

# Panasonic

NEW

## Amplifier Built-in / U-shaped Micro Photoelectric Sensor

Ultra-small / Cable type **PM-25 SERIES**

Compact / Cable type **PM-45 SERIES**

Compact / Connector built-in type **PM-65 SERIES**



Conforming to  
EMC Directive



Certified  
(Some models only)



**PM-25 SERIES**



**PM-45 SERIES**



**PM-65 SERIES**

Ultimate U-shaped micro photoelectric sensors

One Step Ahead in Performance and Mounting Ease

# Industry's First\* and Industry's Top-in-Class Advanced Sensors in the Industry.

The Only  
Industry's first

## \* Three protection circuits standard on all models

PM-25 SERIES PM-45 SERIES PM-65 SERIES

All models are standardly equipped with the following protection circuits in their compact bodies. These protection circuits minimize the possibility of sensor malfunctions caused by erroneous wiring.

- 1 Reverse supply polarity protection circuit
- 2 Reverse output polarity protection circuit
- 3 Output short-circuit protection circuit



The Only  
Industry's first

## \* Industry's first! IP64 rating

PM-25 SERIES PM-45 SERIES

Our original integrated molding method has eliminated grooves and gaps on the sensing surface and main body, thus reducing the possibility of malfunctions caused by splashing water or dust.



No.  
Industry's  
top-in-class

## \* Large and easy to see Multi-angle operation indicator

PM-25 SERIES PM-45 SERIES PM-65 SERIES

The large operation indicator (orange) lights up when the beam enters. The indicator is easy to see from above and from the sides.

[Look!] All models easy to mount with M3 screws

PM-25 SERIES PM-45 SERIES PM-65 SERIES

The sensor unit can be installed with one or two M3 screws.

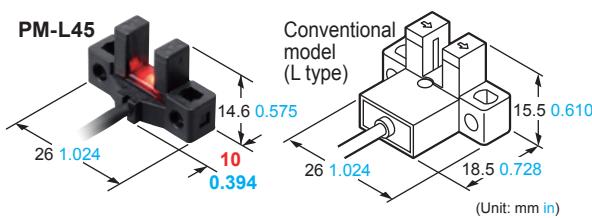
\* M3 screws and washers are not included.

- Models requiring one M3 screw for installation  
PM-F25, PM-R25, PM-F65, PM-R65
- Models requiring two M3 screws for installation  
Models other than above

## \* Compact size

PM-45 SERIES

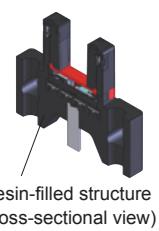
All new models require significantly less mounting space than our conventional models when mounted with the same pitch. What's more, the new models can directly replace our conventional models currently in use.



## Resistant to vibrations and impacts

PM-25 SERIES PM-45 SERIES PM-65 SERIES

The sections where stress concentrates, such as the connecting section of the cable and internal circuit, are covered with a resin. This helps prevent malfunctions caused by vibrations and impacts.



# Translate to the Most

\* As of November 2015, according to our company's survey

The Only

Industry's first



## Ample beam emitting / receiving distance of 6 mm 0.236 in

**PM-25 SERIES PM-45 SERIES PM-65 SERIES**

The beam emitting and receiving sections are 0.5 mm 0.02 in thinner than those on our conventional models while their external dimensions are the same. As a result, the distance between the beam emitting point and receiving point increased by 1 mm 0.039 in. The wider distance means less possibility of collision between the sensing section and sensing object.



The Only

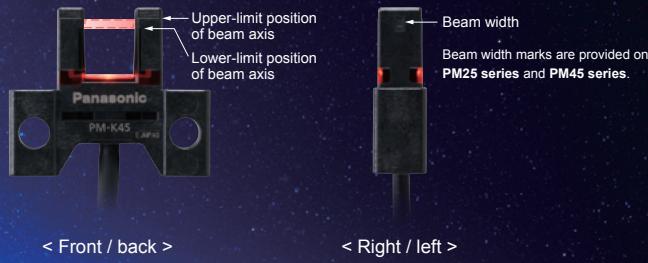
Industry's first



## Beam marks for easy adjustment

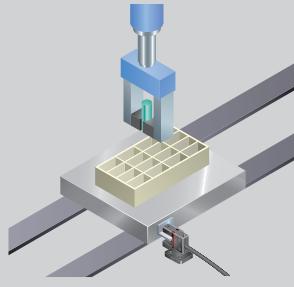
**PM-25 SERIES PM-45 SERIES PM-65 SERIES**

The upper-limit and lower-limit positions of beam can be visually confirmed from the front, back, right and left sides of the sensor unit. This allows easy adjustment of the position of sensing object.



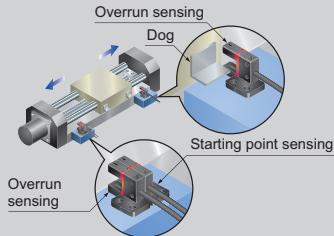
## APPLICATIONS

### ■ Positioning of a pallet



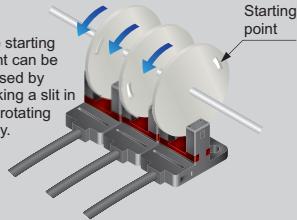
Pallet is stopped by sensing the dog\*.

### ■ Sensing the starting point and overrun of a moving body



Starting point and overrun is sensed using the dog\* on the base.

### ■ Sensing the starting point on a rotating body



\* "Dog" refers to the sensing object for activating the sensor's detecting operation.

## WIDE VARIATION

Sensors come in various shapes to suit a wide range of mounting conditions

### ■ Ultra-small / Cable type **PM-25 SERIES** Easy mounting with M2 / M3 screws!



PM-K25

PM-L25

PM-U25

PM-F25

PM-R25

### ■ Compact / Cable type **PM-45 SERIES** Compact size!



PM-K45

PM-T45

PM-L45

PM-Y45

PM-F45

PM-R45

### ■ Compact / Connector built-in type **PM-65 SERIES** Easy connection with a single touch using commercially-available connectors



PM-K65

PM-T65

PM-T65W

PM-L65

PM-Y65

PM-F65

PM-F65W

PM-R65

PM-R65W

# Ultra-small / Cable type PM-25 SERIES

|                    |            |                    |                    |                                      |        |        |
|--------------------|------------|--------------------|--------------------|--------------------------------------|--------|--------|
| Cable type         | NPN output | 1 m 3.281 ft cable | 3 m 9.843 ft cable | 1 m 3.281 ft bending-resistant cable |        |        |
| Built-in connector | PNP output | 1 m 3.281 ft cable | 3 m 9.843 ft cable | 1 m 3.281 ft bending-resistant cable |        |        |
|                    |            | PM-K25             | PM-L25             | PM-U25                               | PM-F25 | PM-R25 |

Easy mounting with  
M2 / M3 screws!

## ORDER GUIDE

| Type                     | Appearance (mm in) | Sensing range | Model No.        | Cable length                          | Output                        | Output operation                                   |  |
|--------------------------|--------------------|---------------|------------------|---------------------------------------|-------------------------------|--|--|
| Ultra-small / Cable type | K type             |               | <b>PM-K25</b>    | 1 m 3.281 ft                          | NPN open-collector transistor | Incorporated with 2 outputs:<br>Light-ON / Dark-ON |  |
|                          |                    |               | <b>PM-K25-R</b>  | 1 m 3.281 ft, bending-resistant cable |                               |  |  |
|                          |                    |               | <b>PM-K25-C3</b> | 3 m 9.843 ft                          |                               |  |  |
|                          |                    |               | <b>PM-K25-P</b>  | 1 m 3.281 ft                          | PNP open-collector transistor |  |  |
|                          | L type             |               | <b>PM-L25</b>    | 1 m 3.281 ft                          | NPN open-collector transistor |  |  |
|                          |                    |               | <b>PM-L25-R</b>  | 1 m 3.281 ft, bending-resistant cable |                               |  |  |
|                          |                    |               | <b>PM-L25-C3</b> | 3 m 9.843 ft                          |                               |  |  |
|                          |                    |               | <b>PM-L25-P</b>  | 1 m 3.281 ft                          | PNP open-collector transistor |  |  |
|                          | U type             |               | <b>PM-U25</b>    | 1 m 3.281 ft                          | NPN open-collector transistor |  |  |
|                          |                    |               | <b>PM-U25-R</b>  | 1 m 3.281 ft, bending-resistant cable |                               |  |  |
|                          |                    |               | <b>PM-U25-C3</b> | 3 m 9.843 ft                          |                               |  |  |
|                          |                    |               | <b>PM-U25-P</b>  | 1 m 3.281 ft                          | PNP open-collector transistor |  |  |
|                          | F type             |               | <b>PM-F25</b>    | 1 m 3.281 ft                          | NPN open-collector transistor |  |  |
|                          |                    |               | <b>PM-F25-R</b>  | 1 m 3.281 ft, bending-resistant cable |                               |  |  |
|                          |                    |               | <b>PM-F25-C3</b> | 3 m 9.843 ft                          |                               |  |  |
|                          |                    |               | <b>PM-F25-P</b>  | 1 m 3.281 ft                          | PNP open-collector transistor |  |  |
|                          | R type             |               | <b>PM-R25</b>    | 1 m 3.281 ft                          | NPN open-collector transistor |  |  |
|                          |                    |               | <b>PM-R25-R</b>  | 1 m 3.281 ft, bending-resistant cable |                               |  |  |
|                          |                    |               | <b>PM-R25-C3</b> | 3 m 9.843 ft                          |                               |  |  |
|                          |                    |               | <b>PM-R25-P</b>  | 1 m 3.281 ft                          | PNP open-collector transistor |  |  |

