

FXH/FXM Series

DIN W72×H72, W48×H96mm Counter/Timer

■ Features

- Counting speed: 1cps / 30cps / 2kcps / 5kcps
- Selectable voltage input (PNP) method or no-voltage input (NPN) method
- Input mode: Up, Down, Up/Down
- Power supply: 100-240VAC 50/60Hz
- Dot for Decimal Point / Hour. Min. Second by RESET key
- Selectable Counter/Timer by internal DIP switch
- [Counter]
20 input modes/18 output modes
- [Timer]
16 output modes
- Various time setting range - 8-digit model: 0.01 sec to 99999 hour 59.9 min /
6-digit model: 0.1 sec to 99999.9 hour /
4-digit model: 0.01 sec to 9999 hour
- Output: Indicator, 1-stage setting, 2-stage setting



⚠ Please read "Safety Considerations" in the instruction manual before using.



■ Ordering Information



| | | | | | |
|-----------|---------------|----------|----------|--------------|--------------------|
| FX | 4 | H | - | 2P | 4 |
| Item | Display digit | Size | Output | Power supply | |
| | 4 | H | 1P | 4 | 100-240VAC 50/60Hz |
| | 6 | M | 2P | 1P | 1-stage setting |
| | 8 | | I | 2P | 2-stage setting |
| | | | | I | Indicator |
| | | | | H | DIN W48×H96mm |
| | | | | M | DIN W72×H72mm |
| | | | | 4 | 9999 (4-digit) |
| | | | | 6 | 999999 (6-digit) |
| | | | | 8 | 99999999 (8-digit) |
| | | | | FX | Counter/Timer |

■ Specifications

| Model | 1-stage setting | FX4H-1P4 | FX4M-1P4 | FX6M-1P4 | FX8M-1P4 |
|--------------------------------|-----------------|--|---|-------------------------|-----------|
| | 2-stage setting | FX4H-2P4 | FX4M-2P4 | FX6M-2P4 | — |
| | Indicator | — | FX4M-I4 | FX6M-I4 | FX8M-I4 |
| Display digit | | 4-digit | | 6-digit | 8-digit |
| Character size (W×H) | | 6×10mm | | 4×8mm | 3.8×7.6mm |
| Power supply | | 100-240VAC~ 50/60Hz | | | |
| Permissible voltage range | | 90 to 110% of rated voltage | | | |
| Power consumption | | • 1-stage: max. 4.6VA | • 2-stage: max. 5.8VA | • Indicator: max. 3.8VA | |
| Max. counting speed of CP1/CP2 | | Selectable 1cps / 30cps / 2kcps / 5kcps (DIP switch) | | | |
| Return time | | Max. 500ms | | | |
| Min. signal width | | INHIBIT, RESET: approx. 20ms | | | |
| Input method | | Selectable voltage input (PNP) method or no-voltage input (NPN) method [Voltage input (PNP) method]-input impedance: max. 10.8kΩ, [H]: 5-30VDC=, [L]: 0-2VDC [No-voltage input (NPN) method]-short-circuit impedance: max. 470Ω, short-circuit residual voltage: max. 1VDC, open-circuit impedance: min. 100kΩ | | | |
| One-shot output time | | • 1-stage: 0.05 to 5 sec • 2-stage: 1st setting 0.5 sec fixed, 2nd setting 0.05 to 5 sec | | | |
| Control output | Contact | Type | • 1-stage: Instantaneous SPDT (1c) • 2-stage: OUT1-Instantaneous SPDT (1c), OUT2-Instantaneous SPDT (1c) | | |
| | | Capacity | 250VAC~ 3A, 30VDC= 3A resistive load | | |
| | Solid state | Type | • 1-stage: 1 NPN open collector • 2-stage: OUT1-1 NPN open collector, OUT2-1 NPN open collector | | |
| | | Capacity | • Load voltage: max. 30VDC= • Load current: max. 100mA • Residual voltage: max. 1VDC= | | |
| Relay life cycle | Mechanical | Min. 10,000,000 operations | | | |
| | Electrical | Min. 100,000 operations (250VAC 3A resistive load) | | | |
| Repeat/Set/Voltage/Temp. error | | Max. ±0.01% ±0.05 sec | | | |
| Insulation resistance | | Over 100MΩ (at 500VDC megger) | | | |
| External power supply | | Max. 12VDC= ±10% 50mA | | | |
| Memory retention | | Approx. 10 years (non-volatile memory) | | | |
| Dielectric strength | | 2,000VAC 50/60Hz for 1 min (between all terminals and case) | | | |
| Noise immunity | | ±2kV the square wave noise (pulse width 1μs) by noise simulator | | | |

