

EX-30 SERIES Ver.2

Related Information

■ General terms and conditions..... F-3

■ Selection guide P.231~

■ Glossary of terms..... P.1549~

■ General precautions P.1552~

Ver.2

CE

UL

Recognition
(Excluding EX-33(-PN).)
(5 m cable length type)PNP
PNP output
type available

The next-generation new form series

A new alternative to fiber sensors

Simpler design

All you need to do is to make a $\varnothing 4$ mm $\varnothing 0.157$ in hole where you would like to stop or check the object ($\varnothing 6$ mm $\varnothing 0.236$ in hole for reflective type). Furthermore, the center of the sensing axis is the same as the center of the mounting hole, which makes it much easier to set the sensing position.



New design solves all weak points of fiber sensors

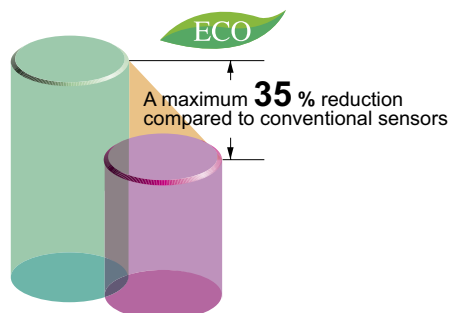
The **EX-30** series solves all of the difficulties associated with fiber sensors, such as:

- Difficulty finding a suitable place for the amplifier
- Fragility of the fiber
- Extra space needed because of difficulty in bending the fiber
- The nuisance of having to use a protective tube to prevent fiber breakage

BASIC PERFORMANCE

Electric power saving*

The **EX-30** series achieves reductions in power consumption of up to 65 %. These sensors contribute to environmental friendliness.



*Effective from production in April 2011.

Long sensing range

The **EX-30** series achieves long distance sensing [thru-beam type: 500 mm **19.685 in** (**EX-33(-PN)**): 800 mm **31.496 in**], reflective type: 50 mm **1.969 in**.]



Globally usable

It conforms to the EMC Directive and obtains the UL Recognition. (excluding 5 m **16.405 ft** cable length type) Moreover, PNP output type which is much in demand in Europe, is also available.

High response speed of 0.5 ms

The same high response speed of 0.5 ms as fiber sensor amplifiers is provided, making these sensors ideal for sensing small objects, counting objects that are moving quickly and positioning items such as circuit boards.

Selection
GuideAmplifier
Built-inPower Supply
Built-inAmplifier-
separated

EX-Z

CX-400

CY-100

EX-10

EX-20

EX-30

EX-40

CX-440

EQ-30

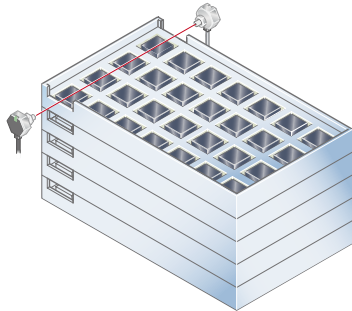
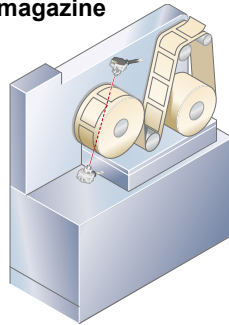
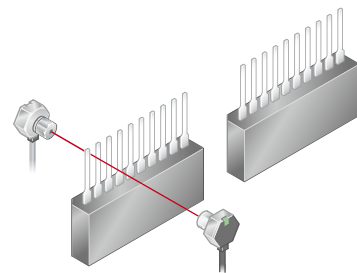
EQ-500

MQ-W

RX-LS200

RX

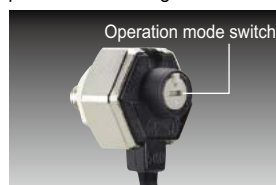
RT-610

APPLICATIONS**Detecting IC height****Detecting quantity of labels in label magazine****Checking IC pins (using slit masks)****VARIETIES**

New thru-beam types now feature operation mode switch and sensitivity adjuster! **EX-33(-PN)**

EX-33(-PN)**① Operation mode switch**

Switching between light-ON and dark-ON operating modes is possible with a single model.