Note: The suffix “-R” in the model No. indicates a bending-resistant cable type. The suffix “-C3” indicates a 3 m 9.843 ft cable length type.

## OPTIONS

| Designation    | Model No.    | Description   |
|----------------|--------------|---|
| Mounting screw | <b>MS-M2</b> | Mounting screw with washers for the ultra-small type sensor (50 pcs. lot). It can mount securely as it is spring washer attached. |

### Mounting screw

- **MS-M2**



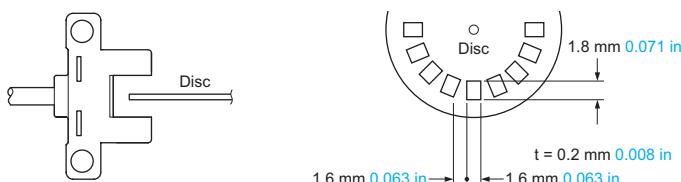
M2 (length 10 mm 0.394 in)  
screw with a spring washer

## SPECIFICATIONS

| Item                     | Model No.                       | Type   | Ultra-small / Cable type   |   |           |
|--------------------------|---------------------------------|--|--|---|-----------|
|                          |                                 |  | Bending-resistant cable  | 3 m 9.843 ft cable                                    | PM-□25-C3 |
|                          | NPN output                      | PM-□25   | PM-□25-R   |   | PM-□25-C3 |
|                          | PNP output                      | PM-□25-P   |  |   |           |
| Sensing range            |                                 |  | 6 mm 0.236 in (fixed)  |   |           |
| Minimum sensing object   |                                 |  | 0.8 × 1.2 mm 0.031 × 0.047 in opaque object  |   |           |
| Hysteresis               |                                 |  | 0.05 mm 0.002 in or less   |   |           |
| Repeatability            |                                 |  | 0.01 mm 0.0004 in or less  |   |           |
| Supply voltage           |                                 |  | 5 to 24 V DC ±10 % Ripple P-P 10 % or less   |   |           |
| Current consumption      |                                 |  | 15 mA or less  |   |           |
| Output                   |                                 | <NPN output type><br>NPN open-collector transistor<br>• Maximum sink current: 50 mA<br>• Applied voltage: 30 V DC or less (between output and 0 V)<br>• Residual voltage: 2 V or less (at 50 mA sink current)<br>1 V or less (at 16 mA sink current) | <PNP output type><br>PNP open-collector transistor<br>• Maximum source current: 50 mA<br>• Applied voltage: 30 V DC or less (between output and + V)<br>• Residual voltage: 2 V or less (at 50 mA source current)<br>1 V or less (at 16 mA source current) |   |           |
| Output operation         |                                 |  | Incorporated with 2 outputs: Light-ON / Dark-ON  |   |           |
| Short-circuit protection |                                 |  | Incorporated   |   |           |
| Response time            |                                 |  | Under light received condition: 20 µs or less<br>Under light interrupted condition: 80 µs or less<br>(Maximum response frequency: 3 kHz) (Note 2)  |   |           |
| Operation indicator      |                                 |  | Orange LED (lights up under light received condition)  |   |           |
| Pollution degree         |                                 |  | 3  |   |           |
| Environmental resistance | Protection                      |  | IP64 (IEC)   |   |           |
|                          | Ambient temperature (Note 3, 4) |  | −25 to +55 °C −13 to +131 °F (No dew condensation or icing allowed), Storage: −30 to +80 °C −22 to +176 °F   |   |           |
|                          | Ambient humidity                |  | 5 to 85 % RH, Storage: 5 to 95 % RH  |   |           |
|                          | Ambient illuminance             |  | Fluorescent light: 1,000 lx at the light-receiving face  |   |           |
|                          | Voltage withstandability        |  | 1,000 V AC for one min. between all supply terminals connected together and enclosure  |   |           |
|                          | Insulation resistance           |  | 20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure   |   |           |
|                          | Vibration resistance            |  | 10 to 2,000 Hz frequency, 1.5 mm 0.059 in double amplitude (maximum acceleration 196 m/s²) in X, Y and Z directions for two hours each   |   |           |
| Shock resistance         |                                 |  | 15,000 m/s² acceleration (1,500 G approx.) in X, Y and Z directions three times each   |   |           |
| Emitting element         |                                 |  | Infrared LED (Peak emission wavelength: 855 nm 0.034 mil, non-modulated)   |   |           |
| Material                 |                                 |  | Enclosure: PBT, Display section: Polycarbonate   |   |           |
| Cable                    |                                 | 0.09-mm² 4-core cabtyre cable, PVC, 1 m 3.281 ft long  | 0.1-mm² 4-core bending-resistant cabtyre cable, PVC, 1 m 3.281 ft long (Note 5, 6)   | 0.09-mm² 4-core cabtyre cable, PVC, 3 m 9.843 ft long |           |
| Cable extension          |                                 | Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable. (Note 7)  |  |   |           |
| Weight                   |                                 | Net weight: 10 g approx., Gross weight: 15 g approx.   |  | Net weight: 30 g approx., Gross weight: 35 g approx.  |           |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) The response frequency is the value when the disc, given in the figure below, is rotated.



3) In case the PM-25 series is used at an ambient temperature of +50 °C +122 °F, or more, make sure to mount it on a metal body.

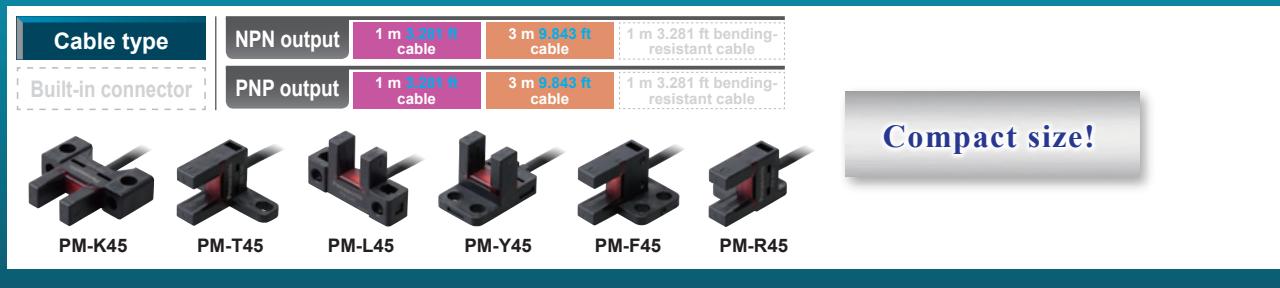
4) Note that the cable of PM-□25-R loses its flexibility when the ambient temperature decreases to about -10 °C +14 F°.

5) The cable of PM-□25-R is a bending-resistant cable usable on a moving base. When the sensor is mounted on a moving base, secure the sensor cable joint at the unit in place so that stress is not applied to it.

6) When storing PM-□25-R, make sure that the cable does not come into contact with the sensing section or operation indicator.

7) If the cable is extended to 20 m 65.617 ft or longer, confirm that the supply voltage at the end of the cable attached to the sensor is 4.5 V or higher.

