

# NAIS

**COMPACT SIZE  
TRIGONOMETRIC  
AREA REFLECTIVE  
PHOTOELECTRIC SENSORS**

# UZD10 Series

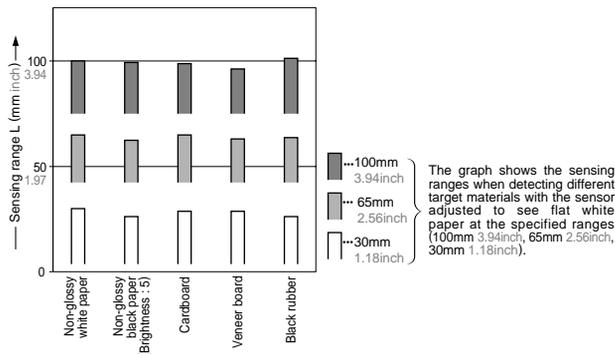
## DETECTS OBJECTS AT THE SAME DISTANCE REGARDLESS OF COLOR



### Not Greatly Affected by Color Differences or Background Objects

(A specular background may require a change in the mounting angle.)

[Material (50×50mm 1.969×1.969inch) - Sensing range correlation of UZD11 (Typical example)]



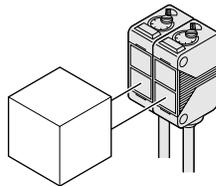
### Compact Size

(W12×H31×D20mm W.472×H1.22×D.787inch)



### Equipped with Automatic Crosstalk Prevention Function

UZD10 series is equipped with automatic crosstalk prevention so that two units can be installed next to or facing each other.



### Waterproof

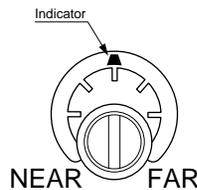
IP67. The sensor can be put on machinery washed with water. The mounting bracket (option) is non-corrosive stainless steel.

### Red LED Light Source

The red LED light source makes exact alignment easy.

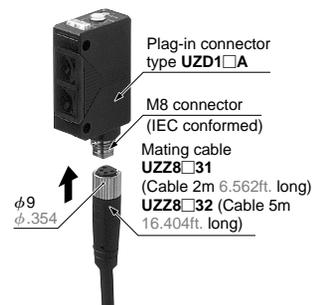
### Two Turn Adjuster with the Indicator

The two turn adjuster makes fine distance adjustments possible. More-over, the indicator shows the adjusted position at a glance.



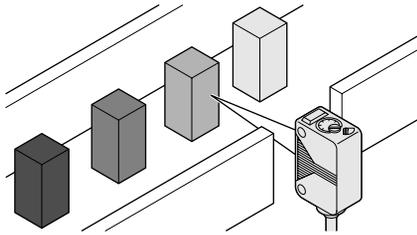
### Plug-in Connector Type

Plug-in connector types of the UZD10 series are easily disconnected for replacement. If a trouble happens, anyone can replace the sensor in a minute.

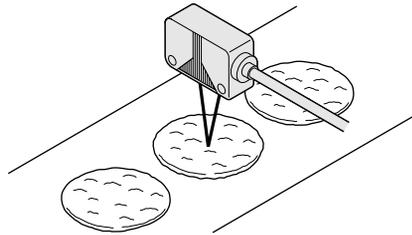


## APPLICATIONS

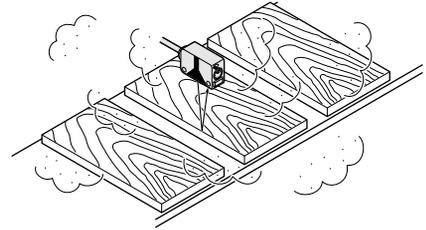
Counting



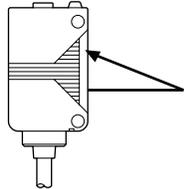
Sensing of thin-baked rice crackers



Positioning of veneer boards



## ORDER GUIDE

	Appearance	Adjuster range (*1)	Model No.	Output
NPN output type		 20 to 40mm .787 to 1.575inch	<b>UZD10</b>	NPN open-collector transistor
		 30 to 100mm 1.181 to 3.937inch	<b>UZD11</b>	
		 30 to 200mm 1.181 to 7.874inch	<b>UZD12</b>	
PNP Output type		 20 to 40mm .787 to 1.575 inch	<b>UZD105</b>	PNP open-collector transistor
		 30 to 100mm 1.181 to 3.937inch	<b>UZD115</b>	
		 30 to 200mm 1.181 to 7.874inch	<b>UZD125</b>	

Cautions : Mounting bracket is not supplied with the sensor so that users' can select it according to their requirements. Purchase it separately.