Receiver

② Sensitivity adjuster

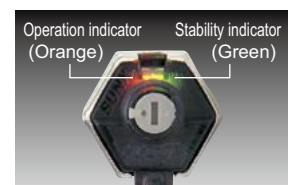
It is convenient when you need fine adjustment.



Emitter

③ Bright 2-color indicator

A bright 2-color indicator has been incorporated in all types.



Receiver

MOUNTING / SIZE**Can be installed in the same way as standard fibers**

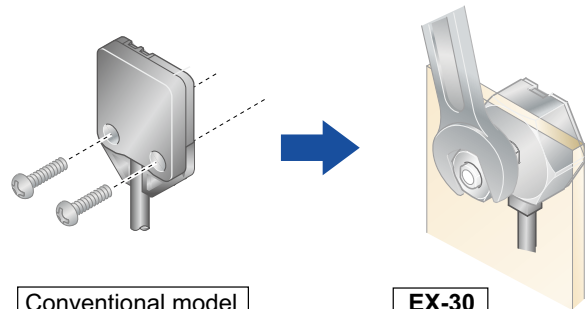
The **EX-30** series can be screwmounted (M4 for thru-beam type, M6 for reflective type) in the same way as standard fiber sensors. This means that they can be inserted into production lines in exactly the same way as conventional high-priced fiber sensors.

M4

Thru-beam type
(Reflective type: M6)

**Single-point tightening cuts down on installation work by half**

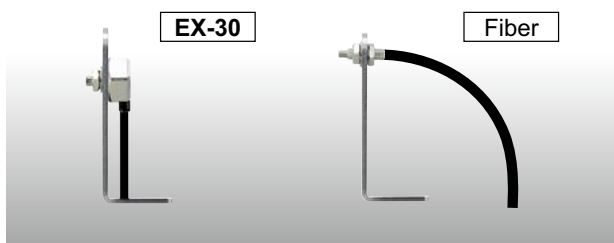
Conventional photoelectric sensors required four (for thru-beam type) or two (for reflective type) mounting holes and screws to be used. However, the **EX-30** series is installed with a single screw, thus cutting down on installation work by half.



Conventional model

EX-30**Takes up very little space**

Unlike conventional fibers, bending radius is not a problem, so that the sensor can be securely installed alongside conveyors.

**EX-30**

Fiber

FIBER
SENSORSLASER
SENSORSPHOTOELECTRIC
SENSORSMICRO
PHOTOELECTRIC
SENSORSAREA
SENSORSSAFETY LIGHT
CURTAINS /
SAFETY COMPONENTSPRESSURE /
FLOW
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE SENSORSSENSOR
OPTIONSSIMPLE
WIRE-SAVING
UNITSWIRE-SAVING
SYSTEMSMEASUREMENT
SENSORSSTATIC
CONTROL
DEVICESLASER
MARKERS

PLC

HUMAN MACHINE
INTERFACESENERGY
MANAGEMENT
SOLUTIONS

FA COMPONENTS

MACHINE VISION
SYSTEMSUV CURING
SYSTEMSSelection
GuideAmplifier
Built-inPower Supply
Built-inAmplifier-
separated**EX-Z****CX-400****CY-100****EX-10****EX-20****EX-30****EX-40****CX-440****EQ-30****EQ-500****MQ-W****RX-LS200****RX****RT-610**

FIBER
SENSORSLASER
SENSORSPHOTOELECTRIC
SENSORSMICRO
PHOTOELECTRIC
SENSORSAREA
SENSORSSAFETY LIGHT
CURTAINS /
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CONTROL
DEVICESLASER
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PLC

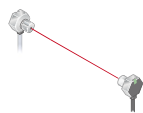
HUMAN MACHINE
INTERFACESENERGY
MANAGEMENT
SOLUTIONS

FA COMPONENTS

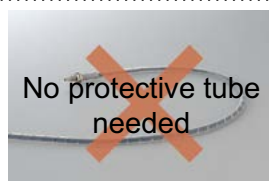
MACHINE VISION
SYSTEMSUV CURING
SYSTEMSSelection
GuideAmplifier
Built-inPower Supply
Built-inAmplifier-
separated**EX-Z****CX-400****CY-100****EX-10****EX-20****EX-30****EX-40****CX-440****EQ-30****EQ-500****MQ-W****RX-LS200****RX****RT-610****ENVIRONMENTAL RESISTANCE****Incorporated an inverter countermeasure circuit***

The **EX-30** series become significantly stronger against inverter light and other extraneous light.