# Compact / Cable type PM-45 SERIES



## ORDER GUIDE

| Type                 | Appearance (mm in) | Sensing range | Model No.          | Cable length | Output                        | Output operation                                   |  |
|----------------------|--------------------|---------------|--------------------|--------------|-------------------------------|--|--|
| Compact / Cable type | K type             |               | <b>PM-K45</b>      | 1 m 3.281 ft | NPN open-collector transistor | Incorporated with 2 outputs:<br>Light-ON / Dark-ON |  |
|                      |                    |               | <b>PM-K45-C3</b>   | 3 m 9.843 ft |                               |  |  |
|                      | T type             |               | <b>PM-K45-P</b>    | 1 m 3.281 ft | PNP open-collector transistor |  |  |
|                      |                    |               | <b>PM-K45-P-C3</b> | 3 m 9.843 ft |                               |  |  |
|                      | L type             |               | <b>PM-T45</b>      | 1 m 3.281 ft | NPN open-collector transistor |  |  |
|                      |                    |               | <b>PM-T45-C3</b>   | 3 m 9.843 ft |                               |  |  |
|                      | Y type             |               | <b>PM-T45-P</b>    | 1 m 3.281 ft | PNP open-collector transistor |  |  |
|                      |                    |               | <b>PM-T45-P-C3</b> | 3 m 9.843 ft |                               |  |  |
|                      | F type             |               | <b>PM-L45</b>      | 1 m 3.281 ft | NPN open-collector transistor |  |  |
|                      |                    |               | <b>PM-L45-C3</b>   | 3 m 9.843 ft |                               |  |  |
|                      | R type             |               | <b>PM-L45-P</b>    | 1 m 3.281 ft | PNP open-collector transistor |  |  |
|                      |                    |               | <b>PM-L45-P-C3</b> | 3 m 9.843 ft |                               |  |  |
|                      | F type             |               | <b>PM-F45</b>      | 1 m 3.281 ft | NPN open-collector transistor |  |  |
|                      |                    |               | <b>PM-F45-C3</b>   | 3 m 9.843 ft |                               |  |  |
|                      | R type             |               | <b>PM-F45-P</b>    | 1 m 3.281 ft | PNP open-collector transistor |  |  |
|                      |                    |               | <b>PM-F45-P-C3</b> | 3 m 9.843 ft |                               |  |  |
|                      | R type             |               | <b>PM-R45</b>      | 1 m 3.281 ft | NPN open-collector transistor |  |  |
|                      |                    |               | <b>PM-R45-C3</b>   | 3 m 9.843 ft |                               |  |  |
|                      | R type             |               | <b>PM-R45-P</b>    | 1 m 3.281 ft | PNP open-collector transistor |  |  |
|                      |                    |               | <b>PM-R45-P-C3</b> | 3 m 9.843 ft |                               |  |  |

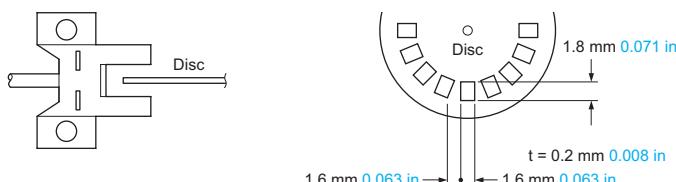
Note: The suffix “-C3” in the model No. indicates a 3 m 9.843 ft cable length type.

## SPECIFICATIONS

| Item                     | Model No.                | Type   | Compact / Cable type   |                    |
|--------------------------|--------------------------|--|--|--------------------|
|                          |                          |  |  | 3 m 9.843 ft cable |
|                          | NPN output               | <b>PM-□45</b>  | <b>PM-□45-C3</b>   |                    |
|                          | PNP output               | <b>PM-□45-P</b>  | <b>PM-□45-P-C3</b>   |                    |
| Sensing range            |                          |  | 6 mm 0.236 in (fixed)  |                    |
| Minimum sensing object   |                          |  | 0.8 × 1.2 mm 0.031 × 0.047 in opaque object  |                    |
| Hysteresis               |                          |  | 0.05 mm 0.002 in or less   |                    |
| Repeatability            |                          |  | 0.01 mm 0.0004 in or less  |                    |
| Supply voltage           |                          |  | 5 to 24 V DC ±10 % Ripple P-P 10 % or less   |                    |
| Current consumption      |                          |  | 15 mA or less  |                    |
| Output                   |                          | <NPN output type><br>NPN open-collector transistor<br>• Maximum sink current: 50 mA<br>• Applied voltage: 30 V DC or less (between output and 0 V)<br>• Residual voltage: 2 V or less (at 50 mA sink current)<br>1 V or less (at 16 mA sink current) | <PNP output type><br>PNP open-collector transistor<br>• Maximum source current: 50 mA<br>• Applied voltage: 30 V DC or less (between output and + V)<br>• Residual voltage: 2 V or less (at 50 mA source current)<br>1 V or less (at 16 mA source current) |                    |
| Output operation         |                          | Incorporated with 2 outputs: Light-ON / Dark-ON  |  |                    |
| Short-circuit protection |                          | Incorporated   |  |                    |
| Response time            |                          | Under light received condition: 20 µs or less<br>Under light interrupted condition: 80 µs or less<br>(Maximum response frequency: 3 kHz) (Note 2)  |  |                    |
| Operation indicator      |                          | Orange LED (lights up under light received condition)  |  |                    |
| Pollution degree         |                          | 3  |  |                    |
| Environmental resistance | Protection               | IP64 (IEC)   |  |                    |
|                          | Ambient temperature      | −25 to +55 °C −13 to +131 °F (No dew condensation or icing allowed), Storage: −30 to +80 °C −22 to +176 °F   |  |                    |
|                          | Ambient humidity         | 5 to 85 % RH, Storage: 5 to 95 % RH  |  |                    |
|                          | Ambient illuminance      | Fluorescent light: 1,000 lx at the light-receiving face  |  |                    |
|                          | Voltage withstandability | 1,000 V AC for one min. between all supply terminals connected together and enclosure  |  |                    |
|                          | Insulation resistance    | 20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure   |  |                    |
|                          | Vibration resistance     | 10 to 2,000 Hz frequency, 1.5 mm 0.059 in double amplitude (maximum acceleration 196 m/s <sup>2</sup> ) in X, Y and Z directions for two hours each  |  |                    |
| Emitting element         |                          | Infrared LED (Peak emission wavelength: 855 nm 0.034 mil, non-modulated)   |  |                    |
| Material                 |                          | Enclosure: PBT, Display section: Polycarbonate   |  |                    |
| Cable                    |                          | 0.09-mm <sup>2</sup> 4-core cabtyre cable, PVC, 1 m 3.281 ft long  | 0.09-mm <sup>2</sup> 4-core cabtyre cable, PVC, 3 m 9.843 ft long  |                    |
| Cable extension          |                          | Extension up to total 100 m 328.084 ft is possible with 0.3 mm <sup>2</sup> , or more, cable. (Note 3)   |  |                    |
| Weight                   |                          | Net weight: 10 g approx., Gross weight: 15 g approx.   | Net weight: 30 g approx., Gross weight: 35 g approx.   |                    |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) The response frequency is the value when the disc, given in the figure below, is rotated.



3) If the cable is extended to 20 m 65.617 ft or longer, confirm that the supply voltage at the end of the cable attached to the sensor is 4.5 V or higher.

# Compact / Connector built-in type PM-65 SERIES

|                    |   |   |
|--------------------|---|---|
| Cable type         | NPN output<br>Connector attached cable<br>1 m 3.28 ft, 2 m 6.562 ft,<br>3 m 9.843 ft, 5 m 16.404 ft | Connector attached bending-resistant cable<br>1 m 3.28 ft, 2 m 6.562 ft,<br>3 m 9.843 ft, 5 m 16.404 ft |
| Built-in connector | PNP output<br>Connector attached cable<br>1 m 3.28 ft, 2 m 6.562 ft,<br>3 m 9.843 ft, 5 m 16.404 ft | Connector attached bending-resistant cable<br>1 m 3.28 ft, 2 m 6.562 ft,<br>3 m 9.843 ft, 5 m 16.404 ft |
|                    | PM-K65<br>PM-T65<br>PM-T65W<br>PM-L65<br>PM-Y65   | PM-F65<br>PM-F65W<br>PM-R65<br>PM-R65W  |

