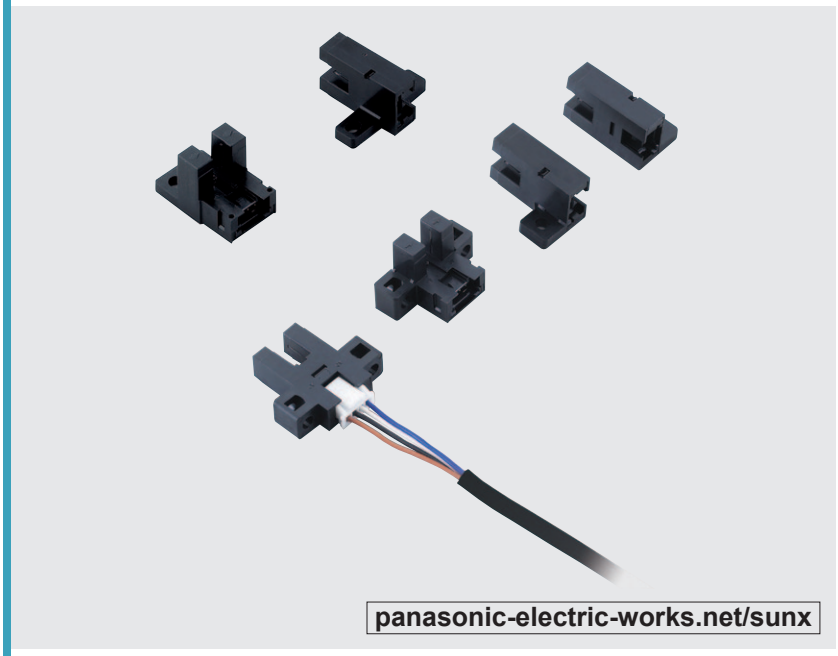
Connector Built-in U-shaped Micro Photoelectric Sensor **Amplifier Built-in**

PM-64 SERIES

Related Information
■ General terms and conditions F-17
■ Glossary of terms ..... P.1359~
■ Sensor selection guide..... P.441~
■ General precautions P.1405



panasonic-electric-works.net/sunx

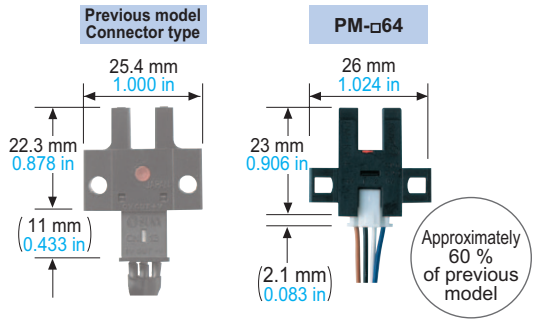
CE Conforming to EMC Directive

cULus Recognition

Easy connection with a single touch using commercially-available connectors

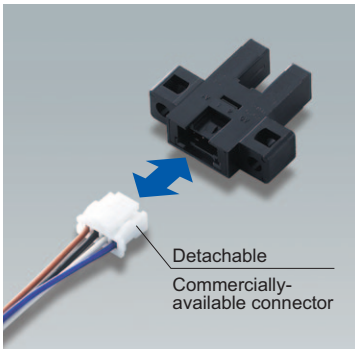
Built-in connector saves space

This greatly reduces the amount of space taken up compared to previous models.
The dimension between the beam axis and cable bending part has been reduced to half at maximum.



Can be connected using commercially-available connectors

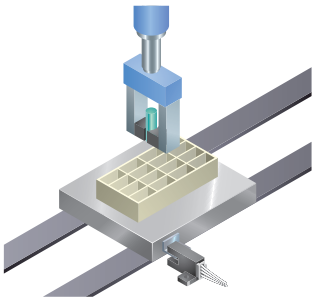
The connector connection type eliminates the extra work of soldering and insulation processing. In addition, the connector used is a commercially-available multi-purpose connector which is also currently used by the **DP-100** series of digital pressure sensors.