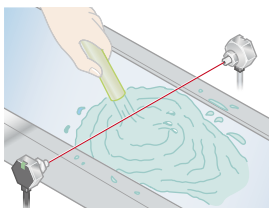
*Effective from production in April 2011.

**No protective tube needed**

The **EX-30** series has high bending strength, so that the protective tube used to protect conventional fiber from breakage is not needed. This also adds up to excellent cost performance.

**Waterproof IP67 (IEC)**

The sensors features an IP67 rating to allow their use in process lines where water is used or splashed.



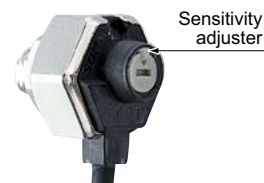
Note: If water splashes on the sensor during sensing operation, it may sense water as an object.

FUNCTIONS**Bright 2-color indicator**

A bright 2-color indicator is incorporated in all types.

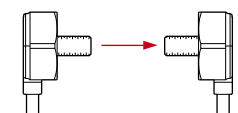

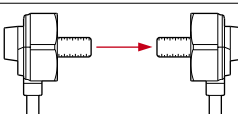

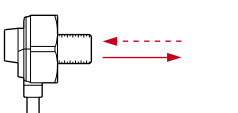

**OPERABILITY****Incorporates a sensitivity adjuster (Excluding EX-31□)**

The sensor incorporates a sensitivity adjuster. It is convenient when you need fine adjustment.



*This photo is a reflective type.

ORDER GUIDE

Type	Appearance	Sensing range	Model No. (Note)	Output	Output operation
Thru-beam		 500 mm 19.685 in	EX-31A	NPN open-collector transistor	Light-ON
			EX-31B		Dark-ON
			EX-31A-PN	PNP open-collector transistor	Light-ON
			EX-31B-PN		Dark-ON
With operation mode switch		 800 mm 31.496 in	EX-33	NPN open-collector transistor	Switchable either Light-ON or Dark-ON
			EX-33-PN	PNP open-collector transistor	
Diffuse reflective		 50 mm 1.969 in	EX-32A	NPN open-collector transistor	Light-ON
			EX-32B		Dark-ON
			EX-32A-PN	PNP open-collector transistor	Light-ON
			EX-32B-PN		Dark-ON

Note: The model No. with "P" shown on the label affixed to the thru-beam type sensor is the emitter, "D" shown on the label is the receiver.

5 m 16.404 ft cable length type

5 m 16.404 ft cable length type (standard: 2 m 6.562 ft) is also available for NPN output type [excluding **EX-33(-PN)**].

When ordering this type, suffix "-C5" to the model No.

(e.g.) 5 m 16.404 ft cable length type of **EX-31A** is "**EX-31A-C5**".

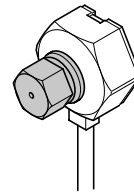
OPTIONS

Designation	Model No.	Description
Slit mask (For thru-beam type sensor only)	OS-EX30-1 (Slit size $\phi 1$ mm) $\phi 0.039$ in	Slit on one side <ul style="list-style-type: none"> Sensing range: 200 mm 7.874 in [EX-31□(-PN)] 320 mm 12.598 in [EX-33(-PN)] Min. sensing object: $\phi 2$ mm $\phi 0.079$ in Slit on both sides <ul style="list-style-type: none"> Sensing range: 150 mm 5.906 in [EX-31□(-PN)] 240 mm 9.449 in [EX-33(-PN)] Min. sensing object: $\phi 1$ mm $\phi 0.039$ in

Note: One slit and two spacers are provided per set. Two sets are required when installing on both sides.

Slit mask

• OS-EX30-1



Apply the optional slit mask when detecting small objects or for increasing the accuracy of sensing position. However, the sensing range is reduced when the slit mask is mounted.

