

# NAIS

## SCREW FITTING MINI PHOTOELECTRIC SENSORS

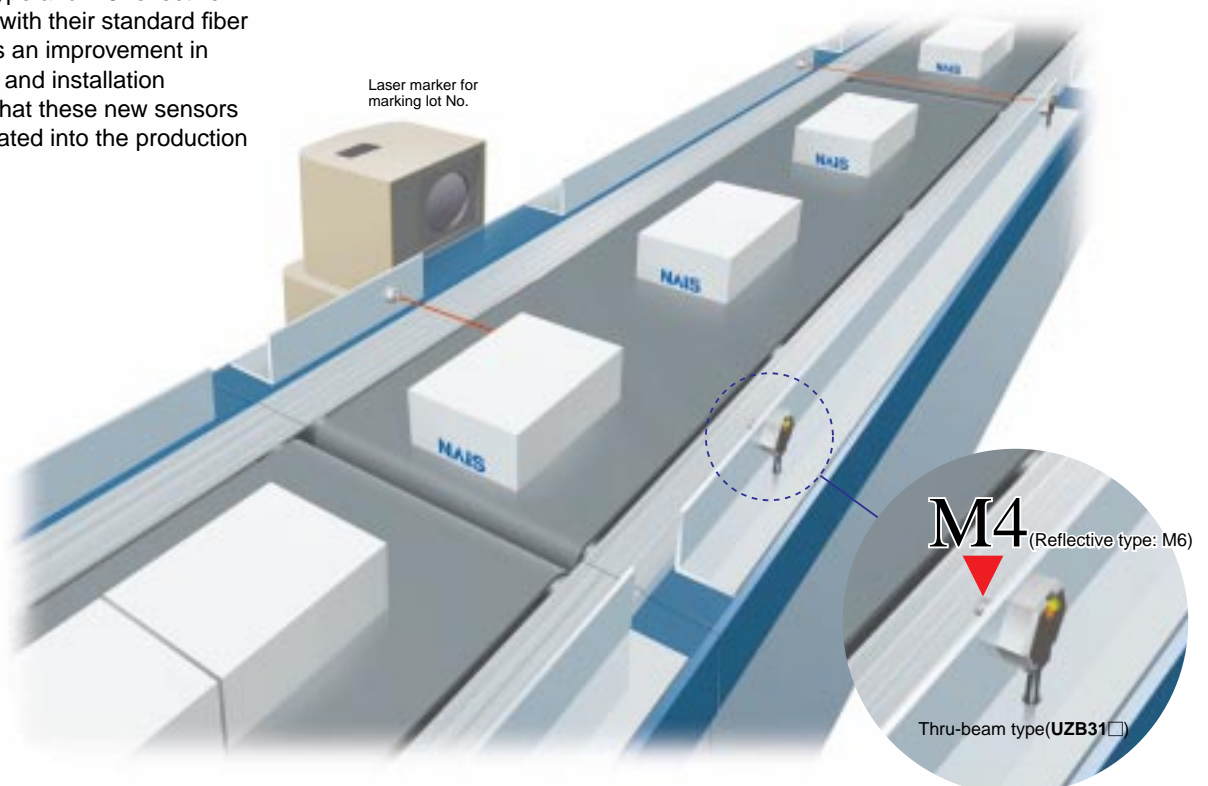
# UZH3 Series



**A new approach**  
**A new concept in design**  
**Gives a new meaning to ease of use**

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

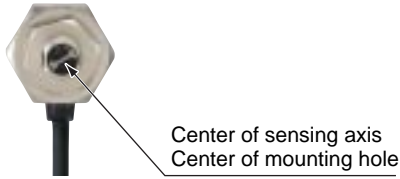
The **UZH3** series have a radically new form which has been developed in response to the many calls for sensors to be easier to install. This new form which fits into the mounting holes for the M4 thru-beam type and M6 reflective type of sensors with their standard fiber sizes represents an improvement in previous design and installation techniques, so that these new sensors can be incorporated into the production line as-is.



