## DIN W72×H72, W144×H72mm of Up / Down / Up·Down measure counter

### ■ Features

- Selectable Multi / Divide function
- Upgrade counting speed : 1cps, 5kcps
- Selectable voltage input(PNP) or no-voltage input(NPN): Memory protection for 10 years (Using non-voltage semiconductor)
- Decimal point setting(Fixed decimal point of display)
- Wide range of power supply : 100-240VAC 50/60Hz
  12-24VAC/DC(Option)
- Built-in Microprocessor

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

### ■ Ordering information

**F 4 A M — 2P**

| | | |
|---|---|---|
| Output | No mark | Single preset |
| | 2P | Dual preset |
| Function | M | Measure function |
| Output | A | Preset |
| | B | Totalizer(Indicator) |
| Digit | 4 | 9999(4digit) |
| | 6 | 999999(6digit) |
| Size | F | DIN W72×H72mm |
| | L | DIN W144×H72mm |

### ■ Specifications

| | | | | | | |
|---|---|---|---|---|---|---|
| Model | Single preset | | **F4AM** | **F6AM** | — | — |
| | Dual preset | | **F4AM-2P** | **F6AM-2P** | **L4AM-2P** | **L6AM-2P** |
| | Totalizer(Indicator) | | **F4BM** | **F6BM** | **L4BM** | **L6BM** |
| Digit | | | 4digit | 6digit | 4digit | 6digit |
| Digit size | | | W8×H14mm | W4×H8mm | W8×H14mm | |
| Power supply | AC Voltage type | | 100-240VAC 50/60Hz | | | |
| | AC/DC Voltage type | | 100-240VAC 50/60Hz, 12-24VDC universal | | | |
| Allowable voltage range | | | 90 to 110% of rated voltage | | | |
| Power consumption | AC Voltage type | | • Indicator: Approx. 4.7VA • Single preset: Approx. 5.6VA • Dual preset: Approx. 6.5VA(240VAC 50/60Hz) | | | |
| | AC/DC Voltage type | | • Indicator: Approx. 5.1VA • Single preset: Approx. 6VA • Dual preset: Approx. 6.5VA(24VAC 50/60Hz)<br>• Indicator: Approx. 2.7W • Single preset: Approx. 3.3W • Dual preset: Approx. 3.8W(24VDC) | | | |
| Max. counting speed | | | Selectable 1cps/30cps/2kcps/5kcps by internal DIP switch | | | |
| Min. signal width | | | Approx. 20ms | | | |
| Input type | CP1,CP2 input | | Input logic is selectable<br>[Voltage input] Input impedance : 5.4kΩ, "H" level voltage : 5-30VDC, "L" level voltage : 0-2VDC<br>[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 | | | • Single preset : 0.5sec.<br>• Dual preset : 0.05 to 5sec. | | | |
| Control output | Contact | Type | Single preset : SPDT(1c)<br>Dual preset : Single preset SPST(1a), Dual preset SPST(1a) | | Dual preset : Single preset SPDT(1c), Dual preset SPDT(1c) | |
| | | Capacity | 250VAC 3A resistive load | | | |
| | Solid-state | Type | Single preset : 1 NPN open collector output, Dual preset : 2 NPN open collector output | | | |
| | | Capacity | 30VDC Max. 100mA Max. | | | |
| Memory protection | | | Approx. 10 years(When using non-volatile semiconductor memory) | | | |
| External power | | | 12VDC±10% 50mA Max. | | | |

