# 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

c ℛ US

### ▣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 | | | • Indicator : Approx. 6VA(240VAC 60Hz), Approx. 2.7W(24VDC), Approx. 5.8VA(24VAC 60Hz)<br>• Single preset : Approx. 7VA(240VAC 60Hz), Approx. 3.3W(24VDC), Approx. 6.8VA(24VAC 60Hz)<br>• 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<br>[Voltage input] Input impedance : 5.4kΩ, "H" level : 5−30VDC, "L" level : 0−2VDC<br>[No−voltage input] Impedance at short−circuit : Max. 1kΩ, Residual voltage at<br>    short−circuit : Max. 2VDC, Impedance at open−circuit : Min. 100kΩ | | | | |
| | RESET input | | | | | | |
| One−shot output time | | | • Single preset type ☞ 0.05~5sec<br>• 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<br>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℃ (at non−freezing status) | | | | |
| Storage temperature | | | −25 ~ +65℃ (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) Field network device

(Q) 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/s² (Approx. 30G) in X, Y, Z directions for 3 times |
| | Malfunction | 100m/s² (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 | | c ⒩ us |
| 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 |

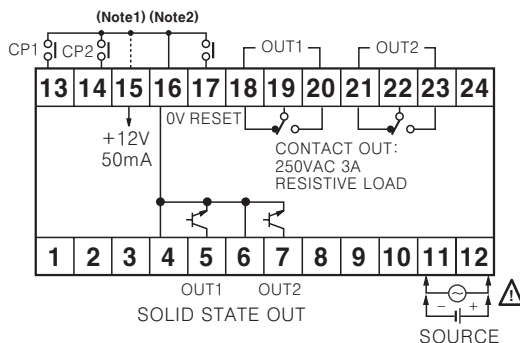## ▣ Connections
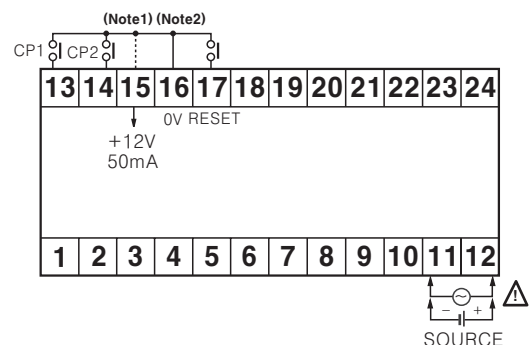


●FX□-2P
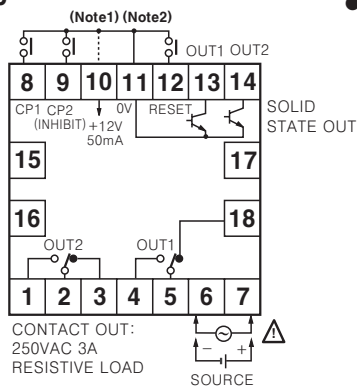
●FX□
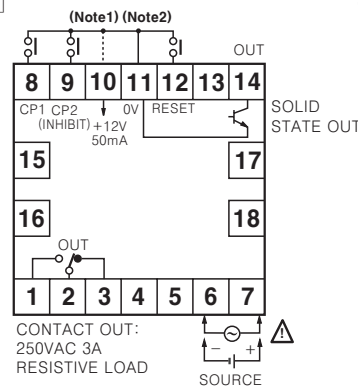
●FX□-I
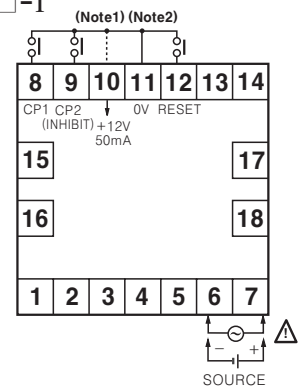


