

# Digital Counters / Timers



## FXS Series PRODUCT MANUAL

**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Features

- Counting speed: 1 cps / 30 cps / 2 kcps / 5 kcps
- Selectable voltage input (PNP) or no-voltage input (NPN)
- Input mode: Up, Down, Up / Down
- Dot for Decimal Point, Hour / Min / Second by RESET key
- Wide range of input power supply  
: 100 - 240 VAC ~ 50 / 60 Hz, 24 VAC ~ 50 / 60 Hz, 24 - 48 VDC = universal
- Selectable Counter / Timer by DIP switch

#### [Counter]

- 20 input modes / 18 output modes

#### [Timer]

- 16 output modes
- Various time setting range
  - 5-digit model: 0.01 sec to 9999.9 hour
  - 4-digit model: 0.01 sec to 9999 hour
- Output: indicator, 1-stage setting

### 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 mm<sup>2</sup>) 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.
- Power supply should be insulated and limited voltage / current or Class 2, SELV power supply device.
- 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 website.

FX **①** **②** - **③** **④**

### ① Display digits

4: 4-digit  
5: 5-digit

### ② Size

S: DIN W 48 × H 48 mm

### ③ Output

1P: 1-stage setting (4-digit)  
I: indicator (5-digit)

### ④ Power supply

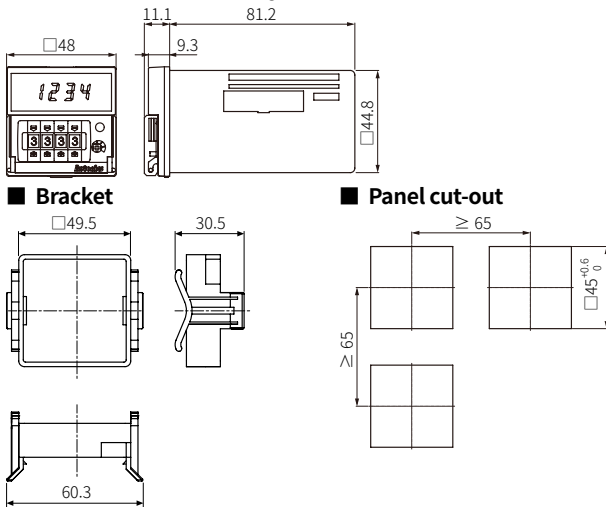
2: 24 VAC ± 10 % 50 / 60 Hz,  
24 - 48 VDC ± 10 %  
4: 100 - 240 VAC ± 10 % 50 / 60 Hz

## Product Components

- Product (+ bracket)
- Instruction manual

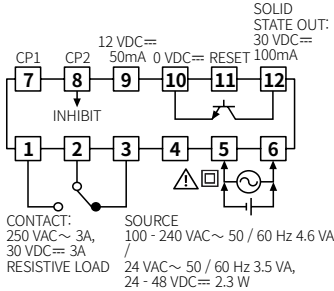
## Dimensions

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

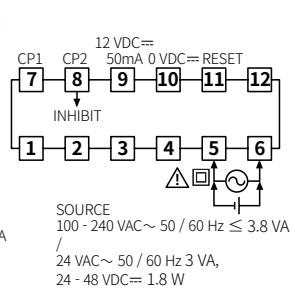


## Connections

### ■ FX4S-1P□



### ■ FX5S-I□



- 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

## Error

- When error occurs, the output turns OFF.
- Indicator model does not have error display function.

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

## Specifications

Model	FX4S-1P□	FX5S-I□
Display digits	4-digit	5-digit
Character size	W 3.8 × H 7.6 mm	W 4 × H 8 mm
Max. counting speed	1 / 30 / 2 k / 5 kcps	
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	0.05 to 5 sec	
Error	Repeat / SET / voltage / Temp.: ≤ ± 0.01 % ± 0.05 s	
Contact control output	Relay	-
Type	Instantaneous SPDT (1c) × 1	-
Capacity	250 VAC ~ 3 A, 30 VDC ~ 3 A resistive load	-
Solid-state control output	NPN open collector × 1	-
Capacity	≤ 30 VDC, 100 mA	-
Unit weight (packaged)	≈ 110 g (≈ 171 g)	≈ 95 g (≈ 156 g)
Certification	CE, RoHS, ENEC, FCC	