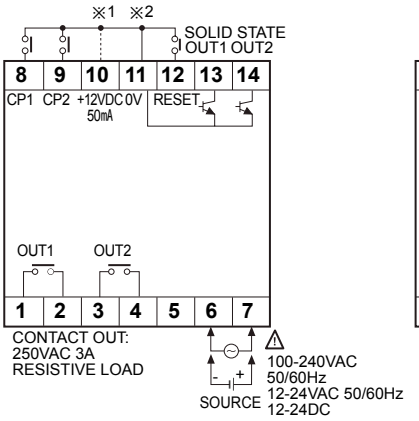
## ▣ Specifications

| | | |
|---|---|---|
| Insulation resistance | | 100MΩ(at 500VDC megger) |
| 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 |
| Vibration | Mechanical | 0.75mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 1 hour |
| | Malfunction | 0.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 10 minutes |
| Shock | Mechanical | 300m/s²(approx. 30G) in each of X, Y, Z directions for 3 times |
| | Malfunction | 100m/s²(approx. 10G) in each of X, Y, Z directions for 3 times |
| Relay life cycle | Mechanical | Min. 10,000,000 operations |
| | Electrical | Min. 100,000 operations(250VAC 3A at resistive load) |
| Environ-ment | Ambient temperature | -10 to 55℃, storage: -25 to 65℃ |
| | Ambient humidity | 35 to 85%RH, storage: 35 to 85%RH |
| Unit weight | AC Voltage type | F4AM: Approx. 273g, F6AM: Approx. 280g, F4AM-2P: Approx. 275g, F6AM-2P: Approx. 282g, F4BM: Approx. 229g, F6BM: Approx. 236g, L4AM: Approx. 505g, L6AM-2P: Approx. 533g, L4AM-2P: Approx. 438g, L6BM: Approx. 445g |
| | AC/DC Voltage type | F4AM: Approx. 268g, F6AM: Approx. 275g, F4AM-2P: Approx. 270g, F6AM-2P: Approx. 287g, F4BM: Approx. 224g, F6BM: Approx. 231g, L4AM-2P: Approx. 511g, L6AM-2P: Approx. 538g, L4BM-2P: Approx. 444g, L6BM: Approx. 450g |

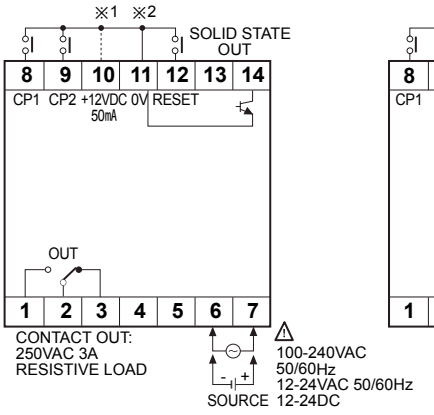
※Environment resistance is rated at no freezing or condensation.

## ▣ Connections

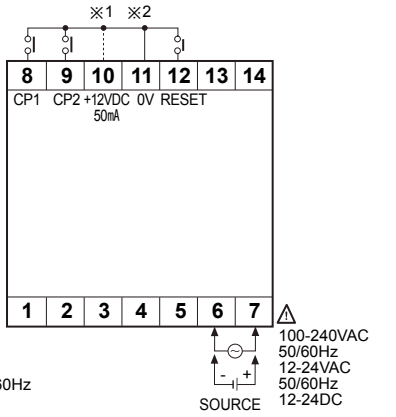
● **F4AM-2P / F6AM-2P**



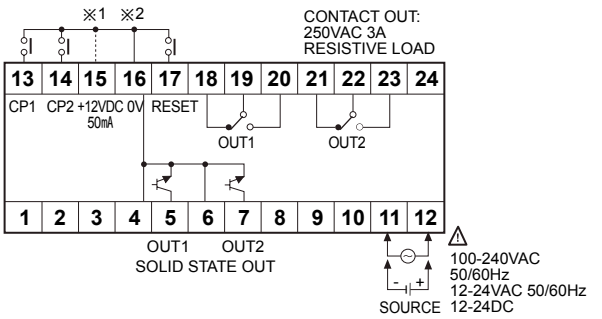

● **F4AM / F6AM**



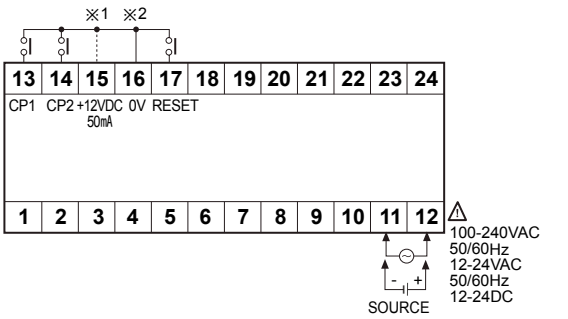

● **F4BM / F6BM**




● **L4AM-2P / L6AM-2P**




● **L4BM / L6BM**

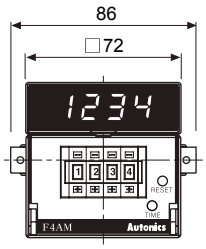


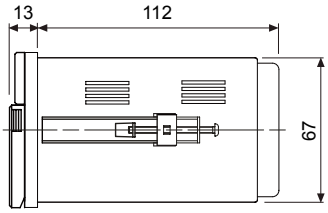

※1: Connection for PNP input in contact input
※2: Connection for NPN input in contact input