Up/Down Counter/Timer

Specifications

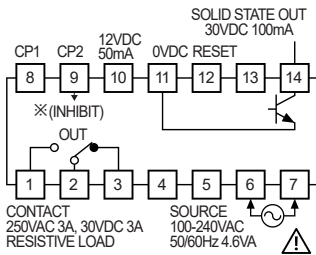
| Model | 1-stage setting | FX4H-1P4 | FX4M-1P4 | FX6M-1P4 | FX8M-1P4 |
|----------------------|-----------------|--|----------|----------|----------|
| | 2-stage setting | FX4H-2P4 | FX4M-2P4 | FX6M-2P4 | — |
| | Indicator | — | FX4M-I4 | FX6M-I4 | FX8M-I4 |
| Vibration | Mechanical | 0.75mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour | | | |
| | Malfunction | 0.5mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min | | | |
| Shock | Mechanical | 300m/s ² (approx. 30G) in each X, Y, Z direction for 3 times | | | |
| | Malfunction | 100m/s ² (approx. 10G) in each X, Y, Z direction for 3 times | | | |
| Environment | Ambient temp. | -10 to 55°C, storage: -25 to 65°C | | | |
| | Ambient humi. | 35 to 85%RH, storage: 35 to 85%RH | | | |
| Protection structure | | IP20 (front part, IEC standard) | | | |
| Approval | | CE   | | | |
| Weight ^{*1} | 1-stage setting | Approx. 245g (approx. 180g) | | | |
| | 2-stage setting | Approx. 265g (approx. 200g) | | | |
| | Indicator | Approx. 225g (approx. 160g) | | | |

*1: The weight includes packaging. The weight in parenthesis is for unit only.

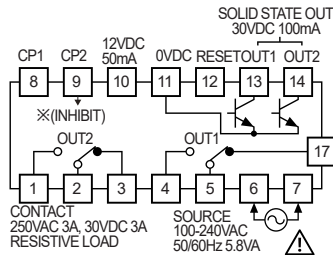
※Environment resistance is rated at no freezing or condensation.