Voltage type	AC voltage	AC / DC voltage
Power supply	100 - 240 VAC ~ 50 / 60 Hz	24 VAC ~ 50 / 60 Hz, 24 - 48 VDC
Permissible voltage range	90 to 110 % of rated voltage	
Power consumption (FX4S-1P□)	≤ 4.6 VA	AC: ≤ 3.5 VA DC: ≤ 2.3 W
Power consumption (FX5S-I□)	≤ 3.8 VA	AC: ≤ 3 VA DC: ≤ 1.8 W
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 minute	Between the charging part and the case: 2,000 VAC ~ 50 / 60 Hz for 1 minute
Noise immunity	± 2 kV square wave noise (pulse width: 1 μs) by the noise simulator	± 500 V 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 min	
Shock	300 m/s <sup>2</sup> (≈ 30 G) in each X, Y, Z direction for 3 times	
Shock (malfunction)	100 m/s <sup>2</sup> (≈ 10 G) in each X, Y, Z direction for 3 times	
Relay life cycle	Mechanical: ≥ 5,000,000 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



## 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	----	[FX4S-1P] ....., ....., ....., .....
	-----	[FX5S-I] ....., ....., ....., .....

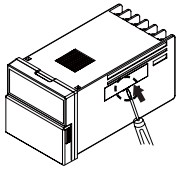
### ■ Dot for Hour / Min / Second of timer

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 SET: Divided with dot	5959: 59 m 59 s 0.59: 59 m 59 s

## Output Operation Mode

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

## Detach DIP Switch Cover



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

⚠ **Caution:** Turn OFF the power before detaching the cover.

⚠ **Caution:** When using the tools, be careful not to be wounded.

## DIP Switch Setting



- Detach the cover of DIP switch and proceed the settings. See the 'Detach DIP Switch Cover.'

- How to change the settings: power OFF → change settings → power ON → press [RESET] key or input the RESET signal ( $\geq 20$  ms) to the external terminal.

### ■ DIP SW1

SW1	Function		Defaults
	Counter	Timer	
1	CP1, CP2, INHIBIT, RESET input logic		ON
2	-		OFF
3	Input operation mode	Time range	OFF
4			OFF
5	Count up / count down	-	OFF

#### • Input logic

SW1-1	Input logic
ON	NPN (no-voltage input)
OFF	PNP (voltage input)

#### • [Counter] Input operation mode

SW1			Count up / count down & input operation mode
5	4	3	
OFF	OFF	OFF	Count up
OFF	OFF	ON	
OFF	ON	OFF	
OFF	ON	ON	
ON	OFF	OFF	Count down
ON	OFF	ON	
ON	ON	OFF	
ON	ON	ON	

#### • [Timer] Time range

SW1			Time range	
4	3	2	4-digit	5-digit
OFF	OFF	OFF	99.99 s	9999.9 s
OFF	OFF	ON	999.9 s	9999.9 s
OFF	ON	OFF	9999 s	9 m 59.99 s
OFF	ON	ON	99 m 59 s	99 m 59.9 s
ON	OFF	OFF	999.9 m	9999.9 m
ON	OFF	ON	99 h 59 m	9 h 59 m 59 s
ON	ON	OFF	999.9 h	999 h 59 m
ON	ON	ON	9999 h	9999.9 h

### ■ DIP SW2

SW2	Function		Defaults
	Counter	Timer	
1	Counter / Timer		ON
2, 3	Max. counting speed	-	OFF
4	Memory retention		OFF
5, 6, 7	Output operation mode <sup>01)</sup>		OFF

01) Except the indicator model.

#### • Counter / Timer

SW2-1	Counter / Timer
ON	Counter
OFF	Timer

#### • Memory retention

SW2-4	Memory retention
ON	×
OFF	○

#### • [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

#### • Output operation mode

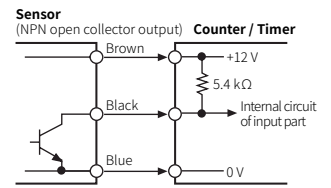
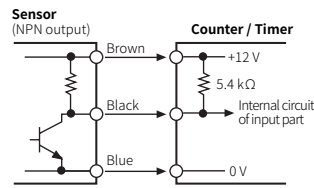
SW2			Output operation mode
7	6	5	
OFF	OFF	OFF	F
OFF	OFF	ON	N
OFF	ON	OFF	C
OFF	ON	ON	R
ON	OFF	OFF	K
ON	OFF	ON	P
ON	ON	OFF	Q
ON	ON	ON	S

## Input Connections

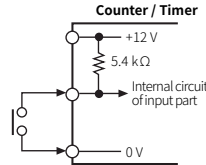
- Input: CP1, CP2 (INHIBIT), RESET
- Max. counting speed in the contact input: 1 or 30 cps setting (counter).

