

Up/Down Counter/Timer

DIN W72 × H72, W48 × H96, W144 × H72mm Counter/Timer

■ Features

- 36 input modes and 20 output modes
- Counting speed : 1cps/30cps/2kcps/5kcps
- Selectable voltage input (PNP) or No voltage input (NPN)
- Addition of Up/Down input mode
- Wide range of power supply : 100–240VAC 50/60Hz
12–24VAC/DC (Option)
- Selectable Counter/Timer by internal DIP switch
- Various time range
- Built-in Microprocessor



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



■ Specifications

| Model | Single preset | FX4 | FX6 | FX4H | — | — |
|----------------------------------|---|--|--|----------|----------|---------|
| | Dual preset | FX4-2P | FX6-2P | FX4H-2P | FX4L-2P | FX6L-2P |
| | Totalizer(Indicator) | FX4-I | FX6-I | FX4H-I | FX4L-I | FX6L-I |
| Digit | | 4 | 6 | 4 | 4 | 6 |
| Digit size | | W8×H14mm | W4×H8mm | W6×H10mm | W8×H14mm | |
| Power supply | 100–240VAC 50/60Hz, 12–24VAC/DC (Option) | | | | | |
| Allowable voltage range | 90 ~ 110% of rated voltage | | | | | |
| Power consumption | <ul style="list-style-type: none"> • Indicator : Approx. 6VA(240VAC 60Hz), Approx. 2.7W(24VDC), Approx. 5.8VA(24VAC 60Hz) • Single preset : Approx. 7VA(240VAC 60Hz), Approx. 3.3W(24VDC), Approx. 6.8VA(24VAC 60Hz) • Dual preset: Approx. 8VA(240VAC 60Hz), Approx. 3.8W(24VDC), Approx. 7.6VA(24VAC 60Hz) | | | | | |
| Max. counting speed for CP1, CP2 | Selectable 1cps/30cps/2kcps/5kcps by internal DIP switch | | | | | |
| Min. input signal width | RESET input | Approx. 20ms | | | | |
| | INHIBIT input | | | | | |
| Input | CP1, CP2 input (INHIBIT) | Input logic is selectable [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 : Min. 100kΩ | | | | |
| | RESET input | | | | | |
| One-shot output time | <ul style="list-style-type: none"> • Single preset type ⚡ 0.05~5sec • Dual preset type ⚡ 1st. output 0.5sec fixed, 2st. output : 0.05~5sec | | | | | |
| Control output | Contact | Type | Single preset type : SPDT(1c), Dual preset type : 1st output SPDT(1c), 2nd output SPDT(1c) | | | |
| | | Capacity | 250VAC 3A at resistive load | | | |
| | Solid-state | Type | Single preset type : 1 NPN open collector Dual preset type : 1st output 1 NPN open collector, 2nd output 1 NPN open collector | | | |
| Capacity | | 30VDC Max. 100mA Max. | | | | |
| Memory protection | 10 years(When using non-volatile semiconductor memory) | | | | | |
| External sensor power | 12VDC ±10% 50mA Max. | | | | | |
| Ambient temperature | -10 ~ +55°C (at non-freezing status) | | | | | |
| Storage temperature | -25 ~ +65°C (at non-freezing status) | | | | | |
| Ambient humidity | 35 ~ 85%RH | | | | | |
| Insulation resistance | Min. 100MΩ (at 500VDC mega) | | | | | |
| Dielectric strength | 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 | | | | |

(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) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder


(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

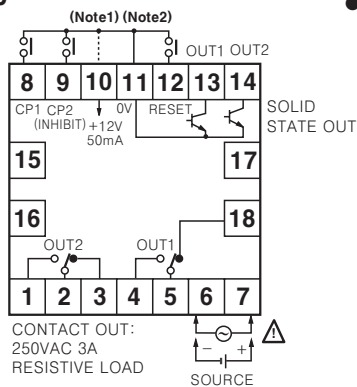
FX/FXH/FXL Series

Specifications

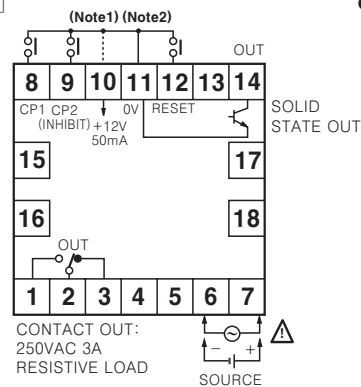
| | | | | | |
|------------------|---|--|---|---|---|
| Vibration | Mechanical | 0.75mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 1 hour | | | |
| | Malfunction | 0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10 minutes | | | |
| Shock | Mechanical | 300m/s ² (Approx. 30G) in X, Y, Z directions for 3 times | | | |
| | Malfunction | 100m/s ² (Approx. 10G) in X, Y, Z directions for 3 times | | | |
| Relay life cycle | Mechanical | Min. 10,000,000 operations | | | |
| | Electrical | Min. 100,000 operations at 250VAC 2A (resistive load) | | | |
| Approval |  | | | | |
| Unit weight | FX4 : Approx. 295g FX4-2P : Approx. 305g FX4-I : Approx. 260g | FX6 : Approx. 305g FX6-2P : Approx. 315g FX6-I : Approx. 265g | FX4H : Approx. 325g FX4H-2P : Approx. 353g FX4H-I : Approx. 297g | FX4L-2P : Approx. 544g FX4L-I : Approx. 455g | FX6L-2P : Approx. 550g FX6L-I : Approx. 461g |

