DIN size W48 × H48mm, Preset Counter/Timer

Features

● Count Up, Count Down, Count Up/Down function
● Multi function unit in a small size
● Wide range of input power supply: 100–240VAC 50/60Hz, 12–24VDC (Option)
● Selectable Counter or Timer function by internal DIP switch
● Counting speed upgrade: 5kcps
● Various Timing ranges programmable

4Digit type: 0.01sec. ~ 9999hour
5Digit type: 0.01sec. ~ 99999hour
● Available to set a decimal point

Specifications

*A blacked(□) item is upgraded function.

<table>
<thead>
<tr>
<th>Model</th>
<th>Single preset</th>
<th>FX4S</th>
<th>Double preset</th>
<th>FX5S-I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit</td>
<td></td>
<td>4</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Digit size</td>
<td></td>
<td>W4 × H8mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
<td>100–240VAC 50/60Hz, 12–24VDC (Option)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable voltage range</td>
<td></td>
<td>90 ~ 110% of rated voltage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Power consumption | | • Indication type: Approx. 4.7VA (240VAC 60Hz), Approx. 2.8W (24VDC)  
                         • single preset: Approx. 5.7VA (240VAC 60Hz), Approx. 3W (24VDC) |

Max. counting speed for CP1, CP2

Selectable 30cps/5kcps by internal DIP switch

Min. input signal width

INHIBIT input

RESET input

Approx. 20ms

Input

CP1, CP2 input (INHIBIT)

RESET input

Input logic is selectable

[Voltage input] Input impedance: 5.4kΩ “H” level: 5–30VDC, “L” level: 0–2VDC

[No-voltage input] Impedance at short-circuit: Max. 1kΩ, Residual voltage at short-circuit: Max. 2VDC, Impedance at open-circuit: Max. 100kΩ

One-shot output time

0.05 ~ 5sec

Control output

Contact Type

SPDT(1c)

Solid-state Type

NP open collector

Capacity

250VAC 3A at resistive load

30VDC Max. 100mA Max.

Memory retention

10 years (When using non-volatile semiconductor memory)

External sensor power

12VDC ±10% 50mA Max.

Dielectric strength

Min. 100VDC (at 500VDC)

Insulation resistance

2000VAC 50/60Hz for 1 minute

Noise strength

AC power  ± 2kV the square wave noise (pulse width: 1μs) by the noise simulator

DC power  ± 500V the square wave noise (pulse width: 1μs) by the noise simulator

Vibration

Mechanical 0.75mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 1 hour

Malfunction 0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10 minutes

Shock

Mechanical 300m/s² (Approx. 30G) in X, Y, Z directions for 3 times

Malfunction 100m/s² (Approx. 10G) in X, Y, Z directions for 3 times

Relay life cycle

Mechanical Min. 10,000,000 times

Electrical Min. 100,000 times (250VAC 3A at resistive load)

Ambient temperature

-10 ~ +55°C (at non-freezing status)

Storage temperature

-25 ~ +65°C (at non-freezing status)

Ambient humidity

35 ~ 85%RH

Weight

AC type: Approx. 147g, DC type: Approx. 153g

AC type: Approx. 137g, DC type: Approx. 143g

Approval
**Connections**

- **FX4S**
  - CP1, CP2 (Note 1) (Note 2)
  - 12V 0V
  - SOLID STATE OUT
  - CONTACT OUT: 250VAC 3A RESISTIVE LOAD

- **FX5S-I**
  - CP1, CP2 (Note 1) (Note 2)
  - 12V 0V
  - SOURCE

**Notes**

- **(Note 1)**: PNP input
- **(Note 2)**: PNP input
- CP2 (INHIBIT): Time Hold terminal when using for timer.
- Operated by a power ON start when it is used as a timer.

**Dimensions**

- **Bracket**
  - Dimensions: 48mm x 48mm x 60mm
  - Panel cut-out:
    - Min. 55mm x 45mm
    - Min. 62mm x 45mm
  - Unit: mm

**Input connections**

- **Input logic**: No-voltage (NPN) input
  - Solid state input (Standard sensor: NPN output type sensor)
  - Sensor: Brown, Black, Blue
  - Counter/Timer: 12V, 5.4kΩ
  - *Transistor ON → Counting
  - *NPN output type sensor
  - CP1, CP2 (INHIBIT), RESET input

- **Input logic**: Voltage (PNP) input
  - Solid state input (Standard sensor: PNP output type sensor)
  - Sensor: Brown, Black, Blue
  - Counter/Timer: 12V, 5.4kΩ
  - *Transistor ON → Counting
  - *PNP output type sensor
  - CP1, CP2 (INHIBIT), RESET input

- **Contact input**
  - Sensor: Brown, Black, Blue
  - Counter/Timer: 12V, 5.4kΩ
  - *Contact ON → Counting
  - Counting speed: 30cps setting (Counter)

- **Contact input**
  - Sensor: Brown, Black, Blue
  - Counter/Timer: 12V, 5.4kΩ
  - *Contact ON → Counting
  - Counting speed: 30cps setting (Counter)
**Input logic selection**
- Select NPN (No-voltage input)
  - NPN
- Select PNP (voltage input)
  - PNP

*Please be sure to turn OFF the power before changing input logic.

