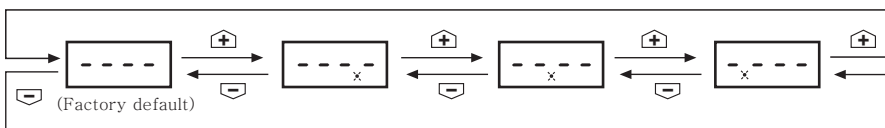


Return to RUN mode

※It returns to decimal point setting status if pressing RESET button for over 3sec. in RUN mode.

※It returns to RUN mode if pressing RESET button for over 3sec. in decimal point setting status.

### ●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 existed in indication type.

# Up/Down Counter/Timer

## Input operation mode(Counter)

INput mode(SW1)			No voltage input(NPN)		voltage input(PNP)	
<b>Count up mode</b> ON  OFF 	Up/Down-A Command input	ON  OFF 	cp1 H L		cp1 H L	
	Up/Down-B Individual input	ON  OFF 	cp1 H L		cp1 H L	
	Up/Down-C Phase difference input	ON  OFF 	cp1 H L		cp1 H L	
	<b>Count up input</b>	ON  OFF 	cp1 H L		cp1 H L	
<b>Count down mode</b> ON  OFF 	Up/Down-D Command input	ON  OFF 	cp1 H L		cp1 H L	
	Up/Down-E Individual input	ON  OFF 	cp1 H L		cp1 H L	
	Up/Down-F Phase difference input	ON  OFF 	cp1 H L		cp1 H L	
	<b>Count down input</b>	ON  OFF 	cp1 H L		cp1 H L	

\*Ⓐ : Over Min. signal width, Ⓑ : Over 1/2 of Min. signal width.

Counting miss by one(±) is occurred if the signal width of A or B is less than Min. signal width.

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Proximity sensor

(J) Photo electric sensor

(K) Pressure sensor

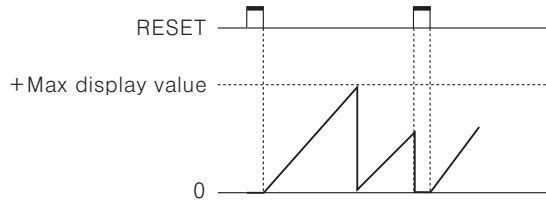
(L) Rotary encoder

(M) 5-Phase stepping motor & Driver & Controller

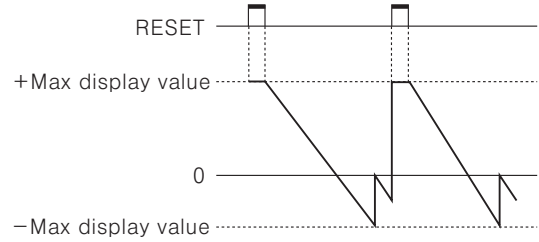
# FXS Series

## Counting operation of indication model(Indication type)

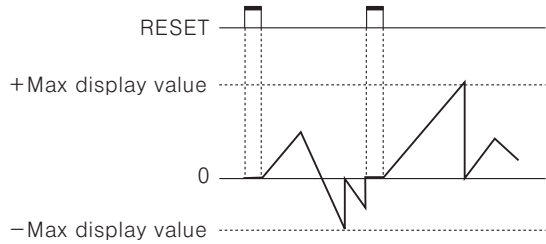
### Up input mode



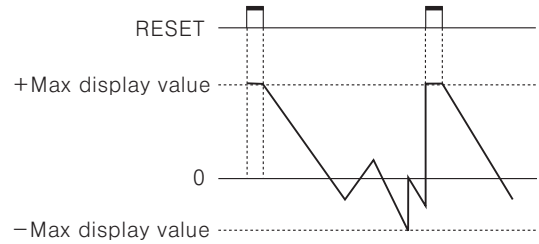
### Down input mode



### Up / Down-A, B, C input mode



### Up / Down-D, E, F input mode



## Time setting mode(Timer)

SW1	4Digit	5Digit
	99.99sec	9999.9sec
	999.9sec	99999sec
	9999sec	9min 59.99sec
	99min 59sec	99min 59.9sec
	999.9min	9999.9min
	99hour 59min	9hour 59min 59sec
	999.9hour	999hour 59min
	9999hour	9999.9hour

# Up/Down Counter/Timer

## Output operation mode (by internal DIP switch)

■ ← One-shot output (0.05~5sec)