Connections

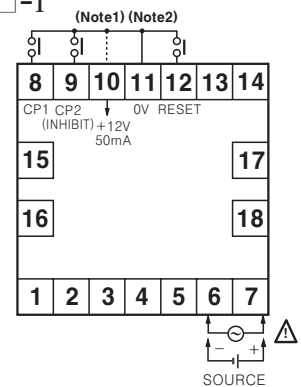
FX□-2P



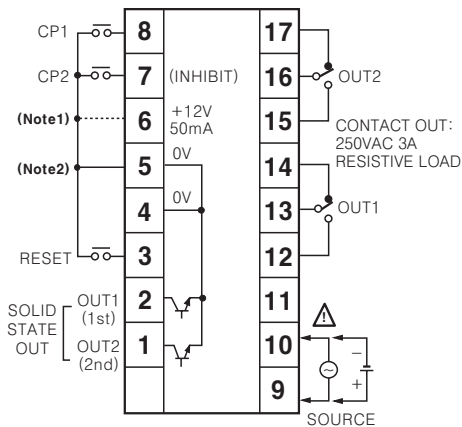
FX□



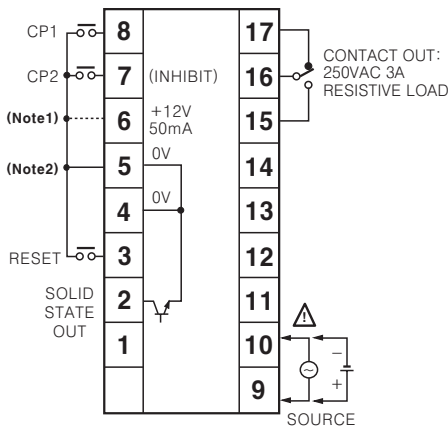
FX□-I



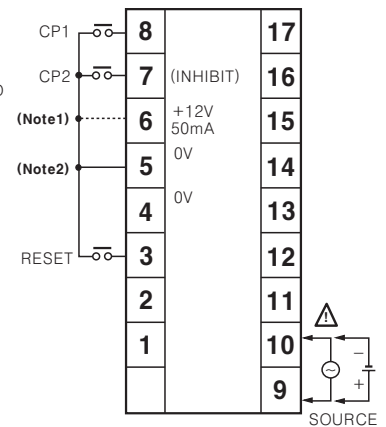
FX4H-2P



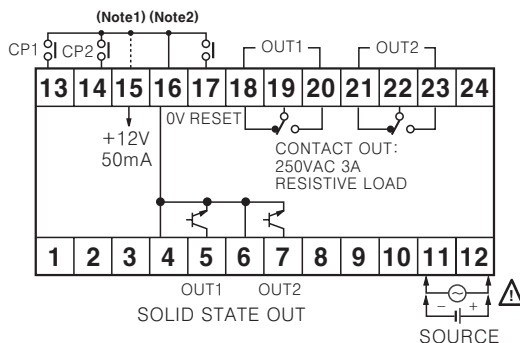
FX4H



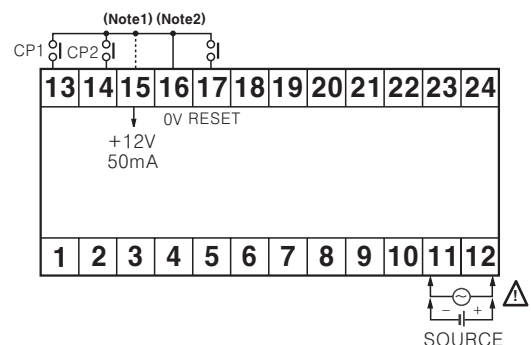
FX4H-I



FX□L-2P



FX□L-I



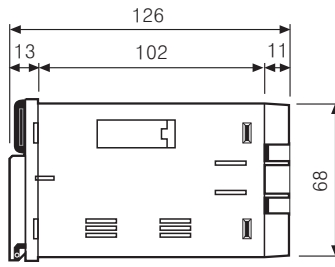
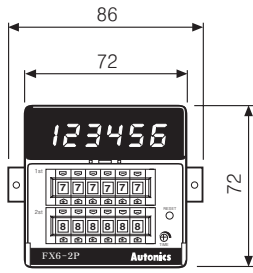
※ CP2(INHIBIT) : Time hold terminal when using for timer.
 ※ It is operated by power ON start type when using for timer.

※ (Note1) : Connection for PNP input
 (Note2) : Connection for NPN input

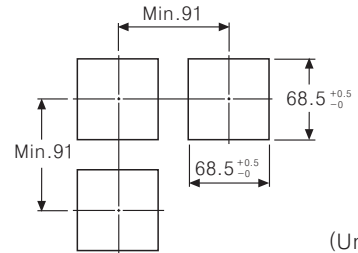
Up/Down Counter/Timer

Dimensions

●FX Series

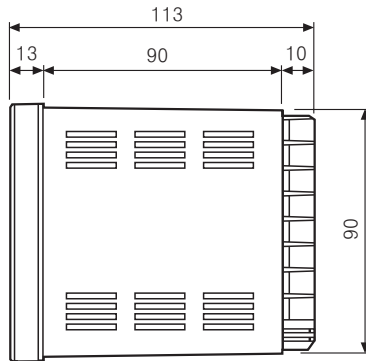
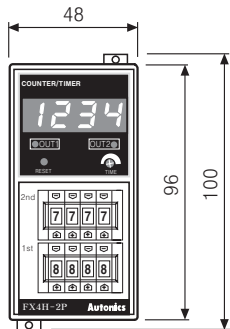


●Panel cut-out

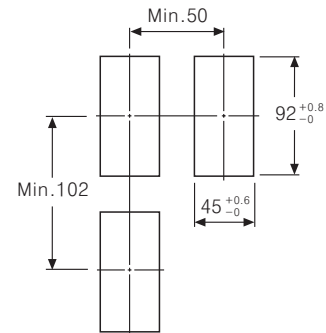


(Unit:mm)

●FXH Series

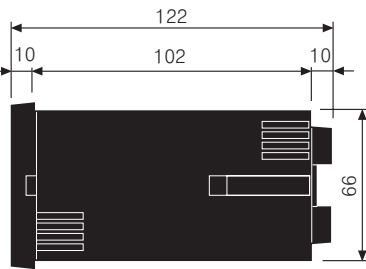
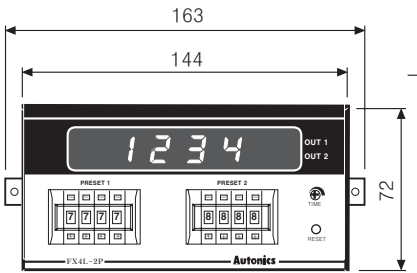


●Panel cut-out

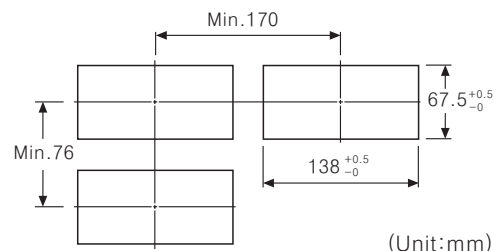


(Unit:mm)

●FXL Series



●Panel cut-out

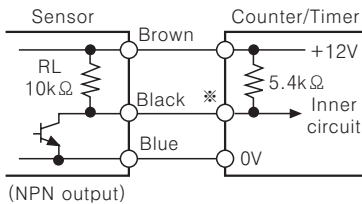


(Unit:mm)

