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

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

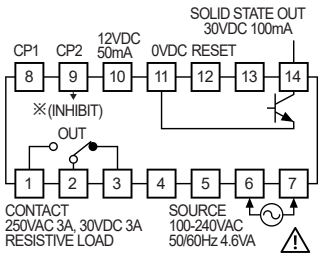
■ Specifications

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℃, storage: -25 to 65℃			
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH			
Protection structure		IP20 (front part, IEC standard)			
Approval		CE c UL us			
Weight※1	1-stage setting	Approx. 245g (approx. 180g)			
	2-stage setting	Approx. 265g (approx. 200g)			
	Indicator	Approx. 225g (approx. 160g)			

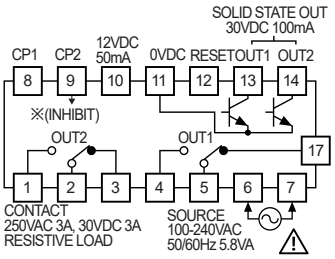
※1: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

■ Connections

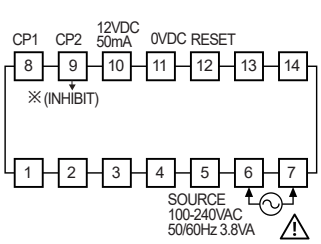
• FX□M-1P4



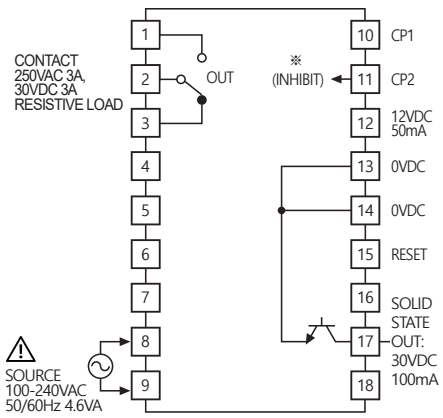
• FX□M-2P4



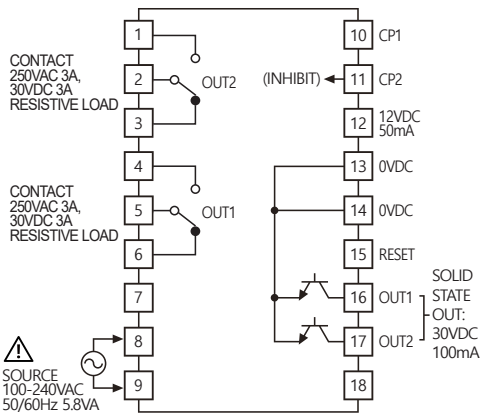
• FX□M-I4



• FX4H-1P4



• FX4H-2P4

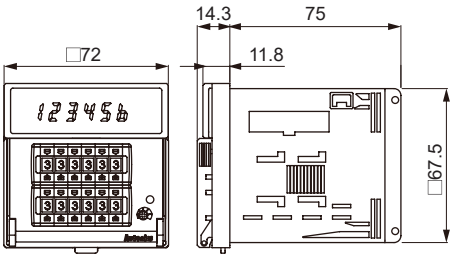


※INHIBIT: In case of timer mode, this terminal is for time hold.
(voltage input (PNP): connect with 12VDC, no-voltage input (NPN): connect with 0VDC)

▣ Dimensions

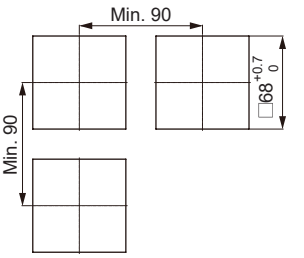
(unit: mm)