## ▣ Dimensions

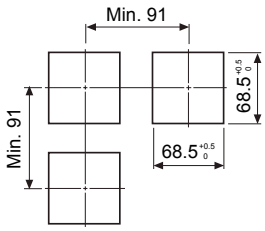
**● FM Series**

(unit: mm)



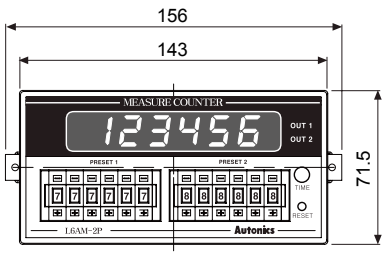



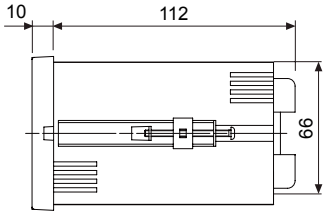

**● Panel cut-out**



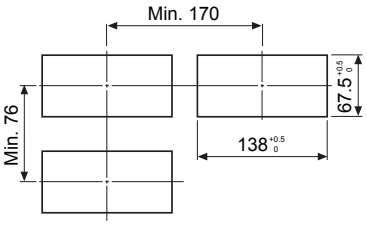

**● LM Series**

(unit: mm)



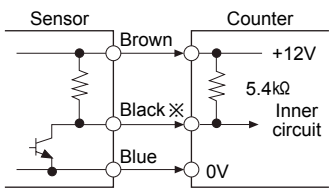

**● Panel cut-out**



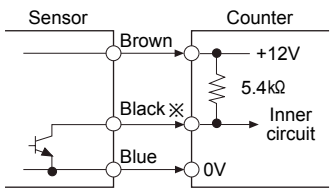

## ▣ Input connections

### ◎ No-voltage input(NPN)

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

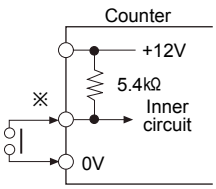



(NPN output)




(NPN open collector output)

**● Contact input**

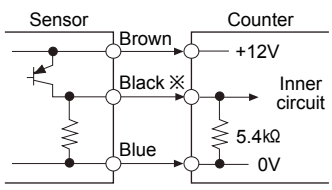



Counting speed : Set as 1 or 30cps

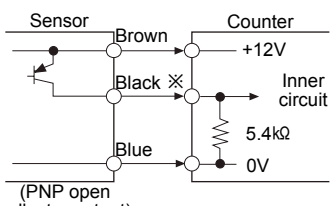
※CP1, CP2, RESET input

### ◎ Voltage input(PNP)

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

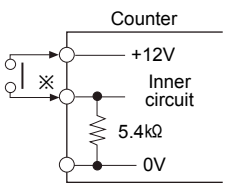



(PNP output)




(PNP open collector output)

**● Contact input**

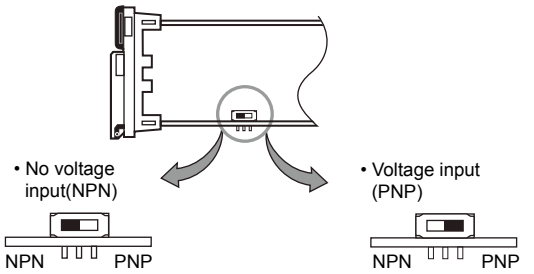



Counting speed : Set as 1 or 30cps

※CP1, CP2, RESET input

## ▣ Description of inner DIP switches

**● FM Series**




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

**● LM Series**

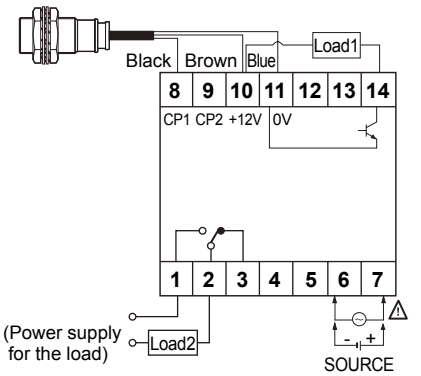
Input logic is changeable by input logic selection switch located at the terminal block.