●FX4H-2P
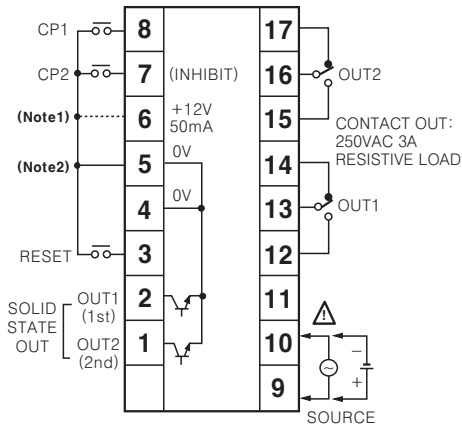
●FX4H
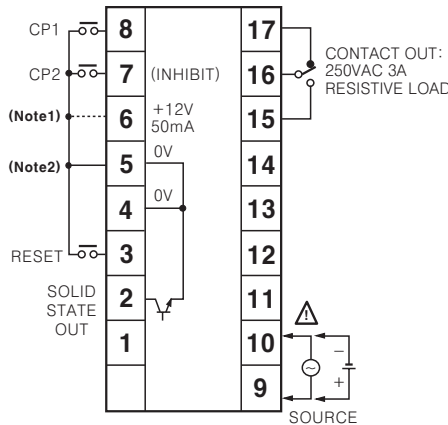
●FX4H-I
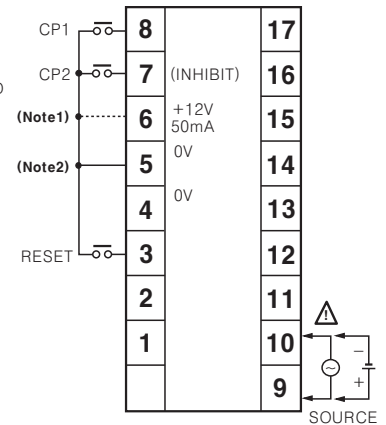


●FX□L-2P

●FX□L-I
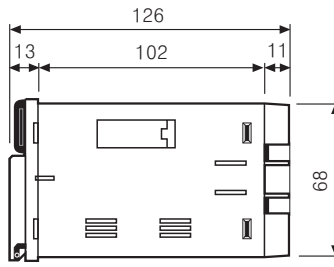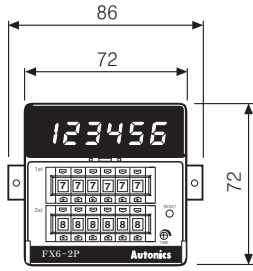
※CP2(INHIBIT) : Time hold terminal when using for timer.
※It is operated by power ON start type when using for timer.

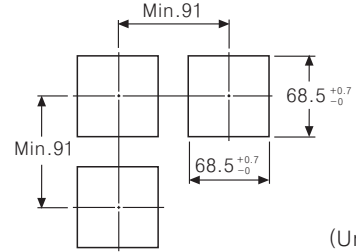※(Note1) : Connection for PNP input
 (Note2) : Connection for NPN input

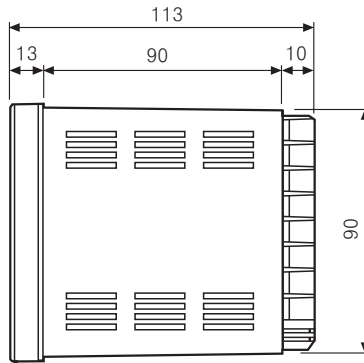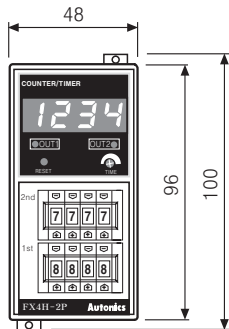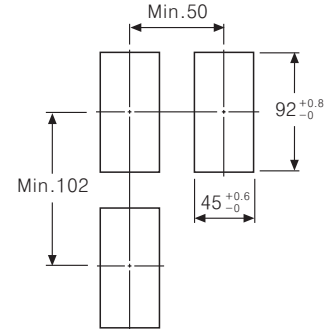Autonics

