

# 8-pin Plug Digital Timers With Thumb wheel Switch



## FSE 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

- Wide range of the time selection (0.01 sec to 9999.9 hour)
- Selectable voltage input (PNP) method or no-voltage input (NPN) method
- Dot for Decimal Point / Hour. Min. Sec. by RESET key
- Wide range of power supply  
: 100 - 240 VAC ~ 50 / 60 Hz, 24 VAC ~ 50 / 60 Hz, 24 - 48 VDC = universal
- Memory protection for 10 years (using non-volatile semiconductor)
- Built-in Microprocessor

### 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, high 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 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.
- 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.
- After turning off the power, change the time range, etc.
- 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**   **E**   **-**   **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 ~ 50 / 60 Hz, 24 - 48 VDC ≐

4: 100 - 240 VAC ~ 50 / 60 Hz

## Product Components

• Product (+ bracket)

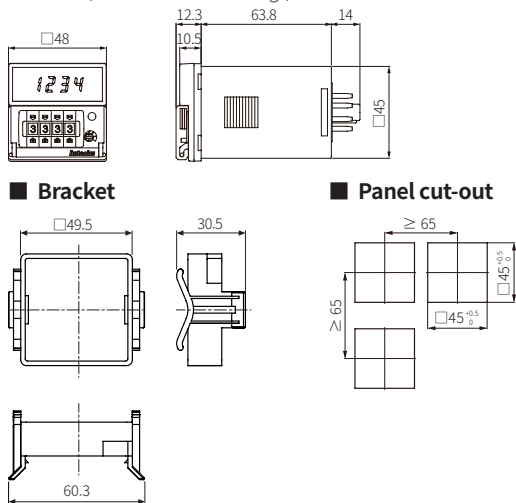
• Instruction manual

## Sold Separately

• 8-pin socket: PG-08, PS-08(N)

## Dimensions

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



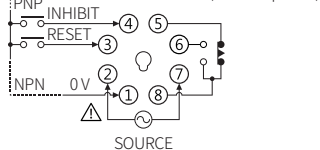
## Connections

### ⚠ Caution

: Refer to the 'specifications' for checking the power supply and control output.

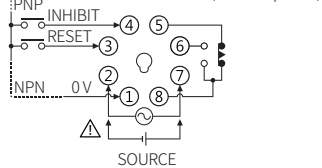
### ■ FS4E-1P4

PNP INHIBIT → 5 - 30 VDC ≐ (External power)



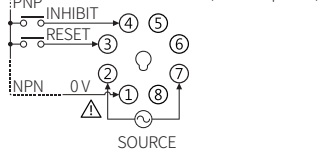
### ■ FS4E-1P2

PNP INHIBIT → 5 - 30 VDC ≐ (External power)



### ■ FS5E-I4

PNP INHIBIT → 5 - 30 VDC ≐ (External power)



## Error

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

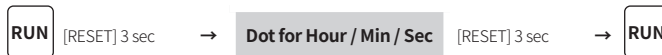
| Display | Description       | Troubleshooting                          |
|---------|-------------------|------------------------------------------|
| E r r 0 | Setting value = 0 | Change the setting value anything but 0. |

## Specifications

| Model                  | FS4E-1P2                                                                                                                                                                                                                                       | FS5E-1P4 | FS5E-I4          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------|
| Display digits         | 4-digit                                                                                                                                                                                                                                        |          | 5-digit          |
| Character size         | W 3.8 × H 7.6 mm                                                                                                                                                                                                                               |          | W 4 × H 8 mm     |
| Return time            | ≤ 500 ms                                                                                                                                                                                                                                       |          |                  |
| Time operation         | Power ON Start                                                                                                                                                                                                                                 |          |                  |
| Min. signal width      | RESET, INHIBIT: ≈ 20 ms                                                                                                                                                                                                                        |          |                  |
| Input logic            | Voltage input (PNP)<br>- input impedance: ≤ 10.8 kΩ, [H]: 5 - 30 VDC ≐, [L]: 0 - 2 VDC ≐<br>No-voltage input (NPN)<br>- short-circuit impedance: ≤ 470 Ω,<br>- short-circuit residual voltage: ≤ 1 VDC ≐<br>- open-circuit impedance: ≥ 100 kΩ |          |                  |
| One-shot output time   | 0.05 to 5 sec                                                                                                                                                                                                                                  |          |                  |
| Control output         | Relay                                                                                                                                                                                                                                          |          | -                |
| Contact type           | Time limit SPDT (1c)                                                                                                                                                                                                                           |          | -                |
| Contact capacity       | 250 VAC ~ 3 A, 30 VDC ≐ 3 A resistive load                                                                                                                                                                                                     |          | -                |
| Error                  | Repeat / SET / Voltage / Temp.: ≤ ± 0.01% ± 0.05 sec                                                                                                                                                                                           |          |                  |
| Unit weight (packaged) | ≈ 90 g (≈ 130 g)                                                                                                                                                                                                                               |          | ≈ 80 g (≈ 120 g) |
| Approval               | CE, RoHS, REACH                                                                                                                                                                                                                                |          |                  |

