

EX-30 SERIES

Related Information

General terms and conditionsP.1
Glossary of termsP.983~

Sensor selection guideP.11~ / P.229~
General precautionsP.986~



The next-generation new form series.
A new alternative to fiber sensors.

Simpler design

All you need to do is make a $\varnothing 4$ mm $\varnothing 0.157$ in hole where you would like to stop or check the workpiece ($\varnothing 6$ 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

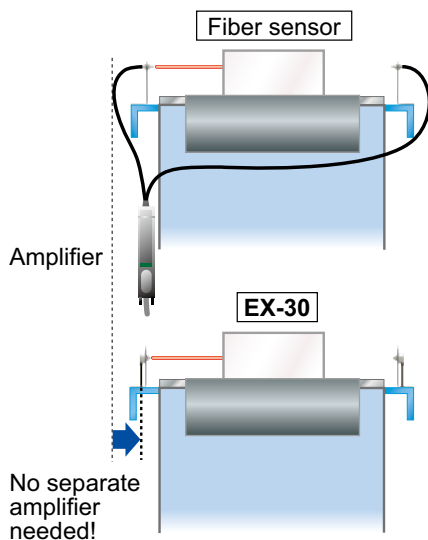
The EX-30 series solves all of the difficulties associated with fiber sensors, such as:

- 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 breakages

BASIC PERFORMANCE

No amplifier needed

The amplifier is built in, so a separate amplifier is not required.



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.]



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.

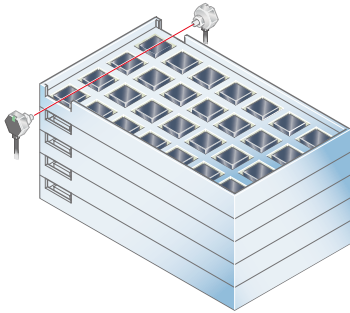
Globally useable

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

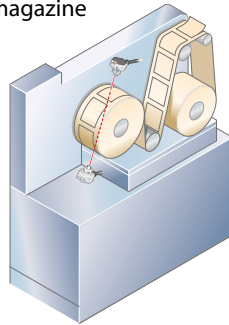
Selection Guide
Amplifier Built-in
CX-400
EX-10
EX-20
EX-30
EX-40
EQ-30
EQ-500
MQ-W
RX-LS200
RX
CY
PX-2
RT-610
Power Supply Built-in
NX5
VF
Amplifier-separated
SU-7 / SH
SS-A5 / SH
Other Products

APPLICATIONS

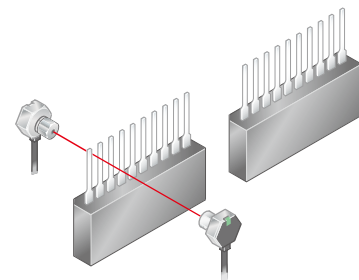
Detecting IC height



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!

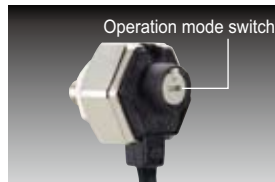
EX-33(-PN)

EX-33(-PN)



1 Operation mode switch

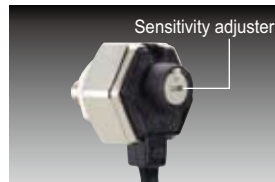
Switching between light-ON and dark-ON operating modes is possible with a single model.



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

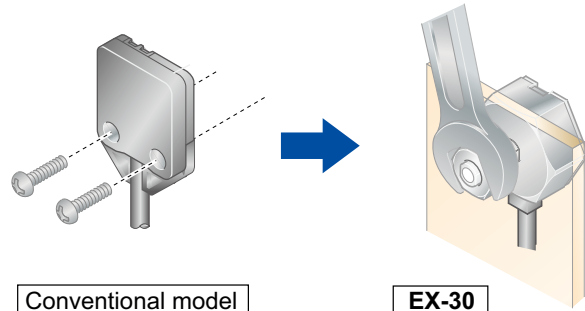
The EX-30 series can be screwmounted (M4 for thru-beam type, M6 for reflective type) in the same way as standard fiber sensors. This means that they can be inserted into production lines in exactly the same way as conventional high-priced fiber sensors.