# Up/Down Counter/Timer

## ▣Dimensions

### ●FX Series
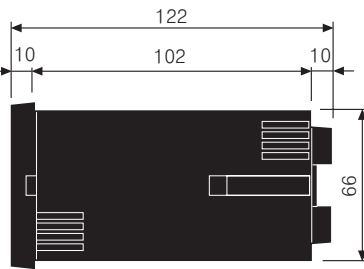


●Panel cut−out

(Unit:mm)
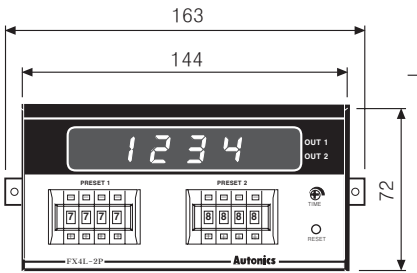
### ●FXH Series



●Panel cut−out

(Unit:mm)

### ●FXL Series



●Panel cut−out
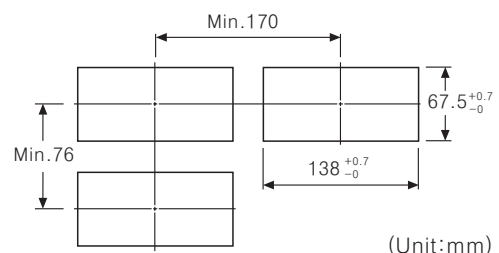
(Unit:mm)

## ▣Input connections

### ◎No−voltage input(NPN)

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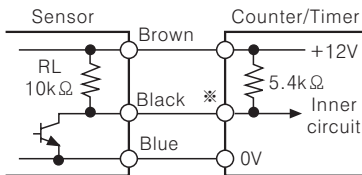


(NPN output)

※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)

# FX/FXH/FXL Series

## ▣Input logic selection

### ●FX series
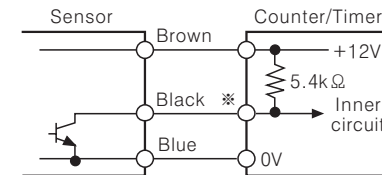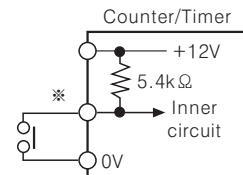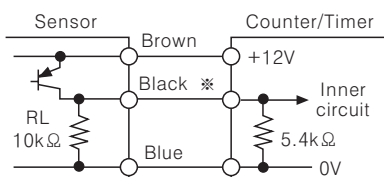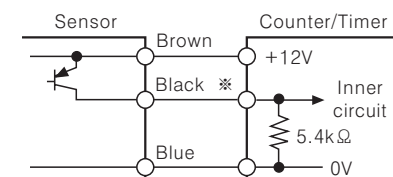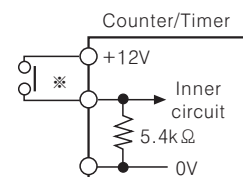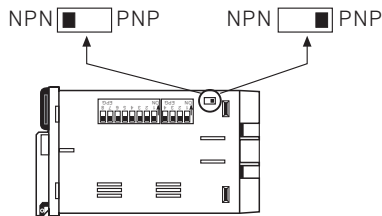Input logic is changeable by input logic selection switch located at the one-side of case.
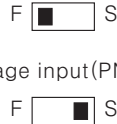
• No-voltage input • Voltage input(PNP)
  (NPN)

NPN ■☐ PNP        NPN ☐■ PNP

### ●FXL series
Input logic is changeable by input logic selection switch located at the terminal block.
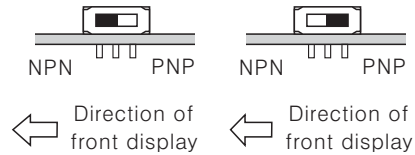
• No-voltageinpu(NPN)

F ■☐ S

• Voltage input(PNP)

F ☐■ S

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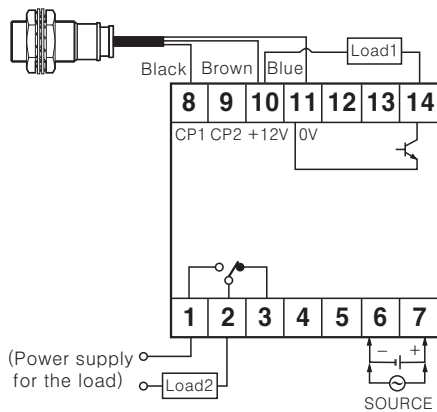Input logic is changeable by input logic selection switch(SW3) located at inside of the case.

