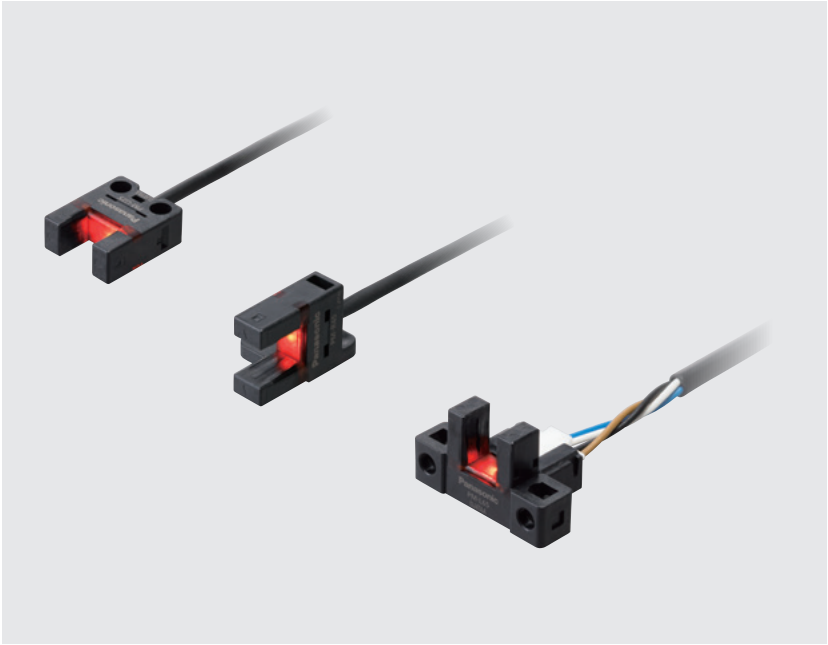
Panasonic
INDUSTRY

Amplifier Built-in

U-shaped Micro Photoelectric Sensor

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



2024.8

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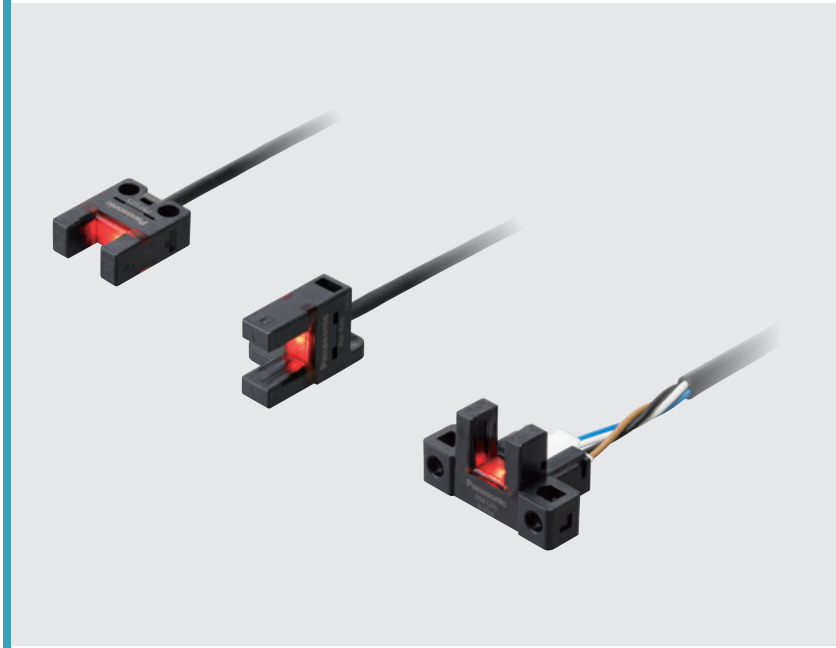


Recognition

PNP output type available

One step ahead in performance and mounting ease

Three protection circuits standard on all models

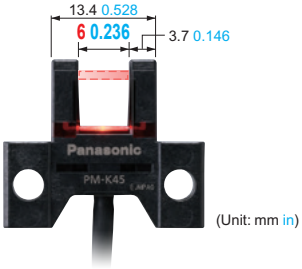
PM-25/45/65 SERIES

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

Ample beam emitting / receiving distance of 6 mm 0.236 in

PM-25/45/65 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.