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 SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Amplifier Built-in

CX-400

EX-10

EX-20

EX-30

EX-40

EQ-30

EQ-500

MQ-W

RX-LS200

RX

CY

PX-2

RT-610

Power Supply Built-in

NX5

VF

Amplifier-separated

SU-7 / SH

SS-A5 / SH

Other Products

- FIBER SENSORS
- LASER SENSORS
- PHOTOELECTRIC SENSORS
- MICRO PHOTOELECTRIC SENSORS
- AREA SENSORS
- SAFETY COMPONENTS
- PRESSURE SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC CONTROL DEVICES
- LASER MARKERS

- Selection Guide
- Amplifier Built-in
- CX-400**
- EX-10**
- EX-20**
- EX-30**
- EX-40**
- EQ-30**
- EQ-500**
- MQ-W**
- RX-LS200**
- RX**
- CY**
- PX-2**
- RT-610**
- Power Supply Built-in
- NX5**
- VF**
- Amplifier-separated
- SU-7 / SH**
- SS-A5 / SH**
- Other Products

ENVIRONMENTAL RESISTANCE

Unbreakable

A cabtyre cable is used, so that the sensor cable will not break like conventional fibers.

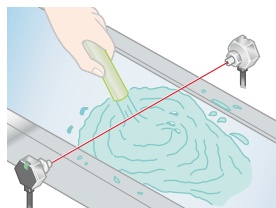
No protective tube needed

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



Waterproof IP67 (IEC)

The sensor can be hosed down because of its IP67 construction.

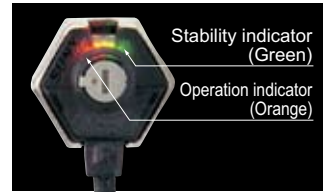


Note: However, take care that if it is exposed to water splashes during operation, it may detect a water drop itself.

FUNCTIONS

Bright 2-color indicator

A bright 2-color indicator has been 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.



ORDER GUIDE

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

Note: The model No. with suffix "P" shown on the label affixed to the thru-beam type sensor is the emitter, "D" shown on the label is the receiver. (e.g.) Emitter of EX-31A: EX-31P, Receiver of EX-31A: EX-31AD

5 m 16.404 ft cable length type

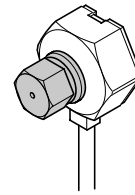
5 m 16.404 ft cable length type(standard: 2 m 6.562 ft) is also available for NPN output type [excluding EX-33(-PN)]. When ordering this type, suffix "-C5" to the model No. (e.g.) 5 m 16.404 ft cable length type of EX-31A is "EX-31A-C5".

OPTIONS

Designation	Model No.	Description
Slit mask (For thru-beam type sensor only)	OS-EX30-1 (Slit size ϕ 1 mm ϕ 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: ϕ2 mm ϕ0.079 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: ϕ1 mm ϕ0.039 in

Slit mask

OS-EX30-1



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

SPECIFICATIONS

Item	Model No.	Thru-beam			Diffuse reflective			
		NPN output	EX-31A	EX-31B	EX-33	EX-32A	EX-32B	
		PNP output	EX-31A-PN	EX-31B-PN	EX-33-PN	EX-32A-PN	EX-32B-PN	
Sensing range			500 mm 19.685 in		800 mm 31.496 in	50 mm 1.969 in (Note 2)		
Sensing object			ϕ 2 mm ϕ0.079 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 \pm 10 %				Ripple P-P 10 % or less	
Current consumption			Emitter: 10 mA or less, Receiver: 15 mA or less			20 mA or less		
Output			<NPN output type> NPN open-collector transistor <ul style="list-style-type: none"> • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 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 <ul style="list-style-type: none"> • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1 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			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) (Refer to p.984 for details of standards.)					
	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 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		20 M Ω , 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 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 for 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) 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 COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Amplifier Built-in