Digital pressure sensor
DP-100 series

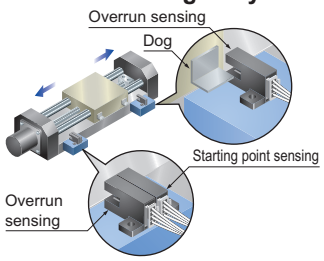
APPLICATIONS

Determining the pallet position



Pallet is stopped by sensing the dog.

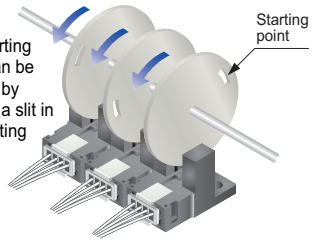
Sensing the starting point and overrun of a moving body



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

Sensing the starting point on a rotating body

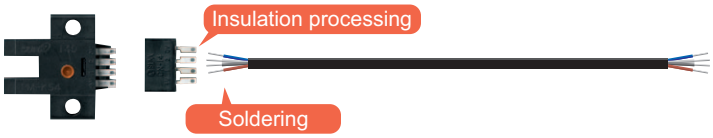
The starting point can be sensed by making a slit in the rotating body.



Improved maintenance and workability significantly reduces total cost

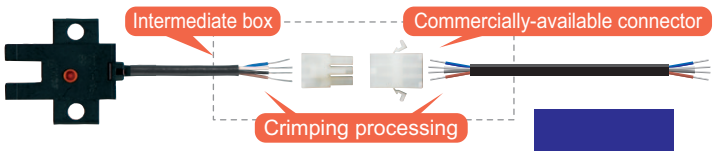
The processing cost of the connector cables can be drastically reduced through the use of commercially-available crimping connectors.

Previous model (Soldering: Connector type)



- **Automation is hard because of soldering.**
- **Insulation processing is required.**
- **A large space is necessary at the terminal area.**
- **Connectors are not reliable (not fully connected or seated).**

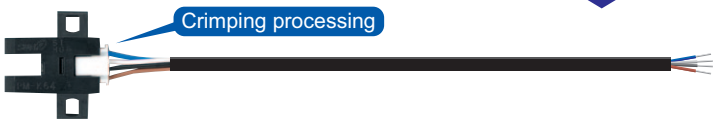
Previous model (Converted to the cable-type commercially-available connector)



- **Crimping processing is required in two places.**
- **A set of commercially-available connectors is necessary.**
- **There are many processes for cable connections.**
- **An intermediate box is required.**

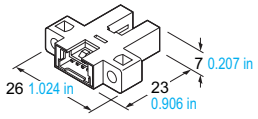
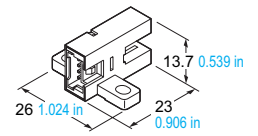
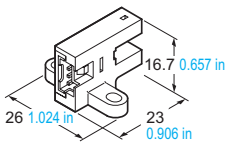
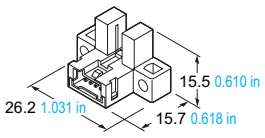
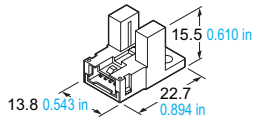
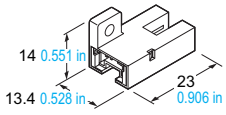
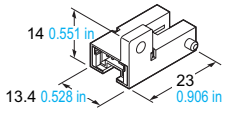
Suggestion

PM-64 series (Commercially-available connectors can be used)



- **Crimping processing makes automation possible so the connectors are also highly reliable.**
- **Soldering, insulation processing, and an intermediate box are not necessary.**
- **Connectors are widely available.**
- **Mounting in a small space is easy.**
- **Strongly connected using a locking connector.**
- **1 m 3.281 ft, 2 m 6.562 ft, 3 m 9.843 ft, and 5 m 16.404 ft connector cables are available.**