◎ FXM Series

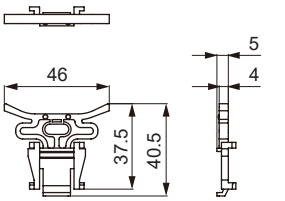


◎ Panel cut-out

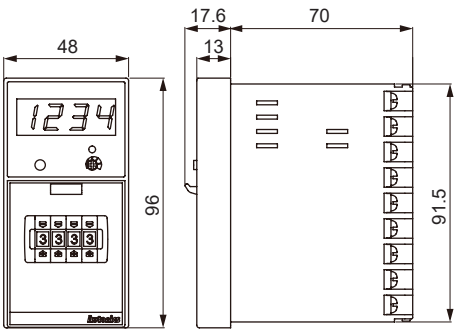
● FXM Series



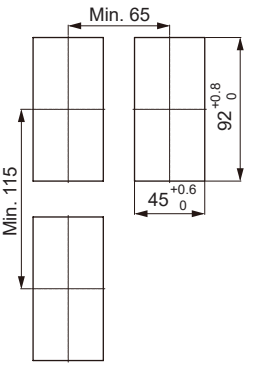
◎ Bracket (FXM, FXH Series universal)



◎ FXH Series



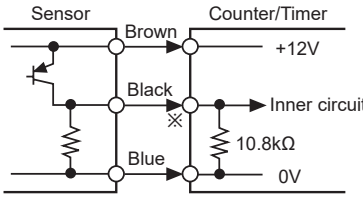
● FXH Series



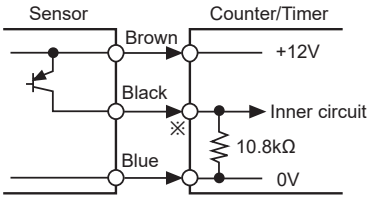
▣ Input Connections

◎ Voltage input (PNP)

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



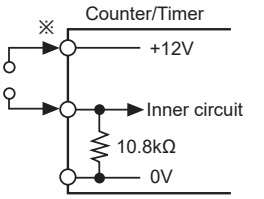
(PNP output)



(PNP open collector output)

※CP1, CP2 (INHIBIT), RESET input part

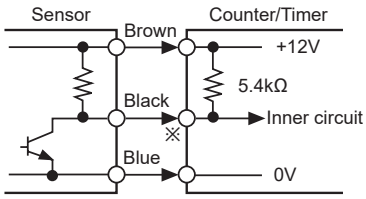
● Contact input



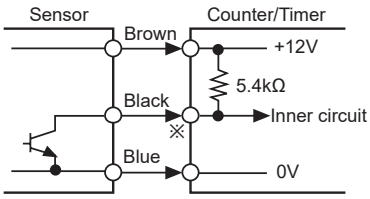
※Counting speed
: Set as 1 or 30cps

◎ No-voltage input (NPN)

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



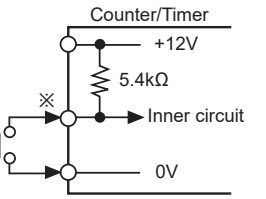
(NPN output)



(NPN open collector output)

