

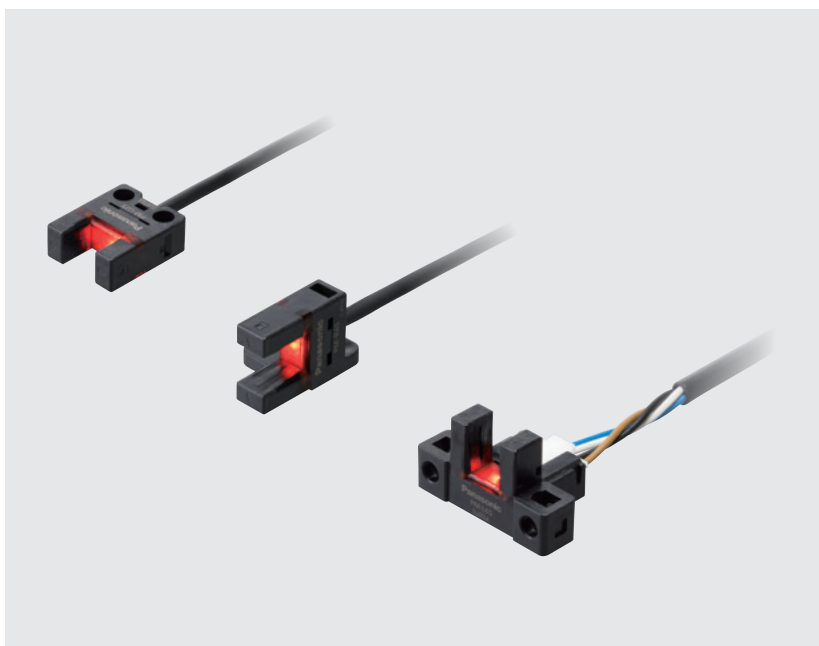
Amplifier Built-in

## U-shaped Micro Photoelectric Sensor

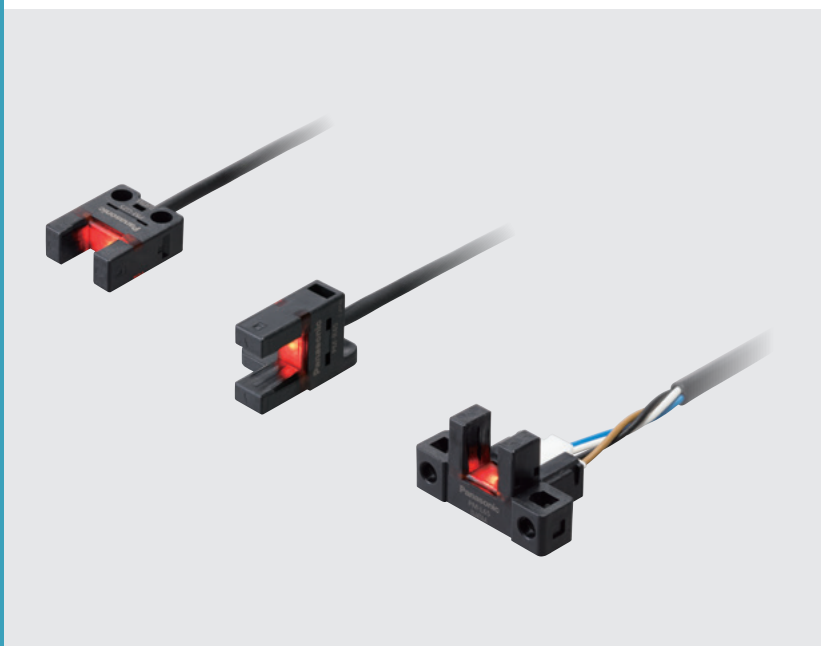
PM-25<sub>SERIES</sub>

PM-45<sub>SERIES</sub>

PM-65<sub>SERIES</sub>



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



## One step ahead in performance and mounting ease

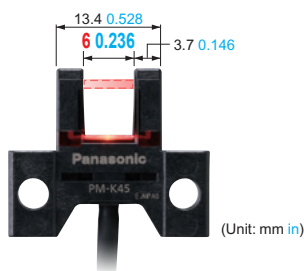
### Three protection circuits standard on all models PM-25/45/65 SERIES

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.

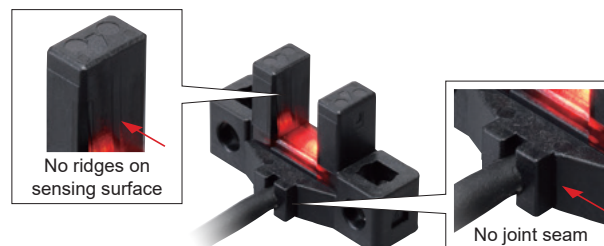


### Industry's first\*! IP64 rating

\*As of April 2017, in-company survey.