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

NPN ⊓⊓⊓ PNP        NPN ⊓⊓⊓ PNP

⇐ Direction of front display        ⇐ 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

Black | Brown | Blue        Load1

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|----|----|----|----|----|
| CP1 | CP2 | +12V | 0V | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

(Power supply for the load)    Load2    SOURCE  − +

●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

(−) Constant−voltage
(+) circuit

※ Load1

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|----|----|----|----|----|
| CP1 | CP2 | +12V | 0V | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

(Power supply for the load)    Load2    SOURCE  − +
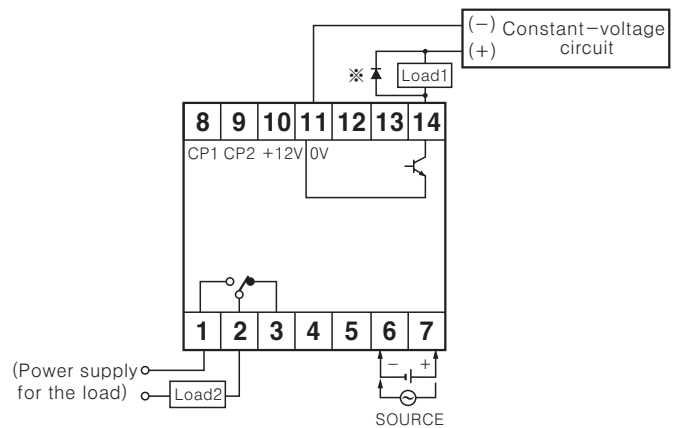
●The capacity of the load must not be exceed max. 30VDC, max. 100mA of the switching capacity of the transistor.
●Please do not supply the reverse polarity voltage.
※Please connector the surge absorber(Diode) at both terminals of the load, in case of using the inductive load. (Relay, etc.)

◎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.

Limit switch contact

(+) External
(−) power supply

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|----|----|----|----|----|
| CP1 | CP2 | +12V | 0V | | | |

(FX4)
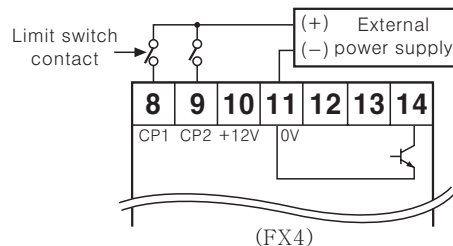
◎Using 2 counters with one sensor
●Please connect as the power of sensor is supplied from only one of counters and design input logic with same way.

Black | Brown | Blue

Black        Blue

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|----|----|----|----|----|
| CP1 | CP2 | +12V | 0V | | | |

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|----|----|----|----|----|
| CP1 | CP2 | +12V | 0V | | | |

(FX4)                                    (FX6−I)
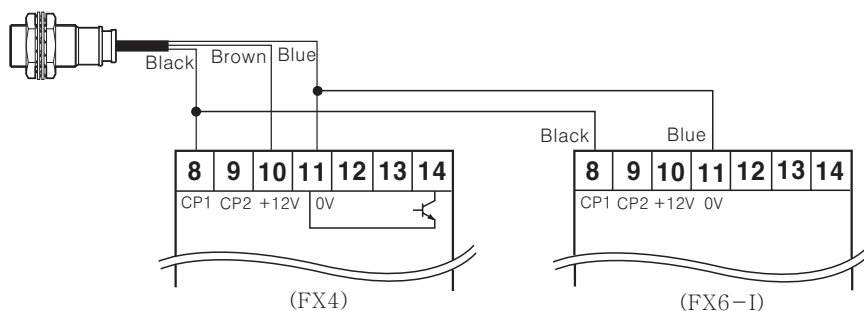
# Up/Down Counter/Timer