Connections

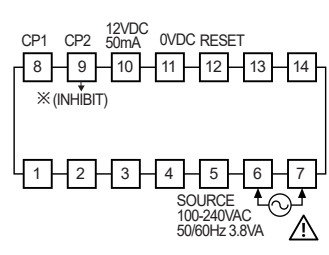
FX□M-1P4



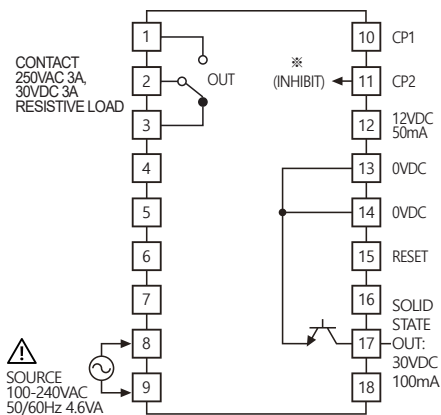
FX□M-2P4



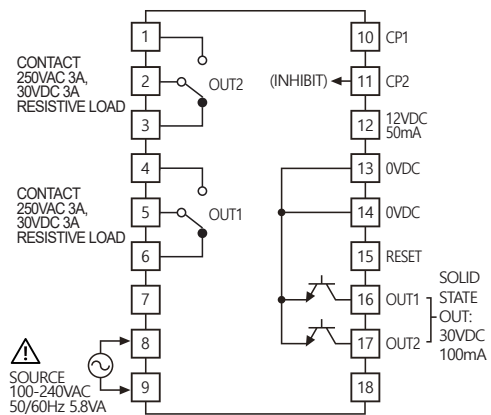
FX□M-I4



FX4H-1P4



FX4H-2P4



※INHIBIT: In case of timer mode, this terminal is for time hold.

(voltage input (PNP): connect with 12VDC, no-voltage input (NPN): connect with 0VDC)

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(J) Temperature Controllers

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(O) Digital Panel Meters

(P) Indicators

(Q) Converters

(R) Digital Display Units

(S) Sensor Controllers

(T) Switching Mode Power Supplies

(U) Recorders

(V) HMIs

(W) Panel PC

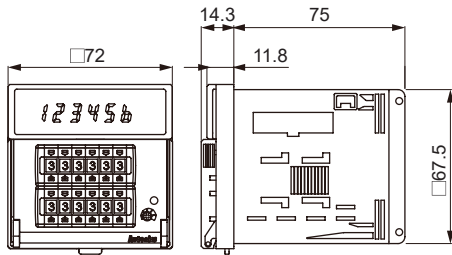
(X) Field Network Devices

FXH/FXM Series

Dimensions

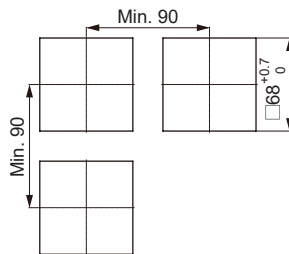
(unit: mm)

FXM Series

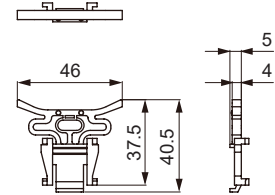


Panel cut-out

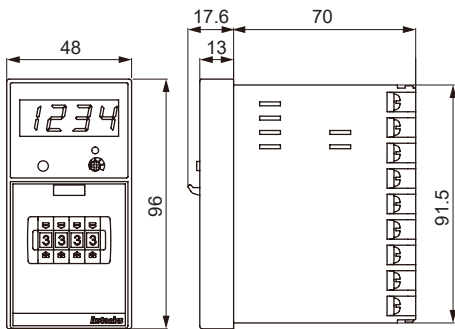
FXM Series



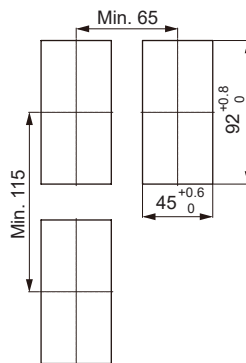
Bracket (FXM, FXH Series universal)



FXH Series



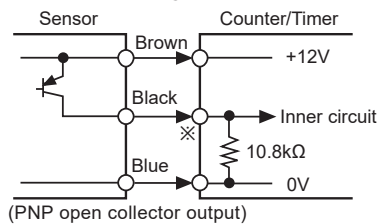
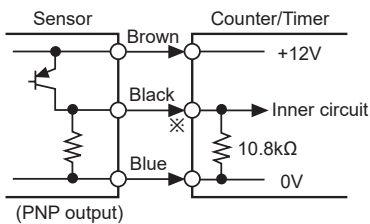
FXH Series



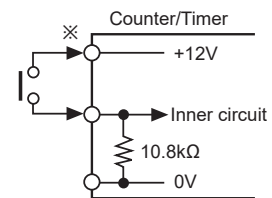
Input Connections

Voltage input (PNP)

