Digital Counters / Timers

FXM / FXH Series

INSTRUCTION MANUAL

TCD220028AD

Autonics

Thank you for choosing our Autonics product.
Read and understand the instruction manual and manual thoroughly before using the product.
For your safety, read and follow the below safety considerations before using.
For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
Keep this instruction manual in a place where you can find easily.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.
Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. 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 personal injury, economic loss or fire.
02. Do not use or store 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 explosion or fire.
03. Install on a device panel to use.
Failure to follow this instruction may result in fire or electric shock.
04. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire or electric shock.
05. Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.
06. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire or electric shock.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. When connecting the power / sensor input and relay output, use AWG 20 (0.50 mm²) cable or over, and tighten the terminal screw with a tightening torque of 0.74 to 0.90 N·m.
Failure to follow this instruction may result in fire or malfunction due to contact failure.
02. Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.
03. Use a dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire or electric shock.
04. Keep the product away from metal chip, dust, and wire residue which flow into the unit.
Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in 'Cautions during Use'.
  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.
- When the counter is operating, in case of contact input, set count speed to low speed mode (1 cps or 30 cps) to operate. If set to high speed mode (2 k, 5 kcps) 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 unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics webstie.

FX ❶ ❷ - ❸ ❹

❶ Display digits	❷ Size	❸ Output	❹ Power voltage
4: 4-digit	M: DIN W 72 × H 72 mm	1P: 1-stage setting	4: 100 - 240 VAC
6: 6-digit	H: DIN W 48 × H 96 mm	2P: 2-stage setting	
8: 8-digit		I: Indicator	

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

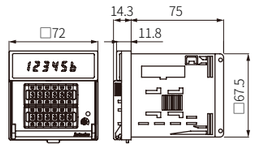
- Terminal protection cover: RMA [01] / RHA-COVER

01) Not supported for 2-stage setting models

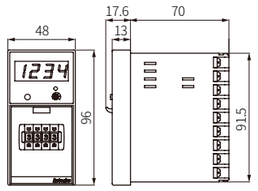
Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.

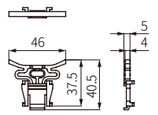
■ FXM



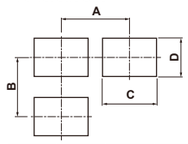
■ FXH



• Bracket



• Panel cut-out

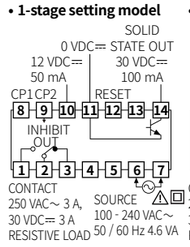


Series	A	B	C	D
FXM	≥ 90	≥ 90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$
FXH	≥ 65	≥ 115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$