SPECIFICATIONS

		Type	Thru-beam		With operation mode switch	Diffuse reflective			
			Model No.	NPN output		EX-31A	EX-31B	EX-33	EX-32A
Item		PNP output	EX-31A-PN	EX-31B-PN	EX-33-PN	EX-32A-PN	EX-32B-PN		
CE marking directive compliance			EMC Directive, RoHS Directive						
Sensing range			500 mm 19.685 in		800 mm 31.496 in	50 mm 1.969 in (Note 2)			
Sensing object			ø2 mm ø0.079 in or more opaque object (Completely beam interrupted objects)			Opaque, translucent or transparent object (Note 3)			
Hysteresis			—————			15 % or less of operation distance (Note 2)			
Repeatability (perpendicular to sensing axis)			0.05 mm 0.002 in or less			0.5 mm 0.020 in or less			
Supply voltage			12 to 24 V DC ±10 % Ripple P-P 10 % or less						
Current consumption			Emitter: 10 mA or less, Receiver: 10 mA or less			13 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)			
			Utilization category			DC-12 or DC-13			
			Output operation		Light-ON	Dark-ON	Switchable either Light-ON or Dark-ON	Light-ON	Dark-ON
			Short-circuit protection			Incorporated			
Response time			0.5 ms or less						
Operation indicator			Orange LED (lights up when the output is ON) (incorporated on the receiver for thru-beam type)						
Stability indicator			Green LED (lights up under stable light received condition or stable dark condition, incorporated on the receiver)			Green LED (lights up under stable light received condition or stable dark condition)			
Sensitivity adjuster			—————		Continuously variable adjuster				
Environmental resistance	Pollution degree		3 (Industrial environment)						
	Protection		IP67 (IEC)						
	Ambient temperature		−25 to +55 °C −13 to +131 °F (No dew condensation or icing allowed), Storage: −30 to +70 °C −22 to +158 °F						
	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH						
	Ambient illuminance		Incandescent light: 3,000 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 500 Hz frequency, 3 mm 0.118 in double amplitude (20 G max.) in X, Y and Z directions for two hours each						
Shock resistance		500 m/s ² acceleration (50 G approx.) in X, Y and Z directions three times each							
Emitting element			Red LED (modulated)						
Material			Enclosure: Die-cast zinc (Nickel plated), Lens: Polycarbonate [EX-32□(-PN): Acrylic], Enclosure cover: Polycarbonate						
Cable			0.1 mm ² 3-core (thru-beam type sensor emitter: 2-core) cabtyre cable, 2 m 6.562 ft long						
Cable extension			Extension up to total 50 m 164.042 ft is possible with 0.3 mm ² , or more, cable (thru-beam type: both emitter and receiver).						
Weight			Net weight (each emitter and receiver): 20 g approx. Gross weight: 65 g approx.			Net weight: 20 g approx., Gross weight: 45 g approx.			
Accessories			Nut: 2 pcs., Toothed lock washer: 2 pcs.			Nut: 1 pc., Toothed lock washer: 1 pc.			

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 sensing range and the hysteresis are specified for white non-glossy paper (100 × 100 mm **3.937 × 3.937 in**) as the object.

3) Make sure to confirm detection with an actual sensor before use.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY MANAGEMENT SOLUTIONS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Amplifier Built-in

Power Supply Built-in

Amplifier-separated

EX-Z

CX-400

CY-100

EX-10

EX-20

EX-30

EX-40

CX-440

EQ-30

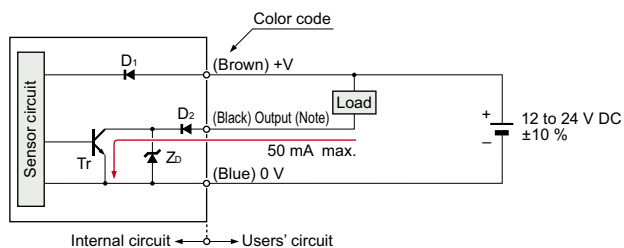
EQ-500

MQ-W

RX-LS200

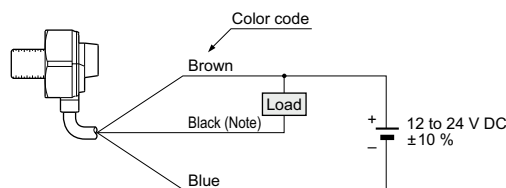
RX

RT-610

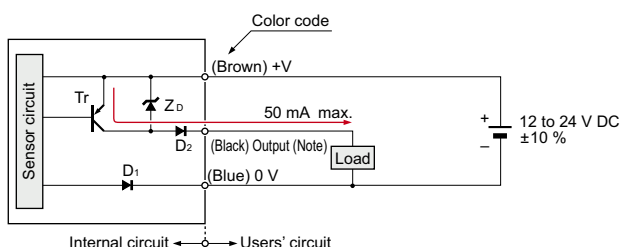
I/O CIRCUIT AND WIRING DIAGRAMS**NPN output type****I/O circuit diagram**

Note: The emitter of the thru-beam type sensor does not incorporate the output.