**Easy connection with a single touch using commercially-available connectors**

## ORDER GUIDE

| Type                              | Appearance (mm in) | Sensing range | Model No. | Output                        | Output operation                                   |
|-----------------------------------|--------------------|---------------|-----------|-------------------------------|--|
| Compact / Connector built-in type | K type             |               | PM-K65    | NPN open-collector transistor |  |
|                                   |                    |               | PM-K65-P  | PNP open-collector transistor |  |
|                                   | T type             |               | PM-T65    | NPN open-collector transistor |  |
|                                   |                    |               | PM-T65-P  | PNP open-collector transistor |  |
|                                   | T type             |               | PM-T65W   | NPN open-collector transistor |  |
|                                   |                    |               | PM-T65W-P | PNP open-collector transistor |  |
|                                   | L type             |               | PM-L65    | NPN open-collector transistor |  |
|                                   |                    |               | PM-L65-P  | PNP open-collector transistor |  |
|                                   | Y type             |               | PM-Y65    | NPN open-collector transistor | Incorporated with 2 outputs:<br>Light-ON / Dark-ON |
|                                   |                    |               | PM-Y65-P  | PNP open-collector transistor |  |
|                                   | F type             |               | PM-F65    | NPN open-collector transistor |  |
|                                   |                    |               | PM-F65-P  | PNP open-collector transistor |  |
|                                   | F type             |               | PM-F65W   | NPN open-collector transistor |  |
|                                   |                    |               | PM-F65W-P | PNP open-collector transistor |  |
|                                   | R type             |               | PM-R65    | NPN open-collector transistor |  |
|                                   |                    |               | PM-R65-P  | PNP open-collector transistor |  |
|                                   | R type             |               | PM-R65W   | NPN open-collector transistor |  |
|                                   |                    |               | PM-R65W-P | PNP open-collector transistor |  |

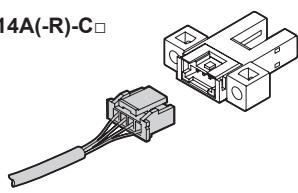
Note: "W" in the model No. indicates that the product is mounting-compatible with our conventional models [PM-T53(B) / PM-□64(P)].

## OPTIONS

| Designation  | Model No.          | Description  |
|--|--------------------|--|
| Connector attached cable                           | <b>CN-14A-C1</b>   | Length: 1m <b>3.281 ft</b><br>0.2 mm <sup>2</sup> 4-core cabtyre cable with connector on one end |
|  | <b>CN-14A-C2</b>   | Length: 2m <b>6.562 ft</b>   |
|  | <b>CN-14A-C3</b>   | Length: 3m <b>9.843 ft</b><br>Cable outer diameter: Ø3.7 mm<br><b>0.146 in</b>                   |
|  | <b>CN-14A-C5</b>   | Length: 5m <b>16.404 ft</b>  |
| Connector attached cable (Bending-resistant cable) | <b>CN-14A-R-C1</b> | Length: 1m <b>3.281 ft</b><br>0.2 mm <sup>2</sup> 4-core cabtyre cable with connector on one end |
|  | <b>CN-14A-R-C2</b> | Length: 2m <b>6.562 ft</b>   |
|  | <b>CN-14A-R-C3</b> | Length: 3m <b>9.843 ft</b><br>Cable outer diameter: Ø3.7 mm<br><b>0.146 in</b>                   |
|  | <b>CN-14A-R-C5</b> | Length: 5m <b>16.404 ft</b>  |
| Connector  | <b>CN-14A</b>      | Set of 10 housings and 40 contacts   |

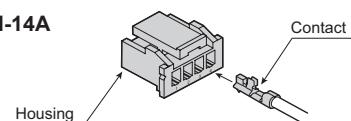
### Connector attached cable

- **CN-14A(-R)-C**



### Connector

- **CN-14A**



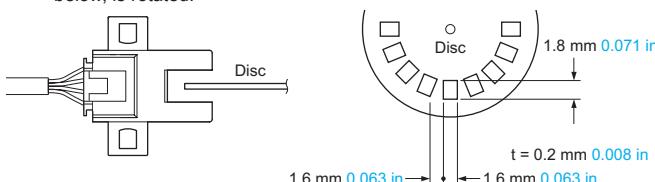
## SPECIFICATIONS

| Item                     | Model No.                | Type   | Compact / Connector built-in type   | Mounting-compatible with conventional model (Note 2) |
|--------------------------|--------------------------|--|---|--|
|                          |                          | NPN output   | <b>PM-□65</b>   |  |
|                          |                          | PNP output   | <b>PM-□65-P</b>   | <b>PM-□65W</b>                                       |
| Sensing range            |                          |  | 6 mm <b>0.236 in</b> (fixed)  |  |
| Minimum sensing object   |                          |  | 0.8 × 1.2 mm <b>0.031 × 0.047 in</b> opaque object  |  |
| Hysteresis               |                          |  | 0.05 mm <b>0.002 in</b> or less   |  |
| Repeatability            |                          |  | 0.01 mm <b>0.0004 in</b> or less  |  |
| Supply voltage           |                          |  | 5 to 24 V DC ±10 % Ripple P-P 10 % or less  |  |
| Current consumption      |                          |  | 15 mA or less   |  |
| Output                   |                          | <NPN output type><br>NPN open-collector transistor<br>• Maximum sink current: 50 mA<br>• Applied voltage: 30 V DC or less (between output and 0 V)<br>• Residual voltage: 2 V or less (at 50 mA sink current)<br>1 V or less (at 16 mA sink current) | <PNP output type><br>PNP open-collector transistor<br>• Maximum source current: 50 mA<br>• Applied voltage: 30 V DC or less (between output and +V)<br>• Residual voltage: 2 V or less (at 50 mA source current)<br>1 V or less (at 16 mA source current) |  |
| Output operation         |                          |  | Incorporated with 2 outputs: Light-ON / Dark-ON   |  |
| Short-circuit protection |                          |  | Incorporated  |  |
| Response time            |                          |  | Under light received condition: 20 µs or less, Under light interrupted condition: 80 µs or less (Maximum response frequency: 3 kHz) (Note 3)  |  |
| Operation indicator      |                          |  | Orange LED (lights up under light received condition)   |  |
| Pollution degree         |                          |  | 3   |  |
| Environmental resistance | Protection               |  | IP40 (IEC)  |  |
|                          | Ambient temperature      |  | -25 to +55 °C <b>-13 to +131 °F</b> (No dew condensation or icing allowed), Storage: -30 to +80 °C <b>-22 to +176 °F</b>  |  |
|                          | Ambient humidity         |  | 5 to 85 % RH, Storage: 5 to 95 % RH   |  |
|                          | Ambient illuminance      |  | Fluorescent light: 1,000 lx at the light-receiving face   |  |
|                          | Voltage withstandability |  | 1,000 V AC for one min. between all supply terminals connected together and enclosure   |  |
|                          | Insulation resistance    |  | 20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure  |  |
|                          | Vibration resistance     |  | 10 to 2,000 Hz frequency, 1.5 mm <b>0.059 in</b> double amplitude (maximum acceleration 196 m/s <sup>2</sup> ) in X, Y and Z directions for two hours each  |  |
|                          | Shock resistance         |  | 15,000 m/s <sup>2</sup> acceleration (1,500 G approx.) in X, Y and Z directions three times each  |  |
| Emitting element         |                          |  | Infrared LED (Peak emission wavelength: 855 nm <b>0.034 mil</b> , non-modulated)  |  |
| Material                 |                          |  | Enclosure: PBT, Display section: Polycarbonate  |  |
| Cable length             |                          |  | Extension up to total 100 m <b>328.084 ft</b> is possible with 0.3 mm <sup>2</sup> , or more, cable. (Note 4)   |  |
| Weight                   |                          |  | Net weight: 3 g approx., Gross weight: 3 g approx.  |  |

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.

2) Mounting-compatible with our conventional models [**PM-T53(B)** / **PM-□64(P)**]

3) The response frequency is the value when the disc, given in the figure below, is rotated.



4) If the cable is extended to 20 m **65.617 ft** or longer, confirm that the supply voltage at the end of the cable attached to the sensor is 4.5 V or higher.

### Recommended connector

Contact: SPHD-001T-P0.5, Housing: PAP-04V-S  
(Manufactured by J.S.T. Mfg. Co., Ltd.)

Note: Contact the manufacturer for details of the recommended products.

### Recommended crimping tool

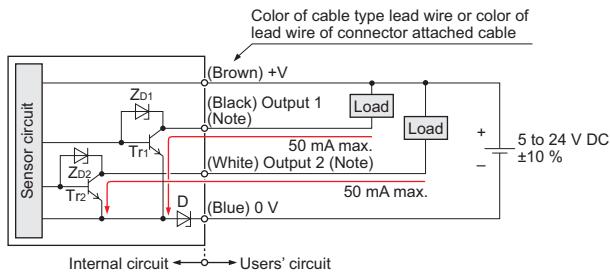
Model No. : YC-610R (Manufactured by J.S.T. Mfg. Co., Ltd.)