• No voltage input(NPN)
(NPN) F ■ S (PNP)

• Voltage input(PNP)
(NPN) F ■ S (PNP)

## ▣ Input & output connections

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

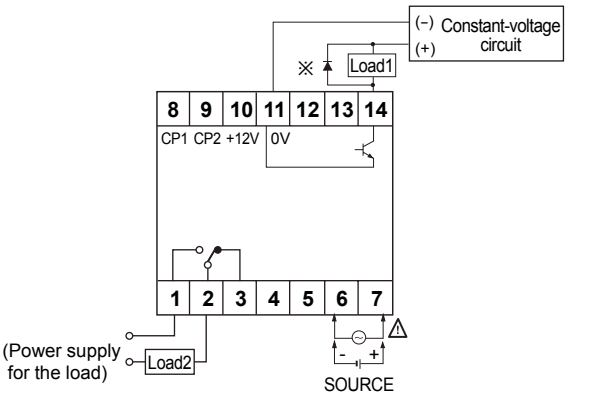



● Please select proper capacity of load, because total value of load capacity and current consumption should not be exceed current capacity(Max. 50mA).

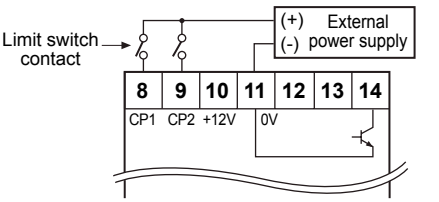
### ◎ How to count by external power supply

This unit start to count when "High" level(5-30VDC) is applied at CP1 or CP2 after selecting PNP. ("Low level" : 0-2VDC)

### ◎ In case of operating the load by external power supply

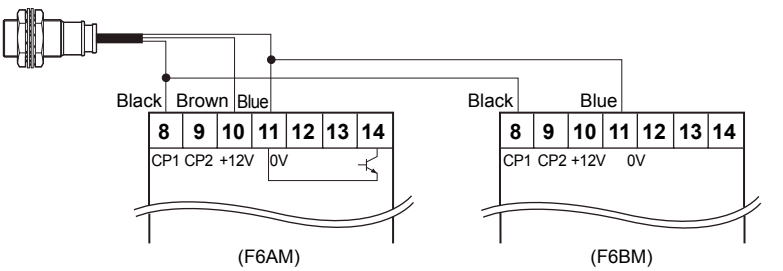



● The capacity of the load must not be exceed Max. 30VDC, Max. 100mA of the switching capacity of the transistor.
● Please do not supply the reverse polarity voltage.
※In case of using the inductive load(Relay, etc.), please connector the surge absorber(Diode)at both terminals of the load, in case of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



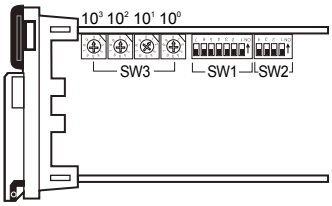

### ◎ Using 2 counters with one sensor

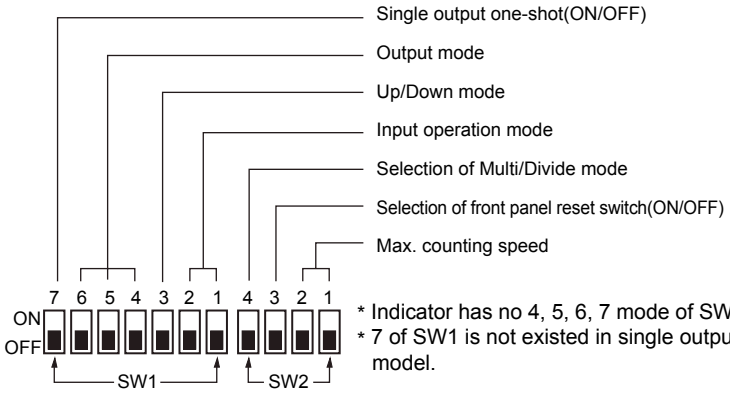
● Please connect as the power of sensor is supplied from only one of counters and design input logic with same way.



## ▣ Selection by DIP switches

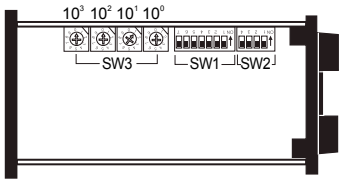
### ● FM Series




* Indicator has no 4, 5, 6, 7 mode of SW1.
* 7 of SW1 is not existed in single output model.

