

PLC

HMI

SENSOR

ENCODER

COUNTER

INFORMATION

# APS-S/M Series

## Features

### Polycarbonate Resin Square Type, 2-wire/3-wire DC System

- Front Surface / Upper Surface detection
- Models of different frequency are available for adjacent installation.
- Conformity with UL standard / CE mark
- NO/NPN/PNP output

Proximity  
Sensor Lineup

Selection Guide

Outline

Cylinder Type

Square Type

Capacitive Type

## Type

### 2-wire DC System

| Output Form          | Operating Distance (mm) |  |  | Output Form | Model Number | Remarks   |
|----------------------|-------------------------|--|--|-------------|--------------|---|
| Non-flush Mount Type | 4                       |  |  | NO          | APS4-12M-Z   | Different frequency-classified models are available. ("L" is attached to the end of model number.)<br>Provided with mounting brackets |
|                      | 4                       |  |  | NO          | APS4-12S-Z   | Different frequency-classified models are available. ("L" is attached to the end of model number.)<br>Provided with mounting brackets |

\* Different frequency-classified models (L) are made-to-order products.

### 3-wire DC System

| Output Form          | Operating Distance (mm) |  |  | Output Form | Model Number | Remarks  |
|----------------------|-------------------------|--|--|-------------|--------------|--|
| Non-flush Mount Type | 2.5                     |  |  | NPN NO      | APS2.5-8M-E  |  |
|                      | 4                       |  |  | NPN NO      | APS4-12M-E   | Different frequency-classified models are available. ("L" is attached to the end of model number.)<br>(Excluding E1 type)<br>Provided with mounting brackets |
|                      |                         |  |  | NPN NC      | APS4-12M-E1  |  |
|                      |                         |  |  | PNP NO      | APS4-12M-E2  |  |
|                      | 2.5                     |  |  | NPN NO      | APS2.5-8S-E  |  |
|                      | 4                       |  |  | NPN NO      | APS4-12S-E   | Different frequency-classified models are available. ("L" is attached to the end of model number.)<br>(Excluding E1 type)<br>Provided with mounting brackets |
| NPN NC               |                         |  |  | APS4-12S-E1 |              |  |
| PNP NO               |                         |  |  | APS4-12S-E2 |              |  |






APS-S/M

APS-F/U

APS-10 to 15

# APS-S/M Series

## 2-wire DC System Non-flush Mount Type

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APS-10 to 15

|                               |    |   |   |
|-------------------------------|----|---|---|
| Effective Operating Distance  |    | 4 mm $\pm$ 10%  |   |
| Photo                         |    |                           |   |
| Remarks                       |    | Different frequency-classified models are available./With action indication/Provided with mounting brackets |   |
|                               |    | Upper surface detection   | Front surface detection                 |
| Output Form                   | NO | Model Number  | APS4-12S-Z                              |
|                               |    | Price   | Open (Minimum order quantity: 5 pieces) |
|                               |    |   | APS4-12M-Z                              |
|                               |    |   | Open (Minimum order quantity: 5 pieces) |
| Rated Working Voltage         |    | 12/24 V DC (10 to 30 V DC) Allowable ripple rate: 3% p-p or less  |   |
| Standard Target Object (mm)   |    | Iron 20 x 20 x 1 t  |   |
| Guaranteed Operating Distance |    | 0 to 2.8 mm   |   |
| Reaction Material             |    | Iron/Non ferrous metal (Operating distance changes depending on materials.)                                 |   |
| Hysteresis                    |    | Approx. 20% or less   |   |
| Operating Cycle Frequency     |    | Up to 200 Hz  |   |
| Rated Working Current         |    | 5 to 50 mA  |   |
| Voltage Drop                  |    | 3 V or lower  |   |
| Off-state Current             |    | 1.0 mA or lower   |   |
| Indicator Lamp                |    | Operation indication  |   |
| Use Ambient Temperature       |    | -10 to +50°C  |   |
| Temperature Characteristics   |    | Within $\pm$ 20% (At the operating distance at +23°C)   |   |
| Withstand Voltage             |    | 500 V AC 50/60 Hz (1 minute)  |   |
| Insulation Resistance         |    | 50 M $\Omega$ or higher (500 V DC)  |   |
| Vibration Resistance          |    | Double amplitude: 1.5 mm, 10 to 55 Hz (2 h each for X, Y and Z direction)                                   |   |
| Impact Resistance             |    | 294m/s <sup>2</sup> , within 11 ms (10 times each for X, Y and Z direction)                                 |   |
| Protection Level              |    | IP67  |   |
| Case Material                 |    | Polycarbonate   |   |
| Lead Wire                     |    | Oil-resistant cable 1 m<br>Outside diameter ( $\phi$ 3) 0.18 mm <sup>2</sup> , 2 core                       |   |
| Tightening Torque             |    | 0.4 Nm or less  |   |
| Weight (g)                    |    | Approx. 20  |   |