## Simpler design

All you need to do is make a  $\phi 4\text{mm}$  .157inch hole where you would like to stop or check the workpiece ( $\phi 6\text{mm}$  .236inch hole for reflective type).

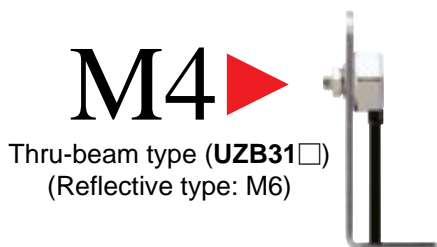
Furthermore, the center of the sensing axis is the same as the center of the mounting hole, which makes it much easier to set the sensing position.



## New concept in shape

Can be installed in the same way as standard fibers

**UZH3** series can be screw-mounted (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.



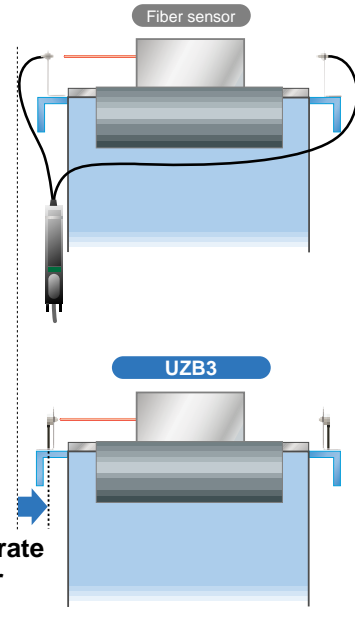
## New design solves all weak points of fiber sensors

The **UZH3** 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

**[No amplifier needed]**

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



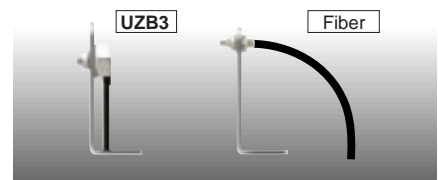
**[Unbreakable]**

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



**[Takes up very little space]**

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



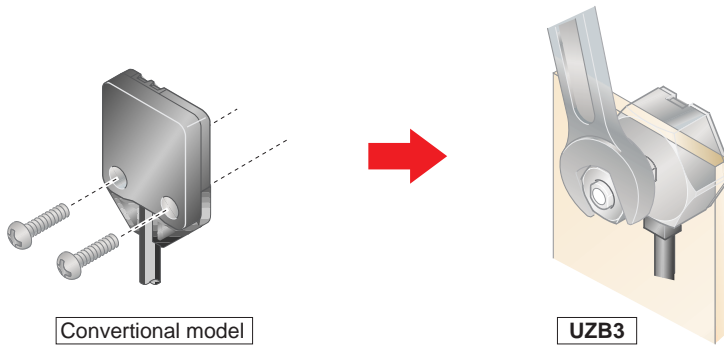
**[No protective tube needed]**

The **UZH3** 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.



## 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 **UZB3** series is installed with a single screw, thus cutting down on installation work by half.

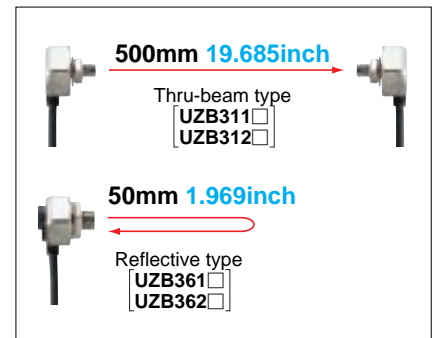


Conventional model

UZB3

## Long sensing range

The **UZB3** series achieves long distance sensing [thru-beam type: 500mm 19.685inch, reflective type: 50mm 1.969inch.]