### ● LM Series




### ● Max. counting speed

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

※Factory default : 30cps

### ● Reset switch of front panel

| SW2 | | Function |
|---|---|---|
| 3 | ON / OFF | Use |
| | ON / OFF | Not used |

※Factory default : Not used

### ● Measure function

| SW1 | | Function |
|---|---|---|
| 4 | ON / OFF | Multi mode |
| | ON / OFF | Divide mode |

※Refer to the J-75 for " ▣ Measure Counter".
※Factory default : Divide mode(SW3:0001)

### ● Up/Down mode selection

| SW1 | | Function |
|---|---|---|
| 3 | ON / OFF | Up mode |
| | ON / OFF | Down mode |

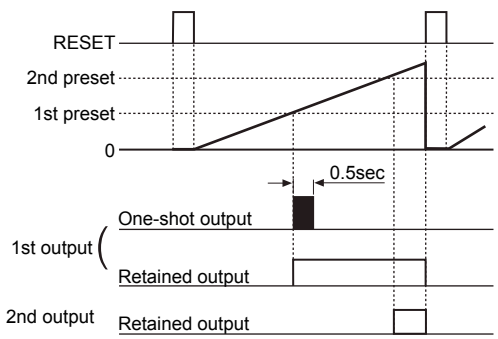
※Factory default : Up mode

### ● Single output one-shot(ON/OFF)

| SW1 | | Function |
|---|---|---|
| 7 | ON / OFF | One-shot output |
| | ON / OFF | Retained output |

※Default : Retained output
※This mode selects one-shot output(0.5sec.) or remained output (until 2nd output turns off) for 1st output in the dual preset counter.

※ Example of F output operation mode



## ▣ Measure Counter

Measure counter sets multiply or divide integer per 1 pulse input.

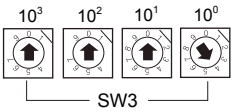
| SW2 | Function |
|---|---|
| 4 ON / OFF | Multi |

| SW2 | Function |
|---|---|
| 4 ON / OFF | Divide |

**● Multi Mode**

It multiplies the inner SW3 setting value at a count input signal and displays it.

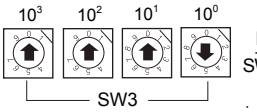
Input signal(N)×SW3 preset value=Indication value




∴ N × 4 = 4, 8, 12 … ( N=1, 2, 3 .. )

**● Divide Mode**

It displays as 1 when the count input signal is entered as preset value of inner SW3.

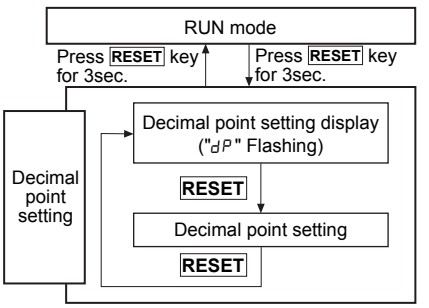



$\frac{\text{Input signal(N)}}{\text{SW3 preset value}}$ = Indication value

∴ $\frac{N}{5}$ = 1, 2, 3 … ( N=5, 10, 15 .. )

(Note) Please be cautious the error can be occurred when down count is executed during up count.

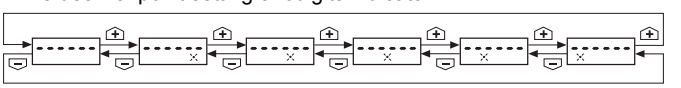
## ▣ Setting function of Decimal point



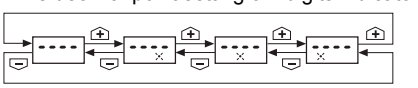

※It advances to "Decimal point setting mode" if press RESET key for 3sec.
※It returns to RUN mode by press RESET key for 3sec in "Decimal point setting mode".
※It returns to RUN mode if no RESET button or digital switch(Dual-setting digital switch for dual preset type) is applied for 60sec. in the "Decimal point setting mode".
※The decimal point setting is not existed in indicator.

