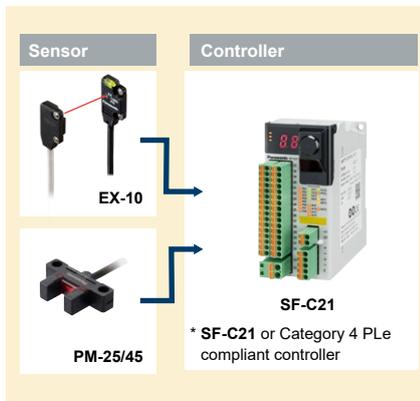


# A Category 3 PLd Safety System Can Be Built

## By Using Category 4 PLe Compliant Controllers Together with Our Sensors



### Precautions when using as Category 3 PLd

## Sensor redundancy is required!

- Observe the following when connecting to the safety controller.
- In the case the product is used in a standalone state, the safety system may not operate properly when a sensor malfunction occurs.
  - Do not use the two outputs from **PM-25/45** series unit for achieving the redundancy (duplication) of safety circuit.

**CAUTION** The product cannot be used for human body detection.

## Sensor unit complies with ISO 13849-1\* Category 1 PLc.

\* Safety-related parts of control systems, Part 1: General principles for design

### EX-10 SERIES Ver.2

- Standard-compliant models

EX-11, EX-13, EX-14, EX-19



### PM-25/45 SERIES

- Standard-compliant models

PM-25 SERIES



- Standard-compliant models

PM-45 SERIES



### Standard-compliant model numbers

	PNP output		NPN output	
	Standard	Standard	5 m 16.404 ft cable length	Bending-resistant cable
Thru-beam	EX-11A/B-PN	EX-11A/B	EX-11A/B-C5	EX-11A/B-R
	EX-11EA/B-PN	EX-11EA/B	EX-11EA/B-C5	EX-11EA/B-R
	EX-11SA/B-PN	EX-11SA/B	—	—
	EX-11SEA/B-PN	EX-11SEA/B	—	—
	EX-13A/B-PN	EX-13A/B	EX-13A/B-C5	EX-13A/B-R
	EX-13EA/B-PN	EX-13EA/B	EX-13EA/B-C5	EX-13EA/B-R
	EX-13SA/B-PN	EX-13SA/B	—	—
	EX-13SEA/B-PN	EX-13SEA/B	—	—
	EX-19A/B-PN	EX-19A/B	EX-19A/B-C5	EX-19A/B-R
	EX-19EA/B-PN	EX-19EA/B	EX-19EA/B-C5	EX-19EA/B-R
	EX-19SA/B-PN	EX-19SA/B	—	—
	Convergent reflective	EX-14A/B-PN	EX-14A/B	EX-14A/B-C5

Note: EX-15 and EX-17 are not compliant with the standard.

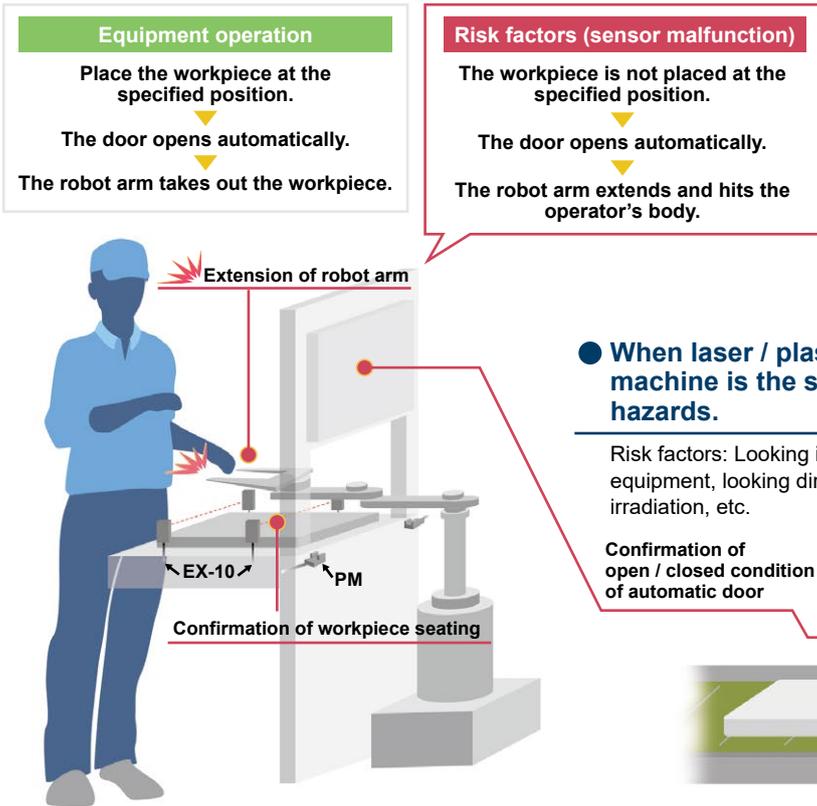
	PNP output		NPN output		
	Standard	3 m 9.843 ft cable length	Standard	3 m 9.843 ft cable length	Bending-resistant cable
PM-25	PM-K25-P	—	PM-K25	PM-K25-C3	PM-K25-R
	PM-L25-P	—	PM-L25	PM-L25-C3	PM-L25-R
	PM-U25-P	—	PM-U25	PM-U25-C3	PM-U25-R
	PM-F25-P	—	PM-F25	PM-F25-C3	PM-F25-R
	PM-R25-P	—	PM-R25	PM-R25-C3	PM-R25-R
PM-45	PM-K45-P	PM-K45-P-C3	PM-K45	PM-K45-C3	—
	PM-T45-P	PM-T45-P-C3	PM-T45	PM-T45-C3	—
	PM-L45-P	PM-L45-P-C3	PM-L45	PM-L45-C3	—
	PM-Y45-P	PM-Y45-P-C3	PM-Y45	PM-Y45-C3	—
	PM-F45-P	PM-F45-P-C3	PM-F45	PM-F45-C3	—
	PM-R45-P	PM-R45-P-C3	PM-R45	PM-R45-C3	—