CX-400

EX-10

EX-20

EX-30

EX-40

EQ-30

EQ-500

MQ-W

RX-LS200

RX

CY

PX-2

RT-610

Power Supply Built-in

NX5

VF

Amplifier-separated

SU-7 / SH

SS-A5 / SH

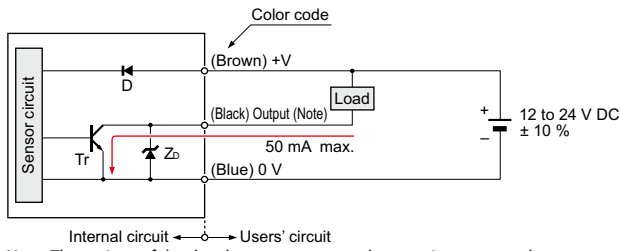
Other Products

FIBER SENSORS
LASER SENSORS
PHOTO-ELECTRIC SENSORS
MICRO PHOTO-ELECTRIC SENSORS
AREA SENSORS
SAFETY COMPONENTS
PRESSURE SENSORS
INDUCTIVE PROXIMITY SENSORS
PARTICULAR USE SENSORS
SENSOR OPTIONS
WIRE- SAVING SYSTEMS
MEASURE- MENT SENSORS
STATIC CONTROL DEVICES
LASER MARKERS
Selection Guide
Amplifier Built-in
CX-400
EX-10
EX-20
EX-30
EX-40
EQ-30
EQ-500
MQ-W
RX-LS200
RX
CY
PX-2
RT-610
Power Supply Built-in
NX5
VF
Amplifier-separated
SU-7 / SH
SS-A5 / SH
Other Products

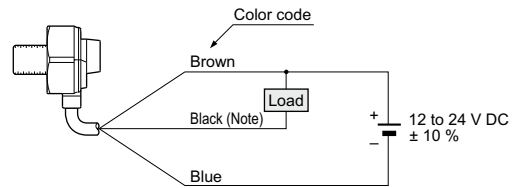
I/O CIRCUIT AND WIRING DIAGRAMS

NPN output type

I/O circuit diagram



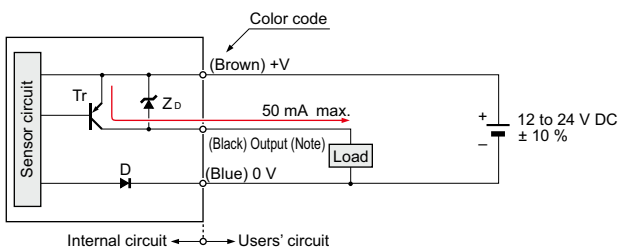
Wiring diagram



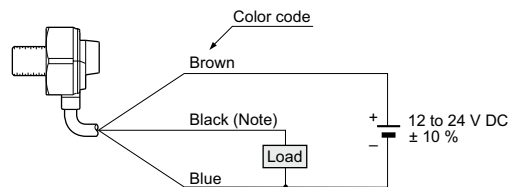
Symbols ... D : Reverse supply polarity protection diode
 ZD: Surge absorption zener diode
 Tr : NPN output transistor

PNP output type

I/O circuit diagram



Wiring diagram



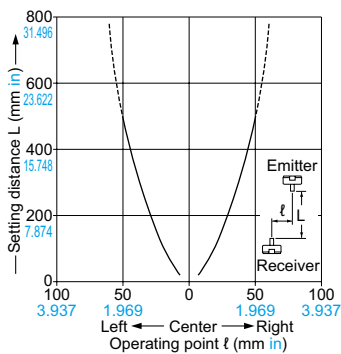
Symbols ... D : Reverse supply polarity protection diode
 ZD: Surge absorption zener diode
 Tr : PNP output transistor

SENSING CHARACTERISTICS (TYPICAL)