(\*1) : Adjustable range shows the possible setting ranges of the maximum sensing distance. Detection of the object is possible up to the sensor face if it is set at 30mm 1.181inch (**UZD10** : 20mm .787inch).

### Plug-in connector type

The sensor with a connector is also available. When ordering this type, add suffix "A" at the end of the model number. Purchase a mating cable separately.

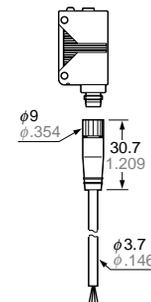
e. g.) The plug-in connector type for **UZD10** is "**UZD10A**".

### Mating cable

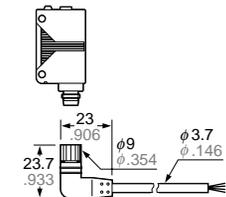
Type	Model No.	Description
Straight	<b>UZZ8031</b>	Length: 2m 6.562ft.
	<b>UZZ8032</b>	Length: 5m 16.404ft.
Elbow	<b>UZZ8131</b>	Length: 2m 6.562ft.
	<b>UZZ8132</b>	Length: 5m 16.404ft.

Cable type: Cabtyre cable with four 0.2mm<sup>2</sup> conductors

• **UZZ803** □



• **UZZ813** □

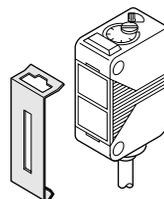


## OPTION

Component	Model No.	Description
Narrow-view slit mask (*1)	<b>UZD801</b>	It makes the horizontal view narrow, and reduces the influence of surrounding objects. (Slit size : 1.5 × 18mm .059 × .709inch)
Sensor mounting bracket (*2)	<b>UZD811</b>	Vertical backward mounting bracket
	<b>UZD812</b>	Vertical mounting bracket

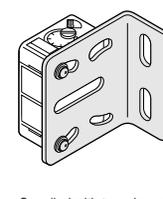
### Narrow-view slit mask

• **UZD801**



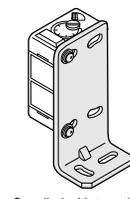
### Sensor mounting bracket

• **UZD811**



Supplied with two pieces of M3 × 18mm .709inch screws

• **UZD812**



Supplied with two pieces of M3 × 18mm .709inch screws

(\*1) : When using with **UZD12**, the adjustable range is 30 to 160mm 1.181 to 6.299inch. It is not available with plug-in connector type.

(\*2) : With the plug-in connector type, space out under the sensor for plug-in connection with the mating cable.