500mm 19.685inch

Thru-beam type  
UZB311   
UZB312

50mm 1.969inch

Reflective type  
UZB361   
UZB362

## Incorporates a sensitivity adjuster (Reflective type only)

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



Sensitivity adjuster

## Bright 2-color indicator

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



Operation indicator (Orange)

Stability indicator (Green)

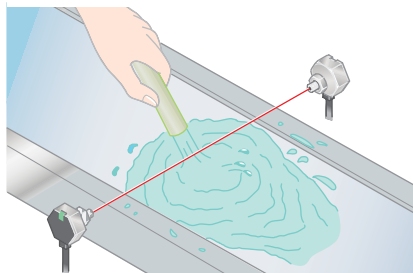
## Globally useable

It conforms to the EMC Directive and will obtain UL Recognition. Moreover, PNP output type which is much demand in Europe, is also available.



## Waterproof

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



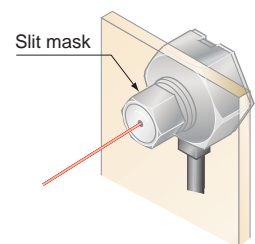
Note: However, take care that if it is exposed to water splashes during operation, it may detect a water drop itself.

## High response speed of 0.5ms

The same high response speed of 0.5ms 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.

## Separate slit masks also available

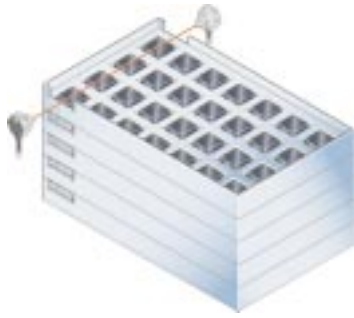
A slit mask can be attached to narrow the beam width down to  $\phi 1\text{mm}$   $\phi.039\text{inch}$  to allow sensing of very small objects.



Slit mask

# APPLICATIONS

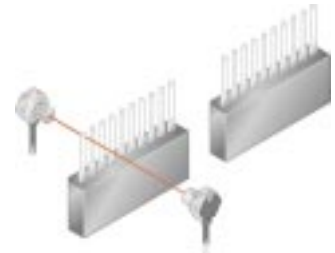
Detecting IC height



Detecting quantity of labels in label magazine



Checking IC pins (using slit mask)



# ORDER GUIDE

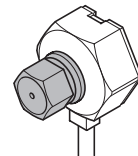
Type	Appearance	Sensing range	Model No.	Output	Output operation
Thru-beam		500mm 19.685inch	UZB311	NPN open-collector transistor	Light-ON
			UZB312		Dark-ON
			UZB3115	PNP open-collector transistor	Light-ON
			UZB3125		Dark-ON
Diffuse reflective		50mm 1.969inch	UZB361	NPN open-collector transistor	Light-ON
			UZB362		Dark-ON
			UZB3615	PNP open-collector transistor	Light-ON
			UZB3625		Dark-ON

# OPTION

Designation	Model No.	Description
Slit mask	UZB831 (Slit size $\phi 1\text{mm}$ $\phi .039\text{inch}$ )	Slit on one side <ul style="list-style-type: none"> <li>• Sensing range: 200mm 7.874inch</li> <li>• Min. sensing object: <math>\phi 2\text{mm}</math> <math>\phi .079\text{inch}</math></li> </ul>
		Slit on both sides <ul style="list-style-type: none"> <li>• Sensing range: 150mm 5.906inch</li> <li>• Min. sensing object: <math>\phi 1\text{mm}</math> <math>\phi .039\text{inch}</math></li> </ul>

