DRW161279AC

Autonics

COUNTER / TIMER
FXM/FXH SERIES
INSTRUCTION MANUAL

CE c UL us

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

■ Safety Considerations

※Please observe all safety considerations for safe and proper operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠**Warning** Failure to follow these instructions may result in serious injury or death.
⚠**Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

1. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in fire, personal injury, or economic loss.
2. **Install on a device panel to use.**
Failure to follow this instruction may result in electric shock or fire.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in electric shock or fire.
4. **Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
5. **Do not disassemble or modify the unit.**
Failure to follow this instruction may result in electric shock or fire.

⚠ Caution

1. **When connecting the power/sensor input and relay output, use AWG 20(0.50mm²) cable or over, and tighten the terminal screw with a tightening torque of 0.74 to 0.90N·m.**
Failure to follow this instruction may result in fire or malfunction due to contact failure.
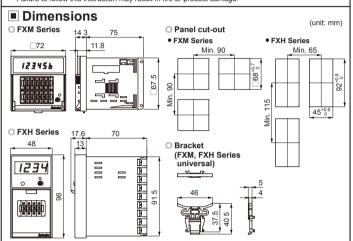2. **Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
3. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in electric shock or fire.
4. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in fire or explosion.
5. **Keep metal chip, dust, and wire residue from flowing into the unit.**
Failure to follow this instruction may result in fire or product damage.

■ Dimensions
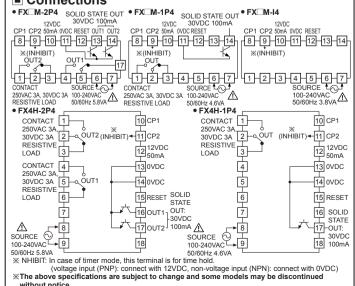
(unit: mm)

● FXM Series
● FXH Series
● Panel cut-out
● Bracket (FXM, FXH Series universal)

■ Specifications

	1-stage setting	FX4H-1P4	FX4M-1P4	FX6M-1P4	FX8M-1P4
Model	2-stage setting	FX4H-2P4	FX4M-2P4	FX6M-2P4	FX8M-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		INH BIT, 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: Instantaneuos SPDT (1c) ● 2-stage: OUT1-Instantaneuos SPDT (1c) OUT2-Instantaneuos 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	Mechanical		Min. 10 000 000 operations		
life cycle	Electrical		Min. 100,000 operations (250VAC 3A resistive load)		
Repeat/Set/Voltage/Temp. error			Max. ±0 01% ±0 05 sec		
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		
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 minutes		
Shock	Mechanical		300m/s² (approx. 30G) in each X, Y, Z direction for 3 times		
	Malfunction		100m/s² (approx. 10G) in each X Y Z direction for 3 times		
Environ-ment	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, EC standard)		
Approval			CE UL		
Weight※1	1-stage setting		Approx. 245g (approx. 180g)		
	2-stage setting		Approx. 265g (approx. 180g)		
	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

※NHIBIT: In case of timer mode, this terminal is for time hold.
(voltage input (PNP): connect with 12VDC, non-voltage input (NPN): connect with 0VDC)
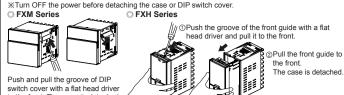**※The above specifications are subject to change and some models may be discontinued without notice.**
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage)

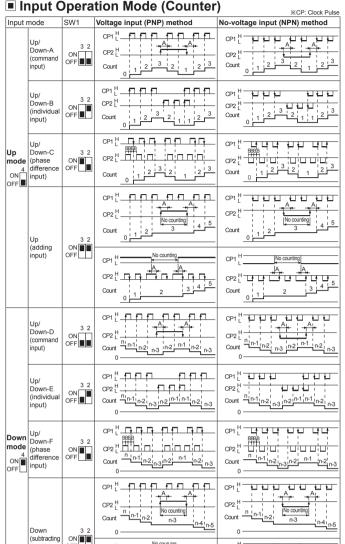## ■ Detaching Case or DIP Switch Cover

※Turn OFF the power before detaching the case or DIP switch cover.
○ FXM Series
○ FXH Series

①Push the groove of the front guide with a flat head driver and pull it to the front.
②Pull the front guide to the front. The case is detached.

Push and pull the groove of DIP switch cover with a flat head driver to the front. The cover is detached from the case.