※CP1, CP2 (INHIBIT), RESET input part

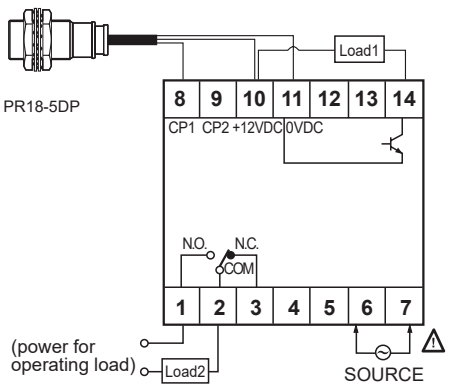
● Contact input



※Counting speed
: Set as 1 or 30cps

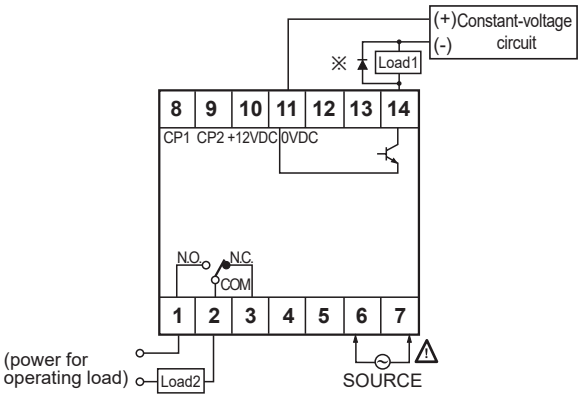
▣ Input & Output Connections

◎ 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

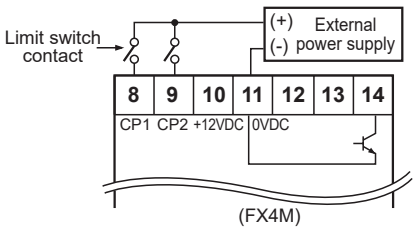


- The capacity of load 1 should not be over transistor switching capacity (max. 30VDC, 100mA)
- Do not supply the reverse polarity power.

※when using inductive load (relay, etc.), connector surge absorber at both ends of the load 1

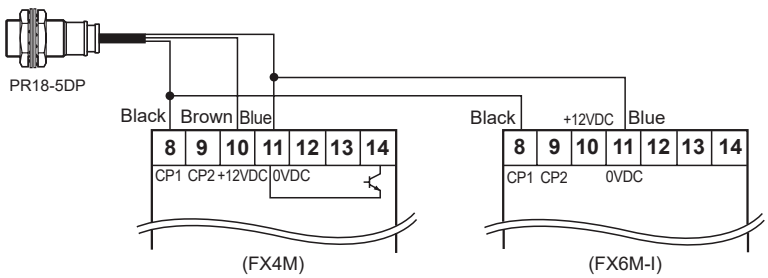
◎ How to count by external power supply

This unit starts to count when [H] (5-30VDC) is applied at CP1 or CP2 after selecting PNP.



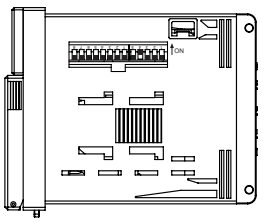
◎ Using 2 counters with one sensor

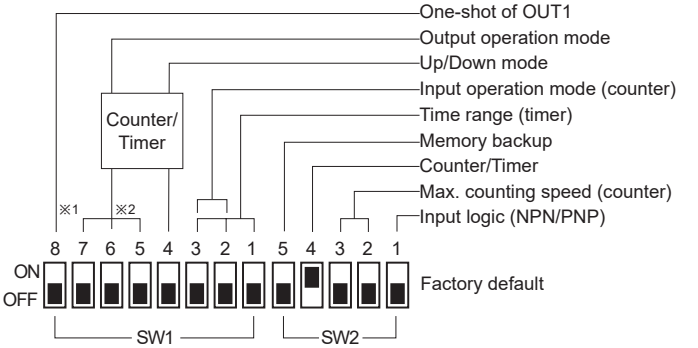
Please connect as the power of sensor is supplied from only one of counters and design input logic with same way.



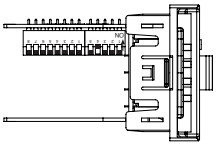
■ DIP Switch Setting

◎ 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
1	ON OFF	NPN (no-voltage input)
	ON OFF	PNP (voltage input)

• Max. counting speed (counter)

SW2	3 2 ON OFF	3 2 ON OFF	3 2 ON OFF	3 2 ON OFF
Function	1cps	30cps	2kcps	5kcps

• Counter/Timer

SW2		Function
4	ON OFF	Counter mode
	ON OFF	Timer mode

• Memory backup

SW2		Function
5	ON OFF	No memory backup
	ON OFF	Memory backup

• Up/Down mode

SW1		Function
4	ON OFF	Down mode
	ON OFF	Up mode

• Time range (timer)