Symbols ... D1: Reverse supply polarity protection diode
D2: Reverse output polarity protection diode
ZD: Surge absorption zener diode
Tr: NPN output transistor

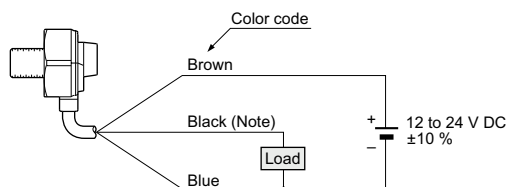
Wiring diagram

Note: The emitter of the thru-beam type sensor does not incorporate the black wire.

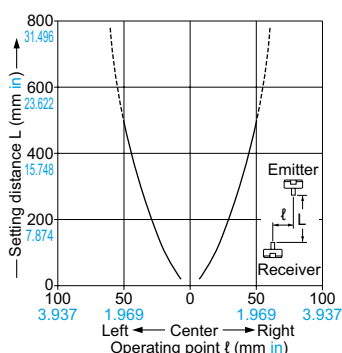
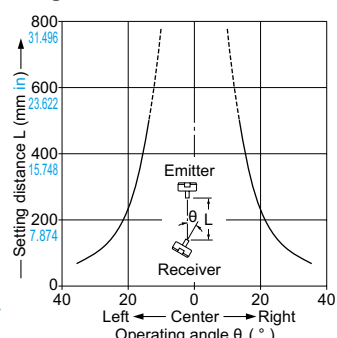
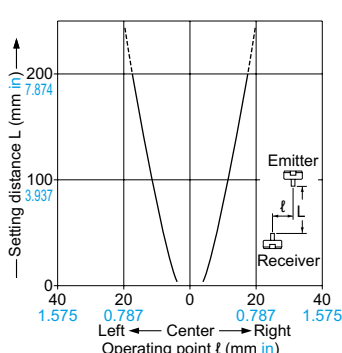
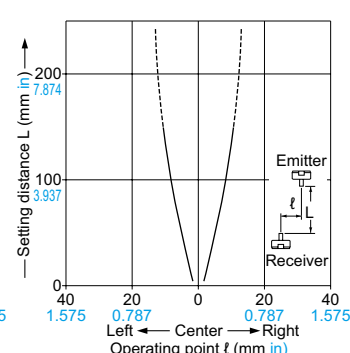
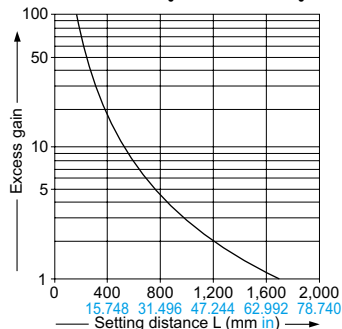
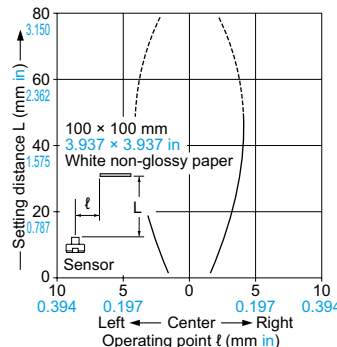
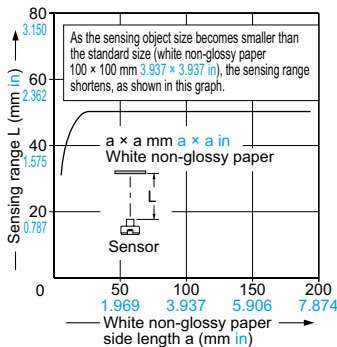
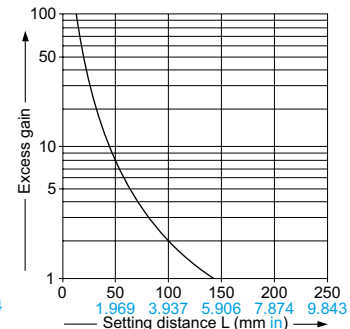
PNP output type**I/O circuit diagram**