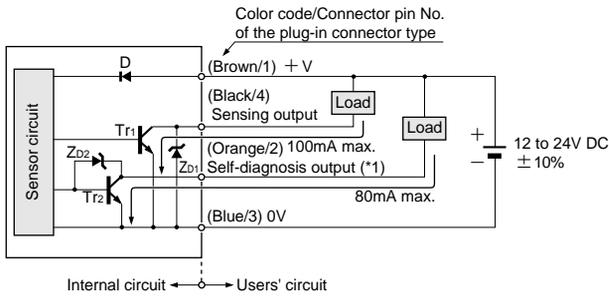
# SPECIFICATIONS

Item	Type	NPN output type			PNP Output type		
	Model No.	UZD10	UZD11	UZD12	UZD105	UZD115	UZD125
Applicable standards	IEC 947-5-2 : 1992						
Adjustable range	20 to 40mm .787 to 1.575inch	30 to 100mm 1.181 to 3.937inch	30 to 200mm 1.181 to 7.874inch	20 to 40mm .787 to 1.575inch	30 to 100mm 1.181 to 3.937inch	30 to 200mm 1.181 to 7.874inch	
Sensing range (with non-glossy white paper and MAX. adjuster)	0 to 40mm 0 to 1.575inch	0 to 100mm 0 to 3.937inch	0 to 200mm 0 to 7.874inch	0 to 40mm 0 to 1.575inch	0 to 100mm 0 to 3.937inch	0 to 200mm 0 to 7.874inch	
Hysteresis	5% or less of set range		20% or less of set range	5% or less of set range		20% or less of set range	
Repeatability	Beam axis direction : 1mm or less .039inch, Vertical direction for a beam axis : 0.2mm or less .008inch (with non glossy white paper)						
Supply voltage	12 to 24V DC $\pm$ 10% Ripple P-P : 10% or less						
Consumption	45mA or less			50mA or less			
Sensing output	NPN open-collector transistor Min. operation current : 100 $\mu$ A Sink current : Max. 100mA Applied voltage : 30V DC or less Residual voltage : 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)			PNP open-collector transistor Min. operation current : 100 $\mu$ A Source current : Max. 100mA Residual voltage : 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)			
	Utilization category	DC-12 or DC-13					
	Output operation	Switch selectable Light-ON or Dark-ON					
	Short-circuit protection	Provided					
Self-diagnostic output	NPN open-collector transistor Sink current : Max. 100mA Applied voltage : 30V DC or less Residual voltage : 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)			PNP open-collector transistor Source current : Max. 80mA Residual voltage : 1V or less (at 80mA sink current) 0.4V or less (at 16mA sink current)			
	Output operation	ON when there is an unstable sensing condition					
	Short-circuit protection	Provided					
Response time	1ms or less						
Operation indicator	Red LED (lights when the sensing output is ON)						
Stable operation indicator	Green LED (lights in the stable light condition or stable dark condition)						
Range adjustment	Two turn adjuster with indicator						
Automatic crosstalk prevention	Provided						
Environmental resistance	Pollution degree	3 (Industrial environment)					
	Protection	IP67 (IEC)					
	Ambient temperature	- 20 to + 55°C - 4 to + 131°F (no dew condensation nor icing allowed), Storage : - 25 to + 70°C - 13 to + 158°F					
	Ambient humidity	35 to 85%RH, Storage : 35 to 85%RH					
	Ambient light	Sun light : 10,000lx on the light-receiving face, Incandescent : 3,000lx on the light-receiving face					
	EMC	Emission : EN50081-2 Immunity : IEC801-2 (Level 3), IEC801-3 (Level 3), IEC801-4 (Level 3), IEC255-5 (Level 3)					
	Withstand voltage	1,000V AC applied between the live parts and enclosure for 1 min.					
	Insulation	20M $\Omega$ or more when 250V DC applied between the live parts and enclosure					
	Vibration	3mm .118inch amplitude at the frequency of 10 to 500Hz in each of X, Y and Z directions for 2 hours each in the power OFF state					
	Shock	500m/s <sup>2</sup> {approx. 50G} impulse in each of X, Y and Z directions 3 times in the power OFF state					
Emitting element	Red LED (modulated)						
Material	Enclosure : PBT, Lens · EIndicator cover : Polycarbonate						
Cable	0.2mm <sup>2</sup> × 4 cores of oil, heat and cold resistant cable of 2m 6.56ft long						
Cable extension	Extendable up to 100m 328.08ft by using 0.3mm <sup>2</sup> or more cable						
Weight	Approx. 50g 1.76oz						
Accessories	Screwdriver for the sensing range adjustment : 1 pc. provided						

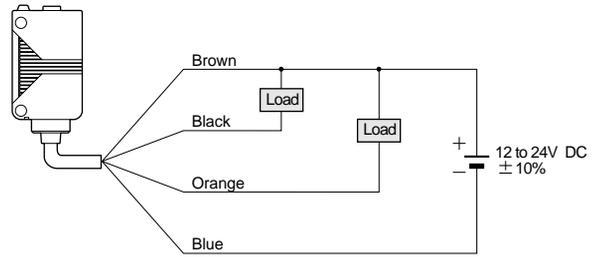
# TYPICAL WIRING DIAGRAMS

## NPN output type

I/O circuit diagram



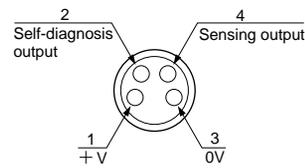
Wiring diagram



(\*1): Using the mating cable for the plug-in connector type substitutes white of the color code on the self-diagnosis output wire.