Note: Contact the manufacturer for details of the recommended products.

## I/O CIRCUIT AND WIRING DIAGRAMS

### NPN output type

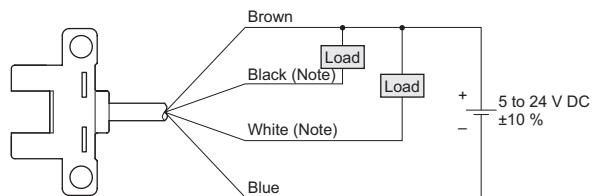
#### I/O circuit diagram



Note: Ensure to insulate the unused output wire.

Symbols...  
D: Reverse supply polarity protection diode  
ZD1, ZD2: Surge absorption zener diode  
Tr1, Tr2: NPN output transistor

#### Wiring diagram (PM-25 series / PM-45 series)

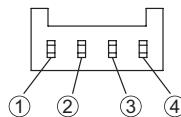


Note: Ensure to insulate the unused output wire.

#### Output operation

|          | Color code | Output operation |
|----------|------------|------------------|
| Output 1 | Black      | Light-ON         |
| Output 2 | White      | Dark-ON          |

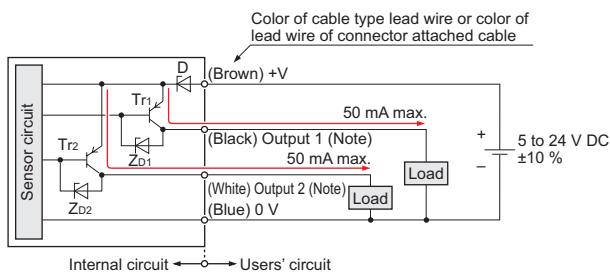
#### Terminal arrangement diagram (PM-65 series)



| Terminal No. | Designation        |
|--------------|--------------------|
| ①            | +V                 |
| ②            | Output 1: Light-ON |
| ③            | Output 2: Dark-ON  |
| ④            | 0 V                |

### PNP output type

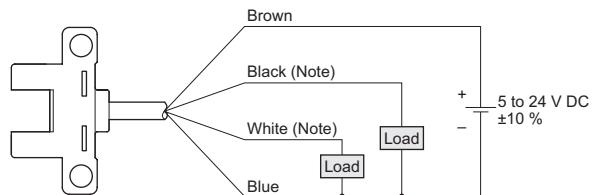
#### I/O circuit diagram



Note: Ensure to insulate the unused output wire.

Symbols...  
D: Reverse supply polarity protection diode  
ZD1, ZD2: Surge absorption zener diode  
Tr1, Tr2: PNP output transistor

#### Wiring diagram (PM-25 series / PM-45 series)

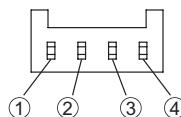


Note: Ensure to insulate the unused output wire.

#### Output operation

|          | Color code | Output operation |
|----------|------------|------------------|
| Output 1 | Black      | Light-ON         |
| Output 2 | White      | Dark-ON          |

#### Terminal arrangement diagram (PM-65 series)

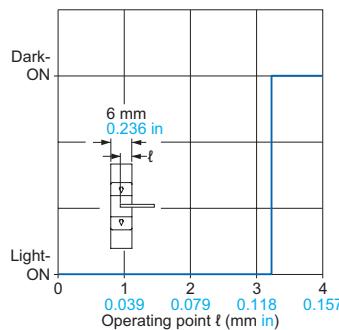
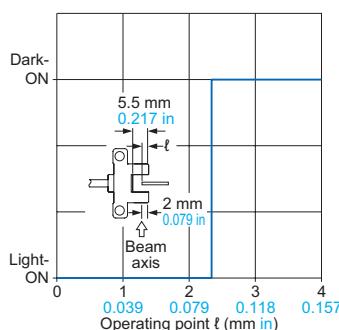


| Terminal No. | Designation        |
|--------------|--------------------|
| ①            | +V                 |
| ②            | Output 1: Light-ON |
| ③            | Output 2: Dark-ON  |
| ④            | 0 V                |

## SENSING CHARACTERISTICS (TYPICAL)

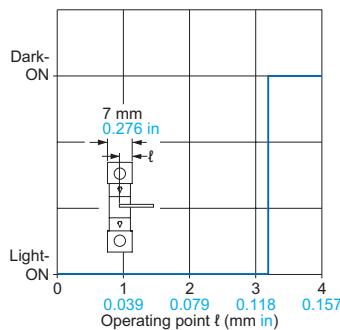
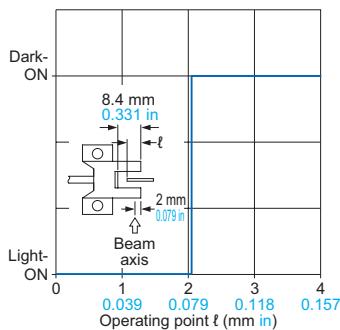
### PM-25 series

#### Sensing position



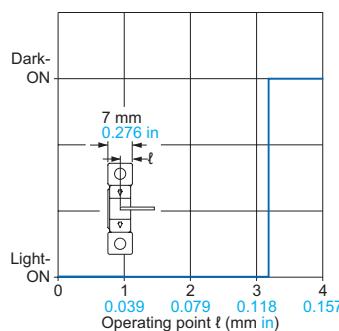
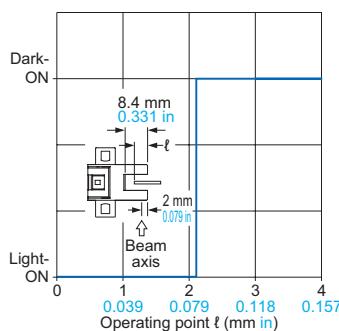
### PM-45 series

#### Sensing position



### PM-65 series

#### Sensing position



## PRECAUTIONS FOR PROPER USE



- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

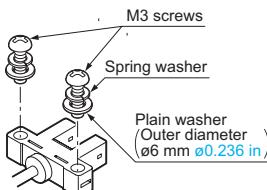
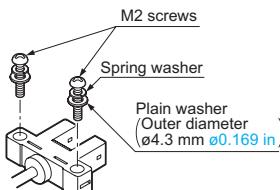
### Mounting

#### PM-25 series

- The following conditions must be observed when using screws to mount the sensor unit.

| Screw    | Spring washer | Flat washer                               | Tightening torque |
|----------|---------------|---|-------------------|
| M2 screw | 1 pc.         | ø4.3 mm ø0.169 in<br>(small round washer) | 0.15 N·m          |
| M3 screw | 1 pc.         | ø6 mm ø0.236 in<br>(small round washer)   | 0.5 N·m           |

< When using M2 screws for mounting > < When using M3 screws for mounting >



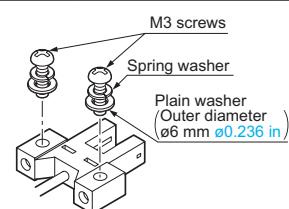
When using the optional mounting screw set **MS-M2**, a spring washer is included.

- In case the PM-25 series is used at an ambient temperature of +50 °C +122 °F, or more, make sure to mount it on a metal body.

#### PM-45 series

- The following conditions must be observed when using screws to mount the sensor unit.

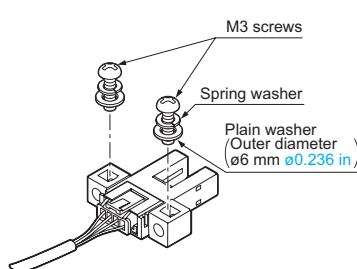
| Screw    | Spring washer | Flat washer                             | Tightening torque |
|----------|---------------|---|-------------------|
| M3 screw | 1 pc.         | ø6 mm ø0.236 in<br>(small round washer) | 0.5 N·m           |



#### PM-65 series

- The following conditions must be observed when using screws to mount the sensor unit.

| Screw    | Spring washer | Flat washer                             | Tightening torque |
|----------|---------------|---|-------------------|
| M3 screw | 1 pc.         | ø6 mm ø0.236 in<br>(small round washer) | 0.5 N·m           |

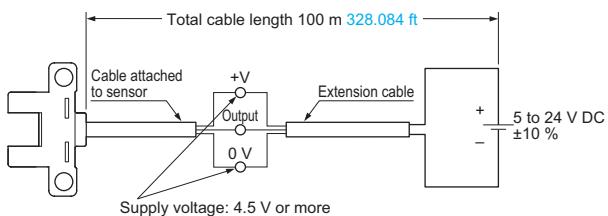


## ■ PRECAUTIONS FOR PROPER USE

### Cable extension

#### PM-25 series / PM-45 series

- Cable extension is possible up to an overall length of 100 m **328.084 ft** with a  $0.3 \text{ mm}^2$ , or more, cable. However, since a voltage drop shall occur due to the cable extension, ensure that the power supply voltage at the end of the cable attached to the sensor is within the rating.