\* "L" is attached to the end of model number of the various frequency-classified models. (Made-to-order product)

# APS-S/M Series

## 3-wire DC System Non-flush Mount Type

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|                               |        |   |  |  |   |   |
|-------------------------------|--------|---|--|--|---|---|
| Effective Operating Distance  |        | 2.5 mm ±15%   |  | 4 mm ±10%  |   |   |
| Photo                         |        |  |  |    |   |   |
| Remarks                       |        | With operation indication /<br>Excluding mounting bracket (APS-KNG8, option)      |  | Different frequency-classified models are available. (Excluding E1 type)<br>With action indication/Provided with mounting brackets |   |   |
|                               |        | Upper surface detection   | Front surface detection                    | Upper surface detection  | Front surface detection                   |   |
| Output Form                   | NPN NO | Model Number  | APS2.5-8S-E                                | APS2.5-8M-E  | APS4-12S-E                                | APS4-12M-E                                |
|                               |        | Price   | Open<br>(Minimum order quantity: 10 units) | Open<br>(Minimum order quantity: 10 units)   | Open<br>(Minimum order quantity: 5 units) | Open<br>(Minimum order quantity: 5 units) |
|                               | NPN NC | Model Number  |  |  | APS4-12S-E1                               | APS4-12M-E1                               |
|                               |        | Price   |  |  | Open<br>(Minimum order quantity: 5 units) | Open<br>(Minimum order quantity: 5 units) |
|                               | PNP NO | Model Number  |  |  | APS4-12S-E2                               | APS4-12M-E2                               |
|                               |        | Price   |  |  | Open<br>(Minimum order quantity: 5 units) | Open<br>(Minimum order quantity: 5 units) |
| Rated Working Voltage         |        | 12/24 V DC (10 to 30 V DC) Allowable ripple rate: 3% p-p or less                  |  |  |   |   |
| No-load Current               |        | 20 mA or lower  |  | 10 mA or lower   |   |   |
| Standard Target Object (mm)   |        | Iron 15 x 15 x 1 t  |  | Iron 20 x 20 x 1 t   |   |   |
| Guaranteed Operating Distance |        | 0 to 1.7 mm   |  | 0 to 2.8 mm  |   |   |
| Reaction Material             |        | Iron/Non ferrous metal (Detection distance changes depending on materials.)       |  |  |   |   |
| Hysteresis                    |        | 20% or less   |  |  |   |   |
| Operating Cycle Frequency     |        | Up to 500 Hz  |  | Up to 200 Hz   |   |   |
| Rated Working Current         |        | Up to 50 mA   |  |  |   |   |
| Voltage Drop                  |        | 1.0 V or lower  |  |  |   |   |
| Off-state Current             |        | 0.1 mA or lower   |  |  |   |   |
| Indicator Lamp                |        | Operation indication  |  |  |   |   |
| Use Ambient Temperature       |        | -10 to +50°C  |  |  |   |   |
| Temperature Characteristics   |        | Within ±20% (At the operating distance at +23°C)                                  |  |  |   |   |
| Withstand Voltage             |        | 500 V AC 50/60 Hz (1 minute)  |  |  |   |   |
| Insulation Resistance         |        | 50 MΩ or higher (500 V DC)  |  |  |   |   |
| Vibration Resistance          |        | Double amplitude: 1.5 mm 10 to 55 Hz  |  |  |   |   |
| Impact Resistance             |        | 294 m/s <sup>2</sup> , within 11 ms (10 times each for X, Y and Z direction)      |  |  |   |   |
| Protection Level              |        | IP67  |  |  |   |   |
| Case Material                 |        | Polycarbonate   |  |  |   |   |
| Lead Wire                     |        | Oilproof cable 1 m<br>Outside diameter (φ) 0.18 mm <sup>2</sup> , 3 core          |  |  |   |   |
| Tightening Torque             |        | 0.4 Nm or less  |  |  |   |   |
| Weight (g)                    |        | Approx. 19  |  | Approx. 20   |   |   |

\* "L" is attached to the end of model number of the various frequency-classified models.