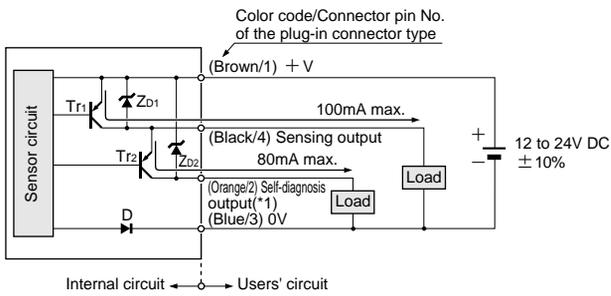
Symbol... D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : NPN output transistor

Connector pin position

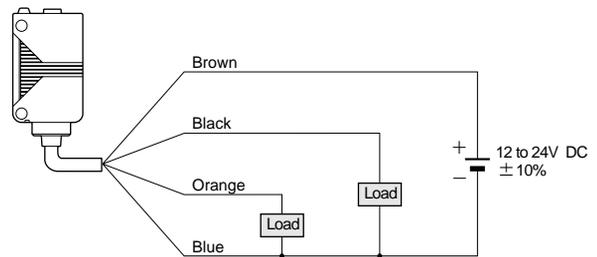


## PNP output type

I/O circuit diagram



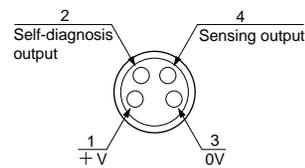
Wiring diagram



(\*1): Using the mating cable for the plug-in connector type substitutes white of the color code on the self-diagnosis output wire.

Symbol...D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : PNP output transistor

Connector pin position

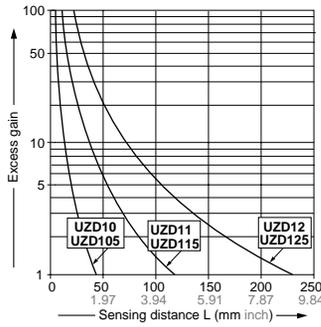


# SENSING FIELDS

These are typical sensing fields, which may vary slightly from unit to unit.

## All models

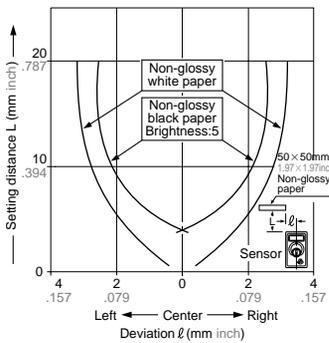
### Sensing range-Excess gain correlation



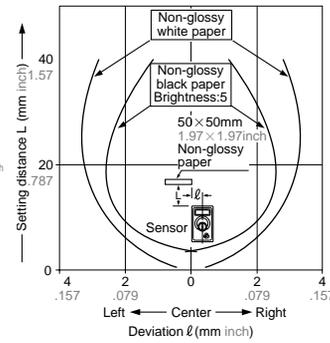
## UZD10, 10A UZD105, 105A

### Sensing field

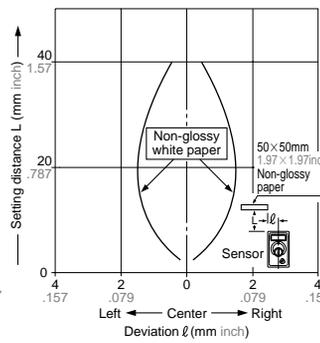
Range set at 20mm .787inch



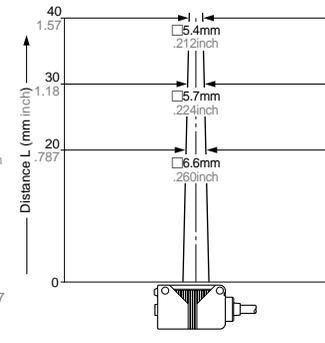
Range set at 40mm 1.575inch



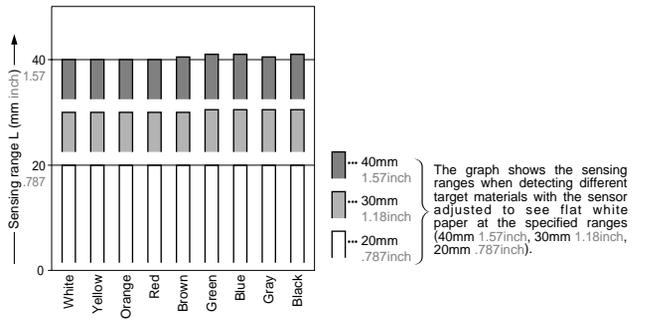
Range set at 40mm 1.575inch with slit mask