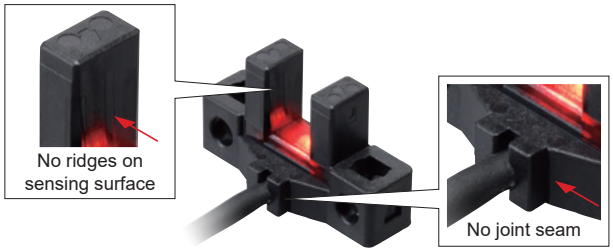


Industry's first*! IP64 rating

*As of April 2017, in-company survey.

PM-25/45 SERIES

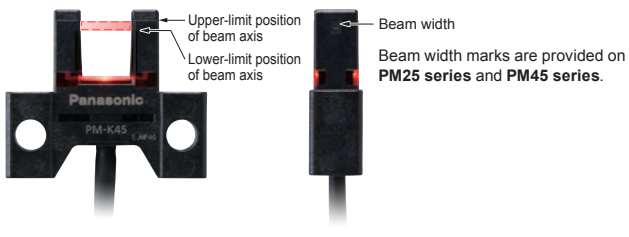
Our original integrated molding method has eliminated grooves and gaps on the sensing surface and main body, thus reducing the possibility of malfunctions caused by splashing water or dust.



Beam marks for easy adjustment

PM-25/45/65 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.



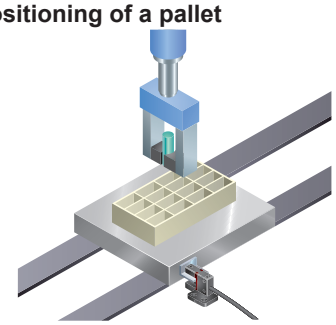
Beam width marks are provided on **PM25 series** and **PM45 series**.

< Front / back >

< Right / left >

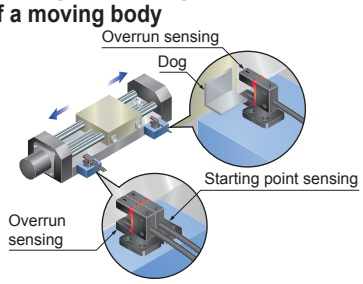
APPLICATIONS

Positioning of a pallet



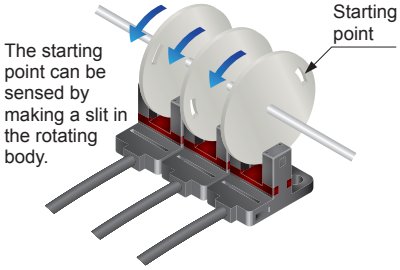
Pallet is stopped by sensing the dog*.

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



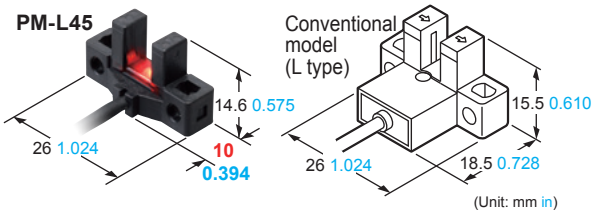
*"Dog" refers to the sensing object for activating the sensor's detecting operation.

Large and easy to see Multi-angle operation indicator PM-25/45/65 SERIES

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

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.



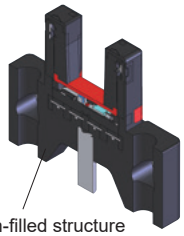
All models easy to mount with M3 screws PM-25/45/65 SERIES

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

Resistant to vibrations and impacts PM-25/45/65 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.



Resin-filled structure
(cross-sectional view)

Compliant with safety standards! PM-25/45 SERIES

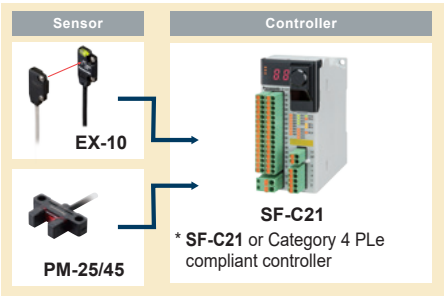
Sensor unit complies with Category 1 PLc.