Note: PM-65 series is not compliant with with the standard.

\* If you need a certificate or confirmation letter, please contact our sales office.

# Introducing application examples...

## When robot arm is the source of hazards

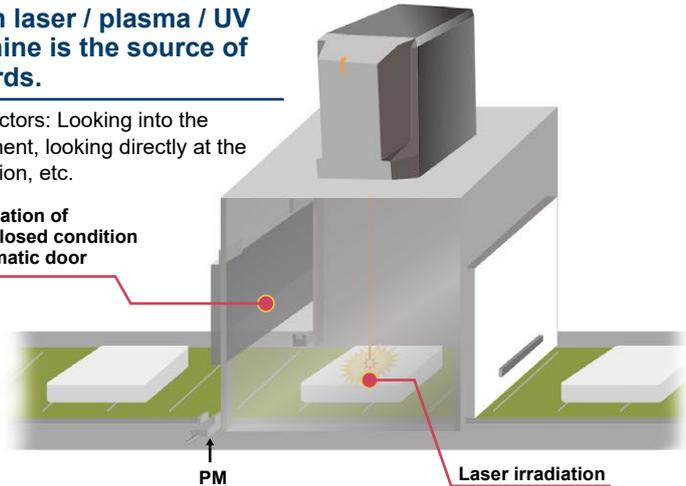


- Required conditions
1. The source of hazards is located inside the machine and may cause hazards to nearby people.
  2. The equipment is classified as Category 3 PLd or lower.
  3. The source of hazards is isolated only by the automatic door.
- \* The product can be used safely when all of the above conditions 1 through 3 are satisfied!
- \* There are cases where you can use it under other conditions.

## When laser / plasma / UV machine is the source of hazards.

Risk factors: Looking into the equipment, looking directly at the irradiation, etc.

Confirmation of open / closed condition of automatic door

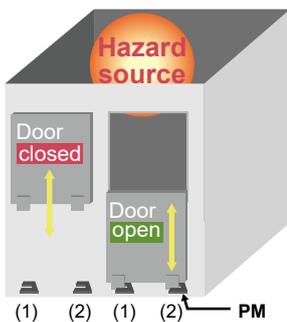


## Precaution for use

### For indirect protection of human body

Confirmation of [opening / closing of automatically controlled door] for safe isolation of the hazard source

**Example of redundancy** Use of two sensor units for confirmation of door operation



PM's output operation

Sensor	Close	Open	Disconnection of sensor
PM (1)	OFF	ON	OFF
PM (2)	OFF	ON	OFF

Output operation should be the same as that of the safety side of the device.

\*Please construct a control system that stops the entire system when the output of duplicate sensors does not match.

### For direct detection of human body

\* Because IEC 61496 certification has not been acquired.

Photoelectric sensors cannot be used for an application where they are arranged in a row and used for [detection of human body like a light curtain].



\* Read the precautions for use described in the "EX-10 Series User's Manual" available on our website or in the section, "PM-□25/□45 When Using for Safety Applications."

- EX-10 SERIES Ver.2 [https://industrial.panasonic.com/ac/e/dl/manual/index.jsp?series\\_cd=1463](https://industrial.panasonic.com/ac/e/dl/manual/index.jsp?series_cd=1463)
- PM SERIES [https://industrial.panasonic.com/ac/e/dl/manual/index.jsp?series\\_cd=3436](https://industrial.panasonic.com/ac/e/dl/manual/index.jsp?series_cd=3436)

# Panasonic

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