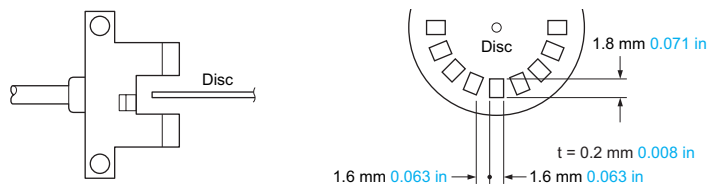


SPECIFICATIONS

Item	Model No.	Type	Ultra-small	
			With flexible cable	
		NPN output	PM-□24	PM-□24-R
		PNP output	PM-□24P	—
Sensing range			5 mm 0.197 in (fixed)	
Minimum sensing object			0.8 × 1.8 mm 0.031 × 0.071 in opaque object	
Hysteresis			0.05 mm 0.002 in or less	
Repeatability			0.03 mm 0.001 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: 0.7 V or less (at 50 mA sink current) 0.4 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: 0.7 V or less (at 50 mA source current) 0.4 V or less (at 16 mA source current)	
	Utilization category		DC-12 or DC-13	
	Output operation		Incorporated with 2 outputs: Light-ON / Dark-ON	
Response time			Under light received condition: 20 μs or less Under light interrupted condition: 100 μs or less (Response frequency: 1 kHz or more) (Note 2)	
Operation indicator			Vermilion LED (lights up under light received condition)	
Environmental resistance	Pollution degree		3 (Industrial environment)	
	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		35 to 85 % RH, Storage: 35 to 85 % RH	
	Ambient illuminance		Fluorescent light: 1,000 lx at the light-receiving face	
	EMC		EN 60947-5-2	
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure	
	Insulation resistance		50 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 amplitude in X, Y and Z directions for two hours each	
	Shock resistance		15,000 m/s ² acceleration (1,500 G approx.) in X, Y and Z directions for three times each	
Emitting element			Infrared LED (Peak emission wavelength: 940 nm 0.037 mil, non-modulated)	
Material			Enclosure: PBT, Slit cover: Polycarbonate	
Cable			0.09 mm ² 4-core cabtyre cable [PM-□24-R: 0.1 mm ² flexible, oil and heat resistant cabtyre cable (Note 5)], 1 m 3.281 ft long	
Cable extension			Extension up to total 100 m 328.084 ft is possible with 0.3 mm ² , or more, cable.	
Weight			Net weight: 10 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**.

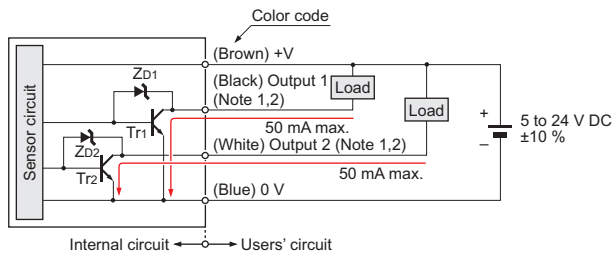
2) The response frequency is the value when the disc, given in the figure below, is rotated.



3) In case the **PM-24** series is used at an ambient temperature of +50 °C **+122 °F**, or more, make sure to mount it on a metal body.

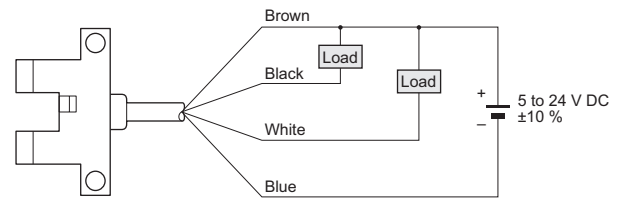
4) Take care that the flexibility of the **PM-□24-R** cable is lost if the ambient temperature in −10 °C **+14 °F** or less.