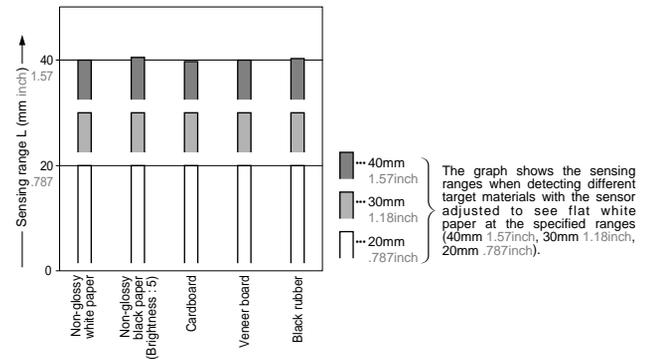
### Light-emitting characteristics



### Color (50 × 50mm 1.969 × 1.969inch) – Sensing range correlation



### Material (50 × 50mm 1.969 × 1.969inch) – Sensing range correlation



# SENSING FIELDS

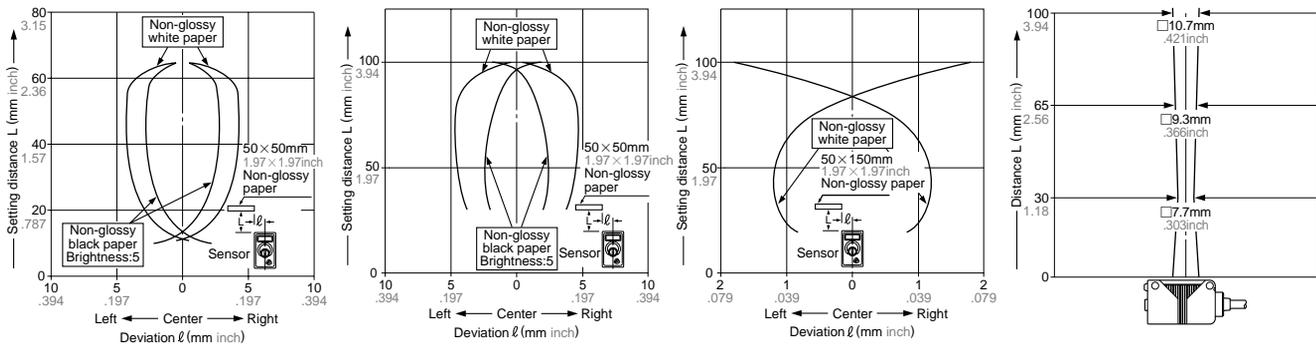
These are typical sensing fields, which may vary slightly from unit to unit.

## UZD11, 11A UZD115, 115A

### Sensing field

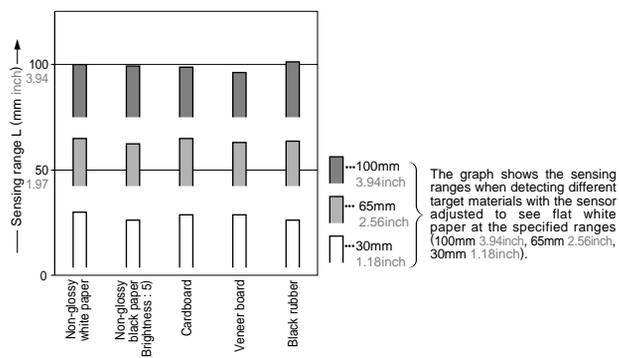
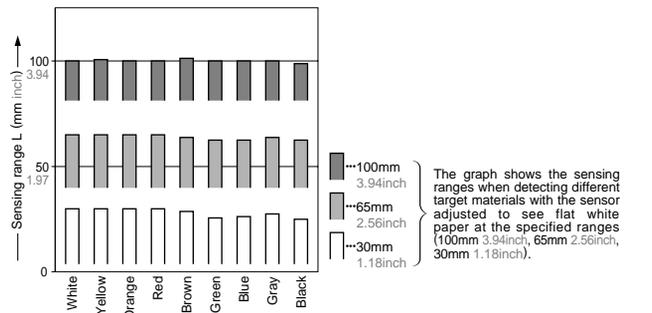
Setting distance at 65mm 2.559inch    Setting distance at 100mm 3.937inch    Setting distance at 100mm 3.937inch with slit mask