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

Slit mask



# SPECIFICATIONS

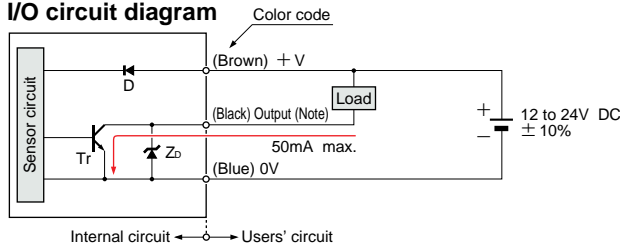
Item	Model No.	Type	Thru-beam		Diffuse reflective	
		NPN output	<b>UZH311</b>	<b>UZH312</b>	<b>UZH361</b>	<b>UZH362</b>
		PNP output	<b>UZH3115</b>	<b>UZH3125</b>	<b>UZH3615</b>	<b>UZH3625</b>
Sensing range			500mm 19.685inch		50mm 1.969inch (Note)	
Sensing object			φ2mm φ.079inch or more opaque object		Opaque, translucent or transparent object	
Hysteresis			—		15% or less of operation distance	
Repeatability (Perpendicular to sensing axis)			0.05mm .002inch or less		0.5mm .020inch or less	
Supply voltage			12 to 24V DC±10% Ripple P-P: 10% or less			
Current consumption			Emitter : 10mA or less, Receiver : 15mA or less		20mA or less	
Output			(NPN output type) NPN open-collector transistor • Maximum sink current : 50mA • Applied voltage : 30V DC or less (between output and 0V) • Residual voltage : 1V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)		(PNP output type) PNP open-collector transistor • Maximum source current : 50mA • Applied voltage : 30V DC or less (between output and + V) • Residual voltage : 1V or less (at 50mA source current) 0.4V or less (at 16mA source current)	
	Utilization category		DC-12 or DC-13			
	Output operation		Light-ON	Dark-ON	Light-ON	Dark-ON
	Short-circuit protection		Incorporated			
Response time			0.5ms or less			
Operation indicator			Orange LED (lights up when 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	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		Sun light : 10,000 lux at the light-receiving face, Incandescent : 3,000 lux at the light-receiving face			
	EMC		Emission: EN50081-2, Immunity: EN50082-2			
	Voltage withstandability		1,000V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance		20MΩ, or more with 250V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance		10 to 500Hz frequency, 3mm .118inch amplitude (20G max.) in X, Y and Z directions for two hours each			
Shock resistance		500m/s <sup>2</sup> acceleration (50G 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 ( <b>UZH31□</b> ) • Acrylic ( <b>UZH36□</b> ), Enclosure cover: Polycarbonate			
Cable			0.1mm <sup>2</sup> 3-cores (thru-beam type sensor emitter: 2-core) cabtyre cable, 2m 6.562ft long			
Cable extension			Extension up to total 50m 164.04ft is possible with 0.3mm <sup>2</sup> , or more, cable (thru-beam type: both emitter and receiver)			
Weight			Emitter: 20g .071oz approx. Receiver: 20g .071oz approx.		20g .071oz approx.	
Accessories			Nut: 2 pcs., Toothed lock washer: 2 pcs.		Nut: 1 pc., Toothed lock washer: 1 pc.	

Note: The sensing range is specified of white non-glossy paper (100×100mm 3.937×3.937inch) as the object.

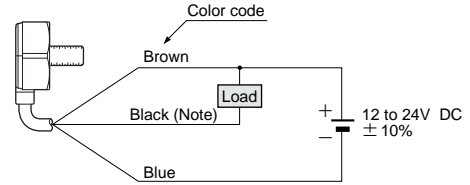
# I/O CIRCUIT AND WIRING DIAGRAMS

## NPN output type

### I/O circuit diagram



### Wiring diagram



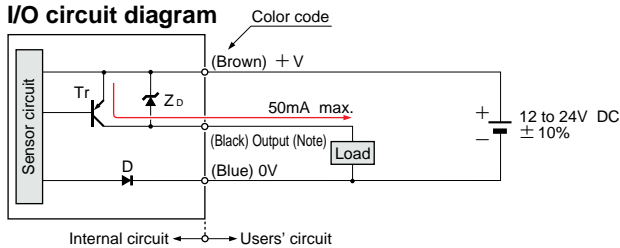
Note: The emitter of the thru-beam type sensor does not incorporate the output.