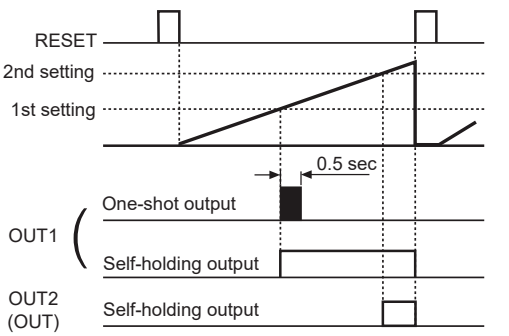
SW1	4-digit	6-digit	8-digit
3 2 1 ON OFF	99.99 sec	99999.9 sec	999999.99 sec
3 2 1 ON OFF	999.9 sec	999999 sec	9999999.9 sec
3 2 1 ON OFF	9999 sec	99 min 59.99 sec	99999999 sec
3 2 1 ON OFF	99 min 59 sec	999 min 59.9 sec	99999 min 59.9 sec
3 2 1 ON OFF	999.9 min	99999.9 min	9999999.9 min
3 2 1 ON OFF	99 hour 59 min	99 hour 59 min 59 sec	999 hour 59 min 59.9 sec
3 2 1 ON OFF	999.9 hour	9999 hour 59 min	9999 hour 59 min 59 sec
3 2 1 ON OFF	9999 hour	99999.9 hour	99999 hour 59.9 min

• One-shot output of OUT1

SW1		Function
8	ON OFF	One-shot output of OUT1
	ON OFF	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.

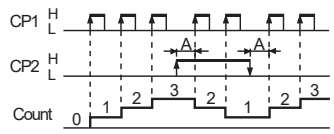
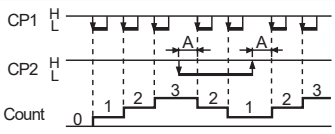
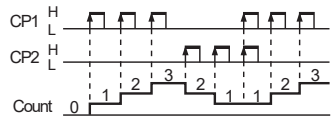
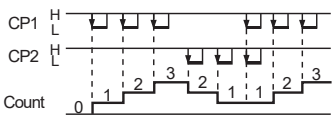
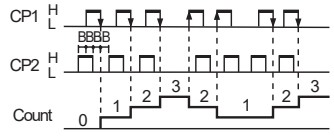
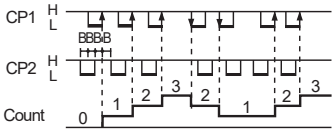
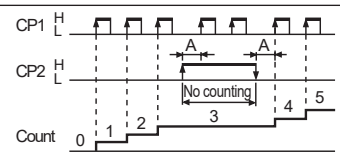
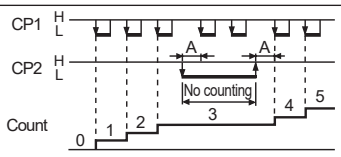
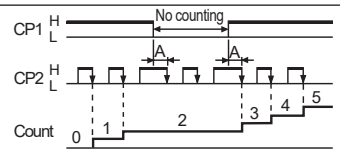
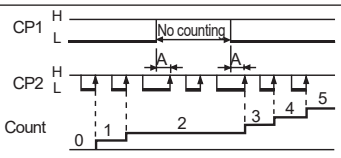
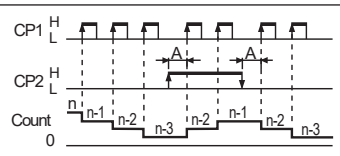
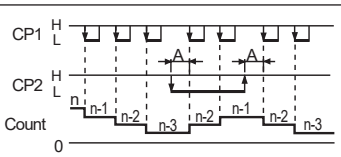
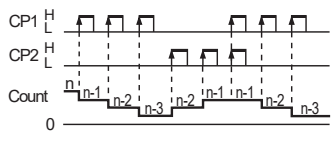
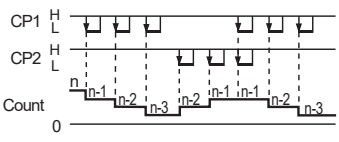
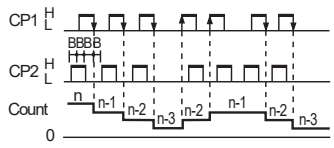
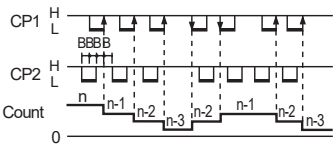
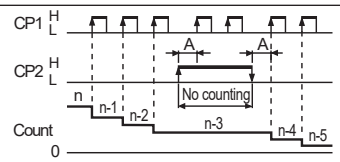
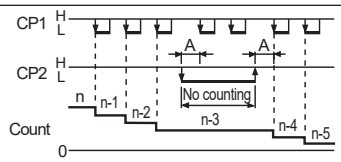
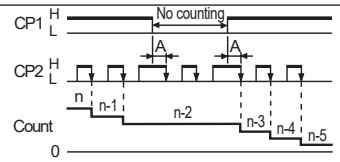
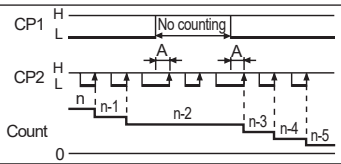
※Example of output operation mode F