### Light-emitting characteristics



### Color (50 × 50mm 1.969 × 1.969inch) – Sensing range correlation

### Material (50 × 50mm 1.969 × 1.969inch) – Sensing range correlation

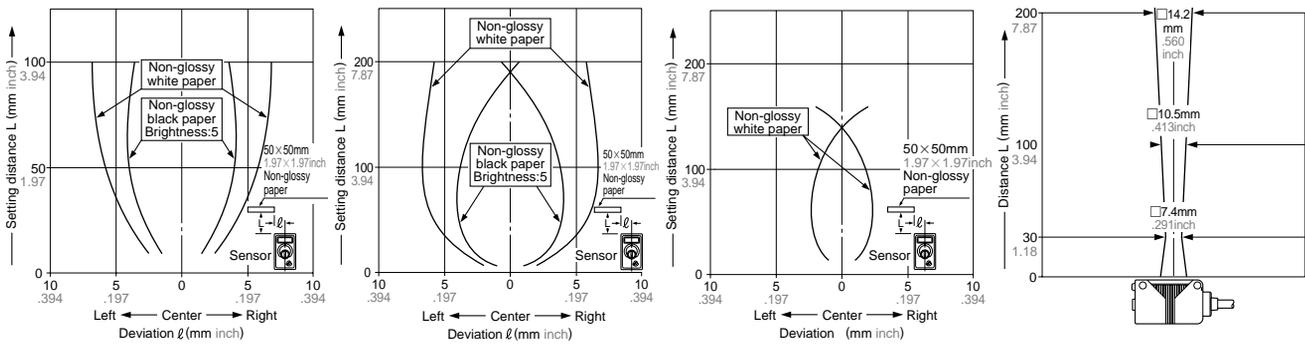


## UZD12, 12A UZD125, 125A

### Sensing field

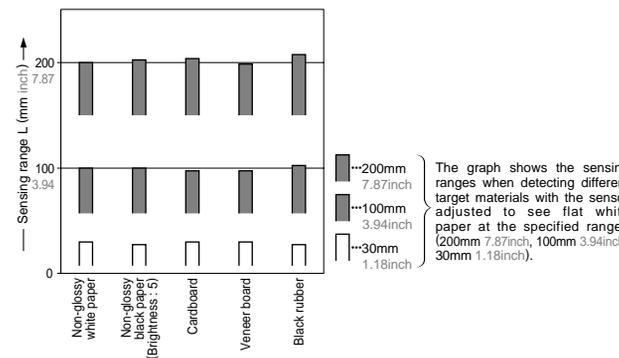
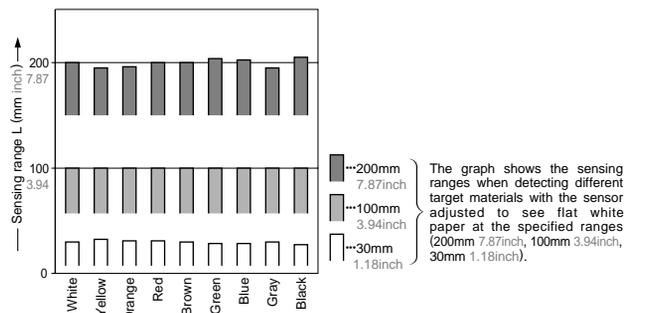
Setting distance at 100mm 3.937inch    Setting distance at 200mm 7.874inch    With slit mask (at MAX. adjuster)

### Light-emitting characteristics



### Color (50 × 50mm 1.969 × 1.969inch) – Sensing range correlation

### Material (50 × 50mm 1.969 × 1.969inch) – Sensing range correlation



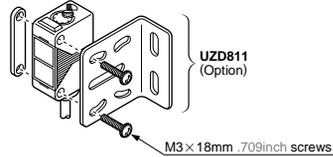
## PRECAUTIONS FOR PROPER USE



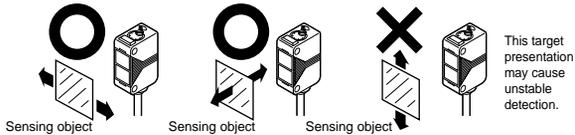
These products are **not** safety sensors and are **not** designed or intended to be used to protect life and prevent bodily injury or property damage.