# APS-S/M Series

## Connection and Operation

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### Connection/Operation

The load can be connected to either side of the power source.

|                                 |  |   |
|---------------------------------|--|---|
| 2-wire DC System                |  | <p>( Target Object )</p> <p>Not Present Present</p> <p>Output OFF ON</p> <p>Operation Indication OFF ON</p> |
| 3-wire DC System NPN Output -E  |  | <p>Output OFF ON</p> <p>Operation Indication OFF ON</p>   |
| 3-wire DC System NPN Output -E1 |  | <p>Output ON OFF</p> <p>Operation Indication ON OFF</p>   |
| 3-wire DC System PNP Output -E2 |  | <p>Output OFF ON</p> <p>Operation Indication OFF ON</p>   |

Note: indicates a load.

### Installation / Effects of Surrounding Metal

Since the proximity sensor is affected by surrounding metal, install it remotely enough from the described dimensions.

(Unit: mm)

| Installation  | - Parallel arrangement of infinite plane metal body | - Parallel arrangement of plane metal body to the detector surface | - Arrangement to fenestrate metal body | - Arrangement of metal body at the front | - Parallel arrangement | - Opposing arrangement (Front detection type) | - Opposing arrangement (Top detection type) |
|---------------|---|--|--|--|------------------------|---|---|
| Model Number  |   |  |  |  |                        |   |   |
| APS2.5-8S-... | 3.7   | 3.7  | 14                                     | 8  | 18                     | —   | 20  |
| APS2.5-8M-... | 10  | 7  | 14                                     | 8  | 18                     | 20  | —   |
| APS4-12S-...  | 3.25  | 3.25   | 30                                     | 10                                       | 32                     | —   | 20  |
| APS4-12M-...  | 20  | 15   | 30                                     | 10                                       | 32                     | 20  | —   |

\* Position of the target body in the top detection models

- When there is metal around the proximity sensor, the operating distance changes and makes operation unstable. Therefore, place the surrounding metal as remotely as possible from the proximity sensor.
- Since the D dimension (mm) is the minimum value from the proximity sensor's detector surface to the surrounding metal body, place the metal more remotely than the numeric values shown in the table above.
- When the B dimension of the APS2.5 to the 8M is 3.7 mm (tight installation), place the proximity sensor's detector surface at least 3 mm away from the surrounding metal.

### [Precautions when handing the product]

#### Before Using the Product

Note that this product may output detection signals for approx. 25 ms when there are no objects detected and for approx. 100 ms when there is a detected object nearby after the power is turned on.

#### Precautions in Installation

The screws should be tightened so that no stress is applied to the sensor.

\*Tightening torque specifications: If the screws are tightened with a force 0.4 Nm or more, the sensor may break.

#### UL Certification

If you use the proximity sensor as a UL certification product, use a Class2 power source.

UL certification products receive recognition on condition that the Class2 power source is used.

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# APS-S/M Series

## Connection and Operation

### Mutual Interference and Frequency Classification

When two or more proximity sensors are closely installed, the installation interval of the sensors should be more than 10 times the operating distance (between centers).

If the interval is too short, mutual interference may occur. If the interval cannot be sufficiently secured, use modes with differently classified frequency.

The frequency classification is represented by the alphabet after the operating distance in the normal model number.

- Models with a classified frequency are shown by the mark on the cable.  
L-band mark

- (Example)
- APS4-12S-E (M) .... Model of standard frequency  
-E2 (M is not normally indicated.)
  - APS4-12S-EL ..... Model with lower frequency than the standard

Combination of Models Classified by Frequency  
(The sensors can be mounted with the cases tightly attached.)

The sensors can be mounted with the cases tightly attached.

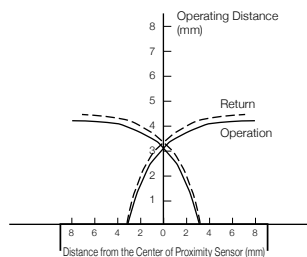
APS4-12□-□(M)L  
(Excluding E1 type)



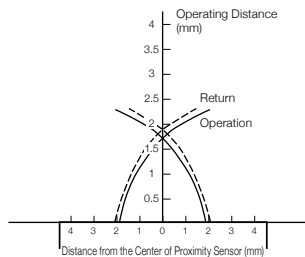
\* It requires consideration when 3 or more sensors are closely mounted.

### Detection Range Diagram (Representative Examples)

APS4-12S/M-...

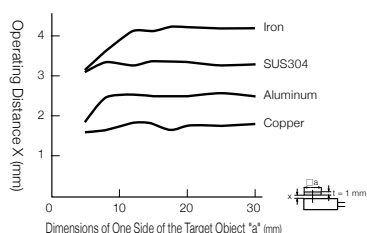


APS2.5-8S/M-E

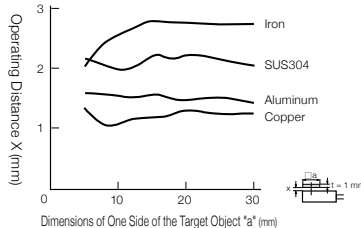


### Shape Based Characteristics (Representative Examples)

APS4-12S/M-...