## ▣Description of inner DIP switches

●72×72 DIP switch position　　●48×96 DIP switch position　　●144×72 DIP switch position
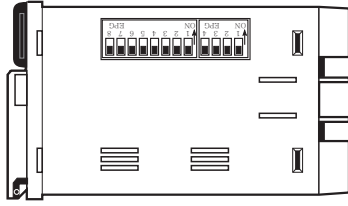
Single output one−shot(ON/OFF)
Output mode
Up/Down mode
Count input mode(Counter)
Time setting mode(Timer)
Memory protection(ON/OFF)
Counter/Timer type
Max. counting speed(Counter)

Dual preset

Counter/Timer type

Counter only

**Indication model
(There is no. 5, 6, 7, 8 of SW1)

*Single preset model
(There is no. 8 of SW1)

SW1 — SW2
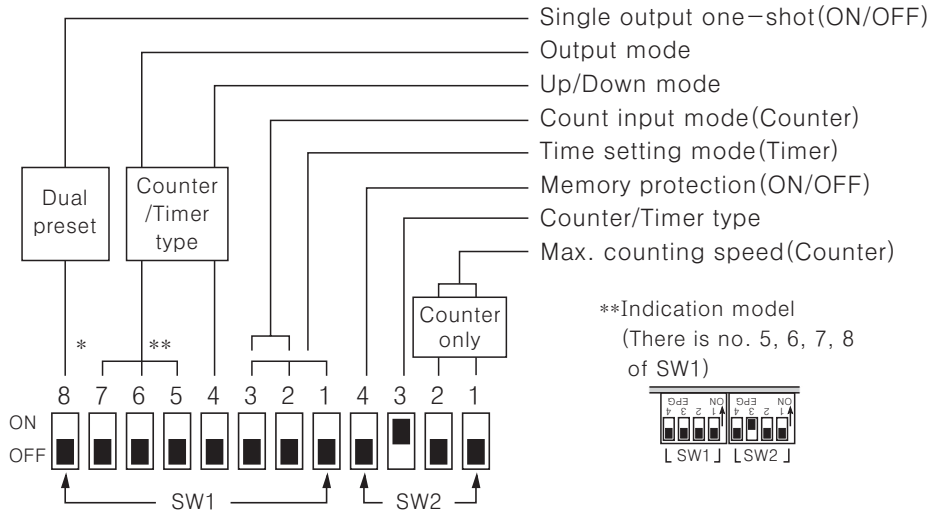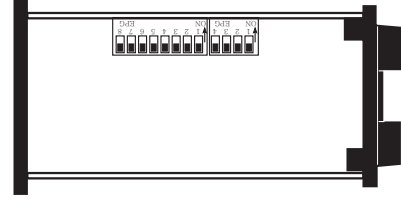
●Max. counting speed

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

●Conter/Timer

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

●Up/Down mode

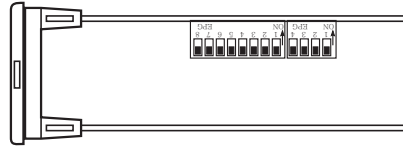| SW1 | | Functions |
|---|---|---|
| 4 | ON OFF | Down mode |
| | ON OFF | Up mode |