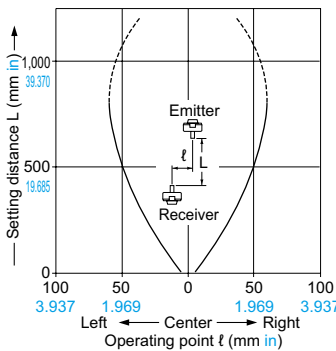
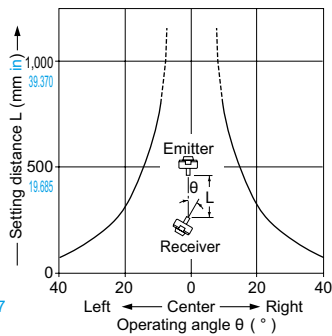
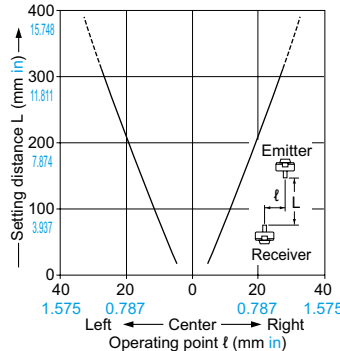
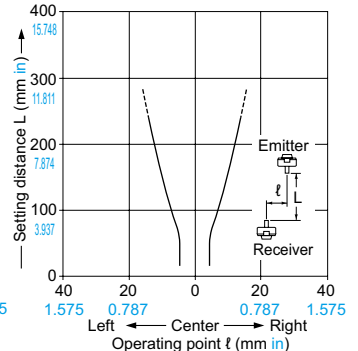
Note: The emitter of the thru-beam type sensor does not incorporate the output.

Symbols ... D1: Reverse supply polarity protection diode
D2: Reverse output polarity protection diode
ZD: Surge absorption zener diode
Tr: PNP output transistor

Wiring diagram

Note: The emitter of the thru-beam type sensor does not incorporate the black wire.

SENSING CHARACTERISTICS (TYPICAL)**EX-31 EX-31-PN****Thru-beam type****Parallel deviation****Angular deviation****Parallel deviation with slit mask on one side****Parallel deviation with slit masks on both sides****EX-31 EX-31-PN Thru-beam type****Correlation between setting distance and excess gain****EX-32 EX-32-PN****Diffuse reflective type****Sensing field****Correlation between sensing object size and sensing range****Correlation between setting distance and excess gain**

SENSING CHARACTERISTICS (TYPICAL)**EX-33 EX-33-PN****Thru-beam type****Parallel deviation****Angular deviation****Parallel deviation with slit mask on one side****Parallel deviation with slit masks on both sides****PRECAUTIONS FOR PROPER USE**

Refer to p.1552~ for general precautions.