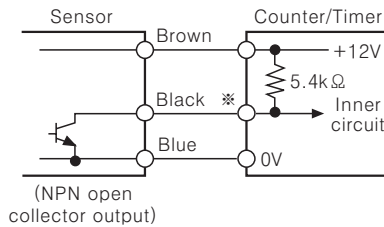
Input connections

○No-voltage input (NPN)

- Solid-state input (Standard input sensor : NPN output type sensor)

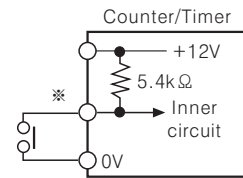


(NPN output)
*CP1, CP2(INHIBIT), RESET input



(NPN open collector output)

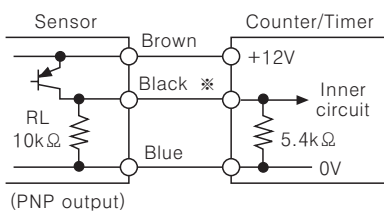
- Contact input



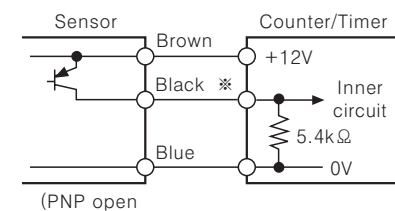
Counting speed :
1 or 30cps setting (Counter)

○Voltage input (PNP)

- Solid-state input (Standard input sensor : PNP output type sensor)

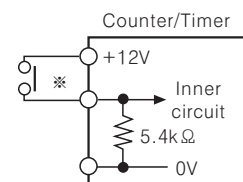


(PNP output)
*CP1, CP2(INHIBIT), RESET Input



(PNP open collector output)

- Contact input



Counting speed :
1 or 30cps setting (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)
Switching power supply

(J)
Proximity sensor

(K)
Photo electric sensor

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Pressure sensor

(M)
Rotary encoder

(N)
Stepping motor & Driver & Controller

(O)
Graphic panel

(P)
Production stoppage models & replacement

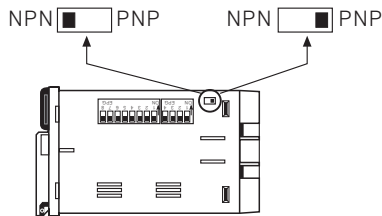
FX/FXH/FXL Series

Input logic selection

FX series

Input logic is changeable by input logic selection switch located at the one-side of case.

- No-voltage input (NPN)
- Voltage input (PNP)



FXL series

Input logic is changeable by input logic selection switch located at the terminal block.

- No-voltage input (NPN)



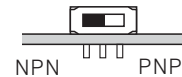
- Voltage input (PNP)



FXH series

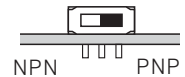
Input logic is changeable by input logic selection switch (SW3) located at inside of the case.

- No-voltage input (NPN)



Direction of front display ←

- Voltage input (PNP)

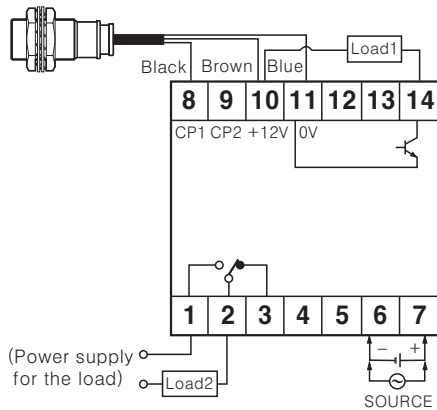


Direction of front display ←

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

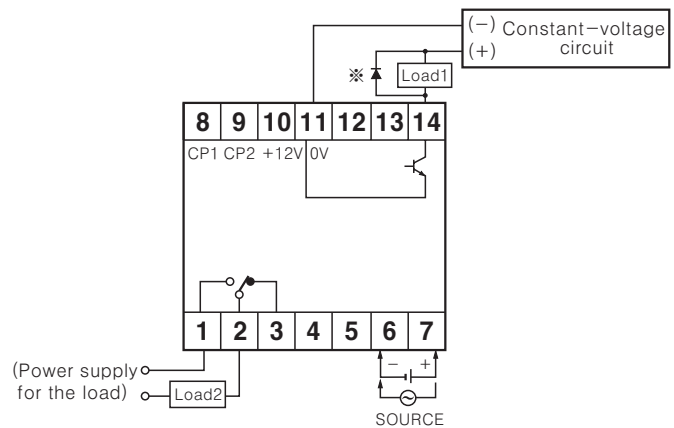
Input & output connections

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



- Please select proper capacity of load, because total value of load capacity and current consumption should not be exceed current capacity. (Max. 50mA)