※How to change settings
Power OFF → change settings → power ON → press RESET key or input signal (min. 20ms)

■ Input Operation Mode (Counter)

※CP: Clock Pulse

Input mode		SW1	Voltage input (PNP) method	No-voltage input (NPN) method
Up mode (4 ON / OFF)	Up/ Down-A (command input)	3 2 ON / OFF		
	Up/ Down-B (individual input)	3 2 ON / OFF		
	Up/ Down-C (phase difference input)	3 2 ON / OFF		
	Up (adding input)	3 2 ON / OFF		
				
Down mode (4 ON / OFF)	Up/ Down-D (command input)	3 2 ON / OFF		
	Up/ Down-E (individual input)	3 2 ON / OFF		
	Up/ Down-F (phase difference input)	3 2 ON / OFF		
	Down (subtracting input)	3 2 ON / OFF		
				

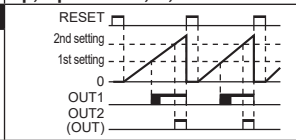
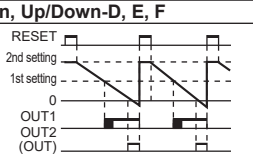
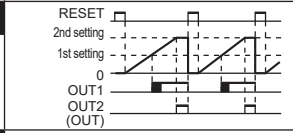
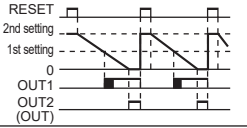
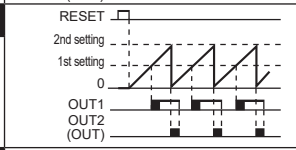
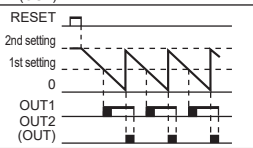
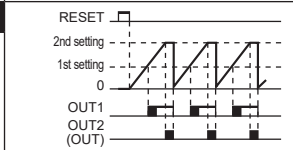
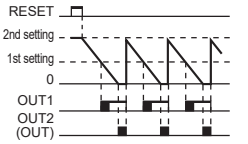
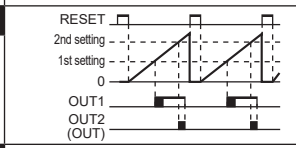
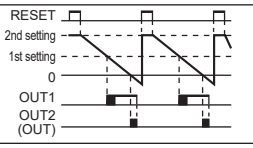
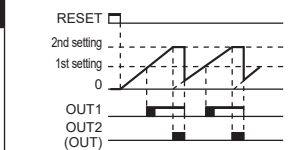
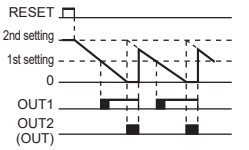
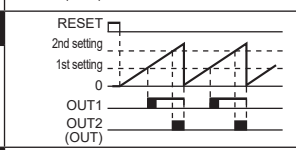
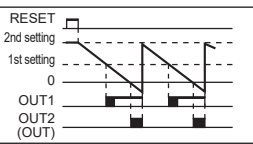
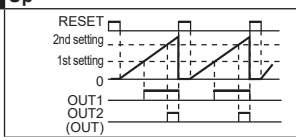
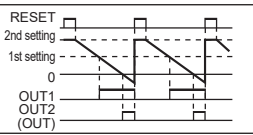
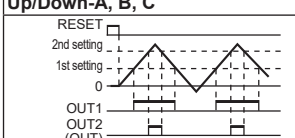
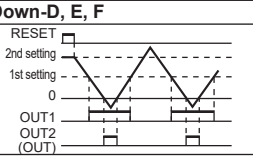
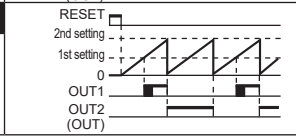
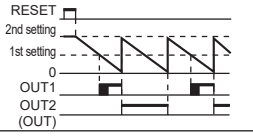
※A: over min. signal width, B: over than 1/2 of min. signal width. If the signal is smaller than these width, it may cause counting error (±1).