**Input & Output connections**

- In case of operating the load by power supply of the sensor

- **(�)** Please select proper capacity of load, because total current consumption should not be exceed current capacity. (Max. 50mA)
- Contact capacity: Max. 250VAC 3A

- In case of operating the load by external power supply

- The capacity of Load1 must not be exceed Max. 30VDC, Max. 100mA of the switching capacity of the transistor.
- Please do not supply the reverse polarity voltage.
- **(�)** Please connect the surge absorber (Diode) at both terminals of Load1, in case of using the inductive load. (Relay, etc.)

**Using 2 counters with one sensor**
- It is available to use 2 counters with one sensor. The power of sensor must be connected to only one of counter.
**Selection by DIP switches**

- The direction of DIP S/W is reverse on this product. If S/W is up, it will be ON. If S/W is down, it will be off.
- There is no output operation mode in indication type (FXSS-1) so 7 Pin DIP S/W is built in.

### • Up/Down mode

<table>
<thead>
<tr>
<th>SW1</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Down mode</td>
</tr>
<tr>
<td>OFF</td>
<td>Up mode</td>
</tr>
</tbody>
</table>

### • Counter/Timer

<table>
<thead>
<tr>
<th>SW1</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Counter</td>
</tr>
<tr>
<td>OFF</td>
<td>Timer</td>
</tr>
</tbody>
</table>

### • Max. counting speed

<table>
<thead>
<tr>
<th>SW1</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>CP1, CP2</td>
</tr>
<tr>
<td>OFF</td>
<td>5kcp/s</td>
</tr>
<tr>
<td></td>
<td>30cp/s</td>
</tr>
</tbody>
</table>

### • Memory retention

<table>
<thead>
<tr>
<th>SW1</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>No memory retention</td>
</tr>
<tr>
<td>OFF</td>
<td>Memory retention</td>
</tr>
</tbody>
</table>

**Decimal point setting**

Display the decimal point.

1. **RUN mode**
   - **It returns to decimal point setting status if pressing RESET button for over 3sec. in RUN mode.**
   - **When “dp” is flickering, one touch the Reset button.**
   - **If pressing one of digital switch buttons (↑, ↓) in decimal point setting mode, decimal point will be moved to Up(+) direction.**
   - **It returns to RUN mode if pressing RESET button for over 3sec. in decimal point setting status.**

2. **Changing the decimal point**
   - (Factory default)  
   - It returns to RUN mode if no RESET button or digital switch is applied for 60sec. in decimal point setting status.
   - The decimal point setting is existed in indication type.
## Input operation mode (Counter)

<table>
<thead>
<tr>
<th>Input mode (SW1)</th>
<th>No voltage input (NPN)</th>
<th>Voltage input (PNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Count up mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON 4 OFF 1</td>
<td>Up/Down-A Command input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cp1 H</td>
<td>cp1 H</td>
</tr>
<tr>
<td></td>
<td>cp2 L</td>
<td>cp2 L</td>
</tr>
<tr>
<td></td>
<td>Counting value</td>
<td>Counting value</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up/Down-B Individual input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cp1 H</td>
<td>cp1 H</td>
</tr>
<tr>
<td></td>
<td>cp2 L</td>
<td>cp2 L</td>
</tr>
<tr>
<td></td>
<td>Counting value</td>
<td>Counting value</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up/Down-C Phase difference input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cp1 H</td>
<td>cp1 H</td>
</tr>
<tr>
<td></td>
<td>cp2 L</td>
<td>cp2 L</td>
</tr>
<tr>
<td></td>
<td>Counting value</td>
<td>Counting value</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td><strong>Count down mode</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON 4 OFF 1</td>
<td>Up/Down-D Command input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cp1 H</td>
<td>cp1 H</td>
</tr>
<tr>
<td></td>
<td>cp2 L</td>
<td>cp2 L</td>
</tr>
<tr>
<td></td>
<td>Counting value</td>
<td>Counting value</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up/Down-E Individual input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cp1 H</td>
<td>cp1 H</td>
</tr>
<tr>
<td></td>
<td>cp2 L</td>
<td>cp2 L</td>
</tr>
<tr>
<td></td>
<td>Counting value</td>
<td>Counting value</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up/Down-F Phase difference input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cp1 H</td>
<td>cp1 H</td>
</tr>
<tr>
<td></td>
<td>cp2 L</td>
<td>cp2 L</td>
</tr>
<tr>
<td></td>
<td>Counting value</td>
<td>Counting value</td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
</tbody>
</table>

*Over Min. signal width, \(\frac{1}{2}\) of Min. signal width.