ORDER GUIDE

Type		Appearance (mm in)	Sensing range	Model No.	Output	Output operation
Small and built-in connector type	K type		5 mm 0.197 in (fixed)	**PM-K64**	NPN open-collector transistor	Incorporated with 2 outputs: Light-ON / Dark-ON
				PM-K64P	PNP open-collector transistor	
	T type			**PM-T64**	NPN open-collector transistor	
				PM-T64P	PNP open-collector transistor	
				**PM-T64W** (Note)	NPN open-collector transistor	
	L type			**PM-L64**	NPN open-collector transistor	
				PM-L64P	PNP open-collector transistor	
	Y type			**PM-Y64**	NPN open-collector transistor	
				PM-Y64P	PNP open-collector transistor	
	F type			**PM-F64**	NPN open-collector transistor	
				PM-F64P	PNP open-collector transistor	
	R type			**PM-R64**	NPN open-collector transistor	
				PM-R64P	PNP open-collector transistor	

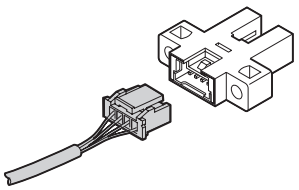
Note: **PM-T64W** is compatible with our conventional **PM-T53**(**B**).

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: ø3.7mm 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 (Flexible cable)	**CN-14A-R-C1**	Length: 1m 3.281 ft	
	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	

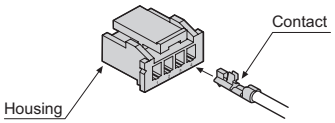
Connector attached cable

• **CN-14A(-R)-C□**



Connector

• **CN-14A**



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.

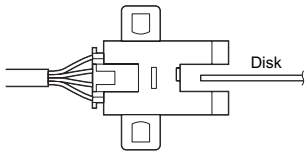
Recommended crimping tool

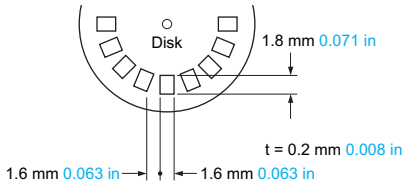
Model No. : YC-610R (Manufactured by J.S.T. Mfg. Co., Ltd.)
Note: Contact the manufacturer for details of the recommended products.

SPECIFICATIONS

Item \ Type		Small and built-in connector type					
		K type	T type	L type	Y type	F type	R type
Model No.	NPN output	**PM-K64**	**PM-T64(W)**	**PM-L64**	**PM-Y64**	**PM-F64**	**PM-R64**
	PNP output	**PM-K64P**	**PM-T64P**	**PM-L64P**	**PM-Y64P**	**PM-F64P**	**PM-R64P**
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 (Note 2)					
Repeatability		0.01 mm 0.0004 in or less (Note 3)					
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 4)					
Operation indicator		Orange LED (lights up under light received condition)					
Environmental resistance	Pollution degree	3 (Industrial environment)					
	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	35 to 85 % RH, Storage: 5 to 95 % RH (Note 5)					
	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/s² 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 length		Total length up to 100 m 328.084 ft is possible with 0.3 mm², or more, cable. (Note 6)					
Weight		Net 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) This is the value when a sensing object is moved in a lateral direction to the U-shape.
3) This is the value when a sensing object is moved in a lateral direction to the U-shape and when the inserting length of the sensing board is 5 mm 0.197 in.
4) The response frequency is the value when the disc, given in the figure below, is rotated.



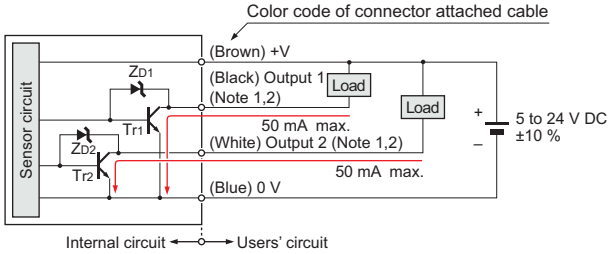


5) 5-35% RH in an ambient temperature of +23 °C +73.4 °F.
6) Confirm that the sensor terminal voltage is more than 4.5 V when using an extension of over 20 m 65.617 ft.