ISO 13849-1: 2015 Safety-related parts of control systems
Part 1: General principles for design

A Category 3 PLd Safety System can be built

By using Category 4 PLe compliant controllers together with our sensors. Sensor redundancy is required!

■ Category 3, PLd construction example



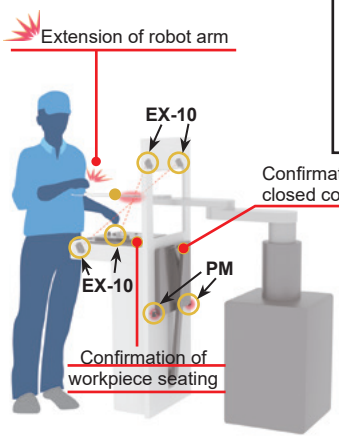
• Do not use the two outputs from **PM-25/45** series unit for achieving the redundancy (duplication) of safety circuit.

* For more information, see our website or product flyer.

Can be retrofit and installed in a very small space as a safety-standard-compliant photoelectric sensor for added safety.

Example of use: For detection of opening / closing of door in front of load port / EFEM robot

● When robot arm is the source of hazards



Risk factors (sensor malfunction)
The workpiece is not placed at the specified position.
▼
The door opens automatically.
▼
The robot arm extends and hits the operator's body.

Note
- Do not use for detection of humans.
- Do not use on a manually opening / closing door.
- Do not use as a safety door switch.

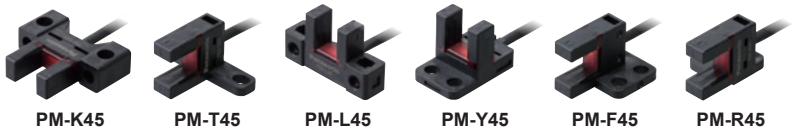
Compact / Cable type PM-45 SERIES

Compact size!

Cable type	NPN output	1 m 3.281 ft cable	3 m 9.843 ft cable
Built-in connector	PNP output	1 m 3.281 ft cable	3 m 9.843 ft cable

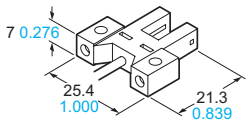
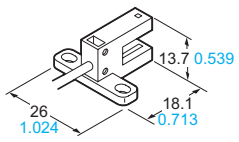
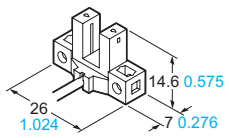
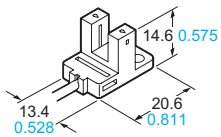
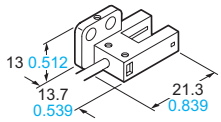
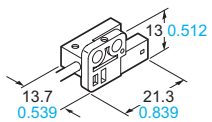
1 m 3.281 ft bending-resistant cable