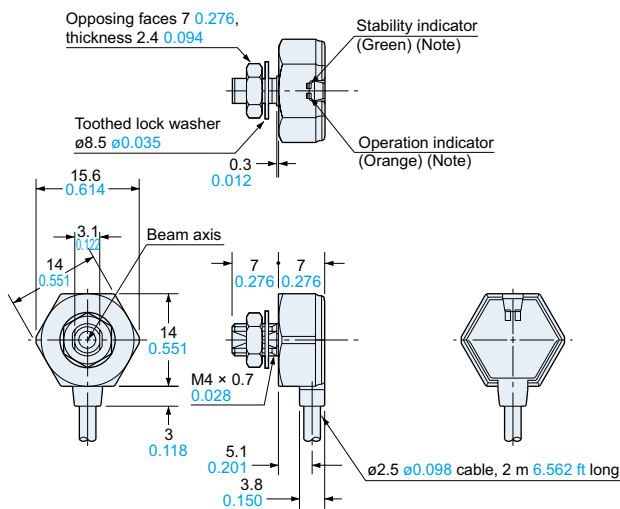


- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

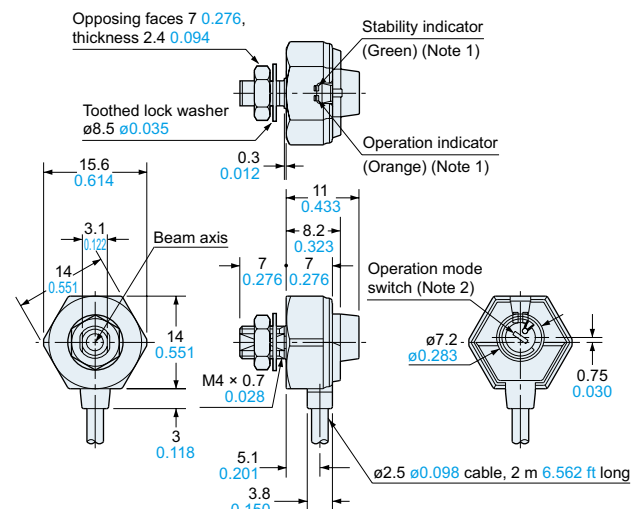
- Do not use during the initial transient time (50 ms approx.) after the power supply is switched on.
- In case of using the sensor at a place where static electricity is generated, use a metal mounting plate. Also, ensure to ground the mounting plate.

DIMENSIONS (Unit: mm in)

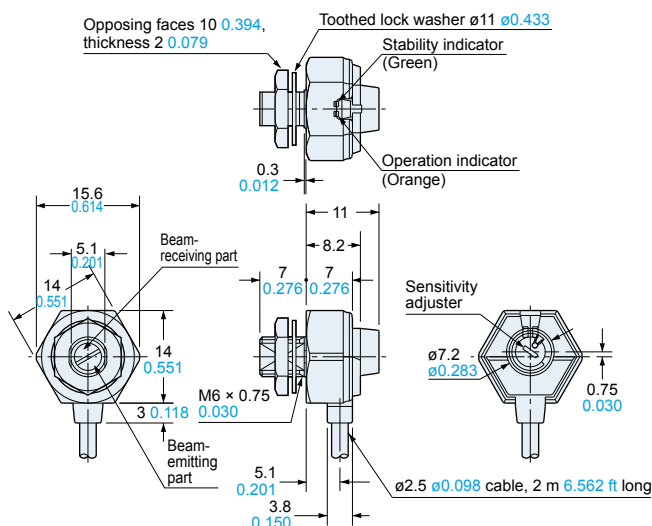
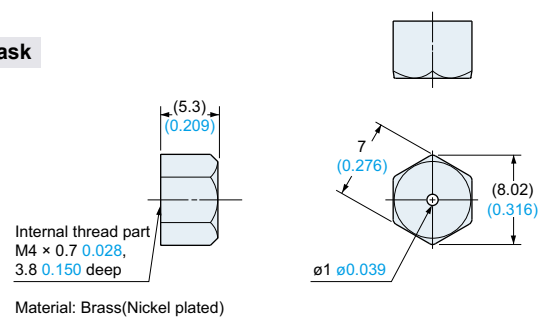
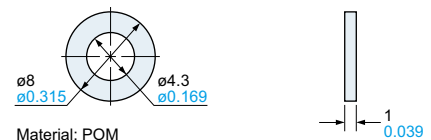
The CAD data can be downloaded from our website.

EX-31 EX-31-PN**Sensor**

Note: Not incorporated on the emitter.

EX-33 EX-33-PN**Sensor**

Notes: 1) Not incorporated on the emitter.
2) It is the sensitivity adjuster on the emitter.

EX-32 EX-32-PN**Sensor****OS-EX30-1****Slit mask (optional)****Slit mask****Spacer**FIBER
SENSORSLASER
SENSORSPHOTO-
ELECTRIC
SENSORSMICRO
PHOTO-
ELECTRIC
SENSORSAREA
SENSORSSAFETY LIGHT
CURTAINS /
SAFETY
COMPONENTSPRESSURE /
FLOW
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE
SENSORSSENSOR
OPTIONSSIMPLE
WIRE-SAVING
UNITSWIRE-SAVING
SYSTEMSMEASURE-
MENT
SENSORSSTATIC
CONTROL
DEVICESLASER
MARKERS

PLC

HUMAN
MACHINE
INTERFACESENERGY
MANAGEMENT
SOLUTIONSFA
COMPONENTSMACHINE
VISION
SYSTEMSUV
CURING
SYSTEMSSelection
GuideAmplifier
Built-inPower Supply
Built-inAmplifier-
separated**EX-Z****CX-400****CY-100****EX-10****EX-20****EX-30****EX-40****CX-440****EQ-30****EQ-500****MQ-W****RX-LS200****RX****RT-610**