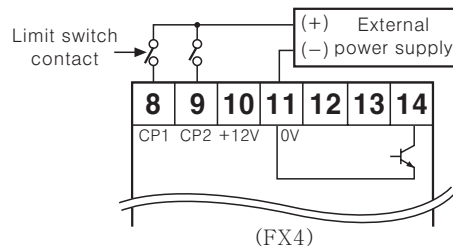
◎In case of operating the load by external power supply



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

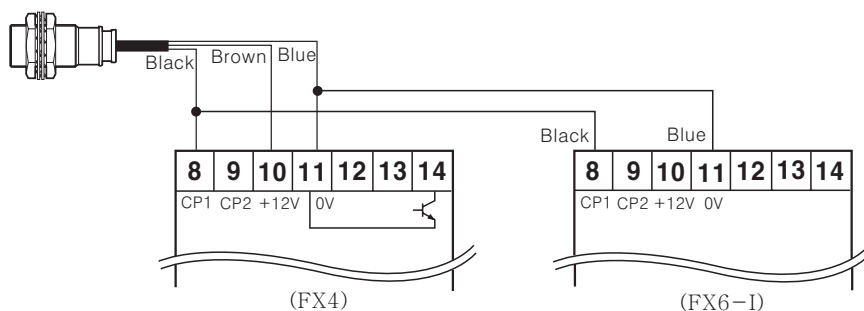
◎How to count by external power supply

This unit starts to count when "High" level (5-30VDC) is applied at CP1 or CP2 after selecting PNP.



◎Using 2 counters with one sensor

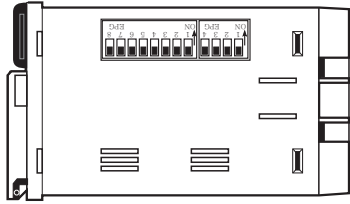
- Please connect as the power of sensor is supplied from only one of counters and design input logic with same way.



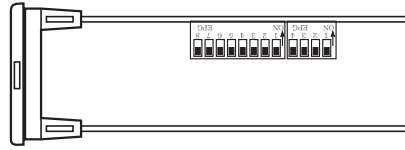
Up/Down Counter/Timer

■ Selection by DIP switches

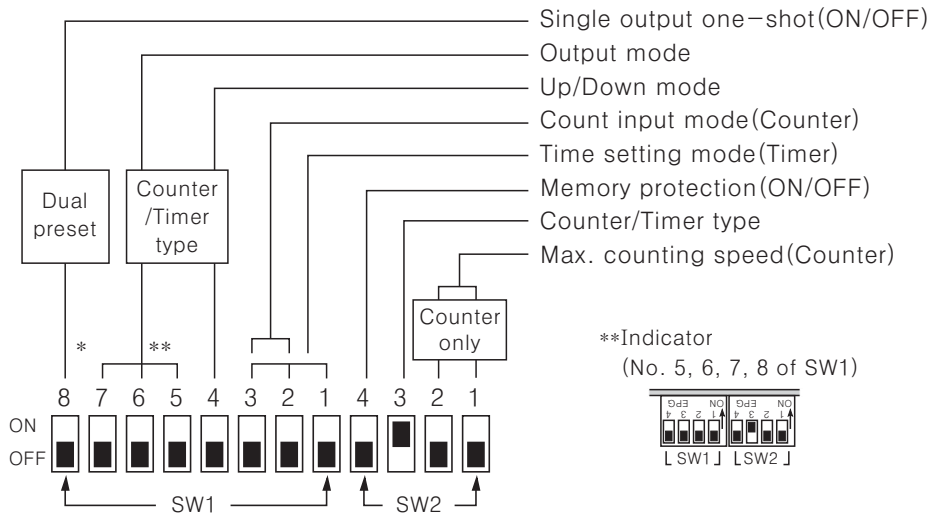
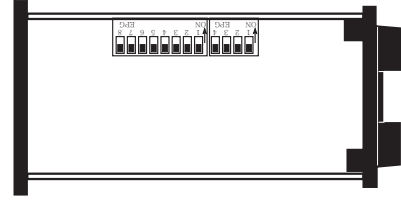
● 72×72 DIP switch position