APS2.5-8S/M-E



# APS-S/M Series

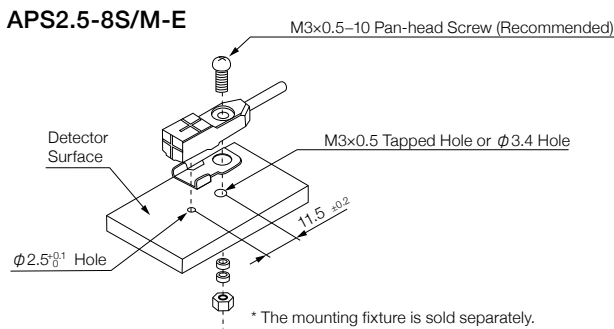
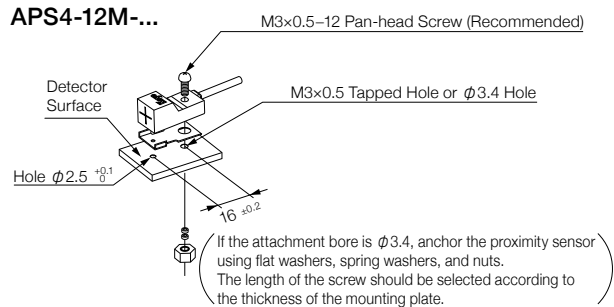
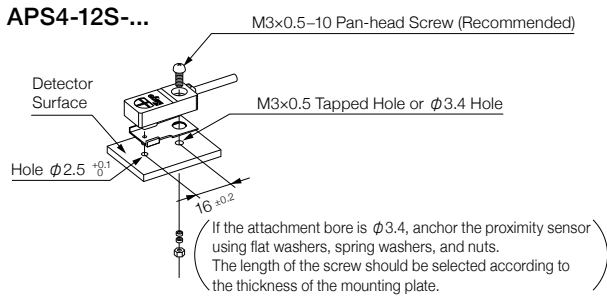
## Dimensions

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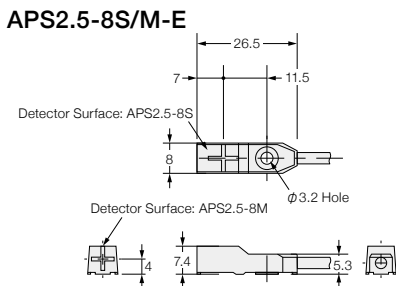
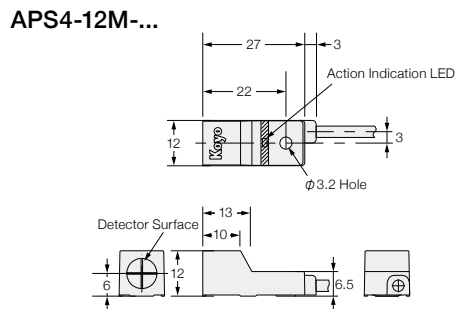
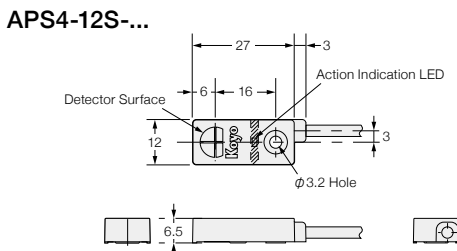
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### Installation (Unit: mm)

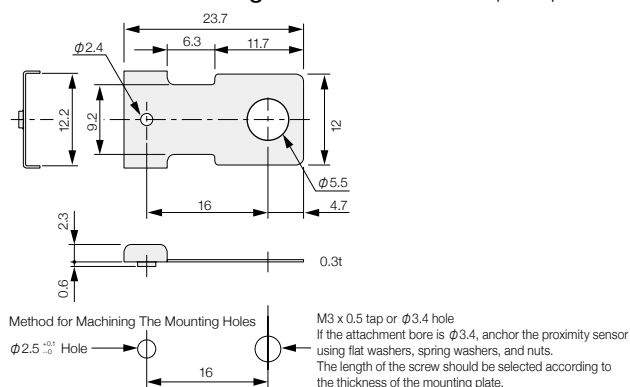


### Dimensions (Unit: mm)



### Mounting Brackets Dimensions (Unit: mm)

**APS4-12S/M Mounting Brackets** \* Enclosed 5 pieces per box



**APS2.5-8S/M Mounting Brackets** \* Excluded as an option