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



Contact input

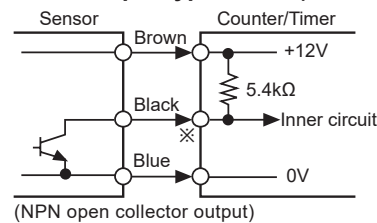
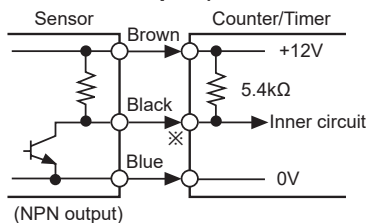


※CP1, CP2 (INHIBIT), RESET input part

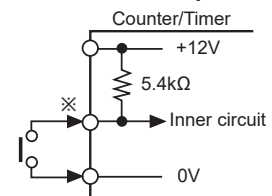
※Counting speed
: Set as 1 or 30cps

No-voltage input (NPN)

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



Contact input

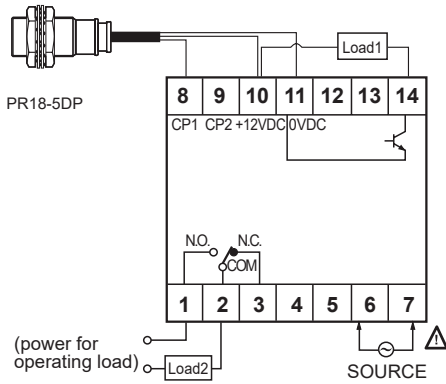


※CP1, CP2 (INHIBIT), RESET input part

※Counting speed
: Set as 1 or 30cps

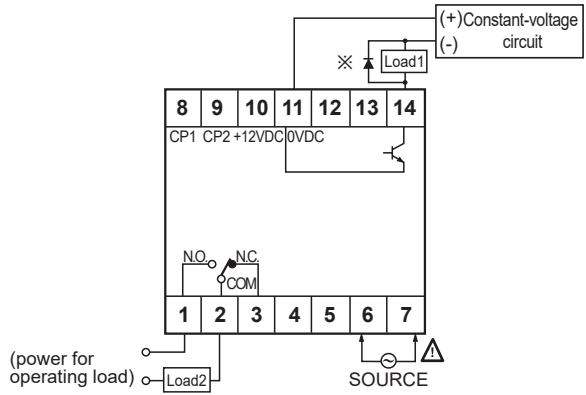
Input & Output Connections

When operation load by sensor power



- The sum of operating current capacity of load 1 and sensor should not be over external power capacity (50mA).

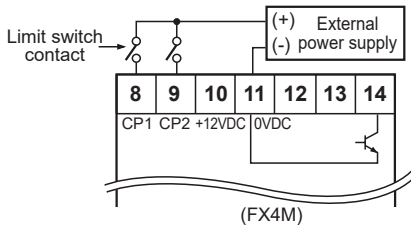
When operating load by external power



- The capacity of load 1 should not be over transistor switching capacity (max. 30VDC, 100mA)
- Do not supply the reverse polarity power.
- ※when using inductive load (relay, etc.), connector surge absorber at both ends of the load 1

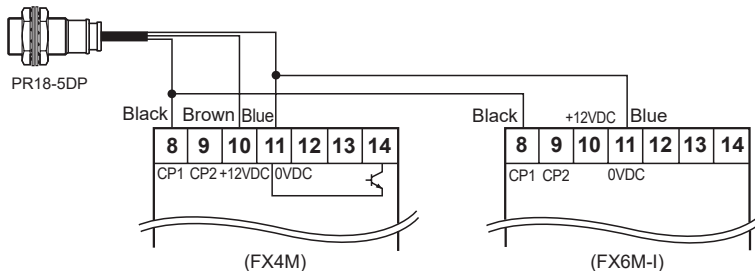
How to count by external power supply

This unit starts to count when [H] (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.