●Memory protection

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

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

| SW1 | | Function |
|---|---|---|
| 8 | ON OFF | 1st output : One−shot output |
| | ON 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
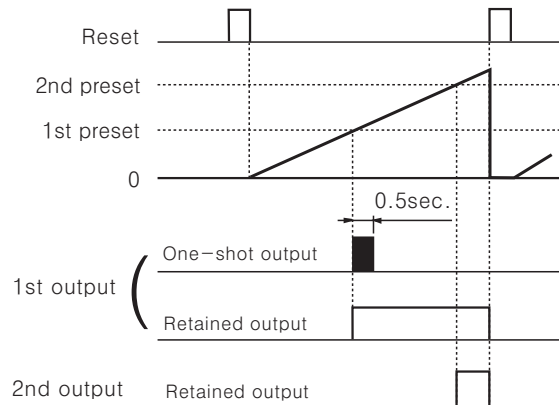
Reset
2nd preset
1st preset
0
0.5sec.
1st output ( One−shot output / Retained output )
2nd output Retained output

## ▣ Input operation(Counter)

| Input mode | | SW1 | No-voltage input type(NPN) | Voltage input type(PNP) |
|---|---|---|---|---|
| **Up mode** | Up/Down−A (Command input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| | Up/Down−B (Individual input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| | Up/Down−C (Phase difference input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| | Up (Count up input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| **Down mode** | Up/Down−D (Command input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| | Up/Down−E (Individual input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| | Up/Down−F (Phase difference input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |
| | Down (Count down input) | ON 2 3 / OFF | cp1, cp2, Count value | cp1, cp2, Count value |

※ Ⓐ : Over Min. signal width, Ⓑ : Over 1/2 of Min. signal width.
If the signal width of Ⓐ or Ⓑ is less than Min. signal width, ±1 of count error is occured.

## ▣Time setting mode(timer)

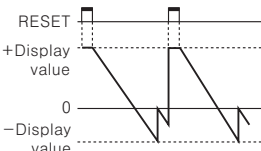| SW1 | | 4Digit | 6Digit |
|---|---|---|---|
| A | ON OFF 1 2 3 | 99.99sec | 99999.9sec |
| B | ON OFF 1 2 3 | 999.9sec | 999999sec |
| C | ON OFF 1 2 3 | 9999sec | 99min 59.99sec |
| D | ON OFF 1 2 3 | 99min 59sec | 999min 59.9sec |
| E | ON OFF 1 2 3 | 999.9min | 99999.9min |
| F | ON OFF 1 2 3 | 99hour 59min | 99hour 59min 59sec |
| G | ON OFF 1 2 3 | 999.9hour | 9999hour 59min |
| H | ON OFF 1 2 3 | 9999hour | 99999.9hour |

## ▣Counting operation of indication type(Counter)
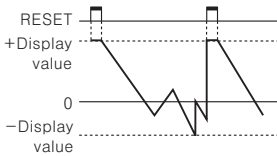
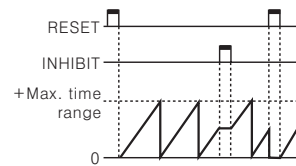●**Up mode**
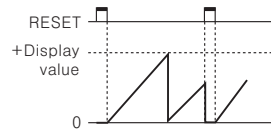
●**Down mode**

●**Up / Down-A, B, C mode**
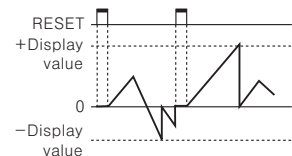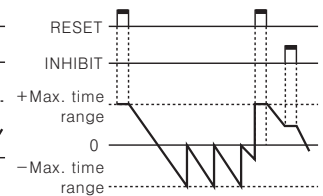
●**Up / Down-D, E, F mode**

## ▣Time operation of indication type (Timer)

●**Up mode**

●**Down mode**

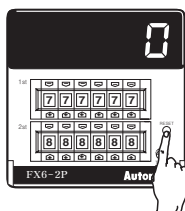## ▣ Setting function of Decimal point

Display the decimal point.