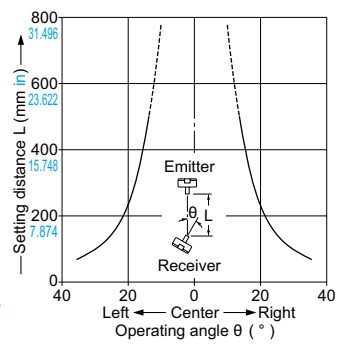
EX-31 EX-31 -PN

Thru-beam type

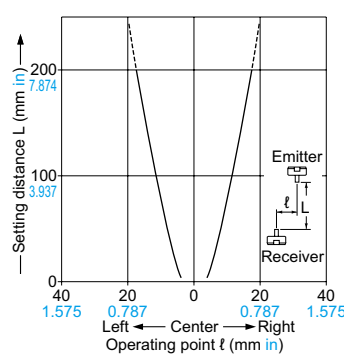
Parallel deviation



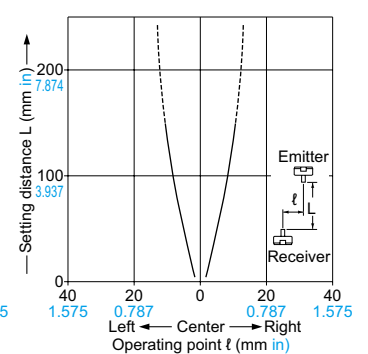
Angular deviation



Parallel deviation with slit mask on one side



Parallel deviation with slit masks on both sides

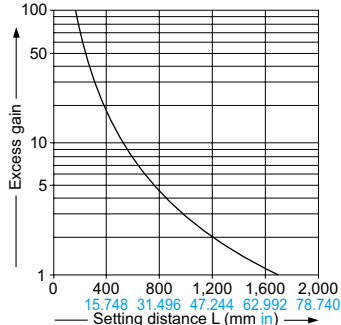


EX-31 EX-31 -PN Thru-beam type

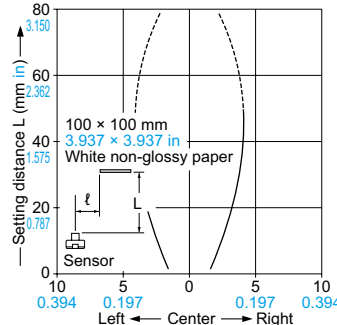
EX-32 EX-32 -PN

Diffuse reflective type

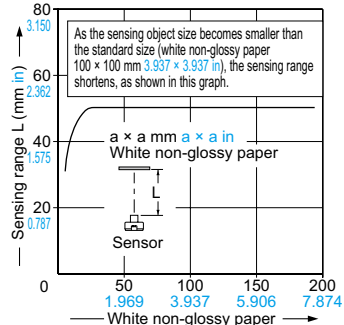
Correlation between setting distance and excess gain



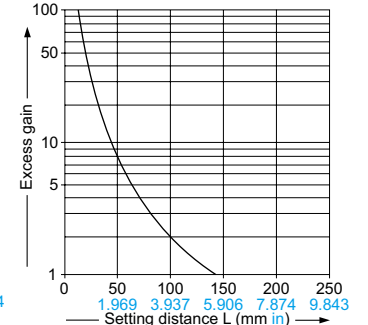
Sensing field



Correlation between sensing object size and sensing range



Correlation between setting distance and excess gain

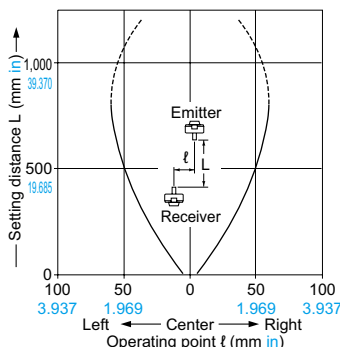


SENSING CHARACTERISTICS (TYPICAL)