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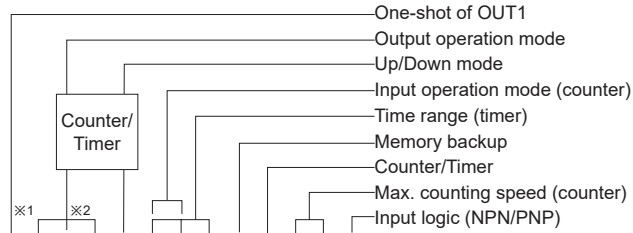
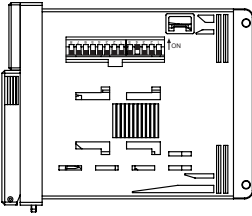
(W) Panel PC

(X) Field Network Devices

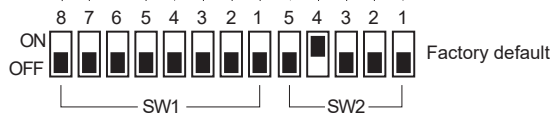
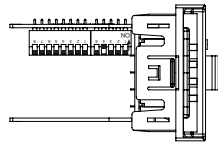
FXH/FXM Series

■ DIP Switch Setting

○ FXM Series



○ FXH Series



※1: Only 2-stage setting model has no. 8 of SW1.
 ※2: Indicator model does not have no. 5, 6, 7, 8 of SW1.

● Input logic (CP1, CP2, INHIBIT, RESET input)

| SW2 | Function |
|---------------------------------|------------------------|
| ON OFF <input type="checkbox"/> | NPN (no-voltage input) |
| ON OFF <input type="checkbox"/> | PNP (voltage input) |

● Max. counting speed (counter)

| SW2 | ON OFF <input type="checkbox"/> | ON OFF <input type="checkbox"/> | ON OFF <input type="checkbox"/> | ON OFF <input type="checkbox"/> |
|----------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Function | 1cps | 30cps | 2kcps | 5kcps |

● Counter/Timer

| SW2 | Function |
|---------------------------------|--------------|
| ON OFF <input type="checkbox"/> | Counter mode |
| ON OFF <input type="checkbox"/> | Timer mode |

● Memory backup

| SW2 | Function |
|---------------------------------|------------------|
| ON OFF <input type="checkbox"/> | No memory backup |
| ON OFF <input type="checkbox"/> | Memory backup |

● Up/Down mode

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

● Time range (timer)

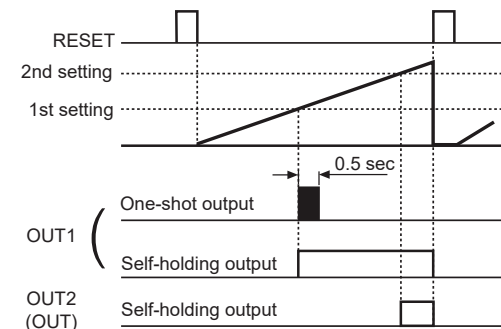
| SW1 | 4-digit | 6-digit | 8-digit |
|---------------------------------|----------------|-------------------------|--------------------------|
| ON OFF <input type="checkbox"/> | 99.99 sec | 99999.9 sec | 999999.99 sec |
| ON OFF <input type="checkbox"/> | 999.9 sec | 999999 sec | 9999999.9 sec |
| ON OFF <input type="checkbox"/> | 9999 sec | 99 min 59.99 sec | 99999999 sec |
| ON OFF <input type="checkbox"/> | 99 min 59 sec | 999 min 59.9 sec | 99999 min 59.9 sec |
| ON OFF <input type="checkbox"/> | 999.9 min | 99999.9 min | 9999999.9 min |
| ON OFF <input type="checkbox"/> | 99 hour 59 min | 99 hour 59 min 59.9 sec | 999 hour 59 min 59.9 sec |
| ON OFF <input type="checkbox"/> | 999.9 hour | 9999 hour 59 min | 9999 hour 59 min 59 sec |
| ON OFF <input type="checkbox"/> | 9999 hour | 99999.9 hour | 99999 hour 59.9 min |