□ ← Self-holding output

Output mode (SW1)	ON 4 OFF ■ <b>UP mode</b>	ON 4 OFF ■ <b>Down mode</b>	Operation after count up
<b>F</b> 8 9 10 ON ■ ■ ■ OFF			The display value continues until reset signal is applied then output is held • Self-holding output is held until reset signal is applied.
<b>N</b> 8 9 10 ON ■ ■ ■ OFF			The display value and hold output are held until reset signal is applied.
<b>C</b> 8 9 10 ON ■ ■ ■ OFF			The display value returns to reset start status as soon as display value is reached to preset value.
<b>R</b> 8 9 10 ON ■ ■ ■ OFF			The display value is held until output is OFF then returns to reset start status.
<b>K</b> 8 9 10 ON ■ ■ ■ OFF			The display value continues until reset signal is applied.
<b>P</b> 8 9 10 ON ■ ■ ■ OFF			The display value is held during one-shot output time, counting process is returned to reset start status as soon as output is ON.
<b>Q</b> 8 9 10 ON ■ ■ ■ OFF			The display value continues during one-shot output time.
<b>S</b>	<b>Up input</b>	<b>Down input</b>	
Count 8 9 10 ON ■ ■ ■ OFF			• Up, UP/Down-A, B, C input mode -Output is ON when (Display value) ≥ (Preset value) • Down, UP/Down-D, E, F input mode -Output is ON when (Display value) ≤ (Zero)
Timer 8 9 10 ON ■ ■ ■ OFF			The output turns ON after the setting time and then turns OFF after the setting time. This operation is repeated sequentially.

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Proximity sensor

(J) Photo electric sensor

(K) Pressure sensor

(L) Rotary encoder

(M) 5-Phase stepping motor & Driver & Controller

# FXS Series

## ■ Proper usage

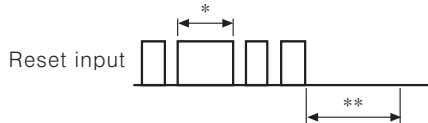
### ◎ Reset function

#### ● Reset

In case of changing the input mode after supplying the power, please take an 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 **max. 20ms** regardless of the contact input & solid-state input.



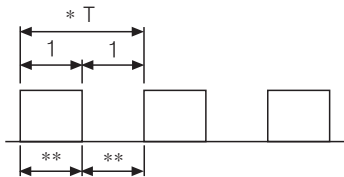
\*In case of a contact reset, it is reset perfectly if the ON time of reset signal is applied during max. 20ms even though a chattering is occurred.

\*\*It can be input the signal of CP1 & CP2 after max. 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. 50mADC.

### ◎ Min. signal width of CP1, CP2 input



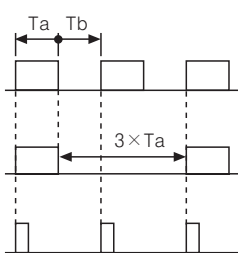
\*Please make duty ratio (ON/OFF) 1:1

\*\* Min. signal width  $\left[ \begin{array}{l} 30\text{cps} : \text{Max. } 16.7\text{ms} \\ 5\text{kcps} : \text{Max. } 0.1\text{ms} \end{array} \right.$

### ◎ Max. counting speed

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

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

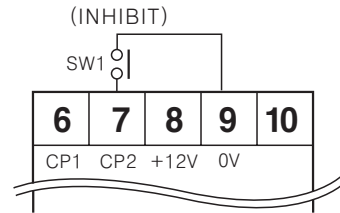


Width of  $T_a$  (ON) and  $T_b$  (OFF) must be larger than Min. signal width.

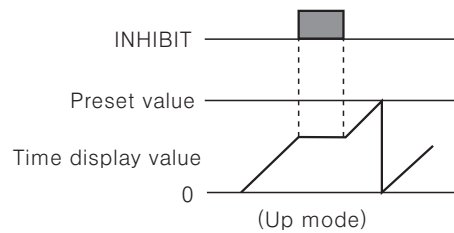
Max. counting speed is 1/2 value of catalog spec. when duty rate is 1:3.

It can not respond because Max. signal width (1a) is little.

### ◎ INHIBIT (When using as Timer)



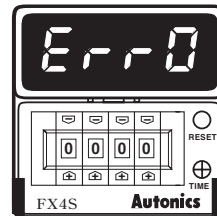
- If SW1 is ON, it becomes INHIBIT. (Time Hold)
- Please apply INHIBIT signal when stopping the time processing in a while.
- The time continues when taking off INHIBIT signal.



### ◎ Error display

Error signal	Error description	Returning method
Err0	Zero set state	Change the set value to non zero state

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



### ◎ 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.