I/O CIRCUIT AND WIRING DIAGRAMS

PM-□64(W) NPN output type

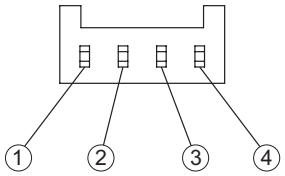
I/O circuit diagram



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

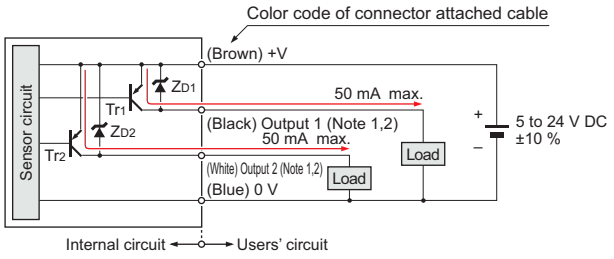
Terminal arrangement diagram



Terminal No.	Designation
①	+V
②	Output1: Light-ON
③	Output2: Dark-ON
④	0 V

PM-□64P PNP output type

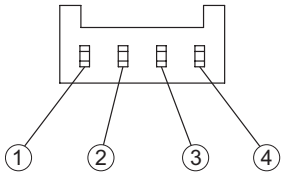
I/O circuit diagram



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

Terminal arrangement diagram

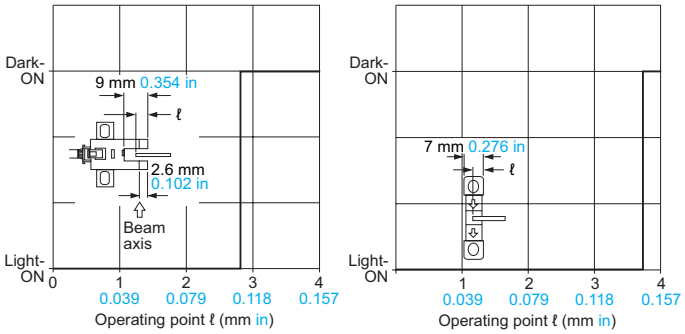


Terminal No.	Designation
①	+V
②	Output1: Light-ON
③	Output2: Dark-ON
④	0 V

SENSING CHARACTERISTICS (TYPICAL)

PM-K64(P) PM-L64(P)

Sensing position



PRECAUTIONS FOR PROPER USE

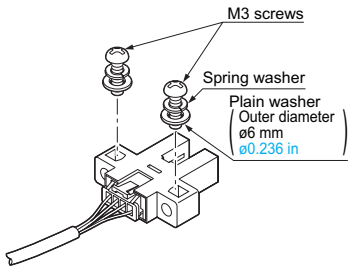
Refer to General precautions.

- 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.

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.

Mounting

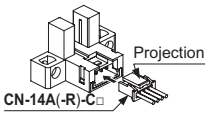
- When fixing the sensor with screws, use M3 screws and the tightening torque should be 0.5 N·m or less. Further, use small, round type plain washers (ø6 mm ø0.236 in).



Wiring

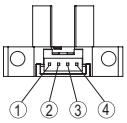
Connection method

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



<Connector>
Housing: PAP-04V-S
(Manufactured by J.S.T. Mfg. Co., Ltd.)

<Connector pin position>



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

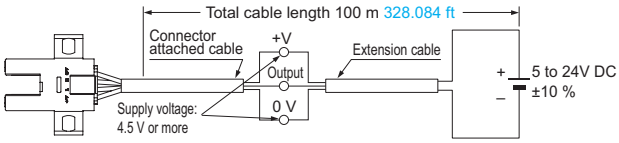
Disconnection method

- Pressing the projection of the connector attached cable, pull out the connector.

Note: Take care that if the cable is pulled out without pressing the projection, the cable may break.

Cable extension

- Cable extension is possible up to an overall length of 100 m 328.084 ft with a 0.3 mm², 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 or at the sensor terminals is within the rating.

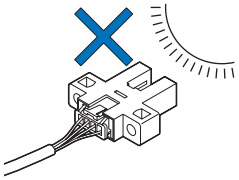


But, when the overall cable length, including the cable attached to the sensor, is as given below, there is no need to confirm the voltage.