**● Decimal point setting**

• The decimal point setting of 6digits indicator



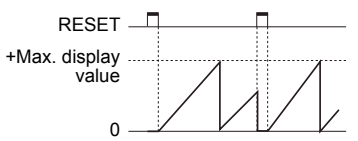
• The decimal point setting of 4digits indicator



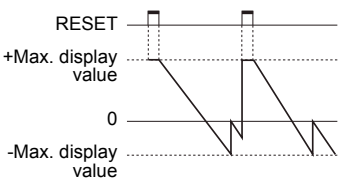
※When it enters to the "Decimal point of setting mode, the prior decimal setting status is displayed.
※In the decimal point setting mode, when pressing one of the Up( ) button of digital switch(Dual-setting digital switch for dual preset type), the point is moved to left direction and it is moved to right direction when one of Down( ) button of digital switch (Dual-setting digital switch for dual preset type).

## ▣ Counting operation of indication type

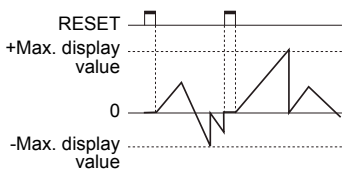
**● Up mode**



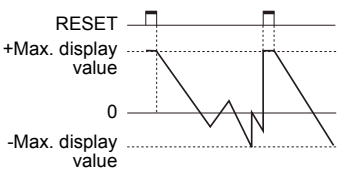

**● Down mode**



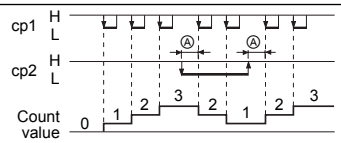
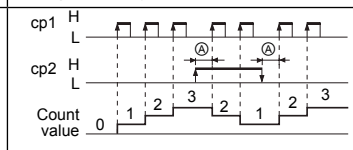
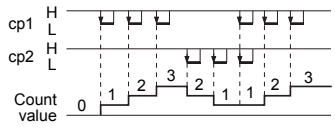
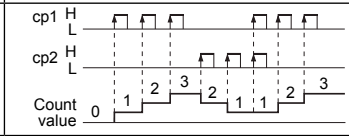
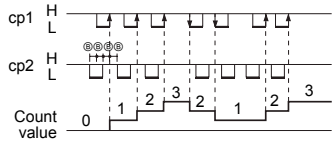
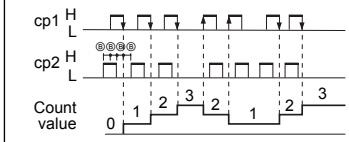
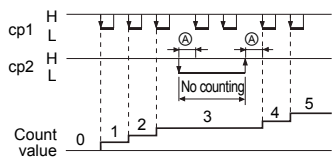
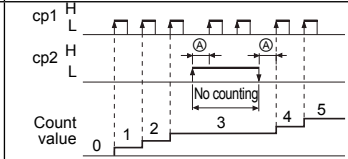
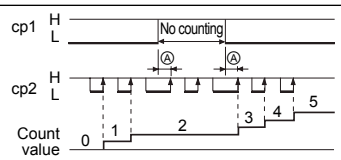
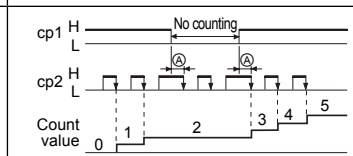
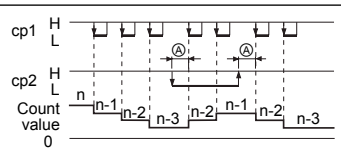
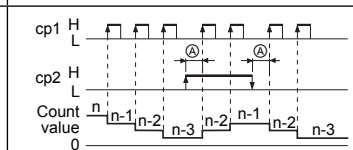
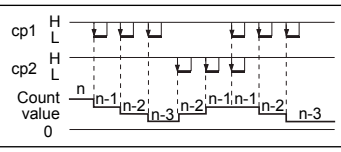
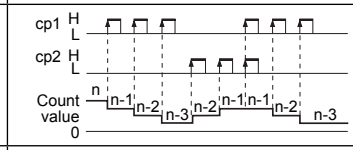
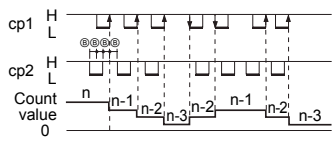
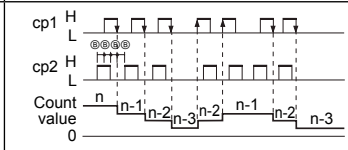
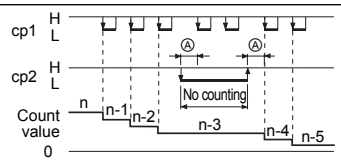
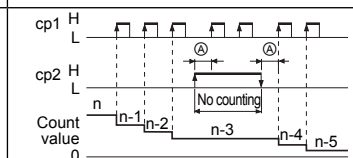
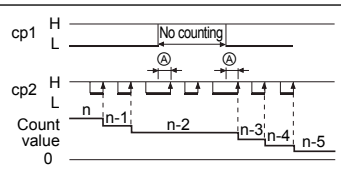
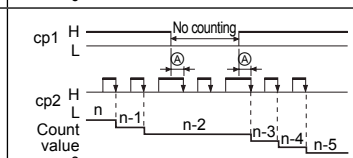