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

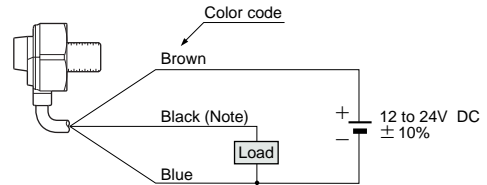
Symbol... D : Reverse supply polarity protection diode  
 ZD : Surge absorption zener diode  
 Tr : NPN output transistor

## PNP output type

### I/O circuit diagram



### Wiring diagram



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

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

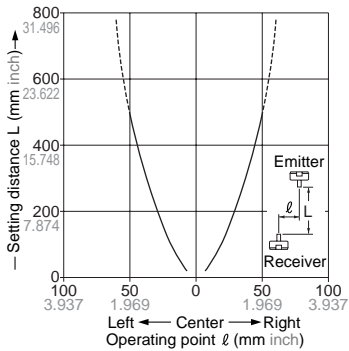
Symbol... D : Reverse supply polarity protection diode  
 ZD : Surge absorption zener diode  
 Tr : PNP output transistor

# SENSING CHARACTERISTICS (TYPICAL)

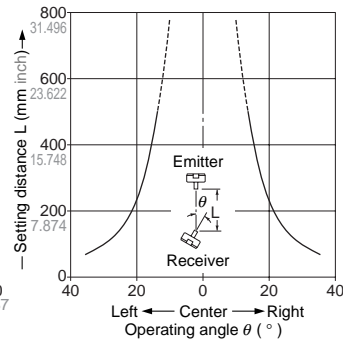
UZB31 □  
 UZB31 □5

Thru-beam type

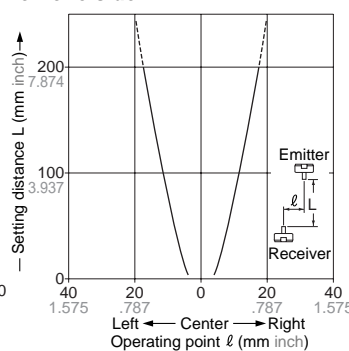
### Parallel deviation



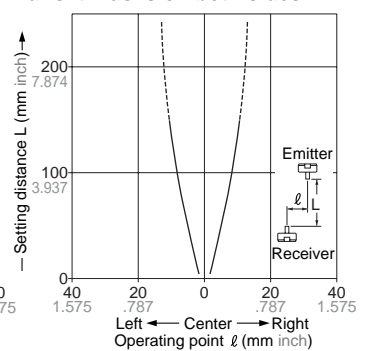
### Angular deviation



### Parallel deviation with slit mask on one side



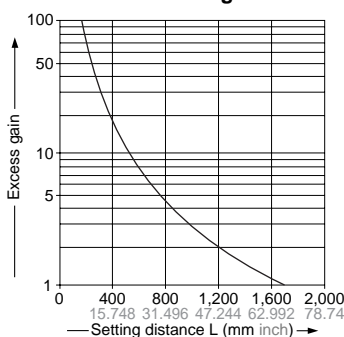
### Parallel deviation with rectangular slit masks on both sides



UZB31 □  
 UZB31 □5

Thru-beam type

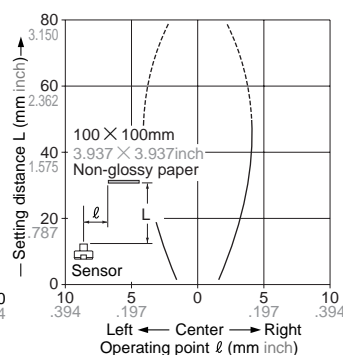
### Correlation between setting distance and excess gain