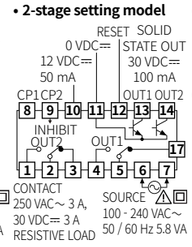
Connections

■ FX□M

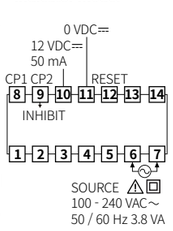
• 1-stage setting model



• 2-stage setting model

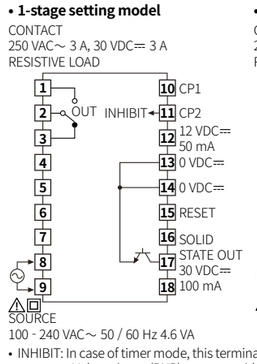


• Indicator model

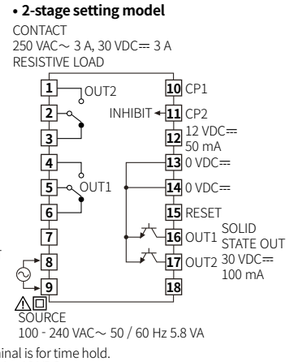


■ FX4H

• 1-stage setting model



• 2-stage setting model



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

Specifications

Model	FX4□-□4	FX6M-□4	FX8M-□4
Display digits	4-digit	6-digit	8-digit
Character size	W 6 × H 10 mm	W 4 × H 8 mm	W 3.8 × H 7.6 mm
Max. counting speed	1 / 30 / 2 k / 5 k cps		
Return time	≤ 500 ms		
Min. signal width	INHIBIT, RESET: ≈ 20 ms		
Input logic	Voltage input (PNP) - input impedance: ≤ 10.8 kΩ, [H]: 5 - 30 VDC⎓, [L]: 0 - 2 VDC⎓ No-voltage input (NPN) - short-circuit impedance: ≤ 470 Ω, short-circuit residual voltage: ≤ 1 VDC⎓ open-circuit impedance: ≥ 100 kΩ		
One-shot output time	Dependent on the output		
1-stage setting	0.05 to 5 sec		
2-stage setting	OUT1: 0.5 sec fixed, OUT2: 0.05 to 5 sec		
Error	Repeat / SET / voltage / Temp.: ≤ ± 0.01 % ± 0.05 s		
Contact control output	Relay		
Type (1-stage)	Instantaneous SPDT (1c) × 1		
Type (2-stage)	Instantaneous SPDT (1c) × 2		
Capacity	250 VAC~ 3 A, 30 VDC⎓ 3 A resistive load		
Solid-state control output	NPN open collector		
Type (1-stage)	× 1		
Type (2-stage)	× 2		
Capacity	≤ 30 VDC⎓, 100 mA, residual voltage: ≤ 1 VDC⎓		
Unit weight (packaged)	1-stage setting: ≈ 180 g (≈ 245 g) 2-stage setting: ≈ 200 g (≈ 265 g) Indicator: ≈ 160 g (≈ 225 g)		
Certification	CE UK CA cULus EAC		
Power supply	100 - 240 VAC~ 50 / 60 Hz		
Permissible voltage range	90 to 110 % of rated voltage		
Power consumption	Dependent on the output		
1-stage setting	≤ 4.6 VA		
2-stage setting	≤ 5.8 VA		
Indicator	≤ 3.8 VA		
External supply power	≤ 12 VDC⎓ ± 10 % 50 mA		
Memory retention	≈ 10 years (non-volatile semiconductor memory type)		
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)		
Dielectric strength	Between the charging part and the case: 3,000 VAC~ 50 / 60 Hz for 1 min		
Noise immunity	± 2 kV square wave noise (pulse width: 1 μs) by the noise simulator		
Vibration	0.75 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 1 hour		
Vibration (malfunction)	0.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 minute		
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times		
Shock (malfunction)	100 m/s² (≈ 10 G) in each X, Y, Z direction for 3 times		
Relay life cycle	Mechanical: ≥ 10,000,000 operations Electrical: ≥ 100,000 operations (250 VAC~ 3 A resistive load)		
Ambient temperature	-10 to 55 °C, storage: -25 to 65 °C (no freezing or condensation)		
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)		
Protection rating	IP20 (front part, IEC standard)		
Insulation type	Double insulation or reinforced insulation (mark: ⊡)		

Mode Setting

RUN [RESET] 3 sec → **Dot for Decimal Point & Hour / Min / Second** [RESET] 3 sec → RUN

Dot for Decimal Point & Hour / Min / Second

- If there is no RESET key or DIP switch input for 60 sec, it returns to RUN mode.
- [RESET] key: Setting mode ↔ RUN mode
  Move the digit when changing the setting value.

■ Decimal point of counter

Parameter		Display	Setting range
C1-1	Setting mode	dP	-
C1-2	Decimal point setting	- - - -	[FX4□-□4] ----, ---.-, --.--, -.---
		- - - - - -	[FX6M-□4] ------, -----.-, ----.--, ---.---, --.----, -.-----
		- - - - - - - -	[FX8M-□4] --------, -------.-, ------.--, -----.---, ----.----, ---.-----, --.------, -.-------

■ Dot for Hour / Min / Second of timer

Parameter		Display	Setting range	Setting example
T1-1	Setting mode	dP	-	-
T1-2	Setting of dot for Hour / Min / Sec	CLr	CLR: Not divided with dot	5959: 59 m 59 s
			SET: Divided with dot	0.59.59: 59 m 59 s

Error

- When error occurs, the output turns OFF.
- When 1-stage setting value = 0, OUT1 turns OFF.
  When 2-stage setting value < 1-stage setting value, OUT1 is ignored and only OUT2 operates.
- Indicator model does not have error display function.