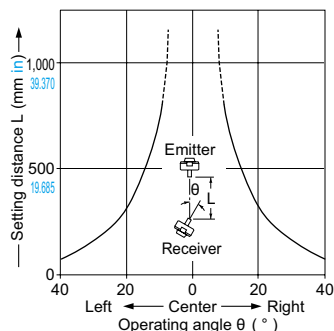
EX-33 EX-33-PN

Thru-beam type

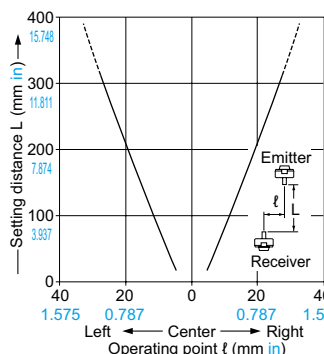
Parallel deviation



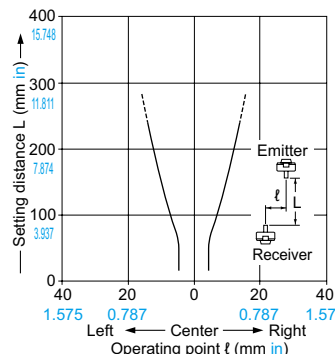
Angular deviation



Parallel deviation with slit mask on one side



Parallel deviation with slit masks on both sides



PRECAUTIONS FOR PROPER USE

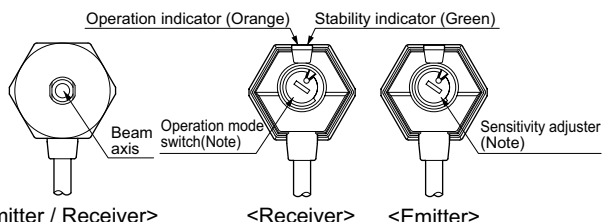
Refer to P.986~ for general precautions.



- 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.

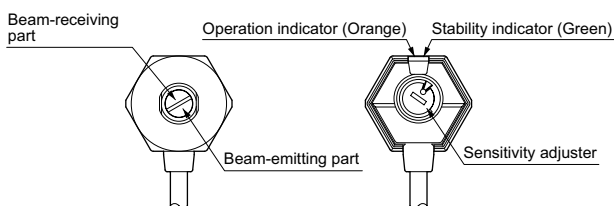
Part description

EX-31 (-PN), EX-33(-PN)



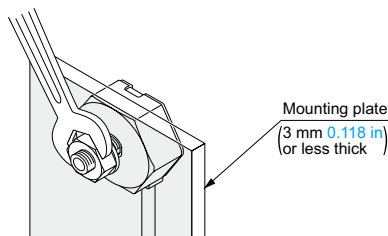
Note: Not incorporated on EX-31 (-PN).

EX-32, EX-32 -PN



Mounting

- Mount the sensor on a mounting plate 3 mm 0.118 in or less thick, using the enclosed nut and toothed lock washer. When tightening the nut, hold the sensor with hand or a spanner and make sure that the tightening torque is 0.6 N·m [EX-32 (-PN): 1.0 N·m] or less. Do not tighten the sensor itself with a spanner, etc.



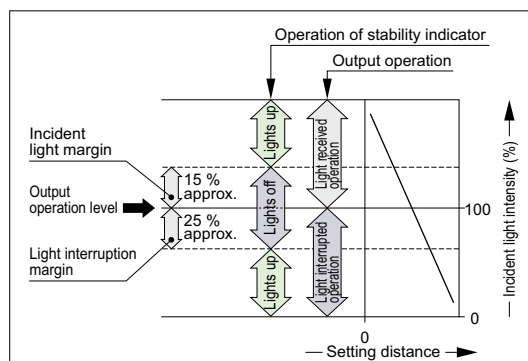
Sensitivity adjustment (Excluding EX-31)

Step	Sensitivity adjuster	Description
①		Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position.
②		In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point ① where the sensor enters the "Light" state operation.
③		In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters the "Light" state operation and then bring it back to confirm point ② where the sensor just returns to the "Dark" state operation. (If the sensor does not enter the "Light" state operation even when the sensitivity adjuster is turned fully clockwise, this extreme position is point ③)
④		The position at the middle of points ② and ③ the optimum sensing position.