| Voltage type                 | AC voltage type                                                                                       | AC / DC voltage type                                            |
|------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Power supply                 | 100 - 240 VAC ~ ± 10% 50 / 60 Hz                                                                      | 24 VAC ~ ± 10% 50 / 60 Hz,<br>24 - 48 VDC ≐ ± 10%               |
| Power consumption (FS5E-1P4) | ≤ 4.6 VA                                                                                              | -                                                               |
| Power consumption (FS5E-I4)  | ≤ 3.8 VA                                                                                              | -                                                               |
| Power consumption (FS4E-1P2) | -                                                                                                     | AC: ≤ 3.5 VA<br>DC: ≤ 2.3 W                                     |
| Memory retention             | ≈ 10 years (non-volatile semiconductor memory type)                                                   |                                                                 |
| Insulation resistance        | ≥ 100 MΩ (500 VDC ≐ megger)                                                                           |                                                                 |
| Dielectric strength          | 2,000 VAC ~ 50 / 60 Hz for 1 min (between all terminals and case)                                     |                                                                 |
| Noise immunity               | ± 2 kV square-wave noise by noise simulator (pulse width 1 μs)                                        | ± 500 V square-wave noise by noise simulator (pulse width 1 μs) |
| Vibration                    | 0.75 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour |                                                                 |
| Vibration (malfunction)      | 0.5 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) 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<br>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



## Dot for Hour / Min / Second

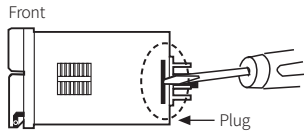
- If there is no RESET key or DIP switch input for 60 sec, it returns to RUN mode.
- [RESET] key: Setting mode ↔ RUN mode  
Move the digit when changing the setting value.

| Parameter                                | Display | Setting range             | Setting example    |
|------------------------------------------|---------|---------------------------|--------------------|
| T1-1 Setting mode                        | d P     | -                         | -                  |
| T1-2 Setting of dot for Hour / Min / Sec | C L r   | CLR: not divided with dot | 5959: 59 m 59 s    |
|                                          |         | SET: divided with dot     | 0.59.59: 59 m 59 s |

## Output Operation Mode

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

## Detach DIP Switch Cover

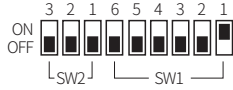


- Push and pull the groove of DIP switch cover with a flat head (-) driver to the front, removing the cover from the case.

⚠ **Caution: Turn OFF the power before removing 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. Refer to 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 |
|---------|----------------------------|----------|
| 1       | INHIBIT, RESET input logic | ON       |
| 2, 3, 4 | Time range                 | OFF      |
| 5       | Count up / count down      | OFF      |
| 6       | Memory retention           | OFF      |

#### • Input logic

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

#### • Time range

| SW1-2,3,4 |     |     | Time range |               |
|-----------|-----|-----|------------|---------------|
| 4         | 3   | 2   | 4-digit    | 5-digit       |
| OFF       | OFF | OFF | 99.99 s    | 9999.9 s      |
| OFF       | OFF | ON  | 999.9 s    | 99999 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      |

#### • Count up / count down

| SW1-5 | Count up / count down |
|-------|-----------------------|
| ON    | Count down            |
| OFF   | Count up              |

#### • 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

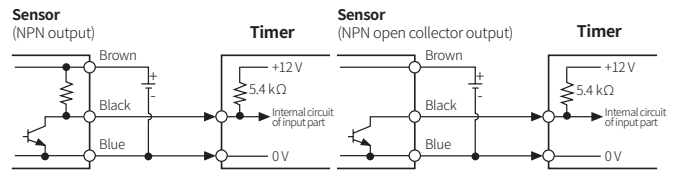
| SW2 |     |     | Output operation mode |
|-----|-----|-----|-----------------------|
| 3   | 2   | 1   |                       |
| OFF | OFF | OFF | F                     |
| OFF | OFF | ON  | N                     |
| OFF | ON  | OFF | C                     |
| OFF | ON  | ON  | R               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

## Input Connections

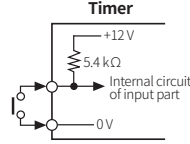
Input: INHIBIT, RESET

### ■ No-voltage (NPN) input

#### • Solid-state input

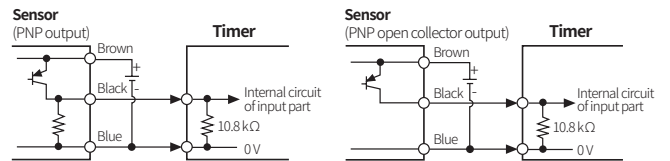


#### • Contact input

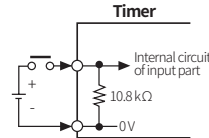


### ■ Voltage (PNP) input

#### • Solid-state input



#### • Contact input



## 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                                                                                                                 |            |
|------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|
|      | Count up                                                                                                                                     | Count down |
| F    | <p>After time-up, the display value increases or decreases until reset signal input is applied and retained (hold) output is maintained.</p> |            |
| N    | <p>After time-up, the display value and retained (hold) output are maintained until reset signal input is applied.</p>                       |            |
| C    | <p>When time-up, the display value is reset and it operates simultaneously.</p>                                                              |            |
| R    | <p>After time-up, the display value is reset after one-shot output time and it operates simultaneously.</p>                                  |            |
| K    | <p>After time-up, the display value increases or decreases until reset signal input is applied.</p>                                          |            |
| P    | <p>After time-up, the display value is maintained while output is ON. The value is internally reset and it operates simultaneously.</p>      |            |
| Q    | <p>After time-up, the display value increases or decreases during one-shot output time.</p>                                                  |            |
| S    | <p>Output turns OFF→ON→OFF operates repeatedly (flicker).</p>                                                                                |            |

## Time operation (for indicator model)

| Count up mode | Count down mode |
|---------------|-----------------|
|               |                 |

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