● One-shot output of OUT1

| SW1 | Function |
|---------------------------------|-----------------------------|
| ON OFF <input type="checkbox"/> | One-shot output of OUT1 |
| ON OFF <input type="checkbox"/> | Self-holding output of OUT1 |

※ This function is for setting one-shot output (0.5 sec fixed) or self-holding output (until OUT2 turns OFF) of OUT1 at 2-stage setting model.

※ Example of output operation mode F



※ How to change settings

Power OFF → change settings → power ON → press [RESET] key or input signal (min. 20ms)

Up/Down Counter/Timer

Input Operation Mode (Counter)

※CP: Clock Pulse

| Input mode | | SW1 | Voltage input (PNP) method | No-voltage input (NPN) method | |
|-------------------|------------------------------------|---|---|-------------------------------|--|
| Up mode | Up/Down-A (command input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| | Up/Down-B (individual input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| | Up/Down-C (phase difference input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| Up (adding input) | Up (adding input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| | | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| Down mode | Up/Down-D (command input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| | Up/Down-E (individual input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| | Up/Down-F (phase difference input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | | |
| | Down (subtracting input) | Down (subtracting input) | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | |
| | | | ON <input type="checkbox"/> 3 OFF <input checked="" type="checkbox"/> 2 | | |

※A: over min. signal width, B: over than 1/2 of min. signal width. If the signal is smaller than these width, it may cause counting error (±1).

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FXH/FXM Series

Output Operation Mode

| | | One-shot output of OUT2 (0.05 to 5 sec) | Self-holding output | One-shot output of OUT1 (0.5 sec fixed) | Self-holding output |
|-------------------|-------------------|--|-------------------------|--|-------------------------|
| Output mode (SW1) | ON OFF Up mode | Up, Up/Down-A, B, C | | ON OFF Down mode | Operation |
| | ON OFF Down mode | Down, Up/Down-D, E, F | | | |
| F | ON OFF | | | <p>After count-up, counting display value increases or decreases until reset signal input is applied and self-holding output is maintained.</p> | |
| N | ON OFF | | | <p>After count-up, counting display value and self-holding output are maintained until reset signal input is applied.</p> | |
| C | ON OFF | | | <p>When count-up, counting display value is reset and it counts simultaneously. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2. One-shot output time of OUT1 is regardless of OUT2 output.</p> | |
| R | ON OFF | | | <p>After count-up, counting display value is reset after one-shot output time of OUT2 and it counts simultaneously. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2. One-shot output time of OUT1 is regardless of OUT2 output.</p> | |
| K | ON OFF | | | <p>After count-up, counting display value increases or decreases until reset signal input is applied. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2. One-shot output time of OUT1 is regardless of OUT2 output.</p> | |
| P | ON OFF | | | <p>After count-up, counting display value is maintained while OUT2 output is ON. Counting value is internally reset and it counts simultaneously. When OUT2 output is OFF, displays counting value while OUT2 output is ON, and it increases or decreases. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2.</p> | |
| Q | ON OFF | | | <p>After count-up, counting display value increases or decreases during one-shot time of OUT2. Self-holding output of OUT1 turns OFF after one-shot output time of OUT2. One-shot output time of OUT1 is regardless of OUT2 output.</p> | |
| S | Counter mode | Up | Down | <ul style="list-style-type: none"> Up, Up/Down-A, B, C input mode : OUT1 output maintains ON when counting display value is larger or equal than 1st setting value. OUT2 output maintains ON when counting display value is larger or equal than 2nd setting value. Down, Up/Down-D, E, F input mode : OUT1 output maintains ON when counting display value is smaller or equal than 1st setting value. OUT2 output maintains ON when counting display value is smaller or equal than 2nd setting value. | |
| | | Up/Down-A, B, C | Up/Down-D, E, F | | |
| S | Timer mode | | | <p>OUT1 and OUT2 turns OFF→ON→OFF repeatedly (flicker).</p> | |

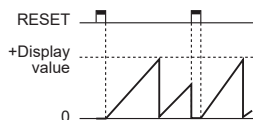
※Set one-shot output time by front TIME volume switch.