Note: Use the attached adjusting screwdriver to turn the adjuster slowly. Turning with excessive strength will damage the adjuster.

Stability indicator

- The stability indicator (green) lights up when the incident light intensity has sufficient margin with respect to the operation level. If the incident light intensity level is such that the stability indicator lights up, stable sensing can be done without the light received operation and the light interrupted operation being affected by a change in ambient temperature or supply voltage.



FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Amplifier Built-in

CX-400

EX-10

EX-20

EX-30

EX-40

EQ-30

EQ-500

MQ-W

RX-LS200

RX

CY

PX-2

RT-610

Power Supply Built-in

NX5

VF

Amplifier-separated

SU-7 / SH

SS-A5 / SH

Other Products



- FIBER SENSORS
- LASER SENSORS
- PHOTO-ELECTRIC SENSORS
- MICRO PHOTO-ELECTRIC SENSORS
- AREA SENSORS
- SAFETY COMPONENTS
- PRESSURE SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC CONTROL DEVICES
- LASER MARKERS
- Selection Guide
- Amplifier Built-in
- CX-400**
- EX-10
- EX-20
- EX-30**
- EX-40
- EQ-30
- EQ-500
- MQ-W
- RX-LS200
- RX
- CY
- PX-2
- RT-610
- Power Supply Built-in
- NX5
- VF
- Amplifier-separated
- SU-7 / SH
- SS-A5 / SH
- Other Products

PRECAUTIONS FOR PROPER USE

Refer to P.986~ for general precautions.

Wiring

- Extension up to total 50 m **164.042 ft** (thru-beam type: both emitter and receiver) is possible with 0.3 mm², or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Excess bending of the cable or stress applied to the cable may disconnect the internal lead wire.

Optional slit mask (Thru-beam type only)

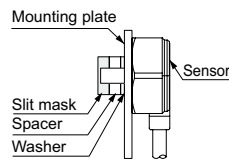
- Apply the optional slit mask when detecting small objects or for increasing the accuracy of sensing position. However, the sensing range is reduced when the slit mask is mounted.

Mounting method

- ① Insert the sensor into the mounting plate.
- ② Fit the washer and spacers enclosed with the slit mask. Note that the number of spacers to be fitted differs with the mounting plate thickness, as give in the table below. (Note)
- ③ Mount the slit mask. Make sure that the tightening torque is 0.6 N·m or less.

Note: If the mounting plate thickness falls within the values mentioned in the table below, use the number of spacers that represents the thickness that comes closest to the actual thickness of the mounting plate being used. There will be no effect on the sensor if the slit mask comes out in the front because of the spacers.

Mounting plate thickness	No. of spacers
3 mm 0.118 in	0 pc.
2 mm 0.079 in	1 pc.
1 mm 0.039 in	2 pcs.



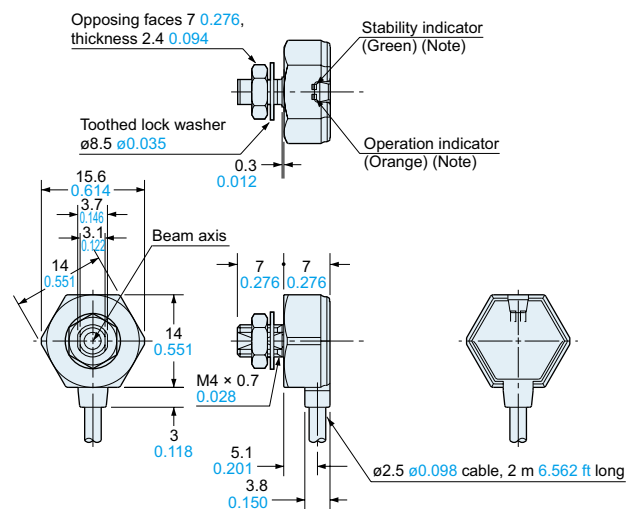
Others

- Do not use during the initial transient time (50 ms) 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)