Counting miss by one (\(\pm\)) is occurred if the signal width of A or B is less than Min. signal width.
FXS Series

• Counting operation of indication model (Indication type)

- **Up input mode**
  - Diagram showing the reset and max display value for the up input mode.

- **Down input mode**
  - Diagram showing the reset and max display value for the down input mode.

- **Up / Down–A, B, C input mode**
  - Diagram showing the reset and max and min display values for the up/down input mode.

- **Up / Down–D, E, F input mode**
  - Diagram showing the reset and max and min display values for the up/down input mode.

• Time setting mode (Timer)

<table>
<thead>
<tr>
<th>SW1</th>
<th>4Digit</th>
<th>5Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>1 2 3</td>
<td>99.99sec</td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td>999.9sec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9999sec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99min 59sec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>999.9min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99hour 59min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>999.9hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9999hour</td>
</tr>
</tbody>
</table>
Output operation mode (by internal DIP switch)

- **One-shot output (0.05~5sec)**
- **Self-holding output**

### Output mode (SW1)

#### F
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### N
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### C
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### R
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### K
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### P
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### Q
- **ON**: 8, 9, 10
- **OFF**: 7
- **Reset**: Output ON
- **Preset**: Output OFF

#### S
- **Up input**: Count
  - **ON**: 8, 9, 10
  - **OFF**: 7
  - **Reset**: Output ON
  - **Preset**: Output OFF
- **Down input**: Count
  - **ON**: 8, 9, 10
  - **OFF**: 7
  - **Reset**: Output ON
  - **Preset**: Output OFF

#### Operation after count up

- **The display value continues until reset signal is applied then output is held**
  - **Self-holding output**
    - until reset signal is applied.

- **The display value and hold output are held until reset signal is applied.**

- **The display value returns to reset start status as soon as display value is reached to preset value.**

- **The display value is held during one-shot output time, counting process is returned to reset start status as soon as output is ON.**

- **The output turns ON after the setting time and then turns OFF after the setting time. This operation is repeated sequentially.**

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**Autonics**

A-42
Proper usage

Reset function

- Reset
  In case of changing the input mode after supplying the power, please take an external reset or manual reset. **If reset is not executed, the counter will be working as previous mode.**

- Reset signal width
  It is reset perfectly when the reset signal is applied during **max. 20ms** regardless of the contact input & solid-state input.

  ![Reset input diagram]

  *In case of a contact reset, it is reset perfectly if the ON time of reset signal is applied during max. 20ms even though a chattering is occurred.
  **It can be input the signal of CP1 & CP2 after max. 50ms from closing time of reset signal.

Sensor power

The power 12VDC which is provided to sensor is built in it. Please use it under Max. 50mADC.

Min. signal width of CP1, CP2 input

![Min. signal width diagram]

*Please make duty ratio(ON/OFF) 1:1

** Min. signal width:
  - 30cps : Max. 16.7ms
  - 5kcps : Max. 0.1ms

Max. counting speed

This is respond speed per 1sec. when the duty ratio (ON/OFF) of input signal is 1:1.
If duty ratio is not 1:1, the respond speed will be getting slow against input signal and also the width between ON and OFF should be over min. signal width and also one of ON width and OFF width is Under min. signal width, this product may not response.

![Max. counting speed diagram]

Width of Ta(ON) and Tb(OFF) must be larger than Min. signal width.

Max.counting speed is 1/2 value of catalog spec. when duty rate is 1:3.

It can not respond because Max. signal width (1a) is little.

INHIBIT (When using as Timer)

![INHIBIT diagram]

- If SW1 is ON, it becomes INHIBIT. (Time Hold)
- Please apply INHIBIT signal when stopping the time processing in a while.
- The time continues when taking off INHIBIT signal.

Error display

<table>
<thead>
<tr>
<th>Error signal</th>
<th>Error description</th>
<th>Returning method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error 0</td>
<td>Zero set state</td>
<td>Change the set value to non zero state</td>
</tr>
</tbody>
</table>

*When Error is displayed, the output continues OFF state.
*There is no Error function in the indication type.

Power

The inner circuit voltage starts to rise up for the first 100ms after power on, the input may not work at this time. And also the inner circuit voltage drops down for the last 500ms after power off, the input may not work at this time.

![Power diagram]