Conductor cross-section area of extension cable	Total cable length
0.08 to 0.1 mm²	Up to 5 m 16.404 ft
0.2 mm²	Up to 10 m 32.808 ft
0.3 mm²	Up to 20 m 65.617 ft

Others

- 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.

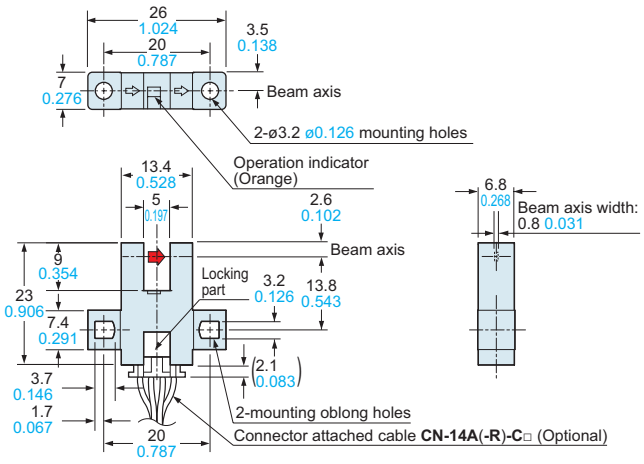


- Do not use during the initial transient time (50 ms) after the power supply is switched on.
- If the sensor is used in a place having excessive dust, periodically clean the emitting and receiving sections with a dry, soft cloth.
- If there is a large surge generating equipment, such as, motor, solenoid, 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.

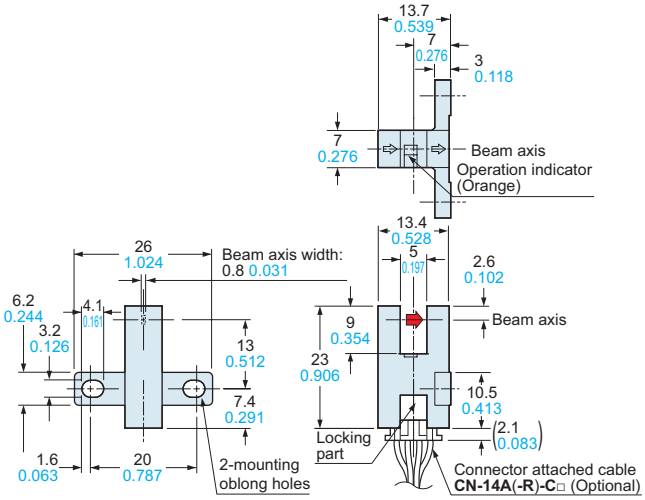
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