▣ 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

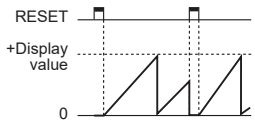
Output mode (SW1)	ON OFF 4 Up mode	ON OFF 4 Down mode	Operation
	Up, Up/Down-A, B, C	Down, Up/Down-D, E, F	
F ON OFF 7 6 5			After count-up, counting display value increases or decreases until reset signal input is applied and self-holding output is maintained.
N ON OFF 7 6 5			After count-up, counting display value and self-holding output are maintained until reset signal input is applied.
C ON OFF 7 6 5			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.
R ON OFF 7 6 5			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.
K ON OFF 7 6 5			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 ON OFF 7 6 5			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.
Q ON OFF 7 6 5			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.
S Counter mode ON OFF 7 6 5	Up	Down	● 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 ON OFF 7 6 5			OUT1 and OUT2 turns OFF→ON→OFF repeatedly (flicker).

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

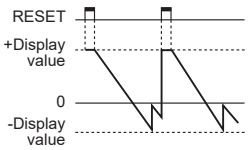
▣ Counting & Time Operation For Indicator (FX□M-I4)

◎ Counting operation

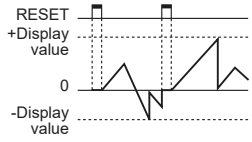
● **Input mode: Up**



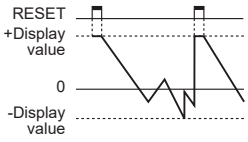
● **Input mode: Down**



● **Input mode: Up / Down-A, B, C**

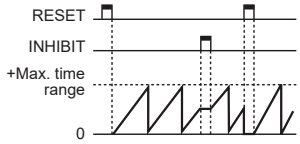


● **Input mode: Up / Down-D, E, F**

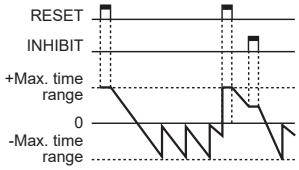


◎ Time operation

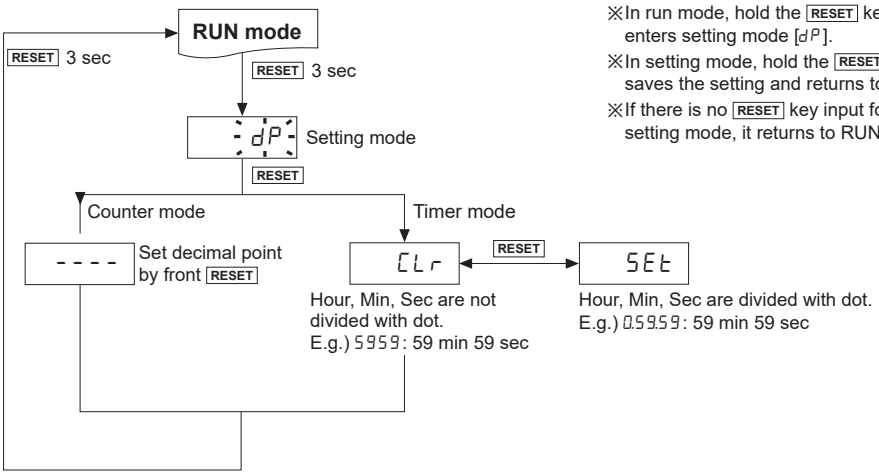
● **Up mode**



● **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.

▣ 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.
  ①Indoors (in the environment condition rated in 'Specifications')
  ②Altitude max. 2,000m
  ③Pollution degree 2
  ④Installation category II