Recognition



PM-K45 PM-T45 PM-L45 PM-Y45 PM-F45 PM-R45

ORDER GUIDE

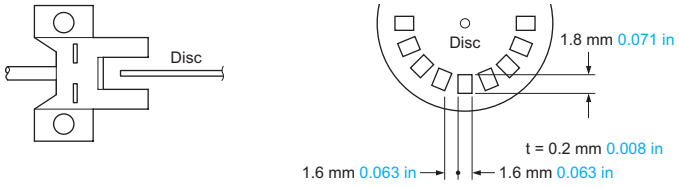
Type		Appearance (mm in)	Sensing range	Model No.	Cable length	Output	Output operation
Compact / Cable type	K type		6 mm 0.236 in (fixed)	PM-K45	1 m 3.281 ft	NPN open-collector transistor	Incorporated with 2 outputs: Light-ON/Dark-ON
				PM-K45-C3	3 m 9.843 ft		
				PM-K45-P	1 m 3.281 ft	PNP open-collector transistor	
				PM-K45-P-C3	3 m 9.843 ft		
	T type			PM-T45	1 m 3.281 ft	NPN open-collector transistor	
				PM-T45-C3	3 m 9.843 ft		
				PM-T45-P	1 m 3.281 ft	PNP open-collector transistor	
				PM-T45-P-C3	3 m 9.843 ft		
	L type			PM-L45	1 m 3.281 ft	NPN open-collector transistor	
				PM-L45-C3	3 m 9.843 ft		
				PM-L45-P	1 m 3.281 ft	PNP open-collector transistor	
				PM-L45-P-C3	3 m 9.843 ft		
	Y type			PM-Y45	1 m 3.281 ft	NPN open-collector transistor	
				PM-Y45-C3	3 m 9.843 ft		
				PM-Y45-P	1 m 3.281 ft	PNP open-collector transistor	
				PM-Y45-P-C3	3 m 9.843 ft		
	F type			PM-F45	1 m 3.281 ft	NPN open-collector transistor	
				PM-F45-C3	3 m 9.843 ft		
				PM-F45-P	1 m 3.281 ft	PNP open-collector transistor	
				PM-F45-P-C3	3 m 9.843 ft		
	R type			PM-R45	1 m 3.281 ft	NPN open-collector transistor	
				PM-R45-C3	3 m 9.843 ft		
				PM-R45-P	1 m 3.281 ft	PNP open-collector transistor	
				PM-R45-P-C3	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	**PM-□45**	**PM-□45-C3**
	PNP output	**PM-□45-P**	**PM-□45-P-C3**
Applicable regulations and certifications		CE Marking (EMC Directive, RoHS Directive), UKCA Marking (EMC Regulations, RoHS Regulations), ISO 13849-1 (Category 1, PLc) (Note 3), UL/c-UL Recognition certification	
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> NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)	<PNP output type> PNP open-collector transistor • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (at 50 mA source current) 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 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 or less 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	0.09 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 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.

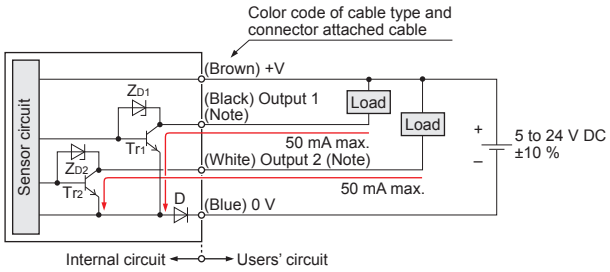


3) If the cable is extended to 20 m 65.617 ft or longer, confirm that the supply voltage at the end of the cable attached to the sensor is 4.5 V or higher.

I/O CIRCUIT AND WIRING DIAGRAMS

NPN output type

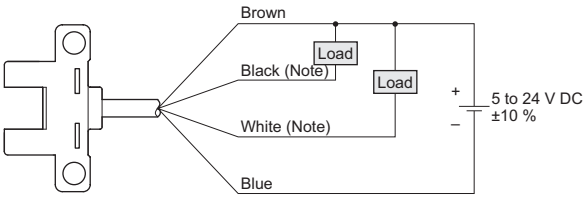
I/O circuit diagram



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)

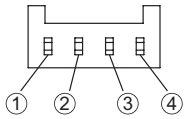


Note: Ensure to insulate the unused output wire.

Output operation

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

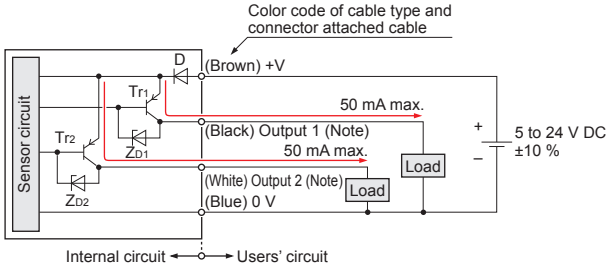
Terminal arrangement diagram (PM-65 series)