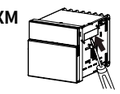
Display	Description	Troubleshooting
Err0	Setting value = 0	Change the setting value anything but 0.

Output Operation Mode

For the detailed timing chart for operation output mode, refer to the manual.

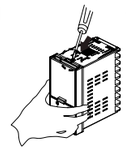
Detach the Case or DIP Switch Cover

■ FXM



- Push and pull the groove of DIP switch cover with a flat head (-) driver to the front, detaching the cover from the case.

■ FXH



- Push the groove of the front guide with a flat head (-) driver and pull it to the front.
- Pull the front guide to the front. The case is detached. DIP switch is located inside.

⚠ Caution: Turn OFF the power before detaching the cover or case.
⚠ Caution: When using the tools, be careful not to be wounded.

DIP Switch Setting

- Detach the case or cover of DIP switch and proceed the settings. See the 'Detach the Case or DIP Switch Cover.'
- How to change the settings:
  power OFF → change settings → power ON → press [RESET] key or input the RESET signal (≥ 20 ms) to the external terminal.

■ DIP SW1

SW1	Function		Defaults
	Counter	Timer	
1	-	Time range	OFF
2	Input operation mode		OFF
3			OFF
4	Count up / count down		OFF
5, 6, 7	Output operation mode [01]		OFF
8	OUT1 One-shot output [02]		OFF

01) Except the indicator model.
02) Only for 2-stage setting model.

■ DIP SW2

SW2	Function		Defaults
	Counter	Timer	
1	CP1, CP2, INHIBIT, RESET input logic		OFF
2	Max. counting speed	-	OFF
3			OFF
4	Counter / Timer		ON
5	Memory retention		OFF

• [Counter] Input operation mode

SW1			Count up / count down & input operation mode	
4	3	2		
OFF	OFF	OFF	Count up	Up / Down - A (command)
OFF	OFF	ON		Up / Down - B (individual)
OFF	ON	OFF		Up / Down - C (phase difference)
OFF	ON	ON		UP
ON	OFF	OFF	Count down	Up / Down - D (command)
ON	OFF	ON		Up / Down - E (individual)
ON	ON	OFF		Up / Down - F (phase difference)
ON	ON	ON		Down

• Output operation mode (1-stage / 2-stage setting model)

SW1			Output operation mode
7	6	5	
OFF	OFF	OFF	F
OFF	OFF	ON	N
OFF	ON	OFF	C
OFF	ON	ON	R
ON	OFF	OFF	K
ON	OFF	ON	P
ON	ON	OFF	Q
ON	ON	ON	S

• OUT1 One-shot output (2-stage setting model)

SW1-8	OUT1 One-shot output
ON	One-shot
OFF	Hold

• [Timer] Time range

SW1			Time range		
3	2	1	4-digit	6-digit	8-digit
OFF	OFF	OFF	99.99 s	99999.9 s	999999.99 s
OFF	OFF	ON	999.9 s	999999 s	9999999.9 s
OFF	ON	OFF	9999 s	99 m 59.99 s	99999999 s
OFF	ON	ON	99 m 59 s	999 m 59.9 s	99999 m 59.9 s
ON	OFF	OFF	999.9 m	99999.9 m	9999999.9 m
ON	OFF	ON	99 h 59 m	99 h 59 m 59 s	999 h 59 m 59.9 s
ON	ON	OFF	999.9 h	9999 h 59 m	9999 h 59 m 59 s
ON	ON	ON	9999 h	99999.9 h	99999 h 59.9 m

• Input logic

SW2-1	Input logic
ON	NPN (no-voltage input)
OFF	PNP (voltage input)

• Counter / Timer

SW2-4	Counter / Timer
ON	Counter
OFF	Timer

• [Counter] Max. counting speed

SW2		Max. counting speed
3	2	
OFF	ON	1 cps
OFF	OFF	30 cps
ON	OFF	2 kcps
ON	ON	5 kcps

• Memory retention

SW2-5	Memory retention
ON	×
OFF	○

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