RUN mode
※Press RESET button for over 3sec., it advances to decimal point setting mode.
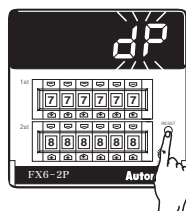
※When "dP" is flashing, one touch the Reset button.
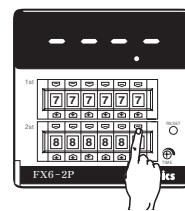
※Set the position of decimal point using ⊞, ⊟ buttons of digital switch.
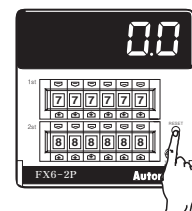
Return to RUN mode
※Press RESET button for over 3sec., it returns to RUN mode

●Changing the decimal point

⊟ (Factory default)
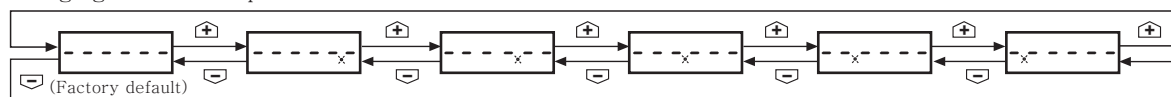
※It returns to RUN mode if no RESET button or digital switch is applied for 60sec. in decimal point. Setting status.
※The decimal point setting is not existed in indication type.

**(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)
Field
network
device**

**(Q)
Production
stoppage
models &
replacement**

# FX/FXH/FXL Series

## ▣Output operation mode

■ ← One−shot output **(0.05~5sec)** of 2nd output

▨ ← Retained output
One−shot output(0.5sec) of 1st output

▭ ← Retained output

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

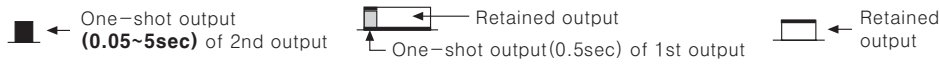| Output mode (SW1) | Up mode<br>Up, Up / Down-A, B, C | Down mode<br>Down, Up / Down-D, E, F | Operation after count up |
|---|---|---|---|
| **F**<br>ON 5 6 7<br>OFF ▨▨▨ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | The display value continues until Reset signal applied and the output is held.<br>• 1st retained output and 2nd output are maintained until Reset signal is applied.<br>• When using 1st output as one−shot output, it will return after operating for 0.5sec. |
| **N**<br>ON 5 6 7<br>OFF ▨▨ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | The display value and output will be held until Reset input is applied. |
| **C**<br>ON 5 6 7<br>OFF ■■ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | The display value will be Reset Start status as soon as it reaches to 2nd setting value.<br>• 1st retained output will be OFF after 2nd one−shot output.<br>• 1st one−shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| **R**<br>ON 5 6 7<br>OFF ■■■ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Display value will be maintained until 2nd output is Off, then it will be reset.<br>• 1st retained output will be OFF after 2nd one−shot output.<br>• 1st one−shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| **K**<br>ON 5 6 7<br>OFF ■■ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | The display value continues until Reset signal applied.<br>• 1st retained output will be OFF after 2nd one−shot output.<br>• 1st one−shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| **P**<br>ON 5 6 7<br>OFF ■ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | The display value will be Reset Start status as soon as it reaches to 2nd setting value.<br>• 1st retained output will be OFF after 2nd one−shot output.<br>• 1st one−shot output will be reset after operating 0.5sec., and it is not related to 2nd output. |
| **Q**<br>ON 5 6 7<br>OFF ■ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | The display continues until 2nd output is OFF.<br>• 1st retained output will be OFF after 2nd one−shot output.<br>• 1st one−shot output will be reset after operating 0.5sec. not related to 2nd output. |
| **S**<br>Counter<br>ON 5 6 7<br>OFF ■■■ | **Up**<br>Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output<br>**Up / Down-A, B, C**<br>Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | **Down**<br>Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output<br>**Up / Down-D, E, F**<br>Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | • Up, Up/Down−A, B, C input mode<br>−OUT1 is ON when(Display value) ≥ (1st setting value)<br>−OUT2 is ON when(Display value) ≥ (Dual setting value)<br><br>• Down, Up/Down−D, E, F input mode<br>−OUT1 is ON when(Display value) ≤ (1st setting value)<br>−OUT2 is ON when(Display value) ≤ (Zero) |
| **S**<br>Timer<br>ON 5 6 7<br>OFF ■■ | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | Reset / 2nd Preset / 1st Preset / 0 / 1st Output / 2nd Output | When it is used as Timer, 1st output and 2nd output are flashing repeatedly. |