5) The cable of **PM-□24-R** is a flexible cable usable on a moving base. When the sensor is mounted on a moving base, fix the sensor cable joint so that stress is not applied to it. (Models other than the **PM-□24-R** cannot be used on a moving base.)

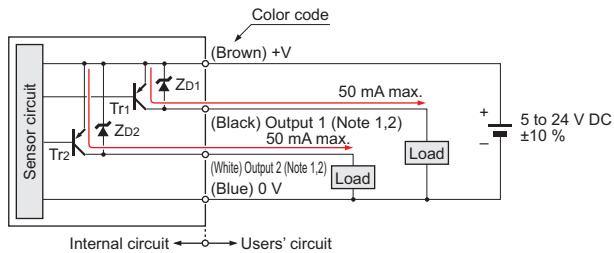
I/O CIRCUIT AND WIRING DIAGRAMS**PM-□24 PM-□24-R****NPN output type****I/O circuit diagram**

- Notes: 1) Make sure to connect terminals correctly as the sensor does not incorporate a reverse polarity protection circuit. Further, the output is not incorporated with a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load. Faulty wiring may result in damage.
- 2) Ensure to insulate the unused output wire.

Symbols ... ZD1, ZD2: Surge absorption zener diode
Tr1, Tr2 : NPN output transistor

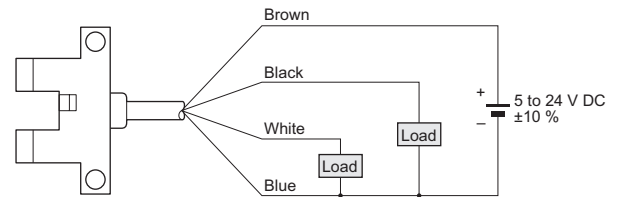
Wiring diagram**Output operation**

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

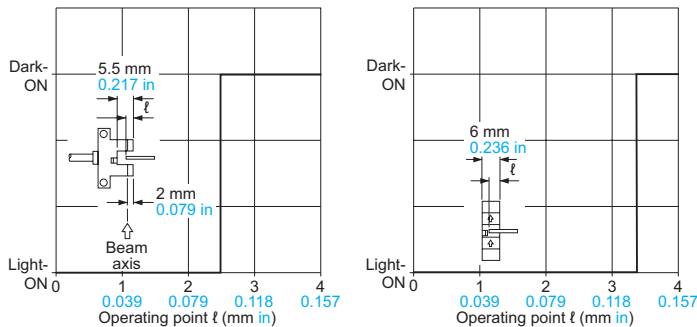
PM-□24P**PNP output type****I/O circuit diagram**

- Notes: 1) Make sure to connect terminals correctly as the sensor does not incorporate a reverse polarity protection circuit. Further, the output is not incorporated with a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load. Faulty wiring may result in damage.
- 2) Ensure to insulate the unused output wire.

Symbols ... ZD1, ZD2 : Surge absorption zener diode
Tr1, Tr2 : PNP output transistor

Wiring diagram**Output operation**

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

SENSING CHARACTERISTICS (TYPICAL)**Sensing position**FIBER
SENSORSLASER
SENSORSPHOTO-
ELECTRIC
SENSORSMICRO
PHOTO-
ELECTRIC
SENSORSAREA
SENSORSLIGHT
CURTAINS /
SAFETY
COMPONENTSPRESSURE /
FLOW
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE
SENSORSSENSOR
OPTIONSSIMPLE
WIRE-SAVING
UNITSWIRE-SAVING
SYSTEMSMEASURE-
MENT
SENSORSSTATIC
ELECTRICITY
PREVENTION
DEVICESLASER
MARKERS

PLC

HUMAN
MACHINE
INTERFACESENERGY
CONSUMPTION
VISUALIZATION
COMPONENTSFA
COMPONENTSMACHINE
VISION
SYSTEMSUV
CURING
SYSTEMSSelection
Guide

U-shaped

Convergent
Reflective**PM-64****PM-24****PM-44/
PM-54**