### PM-25/45 SERIES

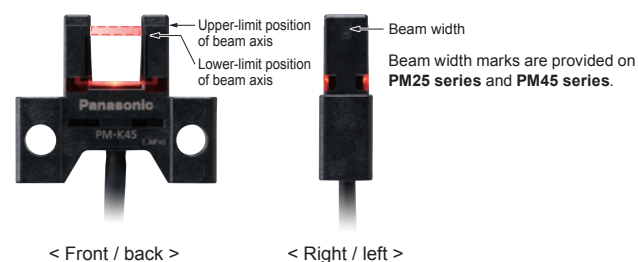
Our original integrated molding method has eliminated grooves and gaps on the sensing surface and main body, thus reducing the possibility of malfunctions caused by splashing water or dust.

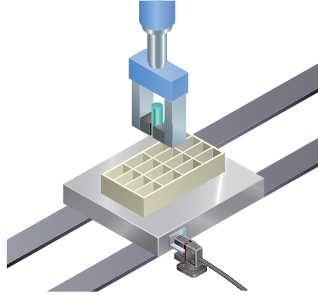


### Beam marks for easy adjustment

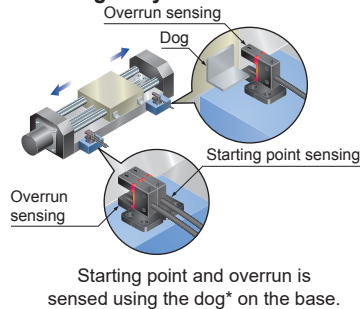
### PM-25/45/65 SERIES

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.

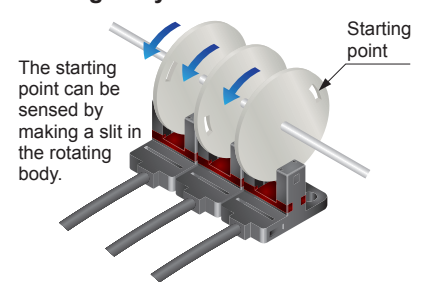


**APPLICATIONS****Positioning of a pallet**

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**

The starting point can be sensed by making a slit in the rotating body.

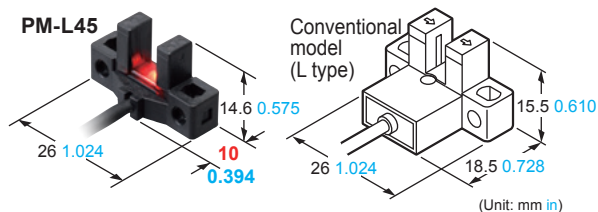
\*"Dog" refers to the sensing object for activating the sensor's detecting operation.

**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.



(Unit: mm in)

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

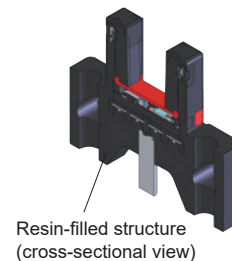
The sensor unit can be installed with one or two M3 screws.

\* 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)

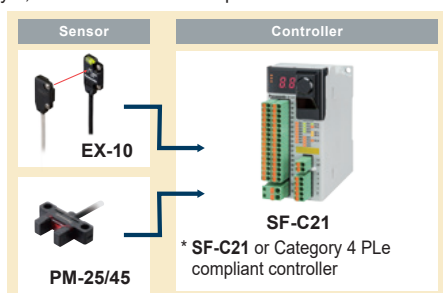
**Compliant with safety standards!****PM-25/45 SERIES****Sensor unit complies with Category 1 PLc.**

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



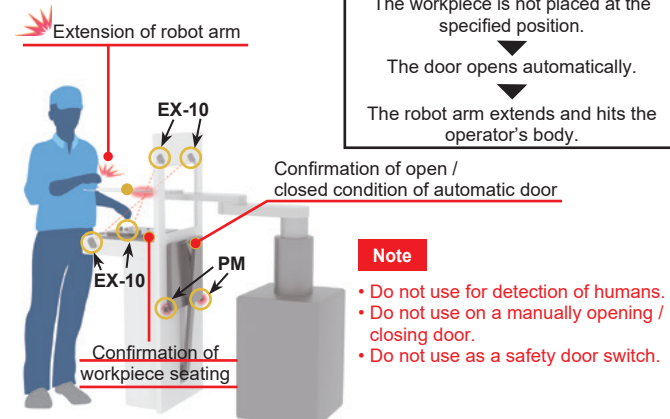
- Do not use the two outputs from **PM-25/45** series unit for achieving the redundancy (duplication) of safety circuit.

\* 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.