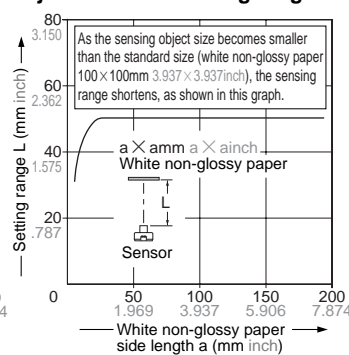
UZB36 □  
 UZB36 □5

Diffuse reflective type

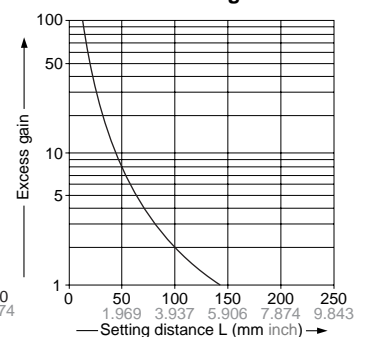
### Sensing field



### Correlation between sensing object size and sensing range



### Correlation between setting distance and excess gain



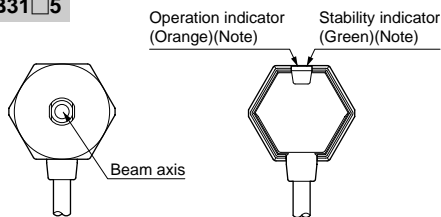
# PRECAUTIONS FOR PROPER USE



This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

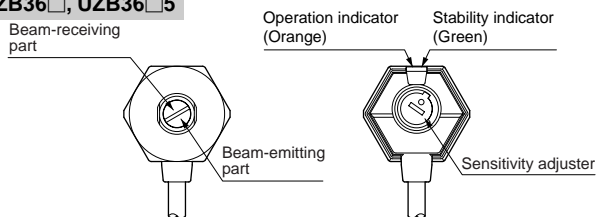
## Part description

**UZH31□, UZH31□5**



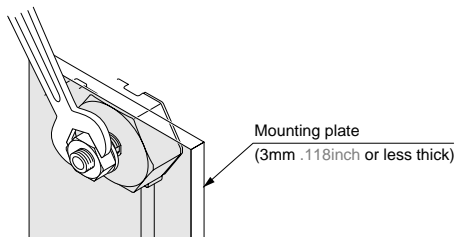
Note: Not incorporated on emitter.

**UZH36□, UZH36□5**



## Mounting

Mount the sensor on a mounting plate 3mm or less thick, using the enclosed nut and toothed washer. When tightening the nut, hold the sensor with hand or a spanner and make sure that the tightening torque is 0.6N·m [UZH36□(36□5): 1.0N·m] or less. Do not tighten the sensor itself with a spanner, etc.



## Sensitivity adjustment (Diffuse reflective type only)

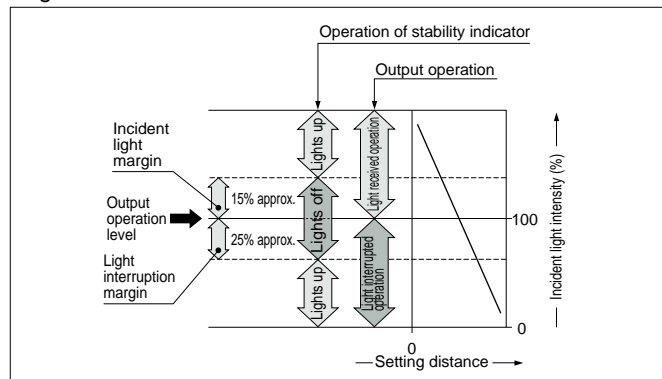
Step	Sensitivity adjuster	Description
①		Turn the sensitivity adjuster fully counter-clockwise to the minimum sensitivity position.
②		In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point (A) where the sensor enters the 'Light' state operation.
③		In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters the 'Light' state operation and then bring it back to confirm point (B) 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 (B). ]
④		The position at the middle of points (A) and (B) is the optimum sensing position.

Note: Use the accessory 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.



## Wiring

- Make sure to carry out the wiring in the power supply off condition.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Extension up to total 50m (thru-beam type: both emitter and receiver) is possible with 0.3mm<sup>2</sup>, or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction. Make sure to use an isolation transformer for the DC power supply. If an auto-transformer (single winding transformer) is used, this product or the power supply may get damaged.
- In case a surge is generated in the used power supply, connect a surge absorber to the supply and absorb the surge.

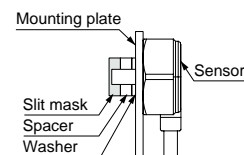
## Optional slit mask (Thru-beam type only)

- Apply the optional slit mask (UZH831) 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

- Insert the sensor into the mounting plate.
- 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.
- Mount the slit mask. Make sure that the tightening torque is 0.6N·m or less.