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



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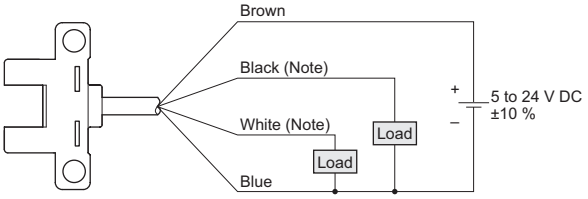

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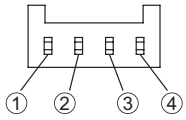
Terminal arrangement diagram (PM-65 series)

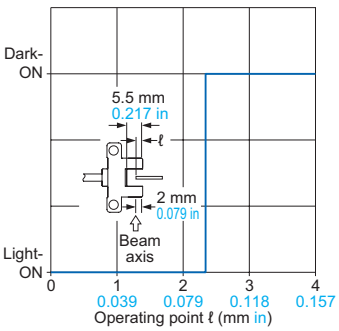


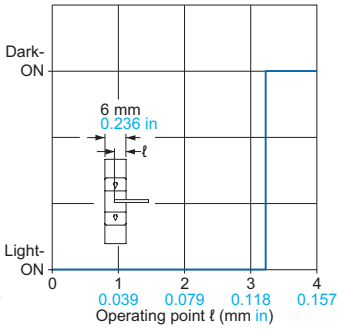
Terminal No.	Designation
①	+V
②	Output 1: Light-ON
③	Output 2: Dark-ON
④	0 V

SENSING CHARACTERISTICS (TYPICAL)

PM-25 series

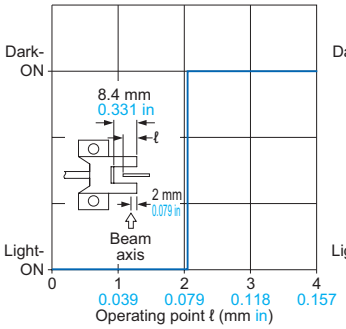
Sensing position

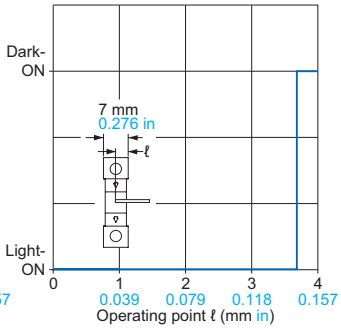




PM-45 series

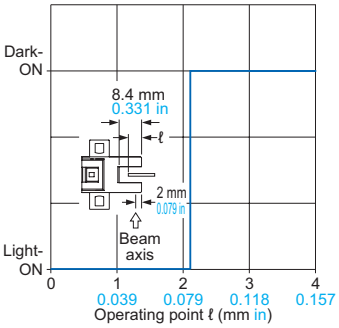
Sensing position

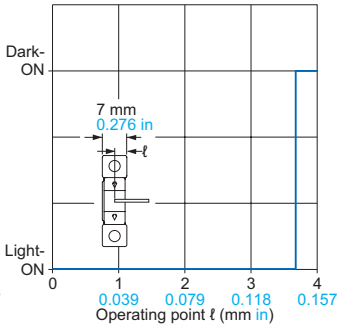




PM-65 series

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.

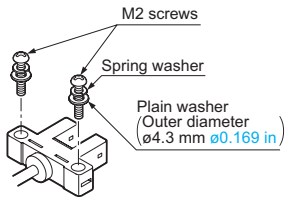
Mounting

PM-25 series

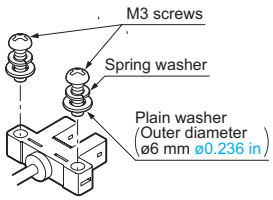
- The following conditions must be observed when using screws to mount the sensor unit.

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

< When using M2 screws for mounting >



< When using M3 screws for mounting >



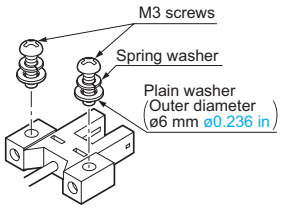
When using the optional mounting screw set **MS-M2**, a spring washer is included.

- 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 (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 (small round washer)	0.5 N·m