● 48×96 DIP switch position



● 144×72 DIP switch position



● Max. counting speed

| SW2 | Functions |
|--------------|-----------|
| 1 ON, 2 ON | 1cps |
| 1 ON, 2 OFF | 30cps |
| 1 OFF, 2 ON | 2kcps |
| 1 OFF, 2 OFF | 5kcps |

● Conter/Timer

| SW2 | Functions |
|-------|-----------|
| 3 ON | Conter |
| 3 OFF | Timer |

● Up/Down mode

| SW1 | Functions |
|-------|-----------|
| 4 ON | Down mode |
| 4 OFF | Up mode |

● Memory protection

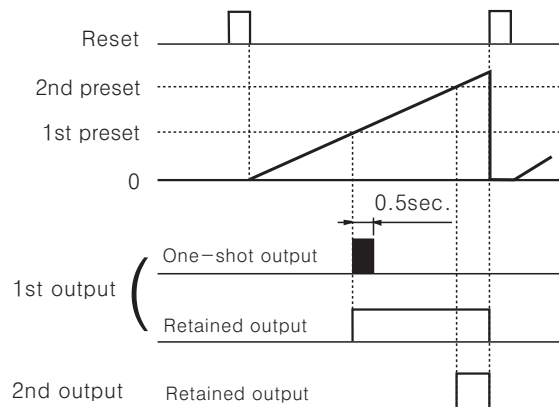
| SW2 | Functions |
|-------|-------------------------------|
| 4 ON | Disable the memory protection |
| 4 OFF | Enable the memory protection |

● Selection of one-shot output or Retained output for 1st output.

| SW1 | Function |
|-------|------------------------------|
| 8 ON | 1st output : One-shot output |
| 8 OFF | 1st output : Retained output |

※ This mode selects a one-shot output (0.5sec fixed) or retained output (Until 2nd output turns off) for 1st output in the dual preset counter.

※ Example of F output operation mode



(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) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

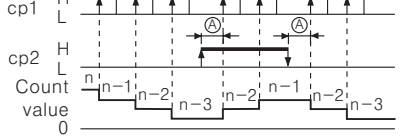
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

FX/FXH/FXL Series

Input operation(Counter)

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

※ (A) : Over Min. signal width, (B) : Over 1/2 of Min. signal width.

If the signal width of (A) or (B) is less than Min. signal width, ±1 of count error is occurred.

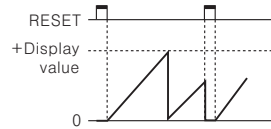
Up/Down Counter/Timer

Time setting mode(timer)

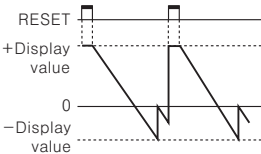
| | SW1 | 4Digit | 6Digit |
|----------|-----|--------------|--------------------|
| A | | 99.99sec | 99999.9sec |
| B | | 999.9sec | 999999sec |
| C | | 9999sec | 99min 59.99sec |
| D | | 99min 59sec | 999min 59.9sec |
| E | | 999.9min | 99999.9min |
| F | | 99hour 59min | 99hour 59min 59sec |
| G | | 999.9hour | 9999hour 59min |
| H | | 9999hour | 99999.9hour |

Counting operation of indication type(Counter)

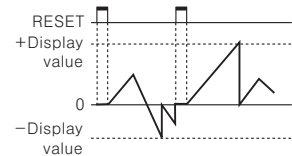
Up mode



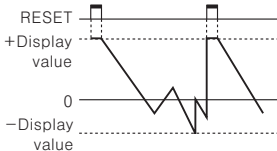
Down mode



Up / Down-A, B, C mode

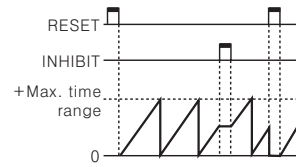


Up / Down-D, E, F mode

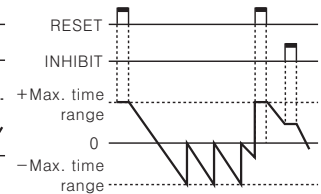


Time operation of indication type (Timer)

Up mode

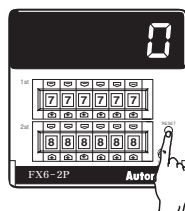


Down mode



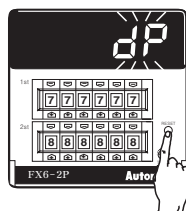
Decimal point setting

Display the decimal point.