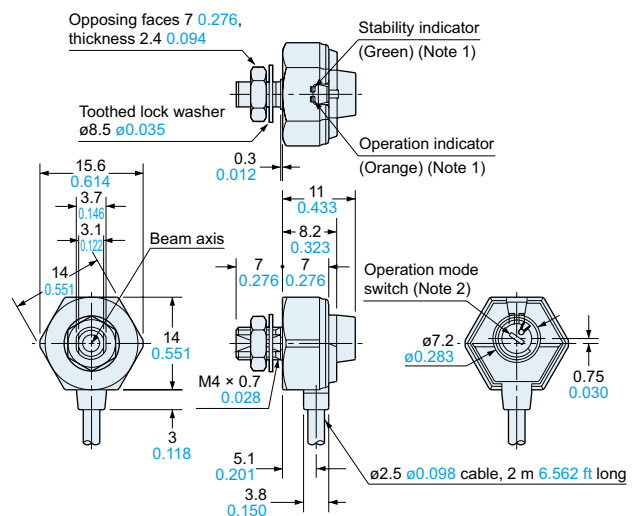
The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

EX-31 EX-31 -PN Sensor



Note: Not incorporated on the emitter.

EX-33 EX-33-PN Sensor



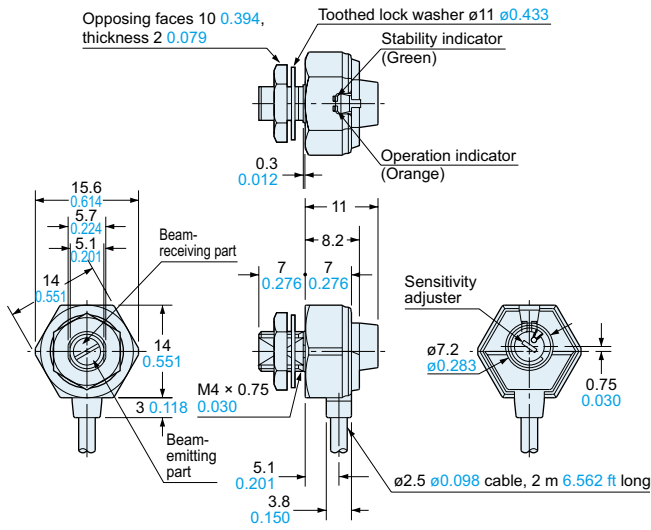
Notes: 1) Not incorporated on the emitter.
2) It is the sensitivity adjuster on the emitter.

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.com>

EX-32 EX-32 -PN

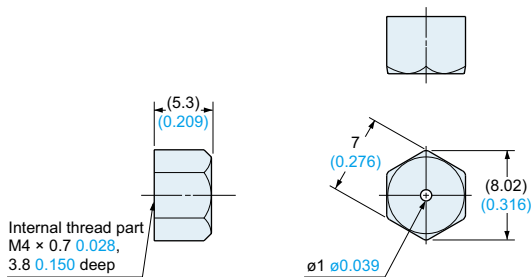
Sensor



OS-EX30-1

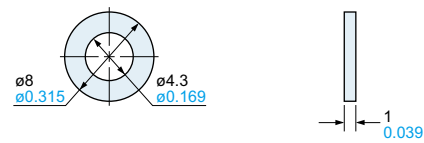
Slit mask (optional)

Slit mask



Material: Brass(Nickel plated)

Spacer



Material: POM

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE- SAVING SYSTEMS

MEASURE- MENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Amplifier Built-in

CX-400

EX-10

EX-20

EX-30

EX-40

EQ-30

EQ-500

MQ-W

RX-LS200

RX

CY

PX-2

RT-610

Power Supply Built-in

NX5

VF

Amplifier-separated

SU-7 / SH

SS-A5 / SH

Other Products