**● Up / Down-A, B, C mode**




**● Up / Down-D, E, F mode**



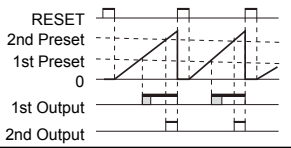
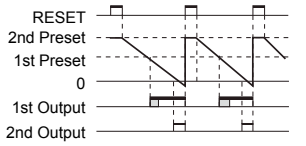
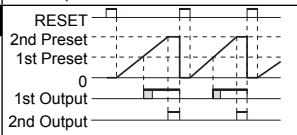
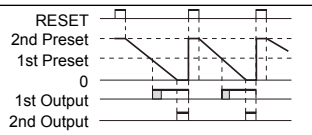
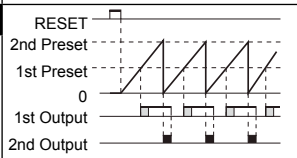
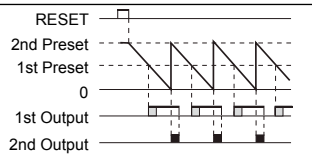
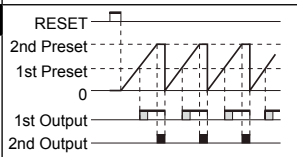
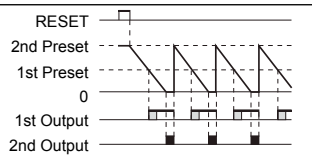
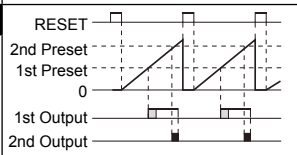
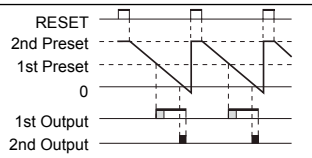
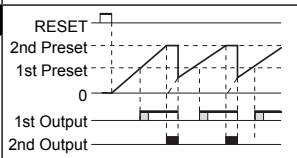
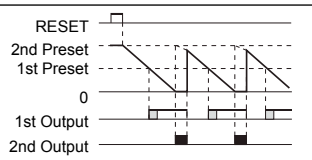
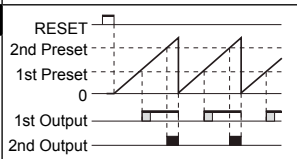
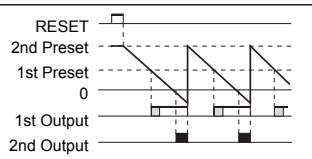
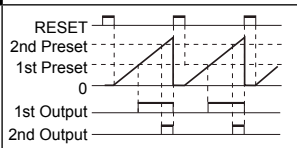
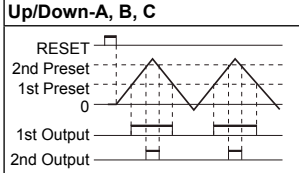
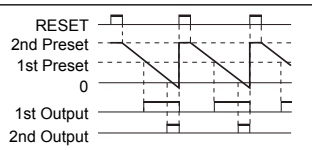
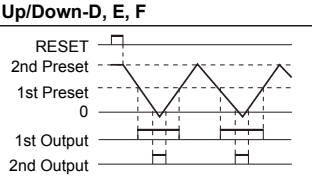
## ■ Input operation mode

| Input mode(SW1) | | SW1 | No-voltage input type(NPN) | Voltage input type(PNP) |
|---|---|---|---|---|
| **Up mode** (3 ON / OFF) | Up/Down-A (Command input) | 1 2 ON / OFF |  |  |
| | Up/Down-B (Individual input) | 1 2 ON / OFF |  |  |
| | Up/Down-C (Phase difference input) | 1 2 ON / OFF |  |  |
| | Up (Count up input) | 1 2 ON / OFF |  |  |
| | | |  |  |
| **Down mode** (3 ON / OFF) | Up/Down-D (Command input) | 1 2 ON / OFF |  |  |
| | Up/Down-E (Individual input) | 1 2 ON / OFF |  |  |
| | Up/Down-F (Phase difference input) | 1 2 ON / OFF |  |  |
| | Down (Count down input) | 1 2 ON / OFF |  |  |
| | | |  |  |