Mounting plate thickness	No. of spacers
3mm .118inch	0 pc.
2mm .079inch	1 pc.
1mm .039inch	2 pcs.



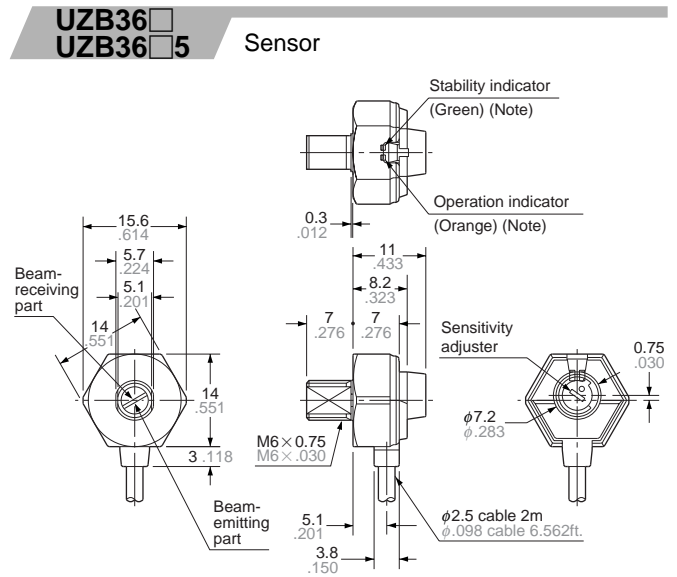
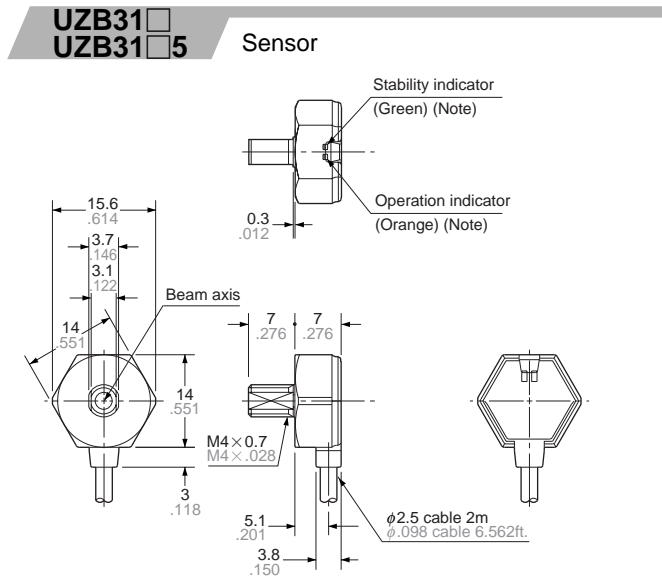


**Others**

- Do not use during the initial transient time (50ms) after the power supply is switched on.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- Avoid dust, dirt, and steam.

- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- 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.

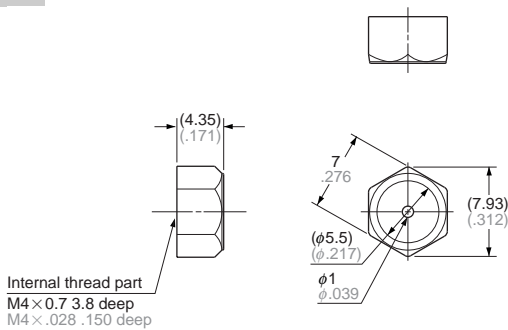
**DIMENSIONS (Unit : mm inch)**



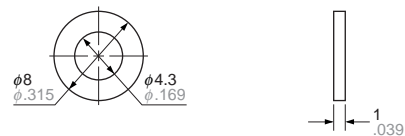
Note: Not incorporated on the emitter.

**UZH831** Slit mask (Optional)

**Slit mask**



**Spacer**



These materials are printed on ECF pulp.  
 These materials are printed with earth-friendly vegetable-based (soybean oil) ink.



Please contact .....

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