⚠ Be sure not to be wounded when using a tool.

■ 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)			
	Up/Down-B (individual input)			
	Up/Down-C (phase difference input)			
	Up (adding input)			
Down mode	Up/Down-D (command input)			
	Up/Down-E (individual input)			
	Up/Down-F (phase difference input)			
	Down (subtracting input)			

※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)	Up mode — Up, Up/Down-A, B, C	Down mode — Down, Up/Down-D, E, F	Operation
F			After count-up, counting display value increases or decreases until reset signal input is applied and self-holding output is maintained.
N			After count-up, counting display value are maintained until reset signal input is applied.
C			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			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			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			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			After count-up, counting display value increases or decreases 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	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.
S (Timer mode)			OUT1 and OUT2 turns OFF → ON → OFF repeatedly (flicker)

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

■ DIP Switch Setting

● FXM Series
One-shot of OUT1
Output operation mode
Up/Down mode
Input operation mode (Counter)
Time range (Timer)
Memory backup
Counter/Timer (Counter)
Max. counting speed (Counter)
Input logic (NPN/PNP)

● FXH Series
Factory default

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

● Max. counting speed (counter)

SW2				
Function	1cps	30cps	2kcps	5kcps

● Counter/Timer mode

SW2	Function
4 OFF	Counter mode
4 ON	Timer mode

● Memory backup

SW2	Function
5 OFF	No memory backup
5 ON	Memory backup

● Up/Down mode

SW1	Function
4 OFF	Down mode
4 ON	Up mode

● Time range (timer)

SW1	4-digit	6-digit	8-digit
	99.99sec	99999.9sec	999999.99sec
	999.9sec	999999sec	99999999.9sec
	9999sec	99min 59.99sec	99999999sec
	99min 59sec	9999min 59.9sec	99999min 59.9sec
	999.9min	99999.9min	9999999.9min
	99hour 59min	99hour 59min 59sec	999hour 59min 59.9sec
	999.9hour	9999hour 59min	9999hour 59min 59sec
	9999hour	99999.9 hour	99999 hour 59.9min

● One-shot output of OUT1

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

○ Voltage input (PNP)
● Solid state input (standard sensor: PNP output type sensor)
● Contact input
※CP1, CP2 (NHIBIT), 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 (NHIBIT), RESET input part
※Counting speed : Set as 1 or 30cps

■ 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
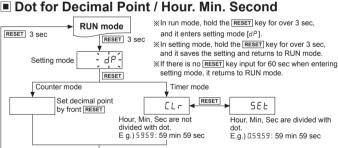
○ Time operation
● Up mode
● Down mode

※- display is only for F, K, Q, S output operation mode and it cannot be set.

■ Dot for Decimal Point / Hour. Min. Second

RUN mode
Setting mode
Counter mode
Set decimal point by front RESET
Timer mode

※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.

Hour, Min, Sec are not divided with dot. E g.) 5959: 59 min 59 sec
Hour, Min, Sec are divided with dot. E.g.) 05959: 59 min 59 sec

■ 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.
※Indicator model does not have error display function.

■ Unit Sticker

Unit sticker is included.
Use the sticker for your application.

COUNTER	mm	inch	mm	inch
TIMER	m	hour	m	hour
COUNTER	cm	sec	cm	sec
TIMER	min	yd	min	yd

■ Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
2. Use the product, 0.1 sec after supplying power.
3. When supplying or turning off the power, use a switch or etc. to avoid chattering.
4. Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
5. 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.
6. 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.
7. 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

■ Major Products

● Photoelectric Sensors
● Fiber Optic Sensors
● Door Sensors
● Door Side Sensors
● Area Sensors
● Proximity Sensors
● Pressure Sensors
● Rotary Encoders
● Connector/Sockets
● Switching Mode Power Supplies
● Control Switches/Lamps/Buzzers
● I/O Terminal Blocks & Cables
● Stepper Motors/Drivers/Motion Controllers
● Graphic/Logic Panels
● Field Network Devices
● Laser Marking System (Fiber, Co₂, Nd: YAG)
● Laser Welding/Cutting System
● Temperature Controllers
● Temperature/Humidity Transducers
● SSR/Power Controllers
● Counters
● Timers
● Panel Meters
● Tachometer/Pulse (Rate) Meters
● Display Units
● Sensor Controllers

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