### Mounting

Tightening torque should be 0.5N·m{5.1kgf·cm} or less.



Care should be taken to orient the sensor properly with respect to the direction of target motion.



Neither specular objects such as aluminum or copper foil, nor shiny materials (painted or coated) make good targets when there is some sensing angle deviation or wrinkles on their surfaces.

Angle the sensor toward the perpendicular to prevent miss-detection when a specular material is the target.

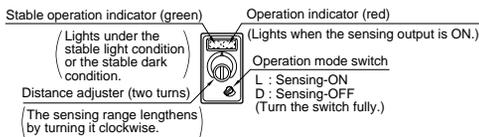
The sensor should lose the signal from any specular or shiny background objects if you slightly change the angle toward it (background influence). The sensor should be angled to miss them and the operation tested to eliminate any miss-detection.

Notice that the sensor goes into the light condition (ON) when too much ambient light is received.

Notice that a dead zone will appear right in front of the sensor when the distance adjuster is set at the NEAR position.

### Distance adjustment

<Adjusters>



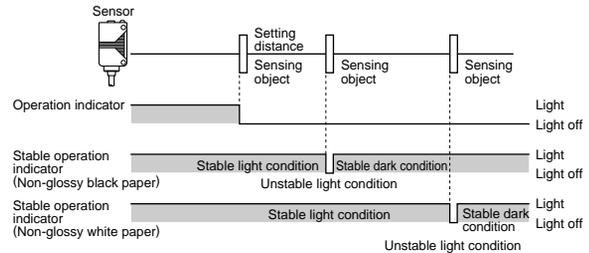
<Setting procedure>

①	Turn the distance adjuster fully counterclockwise to get to the minimum setting position (about 30mm or 20mm 11.811inch or .787inch with UZD10, 105).	
②	Place the target at its normal distance from the sensor, turn the distance adjuster gradually clockwise, and find the "A" point where the sensor "sees" the target.	
③	Remove the target, turn the distance adjuster further clockwise, and find the "B" point where the sensor "sees" the background. (When the sensor does not see the background until the adjuster is fully turned clockwise, "B" point the maximum sensing range).	
④	The optimum position to stably detect targets is the center between "A" and "B" points.	

(\*1) : In order to protect itself, notice that the distance adjuster idles if turned past FAR or NEAR.

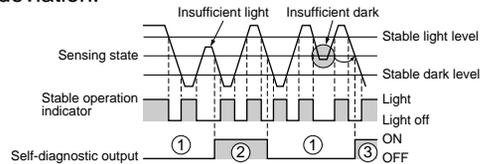
### Stable operation indicator

The UZD10 series uses a PSD (Position Sensitive Diode) as a beam-receiving device which recognizes where the beam is received, not how much of the beam is received (standard diffuse reflective sensors). Note that the positions where the stable operation indicator turns off is varied by the dissimilar reflective level of targets. Do not have the sensor detect objects at ranges where the stable indicator is off (in the unstable light condition).



### Self-diagnostic output

The self-diagnostic output is in the ON state when the light-receiving intensity is reduced due to dirty lens and/or alignment deviation.



- ① The self-diagnostic output transistor is in the ON state during stable sensing.
- ② If the sensor does not arrive at either stable light level or stable dark level when the sensing output turns on or off, the self-diagnostic output turns on.
- ③ If it is insufficiently dark, there will be a time lag before the self-diagnostic output turns on.

### Wiring

Short-circuit protection is not provided for the self-diagnostic output. Do not connect it directly to the power supply or capacitive load.

Power supply should be turned off before wiring.

Verify that any voltage fluctuation does not exceed the rated value.

When using a switching regulator for the power supply (readily available in the market), always ground the frame ground (F.G.) terminal of the supply.

When using equipment which generates electrical noise (switching regulator or inverter motor, etc.) near the sensor, ground the frame ground (F.G.) terminal of this equipment.

Do not run sensor cables near high-voltage lines or power lines, nor put them together in the same raceway. Doing so may cause malfunctions due to inductive interference.

### Others

Do not use the sensor output signal for 50ms immediately after the power is supplied to the sensor.

Avoid places where the sensor may be directly exposed to fluorescent lights with rapid-starters or high frequency lighting as it may affect the sensing performance.

