Autonics

COUNTER / TIMER
FXS SERIES
INSTRUCTION MANUAL

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 product operation to avoid hazards.

※Safety considerations are categorized as follows.
⚠**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.

※The symbols used on the product and instruction manual represent the following
⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ 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 personal injury, fire, or economic loss.
2. **The unit must be installed on a device panel before use.**
   Failure to follow this instruction may result in electric shock.
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.
4. **Do not disassemble or modify the unit. Please contact us if necessary.**
   Failure to follow this instruction may result in electric shock or fire.

⚠ Caution

1. **Do not use the unit outdoors.**
   Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock.
2. **When connecting the power input or relay output cables, make sure to use AWG20 (0.05mm²) cables and make sure to tighten the terminal screw bolt above 0.74 to 0.90N·m.**
   Failure to follow this instruction may result in fire due to contact failure.
3. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in shortening the life cycle of the unit, or fire.
4. **Do not use loads beyond the rated switching capacity of the relay contact.**
   Failure to follow this instruction may result in insulation failure, contact melt, contact failure, relay broken, or fire.
5. **Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.**
   Failure to follow these instructions may result in electric shock or fire.
6. **Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.**
   Failure to follow this instruction may result in fire or explosion.
7. **Keep dust and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.

■ Model

Model	Display digit	Size	Output	Power supply
FX4S-1P2	9999 (4-digit)	DIN W48×H48mm	1-stage setting	24VAC 50/60Hz, 24-48VDC
FX4S-1P4				100-240VAC 50/60Hz
FX5S-I2	99999 (5-digit)		Indicator	24VAC 50/60Hz, 24-48VDC
FX5S-I4				100-240VAC 50/60Hz

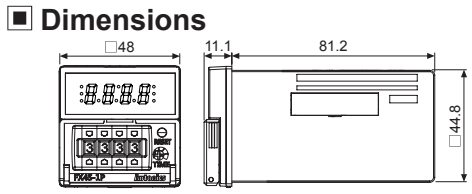
■ Specifications

Model		1-stage setting	FX4S-1P2	FX4S-1P4	—	—
		Indicator	—	—	FX5S-I2	FX5S-I4
Display digit			4-digit		5-digit	
Character size (W×H)			3.8×7.6mm		4×8mm	
Power supply			24VAC~ 50/60Hz, 24-48VDC⎓	100-240VAC~ 50/60Hz	24VAC~ 50/60Hz, 24-48VDC⎓	100-240VAC~ 50/60Hz
Permissible voltage range			90 to 110% of rated voltage			
Power consumption			AC: Max. 3.5VA, DC: Max. 2.3W	Max. 4.6VA	AC: Max. 3VA, DC: Max. 1.8W	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 input: 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			0.05 to 5 sec			
Control output	Contact	Type	Instantaneous SPDT (1c)		—	
		Capacity	250VAC~ 3A resistive load		—	
	Solid state	Type	NPN open collector: 1		—	
		Capacity	Max. 30VDC⎓ 100mA		—	
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	AC voltage		±2kV the square wave noise (pulse width 1μs) by noise simulator			
	AC/DC voltage		±500V 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			
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			Approx. 171g (approx. 110g)		Approx. 156g (approx. 95g)	

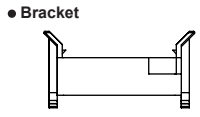
※1: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

■ Dimensions

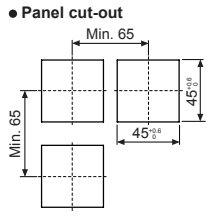
(unit: mm)

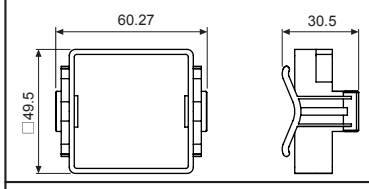


● Bracket



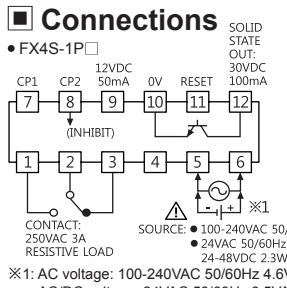
● Panel cut-out



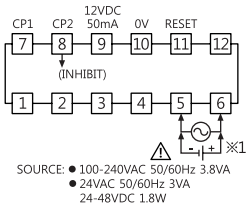


■ Connections

● FX4S-1P□



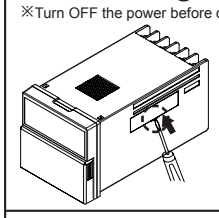
● FX5S-I□



※1: AC voltage: 100-240VAC 50/60Hz 4.6VA/3.8VA
AC/DC voltage: 24VAC 50/60Hz 3.5VA/3VA, 24-48VDC 2.3W/1.8W
※INHIBIT: 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.**

■ Detaching DIP Switch Cover

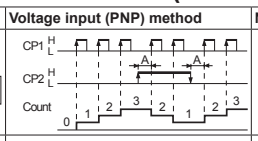
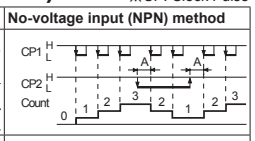
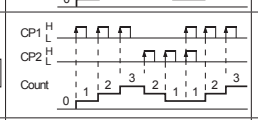
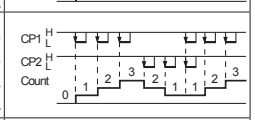
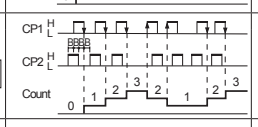
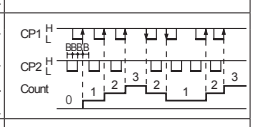
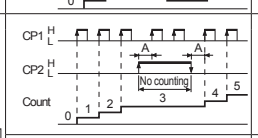
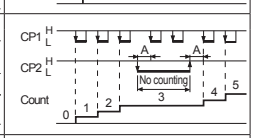
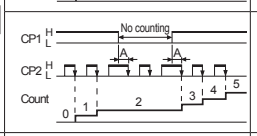
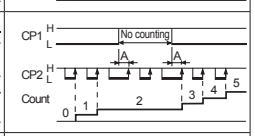
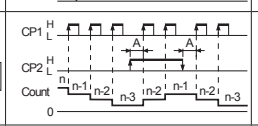
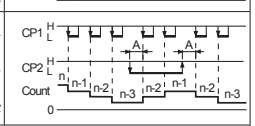
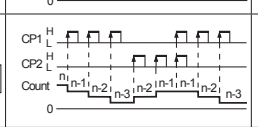
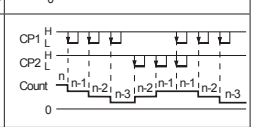
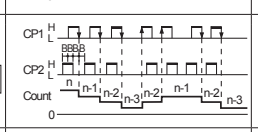
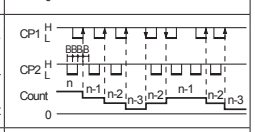
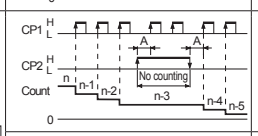
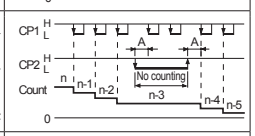
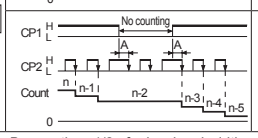
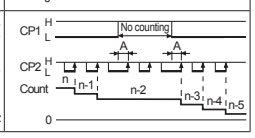
※Turn OFF the power before detaching the DIP switch cover.



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)

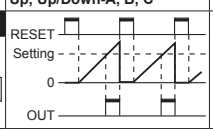
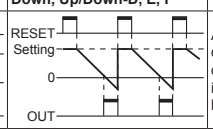
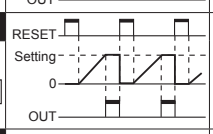
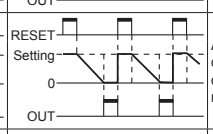
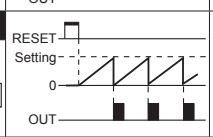
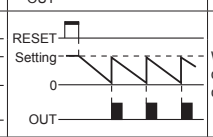
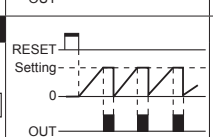
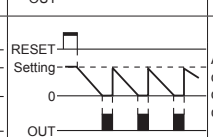
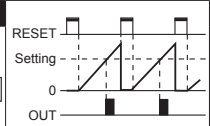
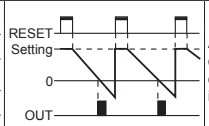
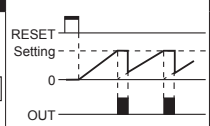
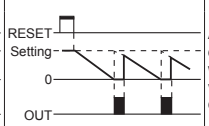
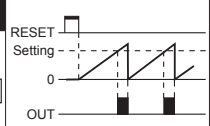
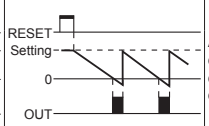
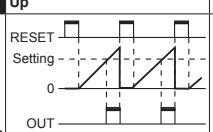
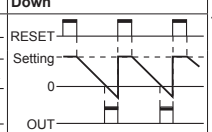
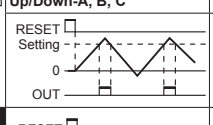
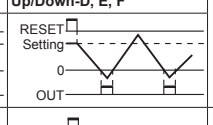
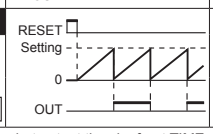
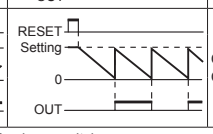
※CP: Clock Pulse

Input mode		SW1	Voltage input (PNP) method	No-voltage input (NPN) method
Up mode (SW1-5 ON)	Up/Down-A (command input)	SW1-4 ON, SW1-3 OFF		
	Up/Down-B (individual input)	SW1-4 ON, SW1-3 OFF		
	Up/Down-C (phase difference input)	SW1-4 ON, SW1-3 OFF		
	Up (adding input)	SW1-4 ON, SW1-3 OFF		
				
Down mode (SW1-5 OFF)	Up/Down-D (command input)	SW1-4 ON, SW1-3 OFF		
	Up/Down-E (individual input)	SW1-4 ON, SW1-3 OFF		
	Up/Down-F (phase difference input)	SW1-4 ON, SW1-3 OFF		
	Down (subtracting input)	SW1-4 ON, SW1-3 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).

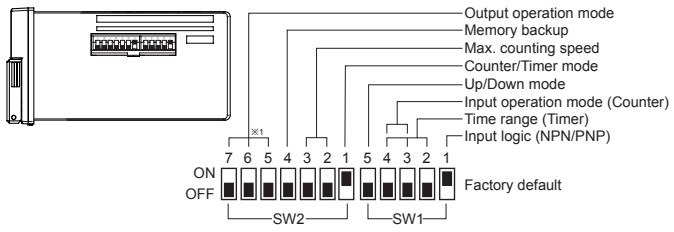
■ Output Operation Mode

■ ← One-shot output (0.05 to 5 sec) □ ← Self-holding output

Output mode (SW2)	Up mode (SW1-5 ON) Up, Up/Down-A, B, C	Down mode (SW1-5 OFF) Down, Up/Down-D, E, F	Operation
F (SW2-7 ON, 6 ON, 5 ON)			After count-up, counting display value increases or decreases until reset signal input is applied and self-holding output is maintained.
N (SW2-7 ON, 6 OFF, 5 ON)			After count-up, counting display value and self-holding output are maintained until reset signal input is applied.
C (SW2-7 ON, 6 OFF, 5 OFF)			When count-up, counting display value is reset and it counts simultaneously.
R (SW2-7 ON, 6 OFF, 5 OFF)			After count-up, counting display value is reset after one-shot output time and it counts simultaneously.
K (SW2-7 OFF, 6 ON, 5 ON)			After count-up, counting display value increases or decreases until reset signal input is applied.
P (SW2-7 OFF, 6 ON, 5 OFF)			After count-up, counting display value is maintained while output is ON. Counting value is internally reset and it counts simultaneously.
Q (SW2-7 OFF, 6 OFF, 5 ON)			After count-up, counting display value increases or decreases during one-shot output time.
S Counter mode (SW2-7 OFF, 6 OFF, 5 OFF)	Up 	Down 	· Up, Up/Down-ABC input mode : Output maintains ON when counting display value is larger or equal than setting value. · Down, Up/Down-D, E, F input mode : Output maintains ON when counting display value is smaller or equal than setting value.
	Up/Down-A, B, C 	Up/Down-D, E, F 	
S Timer mode (SW2-7 OFF, 6 OFF, 5 OFF)			Output turns OFF → ON → OFF repeatedly (flicker).

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

■ DIP Switch Setting



※1: Indicator model (FS5-I□) does not have no. 5, 6, 7 of SW2 for output operation mode setting.

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

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

● **Up/Down mode**

SW1	Function
5 ON	Down mode
5 OFF	Up mode

● **Counter/Timer mode**

SW2	Function
1 ON	Counter mode
1 OFF	Timer mode

● **Memory backup**

SW2	Function
4 ON	No memory backup
4 OFF	Memory backup

● **Max. counting speed**

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

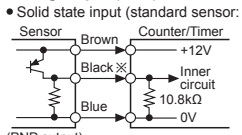
● **Time range (timer)**

SW1	FX4S-1P□	FX5S-I□
4 3 2 ON	99.99sec	9999.9sec
4 3 2 OFF	999.9sec	99999sec
4 3 2 ON	9999sec	9min 59.99sec
4 3 2 OFF	99min 59sec	99min 59.9sec
4 3 2 ON	999.9min	9999.9min
4 3 2 OFF	99hour 59min	9hour 59min 59sec
4 3 2 ON	999.9hour	999hour 59min
4 3 2 OFF	9999hour	9999.9hour

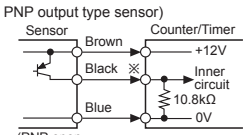
■ Input Connection

◎ **Voltage input (PNP)**

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

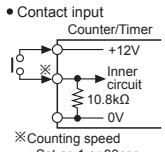


(PNP output)



(PNP open collector output)

● Contact input

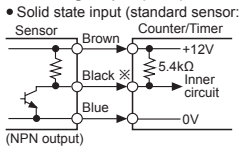


※Counting speed : Set as 1 or 30cps

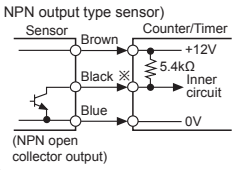
※CP1, CP2 (INHIBIT), RESET input part

◎ **No-voltage input (NPN)**

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

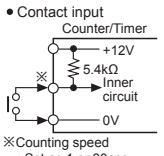


(NPN output)



(NPN open collector output)

● Contact input



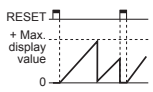
※Counting speed : Set as 1 or 30cps

※CP1, CP2 (INHIBIT), RESET input part

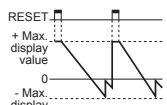
■ Counting & Time Operation for Indicator (FX5S-I□)

◎ **Counting operation**

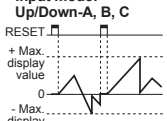
● **Input mode: Up**



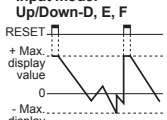
● **Input mode: Down**



● **Input mode: Up/Down-A, B, C**

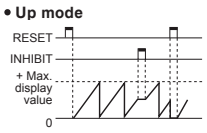


● **Input mode: Up/Down-D, E, F**

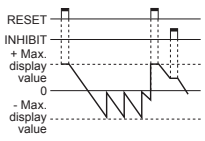


◎ **Time operation**

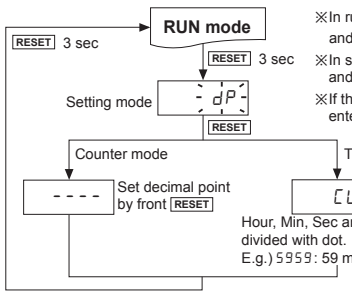
● **Up mode**



● **Down mode**



■ Dot for Decimal Point / Hour. Min. Second



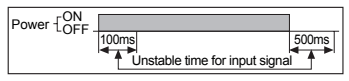
※In run mode, hold the RESET key for over 3 sec, and it enters setting mode [dP].
※In setting mode, hold the RESET key for over 3 sec, and it saves the setting and returns to RUN mode.
※If there is no RESET key input for 60 sec when entering setting mode, it returns to RUN mode.

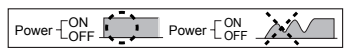
■ Cautions During Use

1. **DIP switch setting**
   Turn OFF the power before setting the DIP switch to the Counter/Timer.
   After DIP switch setting when cutting off the power, press the front RESET key or supplying the external reset.
2. **Error**

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

   ※If error occurs, the output turns OFF.
   ※Indicator model does not have error display function.
3. **Power**
   ①In case of 24VAC, 24-48VDC model, power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
   ②The inner circuit voltage rises within 100ms after supplying the power to the unit.
   The input may be unavailable at this period.
   Be sure that the inner circuit voltage drops within 500ms after turning OFF the power.
   ③Use the unit within the rated power supply.
   When supplying or cutting the power, use a switch not to occur chattering.





4. **Input signal line**
   ①Shorten the cable from the sensor to the unit.
   ②Use shield cable when input cable is longer.
   ③Wire the input signal line separately from power line.
5. **Testing dielectric voltage or insulation resistance when the unit is installed at control panel**
   ①Isolate the unit from the circuit of control panel.
   ②Short all terminals of the unit.
6. **Do not use the unit in the following environments.**
   ①Environments with high vibration or shock.
   ②Environments with strong alkali or strong acid materials
   ③Environments with exposure to direct sunlight
   ④Near machinery which produces strong magnetic force or electric noise
7. **This product may be used in the following environments.**
   ①Indoor ②Altitude max. 2,000m
   ③Pollution degree 2 ④Installation category II

※**Failure to follow these instructions may result in product damage.**

■ 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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