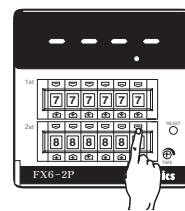


RUN mode

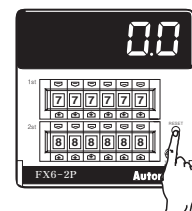
※ Press RESET button for over 3sec., it advances to decimal point setting mode.



※ When "dP" is flashing, one touch the Reset button.



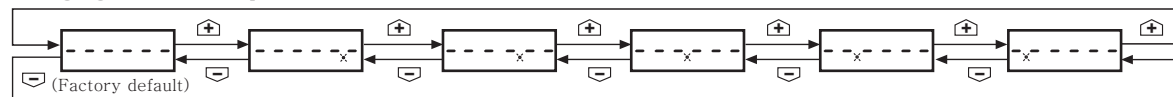
※ Set the position of decimal point using \uparrow , \downarrow buttons of digital switch.



Return to RUN mode

※ Press RESET button for over 3sec., it returns to RUN mode

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 indication type.

(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) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

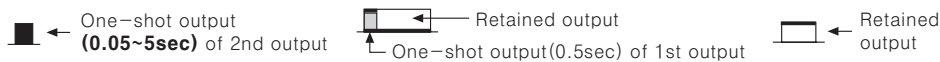
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

FX/FXH/FXL Series

Output operation mode



※The output of single preset type is operated at the status of the second output mode

| Output mode (SW1) | ON OFF | ON OFF | Operation after count up |
|--------------------------------|----------------------------------|--------------------------------------|--|
| | Up mode Up, Up / Down-A, B, C | Down mode Down, Up / Down-D, E, F | |
| F ON OFF | | | The display value continues until Reset signal applied and the output is held. • 1st retained output and 2nd output are maintained until Reset signal is applied. • When using 1st output as one-shot output, it will return after operating for 0.5sec. |
| N ON OFF | | | The display value and output will be held until Reset input is applied. |
| C ON OFF | | | The display value will be Reset Start status as soon as it reaches to 2nd setting value. • 1st retained output will be OFF after 2nd one-shot output. • 1st one-shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| R ON OFF | | | Display value will be maintained until 2nd output is Off, then it will be reset. • 1st retained output will be OFF after 2nd one-shot output. • 1st one-shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| K ON OFF | | | The display value continues until Reset signal applied. • 1st retained output will be OFF after 2nd one-shot output. • 1st one-shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| P ON OFF | | | The display value will be Reset Start status as soon as it reaches to 2nd setting value. • 1st retained output will be OFF after 2nd one-shot output. • 1st one-shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| Q ON OFF | | | The display continues until 2nd output is OFF. • 1st retained output will be OFF after 2nd one-shot output. • 1st one-shot output will be reset after operating 0.5sec. not related to 2nd output. |
| S Counter ON OFF | Up | Down | • Up, Up/Down-A, B, C input mode -OUT1 is ON when (Display value) ≥ (1st setting value) -OUT2 is ON when (Display value) ≥ (Dual setting value) • Down, Up/Down-D, E, F input mode -OUT1 is ON when (Display value) ≤ (1st setting value) -OUT2 is ON when (Display value) ≤ (Zero) |
| | Up / Down-A, B, C | Up / Down-D, E, F | |
| S Timer ON OFF | | | When it is used as Timer, 1st output and 2nd output are flashing repeatedly. |

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

Up/Down Counter/Timer

Proper usage

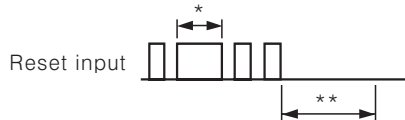
Reset

Reset

In case of changing the input mode after supplying the power, please provide an external reset or manual reset. **If reset is not executed, the counter will be working in previous mode.**

Reset signal width

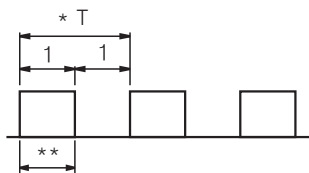
To guarantee proper reset, the signal must be supplied for a minimum of **min. 20ms** regardless the signal comes from a contact or a solid-state input.