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

## ▣ Output operation mode

One-shot output (0.05 to 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) | 4 ON OFF Up mode | 4 ON OFF Down mode | Operation after count up |
|---|---|---|---|
| | Up, Up/Down-A, B, C mode | Down, Up/Down-D, E, F mode | |
| 4 5 6 ON OFF |  |  | 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** 4 5 6 ON OFF |  |  | Display value and retained 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. |
| **C** 4 5 6 ON OFF |  |  | 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** 4 5 6 ON OFF |  |  | The display value will be held until 2nd output is OFF then 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** 4 5 6 ON OFF |  |  | 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** 4 5 6 ON OFF |  |  | 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** 4 5 6 ON OFF |  |  | 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** 4 5 6 ON OFF | **Up input**<br>  <br>**Up/Down-A, B, C**<br>  | **Down input**<br>  <br>**Up/Down-D, E, F**<br>  | • 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>• 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) |

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

## ▣ Proper usage

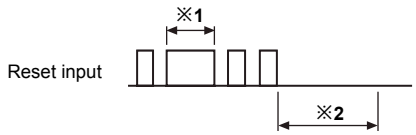
### ◎ Reset function

**● 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.**

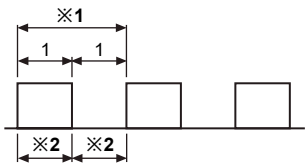
**● Reset signal width**

It is reset perfectly when the reset signal is applied during **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 is occurred.
※2: It can be input the signal of CP1 & CP2 after min. 50ms from closing time of reset signal.

### ◎ Min. signal width

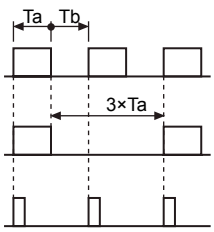



※1: Please make duty ratio(ON/OFF) 1:1.

※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 is getting slower against input signal. If either ON or OFF signal is shorter than minimum signal width, this product may not respond.




Ta(ON width) and Tb(OFF width) need to be over 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(Ta).

### ◎ Error display

| Error signal | Error description | Returning method |
|---|---|---|
| Err0 | The state that second preset is 0 | Change the setting value to non zero status |

※When Error is displayed, the output continues OFF state.
※1st output maintains OFF status by set 1st setting value as 0.
※There is no Error function in indicator.

### ◎ Detach the case from body

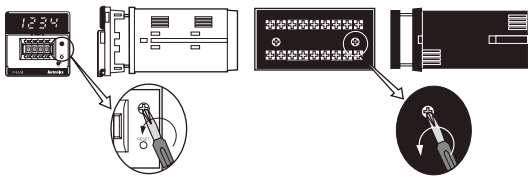
Cut OFF the power to the counter before detaching the case.

**● FM Series**

Unscrew the front bolt, and pull the body forward.

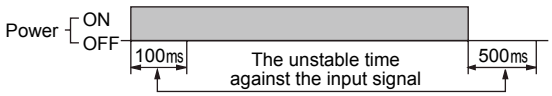
**● LM Series**

Unscrew the rear bolt, and pull the body forward.



### ◎ 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.




● Please use the power within rated power and apply or cut the power at once to prevent from chattering.


### ◎ Input signal line

- Shorten the cable distance between the sensor and this product.
- Please use shield wire for input signal needed to be long.
- Please wire input signal line separated from power line.

### ◎ Test circuit dielectric, impulse voltage and measure insulated resistor by installing in control panel

- Separate the unit from control box circuit.
- Short-circuit all terminals in terminal block.

### ◎ Do not use this unit at below places.

- Place where there are severe vibration or impact.
- Place where strong alkalis or acids are used.
- Place where there are direct rays of the sun
- Place where strong magnetic field or electric noise are generated.

### ◎ Installation environment

- It shall be used indoor
- Altitude Max. 2000m
- Pollution Degree 2
- Installation Category II