Up/Down Counter/Timer

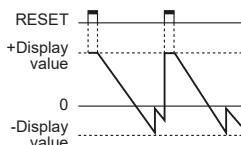
Counting & Time Operation For Indicator (FX□M-I4)

Counting operation

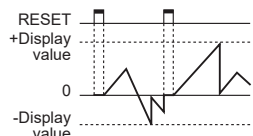
Input mode: Up



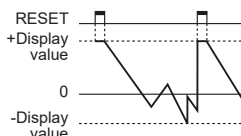
Input mode: Down



Input mode: Up / Down-A, B, C

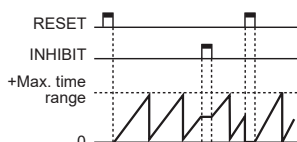


Input mode: Up / Down-D, E, F

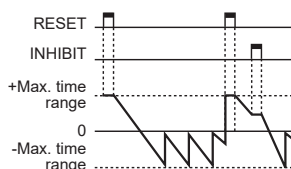


Time operation

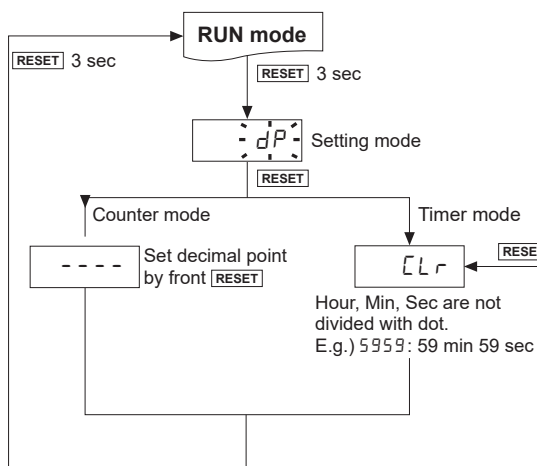
Up mode



Down mode



Dot for Decimal Point / Hour, Min, Sec



※In run mode, hold the **[RESET]** key for over 3 sec, and it enters setting mode [dP].

※In setting mode, hold the **[RESET]** key for over 3 sec, and it saves the setting and returns to RUN mode.

※If there is no **[RESET]** key input for 60 sec when entering setting mode, it returns to RUN mode.

Error Display and Output Operation

| Error Display | Error description | Troubleshooting |
|---------------|---------------------|--|
| Err0 | Setting value is 0. | Change the setting value anything but 0. |

※When error occurs, the output turns OFF.

※When 1st setting value is set as 0 (zero), OUT1 maintains OFF.

When 2nd setting value is smaller than 1st setting value, 1st setting value is ignored and only OUT2 output operates.

※Indicator model does not have error display function.

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FXH/FXM Series

■ Proper Usage

- Follow instructions in 'Proper Usage'. Otherwise, it may cause unexpected accidents.
- Use the product, 0.1 sec after supplying power.
- When supplying or turning off the power, use a switch or etc. to avoid chattering.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- In case of contact input, set count speed to low speed mode (1cps or 30cps) to operate.
If set to high speed mode (2kcps or 5kcps), counting error occurs due to chattering.
- Keep away from high voltage lines or power lines to prevent inductive noise.
In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
Do not use near the equipment which generates strong magnetic force or high frequency noise.
- This product may be used in the following environments.
 - ① Indoors (in the environment condition rated in 'Specifications')
 - ② Altitude max. 2,000m
 - ③ Pollution degree 2
 - ④ Installation category II