### ■ No-voltage (NPN) input

#### • Solid-state input

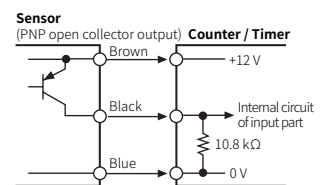
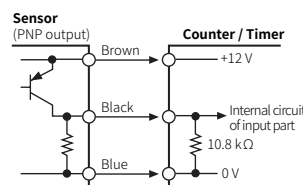


#### • Contact input

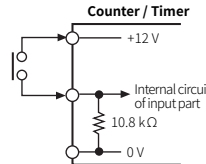


### ■ Voltage (PNP) input

#### • Solid-state input



#### • Contact input



## Input Operation Mode

### Counter

Mode	Counting chart <sup>01)</sup>	
	Voltage input (PNP)	No-voltage input (NPN)
Up / Down - A : command input		
Up / Down - B : individual input		
Up / Down - C : phase difference input		
Up : count up input		
Up / Down - D : command input		
Up / Down - E : individual input		
Up / Down - F : phase difference input		
Down : count down input		

01) CP: clock pulse, n: +max. display value  
A should be over min. signal width, B is over 1/2 of min. signal width. If the signal is smaller than these widths, it may cause counting error (± 1).

## Output Operation Mode

- Output type  
One-shot output Retained (hold) output

- Set One-shot output time via [TIME] volume switch on the front side.  
Setting range: 0.05 to 5 sec

Mode	Output operation description in input operation mode	
	Up, Up / Down - A, B, C	Down, Up / Down - D, E, F
F		
	After count-up, counting display value increases or decreases until RESET input is applied and retained (hold) output is maintained.	
N		
	After count-up, counting display value and retained (hold) output are maintained until RESET input is applied.	
C		
	When count-up, counting display value is RESET and it counts simultaneously.	
R		
	After count-up, counting display value is RESET after One-shot output time and it counts simultaneously.	
K		
	After count-up, counting display value increases or decreases until RESET input is applied.	
P		
	After count-up, counting display value is maintained while output is ON, and internally RESET and it counts simultaneously.	
Q		
	After count-up, counting display value increases or decreases during One-shot output time.	

### Counter

Mode	Output operation description in input operation mode	
	Up	Down
S		
	Output maintains ON when counting display value ≥ setting value. Output maintains ON when counting display value ≤ setting value.	

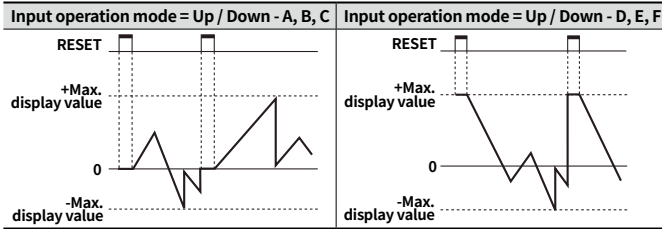
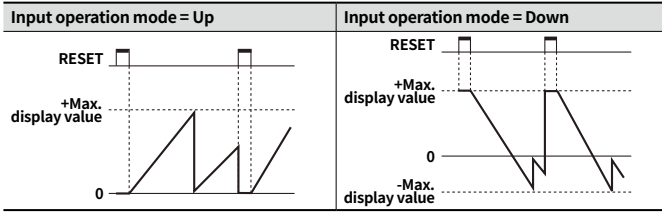
Mode	Output operation description in input operation mode	
	Up / Down - A, B, C	Up / Down - D, E, F
S		
	Output maintains ON when counting display value ≥ setting value. Output maintains ON when counting display value ≤ setting value.	

### Timer

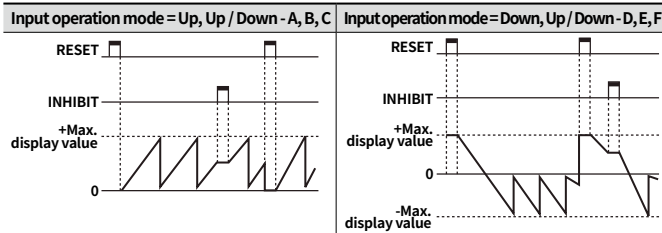
Mode	Output operation description in input operation mode	
	Up, Up / Down - A, B, C	Down, Up / Down - D, E, F
S		
	Output turns OFF → ON → OFF repeatedly (flicker).	

## Operation Mode for Indicator Model

### Counting operation for counter



### Time operation for timer



## Segment Table

The segments displayed on the product indicate the following meanings. It may differ depending on the product.

7 segment	11 segment	12 segment	16 segment
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
A	A	A	A
b	b	b	b
c	c	c	c
d	d	d	d
E	E	E	E
F	F	F	F
G	G	G	G
H	H	H	H