*In case of a contact reset, contact chattering will not affect the reset as long as it is applied for a minimum of 20ms.

**Input signal at CP1 & CP2 must be applied for a minimum of 50ms after the reset is removed.

Minimum count signal width

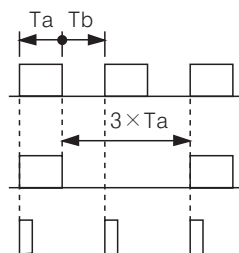


* Please make duty ratio(ON/OFF) as 1:1.

**Minimum signal width $\left[\begin{array}{l} 30\text{cps} : \text{Min. } 16.7\text{ms} \\ 2\text{kcps} : \text{Min. } 0.25\text{ms} \end{array} \right.$

Maximum 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. If either ON or OFF signal is shorter than minimum signal width, this product may not respond.



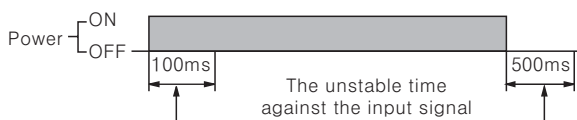
Therefore T_a (ON width) and T_b (OFF width) needed to be over min. signal width.

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

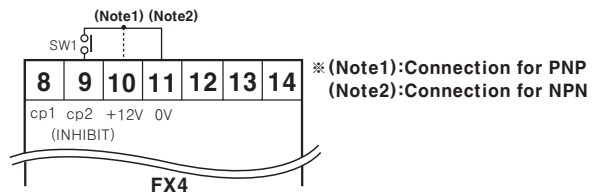
It can not respond because Max. signal width(1a) is small.

Power

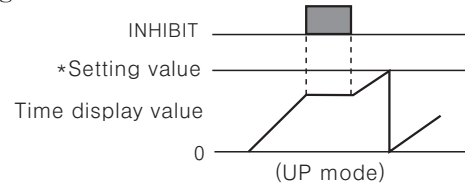
The inner circuit voltage starts to rise up for the first 100ms after power on, the input may not work at this time. And also the inner circuit voltage drops down for the last 500ms after power off, the input may not work at this time.



INHIBIT(Only Timer)

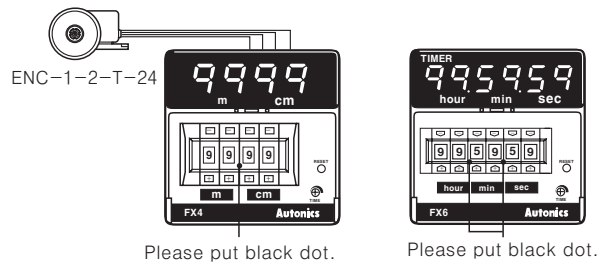


- INHIBIT mode is active when SW1 turns ON. (Time Hold)
- When power is applied, it starts to progress and INHIBIT mode is used to stop the time is under the progress at the moment.
- When SW1 is OFF, timer starts to progress again.



How to use the sticker

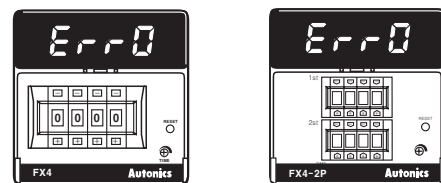
The below sticker can be found inside the box. Use the sticker according to application as follow:
Ex1) Measurement of length by the rotary encoder Ex2) Timer[F mode]



Error display

| Error signal | Error description | Returning method |
|--------------|--|--|
| Err0 | Zero setting status | Change the setting value to non zero status |
| | When 2nd setting value is smaller than 1st setting value | Make 2nd setting value bigger than 1st setting value |

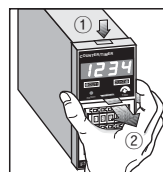
- *There is no Error display function in indication type.
- *There is no Error function in indicator.



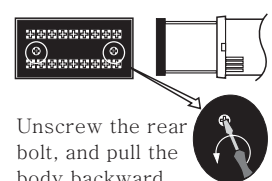
Case & DIP switch detachment

FXH Series

- 1 Push down the front guide.
- 2 Pull out the front guide.



FXL Series



Unscrew the rear bolt, and pull the body backward.

*Please be careful of the injury caused by tools.

(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) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement