

# 8-Pin Plug Digital Counters



## FS 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 speeds: 1 cps / 30 cps / 2 kcps / 5 kcps
- Switch between voltage input (PNP) and no-voltage input (PNP) using DIP switch
- Operation modes: count-up, count-down
- Decimal point display function (fixed decimal point)
- 10 year memory protection (using non-volatile semiconductor)
- Output model types: single preset, indicator only
- Power supply
  - 100 - 240 VAC ~ 50 / 60 Hz (AC type)
  - 24 VAC ~ 50 / 60 Hz, 24 - 48 VDC = (AC / DC universal type)

### 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 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.

**FS** ① - ② ③

### ① Display digits

4: 4-digit  
5: 5-digit

### ② Output

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

### ③ Power supply

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

## Product Components

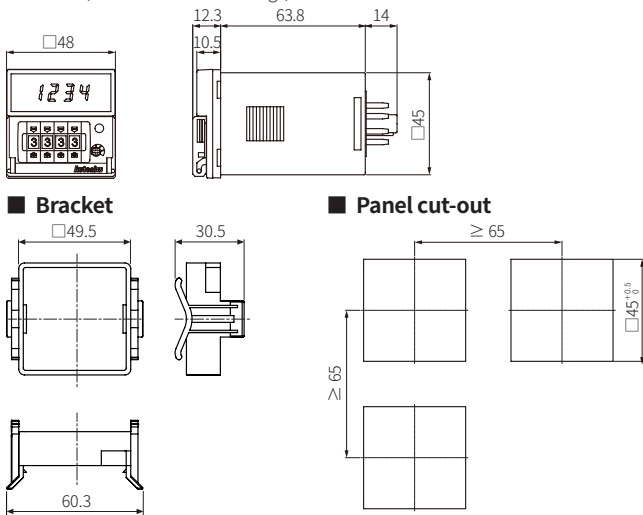
- Product (+ bracket)
- Instruction manual

## Sold Separately

- 8-pin controller socket: PG-08, PS-08(N)

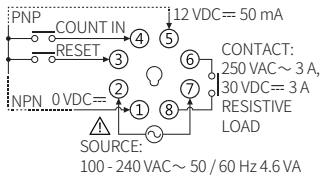
## Dimensions

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

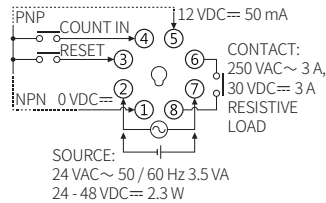


## Connections

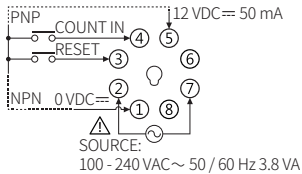
### FS4-1P4



### FS4-1P2



### FS5-I4



## Error

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

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

## Specifications

Model	FS4-1P□	FS5-I4
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 k cps	
Return time	≤ 500 ms	
Min. signal width	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	
Contact control output	Relay	-
Type	Instantaneous SPST (1a) × 1	-
Capacity	250 VAC ~ 3 A, 30 VDC = 3 A resistive load	-
Unit weight (packaged)	≈ 90 g (≈ 130 g)	≈ 80 g (≈ 120 g)
Certification	CE, RoHS, ENEC, EAC	

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 (FS4-1P□)	≤ 4.6 VA	AC: ≤ 3.5 VA DC: ≤ 2.3 W
Power consumption (FS5-I4)	≤ 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 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)	

## Mode Setting



## Decimal Point Setting

- 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.

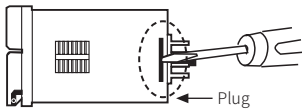
Parameter	Display	Setting range
C1-1 Setting mode	dP	-
C1-2 Decimal point setting	----	[FS4-1P□] -----, ----, ---, --, -
	-----	[FS5-I4] -----, ----, ---, --, -

## Output Operation Mode

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

## Detach the Case

Front

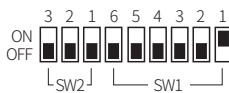


- Push the grooves at both side of the product to the outside of the product with a flat head (-) driver and push the plug to the front to separate it from the case. DIP switch is located inside.

⚠ **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 case and proceed the settings. See the 'Detach the Case.'
- 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
1	COUNT IN, RESET input logic	ON
2	Count up / count down	OFF
3	-	OFF
4,5	Max. counting speed	OFF
6	Memory retention	OFF

#### • Input logic

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

#### • Count up / count down

SW1-2	Count up / count down
ON	Count down
OFF	Count up

#### • Max. counting speed

SW1		Max. counting speed
5	4	
OFF	ON	1 cps
OFF	OFF	30 cps
ON	OFF	2 kcps
ON	ON	5 kcps

#### • Memory retention

SW1-6	Memory retention
ON	×
OFF	○

### ■ DIP SW2

SW2	Function	Defaults
1, 2, 3	Output operation mode <sup>(01)</sup>	OFF

01) Except the indicator model.

#### • Output operation mode

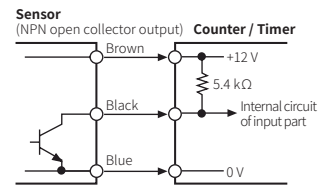
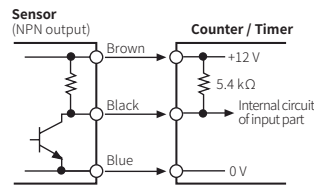
SW2			Output operation mode
3	2	1	
OFF	OFF	OFF	F
OFF	OFF	ON	N
OFF	ON	OFF	C
OFF	ON	ON	R
ON	OFF	OFF	K
ON	OFF	ON	P
ON	ON	OFF	Q
ON	ON	ON	S

## Input Connections

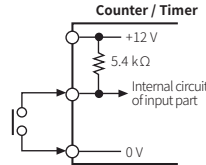
- Input: COUNT IN, RESET
- Max. counting speed in the contact input: 1 or 30 cps setting.

### ■ No-voltage (NPN) input

#### • Solid-state input

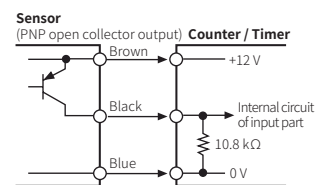
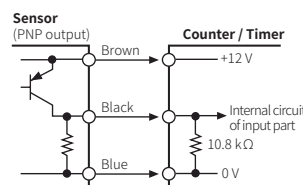


#### • Contact input

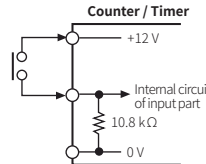


### ■ Voltage (PNP) input

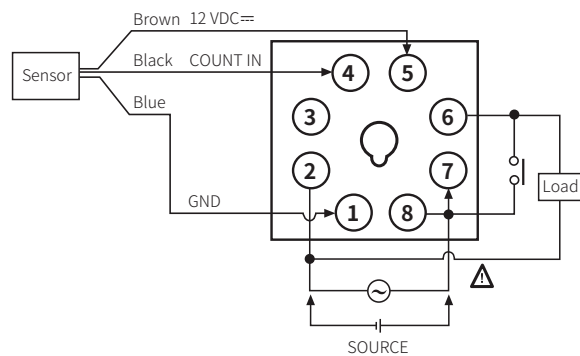
#### • Solid-state input



#### • Contact input



## Input / Output Connections



The capacity of sensor power supply is 12 VDC= 50 mA. Be careful not to exceed the capacity when connecting the sensor.  
Be careful not to let the load capacity exceed the contact capacity.

## Sold Separately: 8-pin Controller Socket

- For detailed information, refer to the 'PG Series, PS Series' manual.

Appearance	Pins	Rated Voltage	Rated current	Feature	Model
	8-pin	250 VAC~	7 A (resistance load)	Controller sockets	PG-08
	8-pin	250 VAC~	7 A (resistance load)	Controller sockets (DIN Rail / Panel)	PS-08(N)

## Counter Operation

### 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	Down
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.	
Mode	Output operation description in input operation mode	
	Up	Down
S		
	Output maintains ON when counting display value $\geq$ setting value.      Output maintains ON when counting display value $\leq$ setting value.	

### Counting operation (for indicator model)

Input operation mode = Up	Input operation mode = Down

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

## 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	i	l	0	0	i	l	0	0	i	l	0	0	i	l
1	1	j	J	1	1	j	J	1	1	j	J	1	1	j	J
2	2	k	K	2	2	k	K	2	2	k	K	2	2	k	K
3	3	l	L	3	3	l	L	3	3	l	L	3	3	l	L
4	4	m	M	4	4	m	M	4	4	m	M	4	4	m	M
5	5	n	N	5	5	n	N	5	5	n	N	5	5	n	N
6	6	o	O	6	6	o	O	6	6	o	O	6	6	o	O
7	7	p	P	7	7	p	P	7	7	p	P	7	7	p	P
8	8	q	Q	8	8	q	Q	8	8	q	Q	8	8	q	Q
9	9	r	R	9	9	r	R	9	9	r	R	9	9	r	R
A	A	s	S	A	A	s	S	A	A	s	S	A	A	s	S
b	B	t	T	b	B	t	T	b	B	t	T	b	B	t	T
c	C	u	U	c	C	u	U	c	C	u	U	c	C	u	U
d	D	v	V	d	D	v	V	d	D	v	V	d	D	v	V
E	E	w	W	E	E	w	W	E	E	w	W	E	E	w	W
F	F	x	X	F	F	x	X	F	F	x	X	F	F	x	X
G	G	y	Y	G	G	y	Y	G	G	y	Y	G	G	y	Y
H	H	z	Z	H	H	z	Z	H	H	z	Z	H	H	z	Z