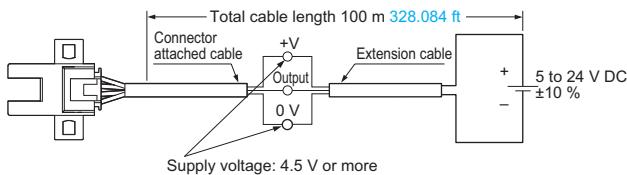


But, when the overall cable length, including the cable attached to the sensor, is as given below, there is no need to confirm the voltage.

| Conductor crosssection area of extension cable | Total cable length          |
|--|-----------------------------|
| 0.08 to 0.1 mm <sup>2</sup>                    | Up to 5 m <b>16.404 ft</b>  |
| 0.2 mm <sup>2</sup>                            | Up to 10 m <b>32.808 ft</b> |
| 0.3 mm <sup>2</sup>                            | Up to 20 m <b>65.617 ft</b> |

#### PM-65 series

- Cable extension is possible up to an overall length of 100 m **328.084 ft** with a  $0.3 \text{ mm}^2$ , or more, cable. However, since a voltage drop shall occur due to the cable extension, ensure that the power supply voltage at the end of the connector attached cable of the sensor or at the sensor terminals is within the rating.



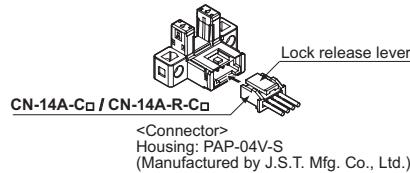
But, when the overall cable length, including the cable attached to the sensor, is as given below, there is no need to confirm the voltage.

| Conductor crosssection area of extension cable | Total cable length          |
|--|-----------------------------|
| 0.08 to 0.1 mm <sup>2</sup>                    | Up to 5 m <b>16.404 ft</b>  |
| 0.2 mm <sup>2</sup>                            | Up to 10 m <b>32.808 ft</b> |
| 0.3 mm <sup>2</sup>                            | Up to 20 m <b>65.617 ft</b> |

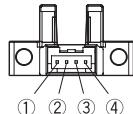
### Wiring (PM-65 series)

#### Connection method

- Insert the connector attached cable **CN-14A-C□ / CN-14A-R-C□** in the connector part of this product as shown in the figure below.



#### <Connector pin position>



| Connector pin No.    | ①  | ②        | ③        | ④   |
|----------------------|----|----------|----------|-----|
| Terminal designation | +V | Output 1 | Output 2 | 0 V |

#### Disconnection method

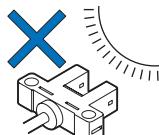
- Press and hold the lock release lever to disconnect the cable connector.

Note: Pulling the cable without pressing the lock release lever in an attempt to disconnect the connector can cause wire breakage in the cable or damage to the connector.

#### When using the product as an S-mark compatible product in Korea

- The power supply cable and output cable connected to the product must be less than 10 m **32.808 ft**.

#### Other

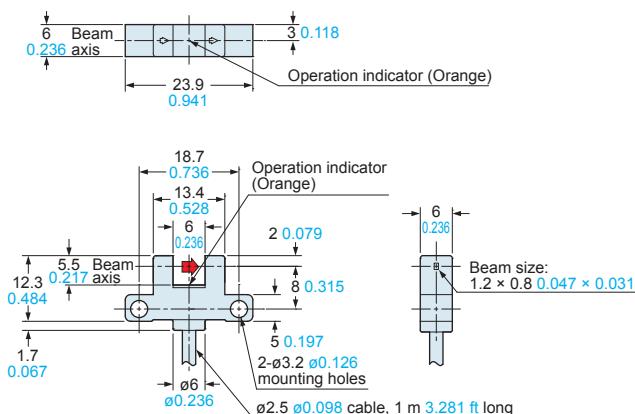
- This device has been developed / produced for industrial use only.
- Since the sensor is intended for use inside machines, no special countermeasures have been taken against extraneous light. Take care that extraneous light is not directly incident on the beam receiving section. 
- Do not use during the initial transient time (50 ms) after the power supply is switched on.
- Note that the cable of **PM-□25-R** loses its flexibility when the ambient temperature decreases to about  $-10^\circ\text{C}$   $+14^\circ\text{F}$ .
- The cable of **PM-□25-R** is a bending-resistant cable usable on a moving base. When the sensor is mounted on a moving base, secure the sensor cable joint at the unit in place so that stress is not applied to it.
- When storing **PM-□25-R**, make sure that the cable does not come into contact with the sensing section or operation indicator.
- If the sensor is used in a place having excessive dust, periodically clean the emitting and receiving sections with a dry, soft cloth.
- If there is a large surge generating equipment, such as, motor, solenoid, electromagnetic valve, etc., in the vicinity of the sensor, use a surge absorber on that equipment. Further, do not run the sensor cables along power lines and use a capacitor between +V and 0 V, if required. Use the sensor after confirming that the surge has been eliminated.

## DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

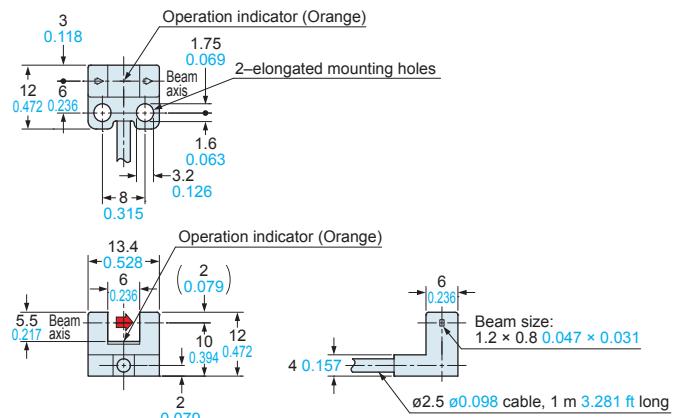
PM-K25□

Sensor



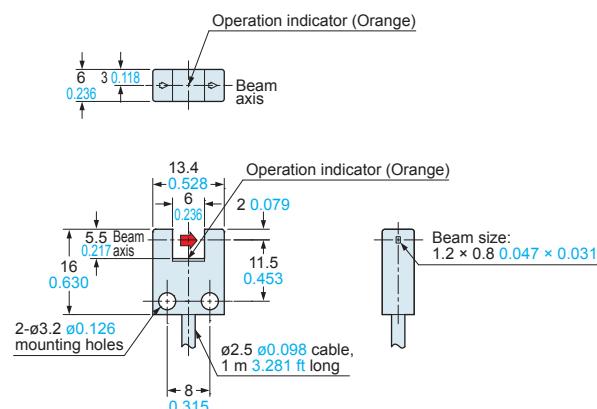
PM-L25□

Sensor



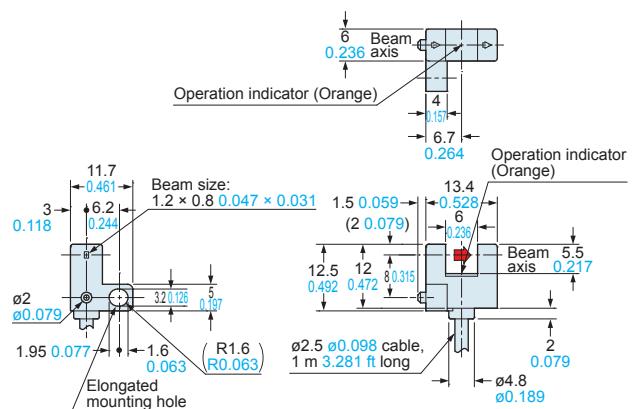
PM-U25□

Sensor



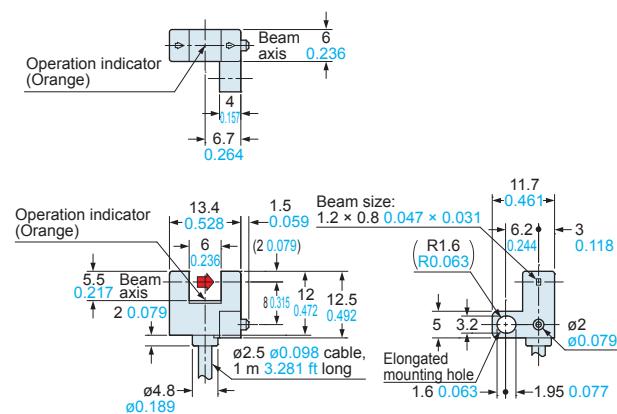
PM-F25□

Sensor



PM-R25□

Sensor



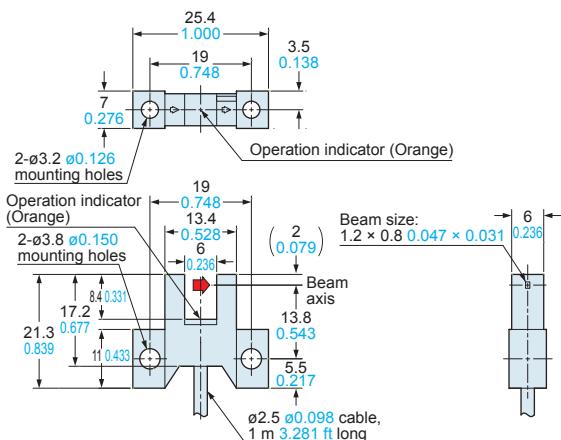
**PM-25 PM-45 PM-65**

## DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

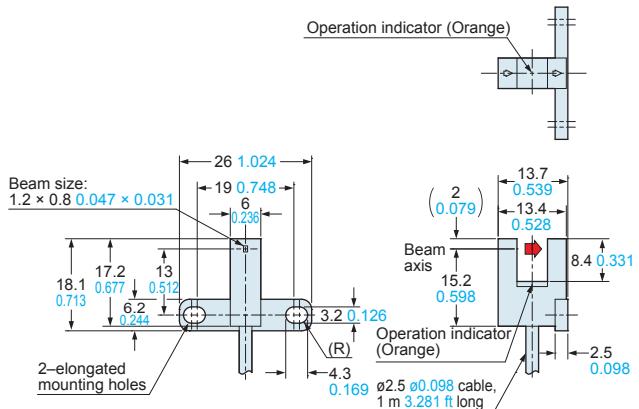
**PM-K45□**

**Sensor**



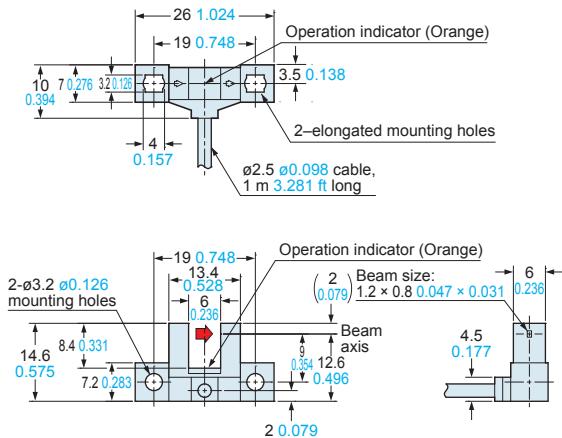
**PM-T45□**

**Sensor**



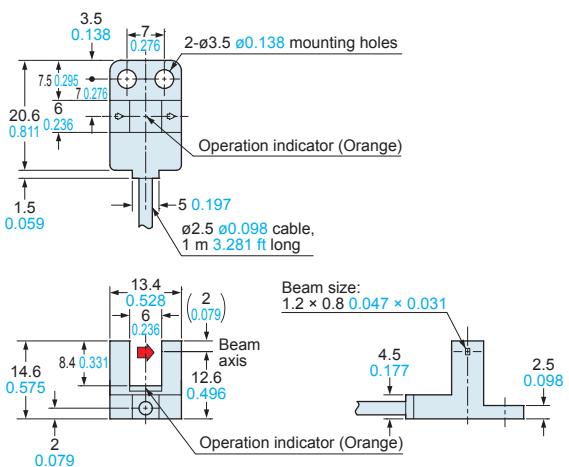
**PM-L45□**

**Sensor**



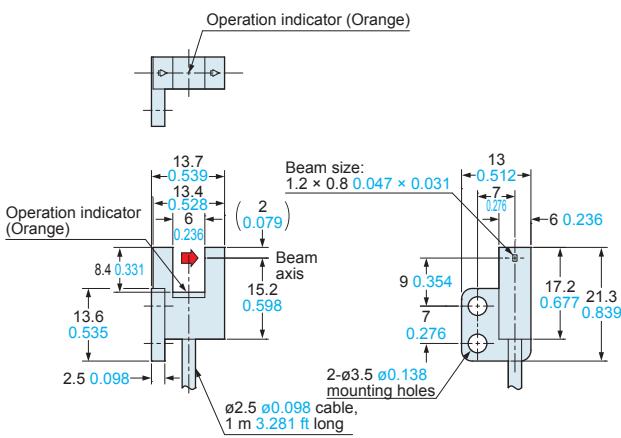
**PM-Y45□**

**Sensor**



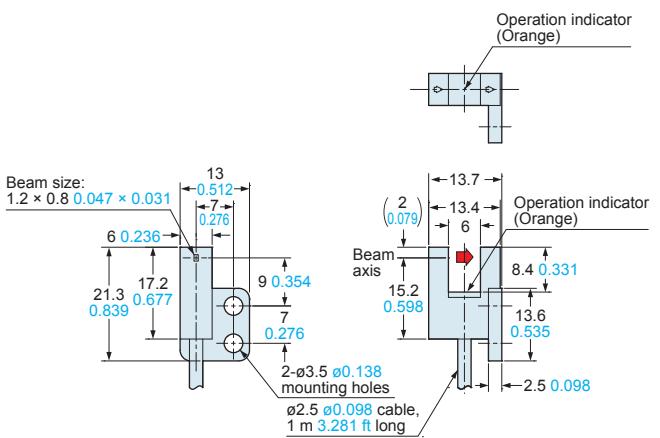
**PM-F45□**

**Sensor**



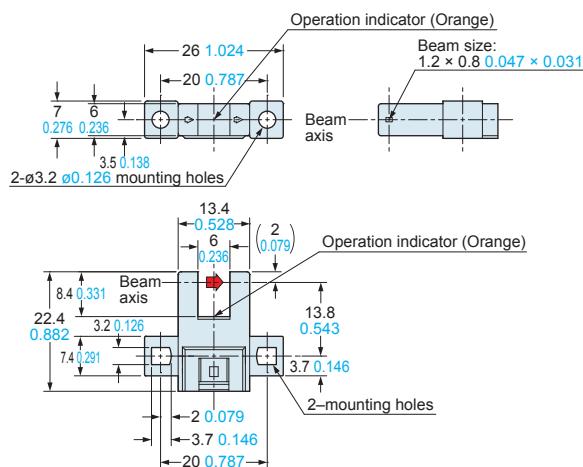
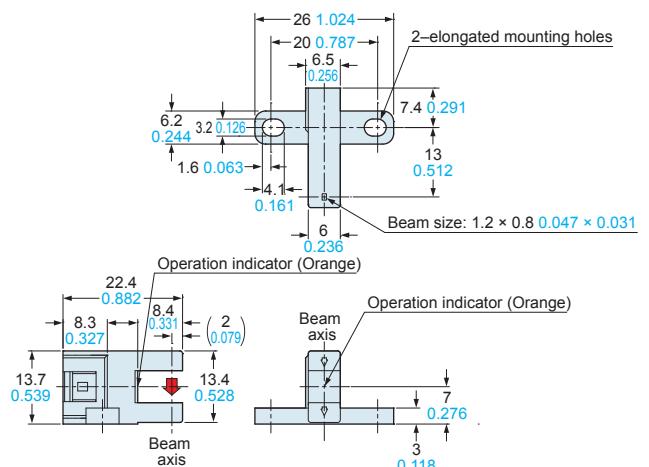
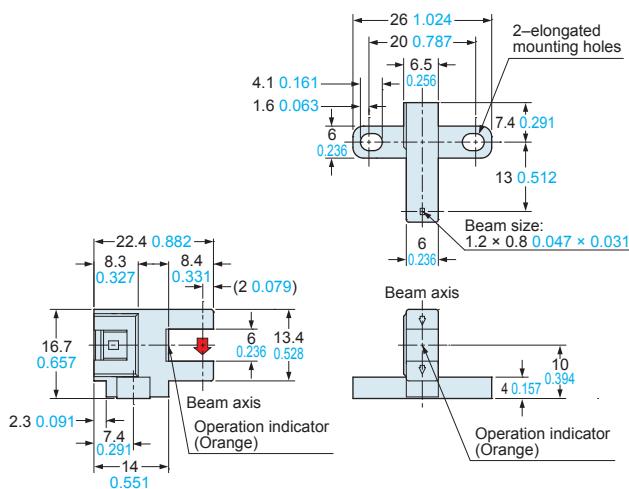
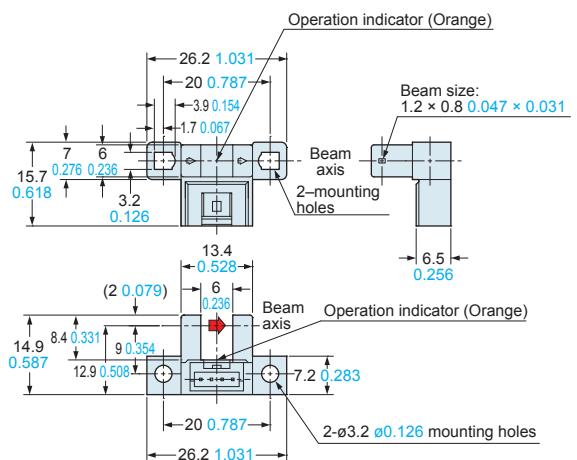
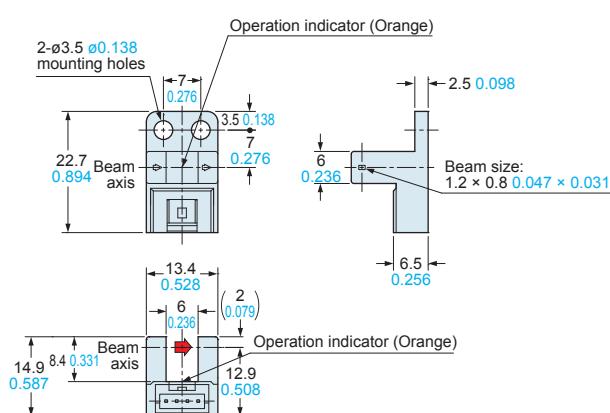
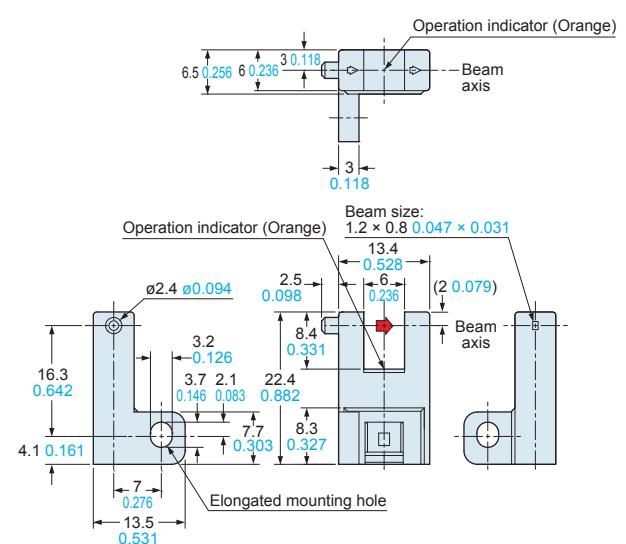
**PM-R45□**

**Sensor**



**DIMENSIONS (Unit: mm in)**

The CAD data can be downloaded from our website.

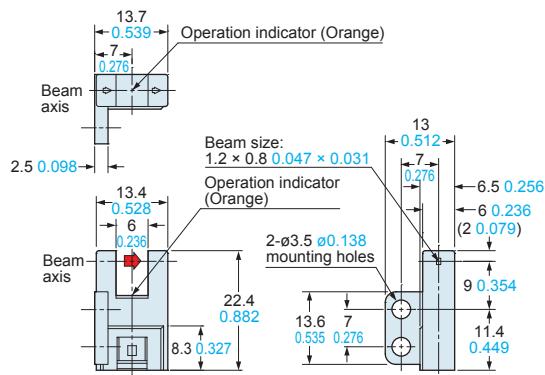
**PM-K65 PM-K65-P****Sensor****PM-T65 PM-T65-P****Sensor****PM-T65W PM-T65W-P****Sensor****PM-L65 PM-L65-P****Sensor****PM-Y65 PM-Y65-P****Sensor****PM-F65 PM-F65-P****Sensor**

# PM-25 PM-45 PM-65

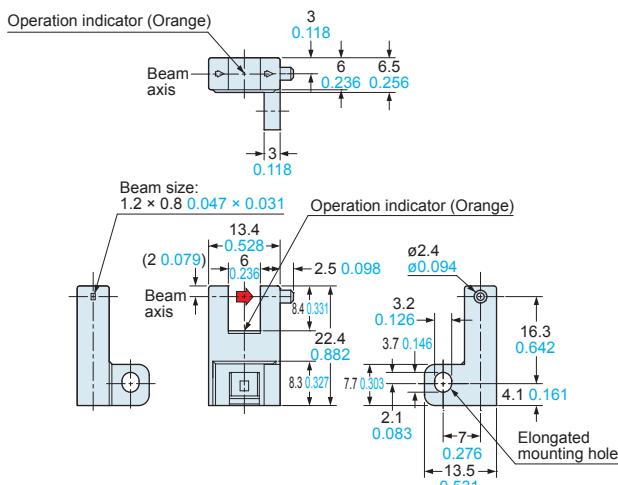
## DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

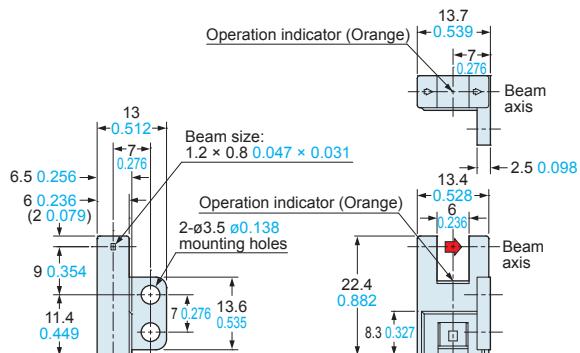
**PM-F65W PM-F65W-P Sensor**



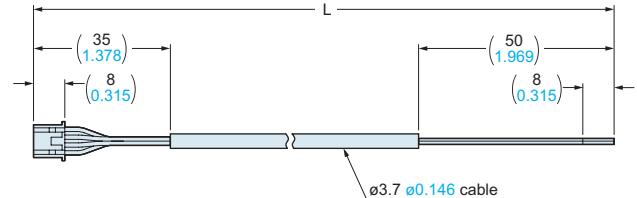
**PM-R65 PM-R65-P Sensor**



**PM-R65W PM-R65W-P Sensor**



**CN-14A-C□ CN-14A-R-C□ Connector attached cable (Optional)**



• Length L

| Model No.            | Length L             |
|----------------------|----------------------|
| <b>CN-14A(-R)-C1</b> | 1,000 <b>39.370</b>  |
| <b>CN-14A(-R)-C2</b> | 2,000 <b>78.740</b>  |
| <b>CN-14A(-R)-C3</b> | 3,000 <b>118.110</b> |
| <b>CN-14A(-R)-C5</b> | 5,000 <b>196.850</b> |

### Disclaimer

The applications described in the catalog are all intended for examples only. The purchase of our products described in the catalog shall not be regarded as granting of a license to use our products in the described applications. We do NOT warrant that we have obtained some intellectual properties, such as patent rights, with respect to such applications, or that the described applications may not infringe any intellectual property rights, such as patent rights, of a third party.

Please contact:

**Panasonic Industrial Devices SUNX Co., Ltd.**

2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan

Global Sales Department

■Telephone: +81-568-33-7861 ■Facsimile: +81-568-33-8591

[panasonic.net/id/pidsx/global](http://panasonic.net/id/pidsx/global)

**Panasonic®**

All Rights Reserved ©Panasonic Industrial Devices SUNX Co., Ltd. 2015