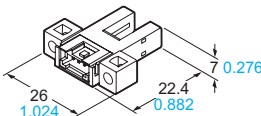
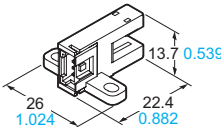
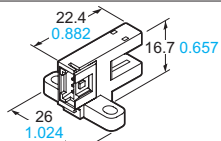
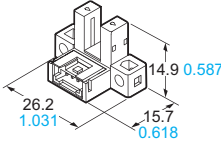
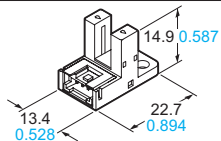
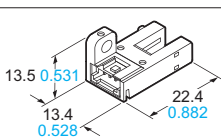
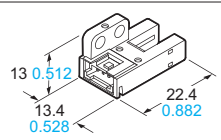
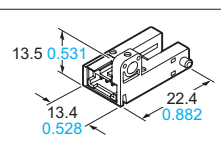
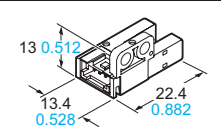
**Note**

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

Cable type	NPN output	Connector attached cable 1 m 1.2 m 2 m 3 m 5 m 10 m	Connector attached bending-resistant cable 1 m 1.2 m 2 m 3 m 5 m 10 m
Built-in connector	PNP output	Connector attached cable 1 m 1.2 m 2 m 3 m 5 m 10 m	Connector attached bending-resistant cable 1 m 1.2 m 2 m 3 m 5 m 10 m

**PM-K65****PM-T65****PM-T65W****PM-L65****PM-Y65****PM-F65****PM-F65W****PM-R65****PM-R65W****ORDER GUIDE**

Type	Appearance (mm in)	Sensing range	Model No.	Output	Output operation
Compact / Connector built-in type	K type 	6 mm 0.236 in (fixed)	PM-K65	NPN open-collector transistor	Incorporated with 2 outputs: Light-ON/Dark-ON
			PM-K65-P	PNP open-collector transistor	
	T type  		PM-T65	NPN open-collector transistor	
			PM-T65-P	PNP open-collector transistor	
			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	
			PM-Y65-P	PNP open-collector transistor	
	F type  		PM-F65	NPN open-collector transistor	
			PM-F65-P	PNP open-collector transistor	
			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	
			PM-R65W	NPN open-collector transistor	
			PM-R65W-P	PNP open-collector transistor	

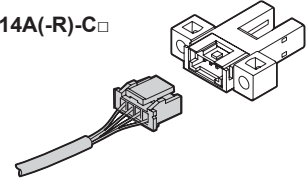
Note: **PM-T65W** is mounting-compatible with our conventional model "PM-T64W".  
**PM-F65W(-P)** is mounting-compatible with our conventional model "PM-F54(P)".  
**PM-R65W(-P)** is mounting-compatible with our conventional model "PM-R54(P)".

## OPTIONS

Designation	Model No.	Description	
Connector attached cable	CN-14A-C1	Length: 1m 3.281 ft	0.2 mm² 4-core cabtyre cable with connector on one end Cable outer diameter: ø3.7 mm ø0.146 in
	CN-14A-C2	Length: 2m 6.562 ft	
	CN-14A-C3	Length: 3m 9.843 ft	
	CN-14A-C5	Length: 5m 16.404 ft	
Connector attached cable (Bending-resistant)	CN-14A-R-C1	Length: 1m 3.281 ft	0.2 mm² 4-core cabtyre cable with connector on one end Cable outer diameter: ø3.7 mm ø0.146 in
	CN-14A-R-C2	Length: 2m 6.562 ft	
	CN-14A-R-C3	Length: 3m 9.843 ft	
	CN-14A-R-C5	Length: 5m 16.404 ft	
Connector	CN-14A	Set of 10 housings and 40 contacts	

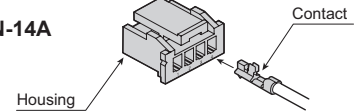
### Connector attached cable

- **CN-14A(-R)-C□**



### Connector

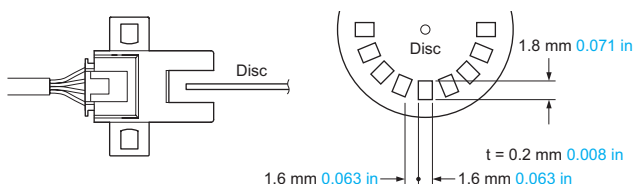
- **CN-14A**



## SPECIFICATIONS

Item		Model No.	Type	Compact / Connector built-in type	
				Mounting-compatible with conventional model (Note 2)	
			NPN output	PM-□65	PM-□65W
		PNP output	PM-□65-P	PM-□65W-P	
Applicable regulations and certifications			CE Marking (EMC Directive, RoHS Directive), UKCA Marking (EMC Regulations, RoHS Regulations), 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 <ul style="list-style-type: none"><li>Maximum sink current: 50 mA</li><li>Applied voltage: 30 V DC or less (between output and 0 V)</li><li>Residual voltage: 2 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)</li></ul>		<PNP output type> PNP open-collector transistor <ul style="list-style-type: none"><li>Maximum source current: 50 mA</li><li>Applied voltage: 30 V DC or less (between output and +V)</li><li>Residual voltage: 2 V or less (at 50 mA source current) 1 V or less (at 16 mA source current)</li></ul>	
		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 -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/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 0.034 mil, non-modulated)		
Material			Enclosure: PBT, Display section: Polycarbonate		
Cable length			Extension up to total 100 m 328.084 ft 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) **PM-T65W** is mounting-compatible with our conventional model **"PM-T64W"**.  
**PM-F65W(-P)** is mounting-compatible with our conventional model **"PM-F54(P)"**.  
**PM-R65W(-P)** is mounting-compatible with our conventional model **"PM-R54(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.