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

## ▪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.**
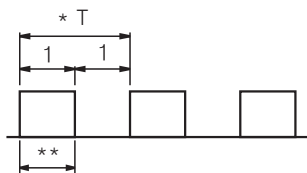
#### ●Reset signal width

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.
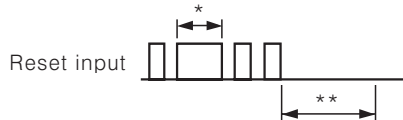
Reset input

*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

* T

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

**Minimum signal width ⌈ 30cps : Min. 16.7ms
⌊ 2kcps : Min. 0.25ms

### ◎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.
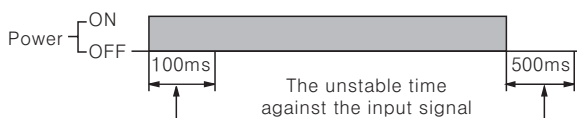
Ta Tb

3×Ta
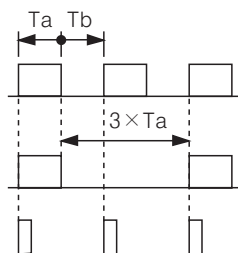
Therefore Ta(ON width) and Tb(OFF width) needed to be over min.signal width.

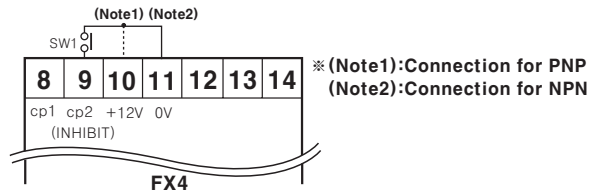Max. counting speed is 1/2 value of catalog spec. when duty ratio is 1:3.

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.

Power ⌈ON ⌊OFF

100ms

The unstable time against the input signal

500ms

### ◎INHIBIT(Only Timer)

(Note1) (Note2)

SW1

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |

cp1 cp2 +12V 0V
(INHIBIT)

FX4

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

#### ●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.

INHIBIT

*Setting value
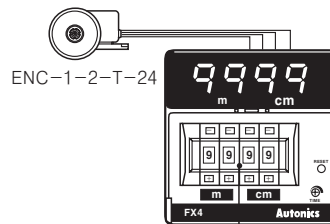
Time display value

0

(UP mode)
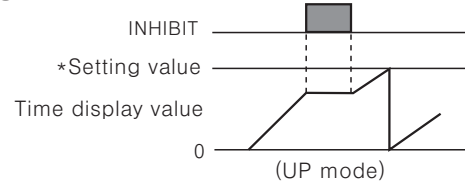
### ◎How to use the sticker

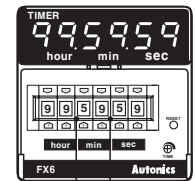The below sticker can be found inside the box.

Use the sticker according to application as follow;

Ex1)Measurement of length by the rotary encoder

EX2)Timer[F mode]

ENC−1−2−T−24

Please put black dot.

Please put black dot.

### ◎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 |

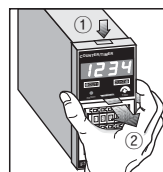※There is no Error display function in indication type.
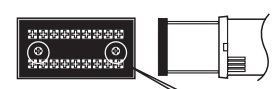※There is no Error function in indicator.

Err0

FX4

Err0

FX4-2P
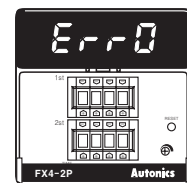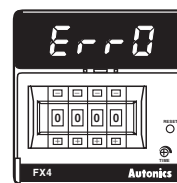
## ▪Case & DIP switch detachment

#### ●FXH Series

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

#### ●FXL Series

Unscrew the rear bolt, and pull the body backward.

※Please be careful of the injury caused by tools.