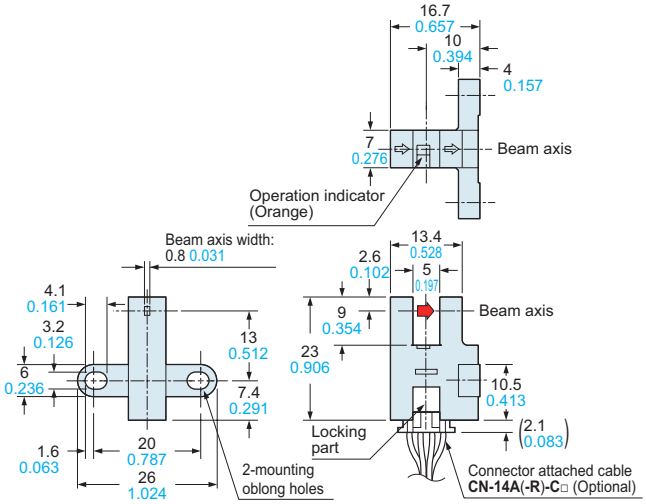
PM-K64(P) Sensor



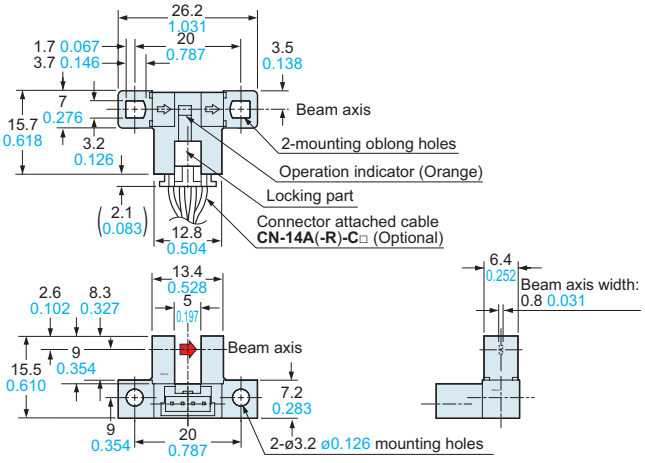
PM-T64(P) Sensor



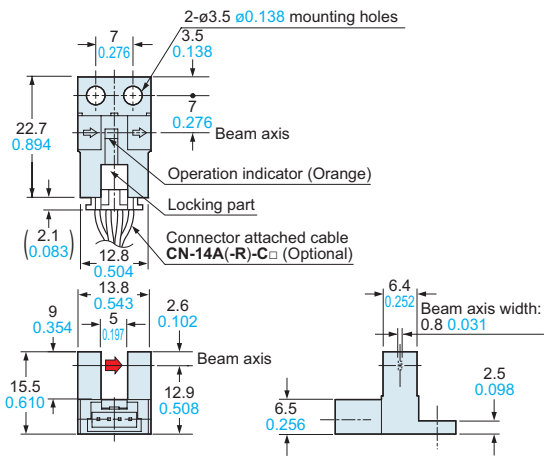
PM-T64W Sensor



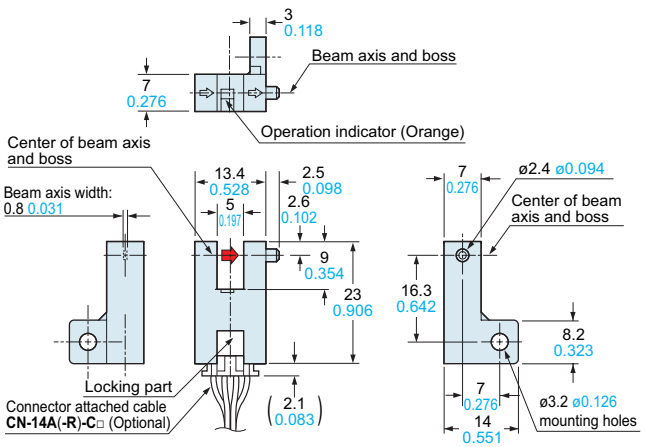
PM-L64(P) Sensor



PM-Y64(P) Sensor



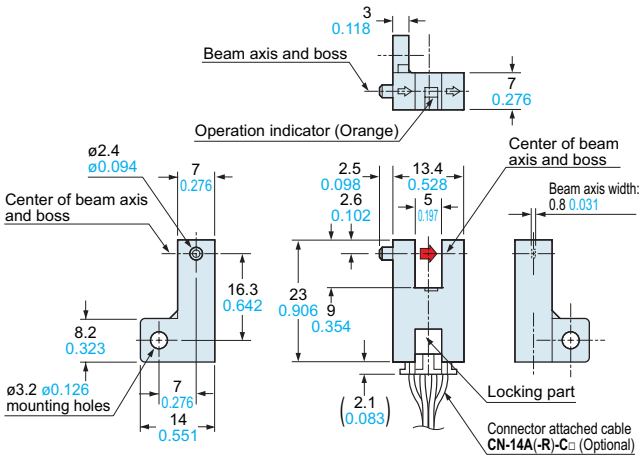
PM-F64(P) Sensor



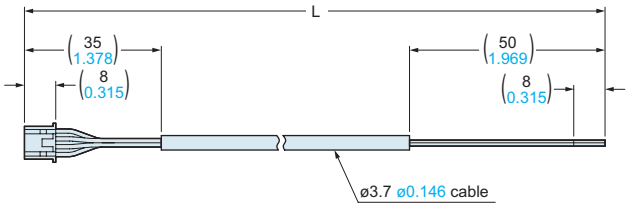
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

PM-R64(P) — Sensor



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



• Length L

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