

NAIS

SUPER-SLIM PHOTOELECTRIC SENSORS

UZH1/2 series

AMPLIFIER BUILT-IN EXTRAORDINARILY DOWN-SIZED



PNP output type available

PNP output type which is much in demand in Europe is now available. Of course, it conforms to the EMC directive.

The Smallest Body Just 3.5mm .138inch Thick

Just W10×H14.5×D3.5mm W.394×H.571×D.138inch in dimensions (the front sensing type of thru-beam mode) The smallest in small sensors you have never seen before. It needs only a minute space to be mounted.



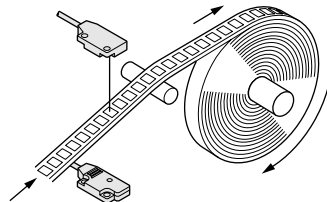
Visible Two-color Indicator

Every **UZH** sensor is incorporated with the visible two-color indicator in the miniature body.



High-speed Response Time : 0.5ms

The sensor is suitable to detect small and high-speed traveling objects.



Waterproof

The **UZH** series has IP67 protection. No matter where it is washed down with water.

Note : Do not expose it to water splash during operation. If it may so, it detects water drop on it.

Red Beam Makes Beam Alignment Easy

The red LED beam projected from the emitter helps you to align the sensor heads.

Flexible Mounting

In the diffuse reflective mode, there is the front sensing type that keeps original flatness of the mounting base.

In the thru-beam mode, there are the front sensing type and the side sensing type, that give you versatility in mounting.

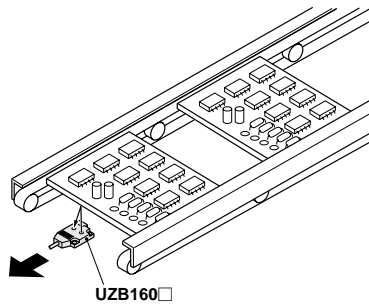
Diffuse reflective/
Front sensing type

Thru-beam
• Front sensing type

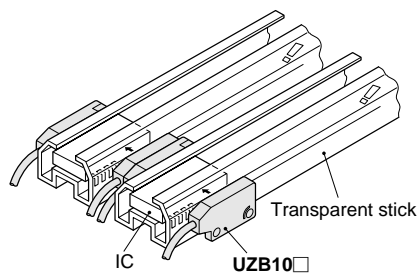
• Side sensing type

APPLICATIONS

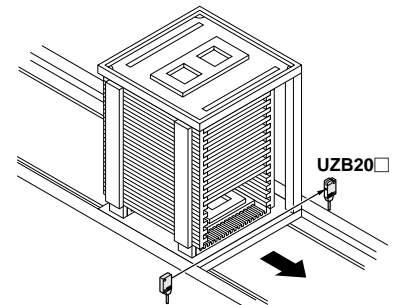
Verifying position of PCBs



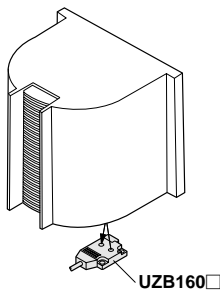
Detecting ICs



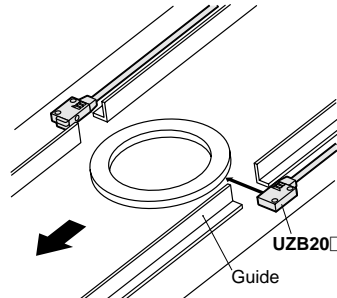
Detecting PCB rack



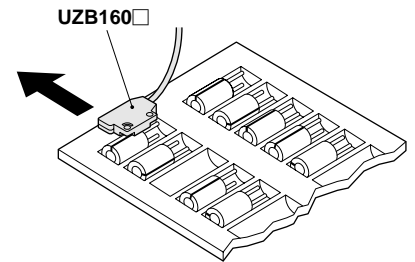
Detecting wafer cassette



Detecting thin ring

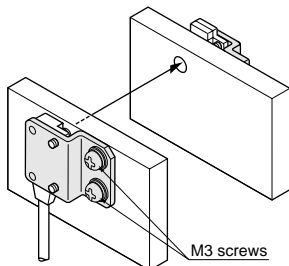


Checking for absence of capacitor in tray

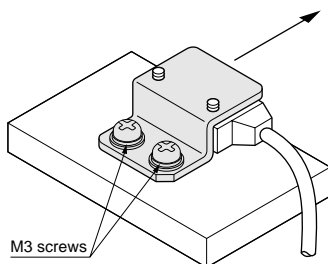


Mountable with M3 Screws

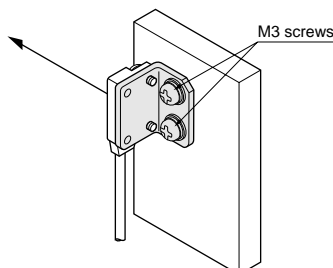
- UZB801 (SPCC) (mounting bracket for the front sensing type)



- UZB802 (SPCC) (mounting bracket for the side sensing type)

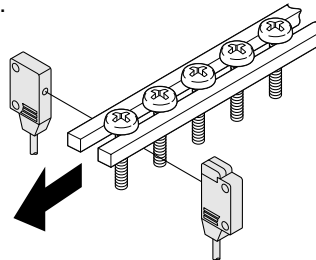


- UZB803 (SPCC) (L-shaped mounting bracket)



Minimum Sensing Object : $\phi 1\text{mm}$.039inch

Each of the **UZB101** and the **UZB201** is incorporated with the slit masks $\phi 1\text{mm}$.039inch on both the emitter and the receiver. Any object more than $\phi 1\text{mm}$.039inch can be detected so that they work for precise positioning or small parts detection.

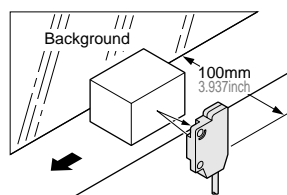


Long Sensing Range : 1,000mm 39.37inch

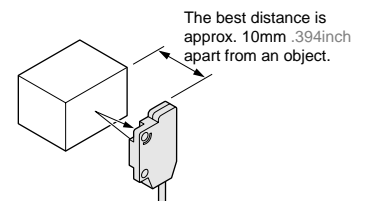
A sensing range of 1,000mm 39.37inch has been realized with a slim size of just 3.5mm .138inch. It can be used for wide objects. Moreover, the visible red LED beam projected from the emitter helps you to align the sensor heads.

Background Suppression : UZB1601, UZB1602

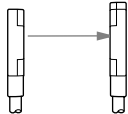
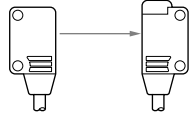
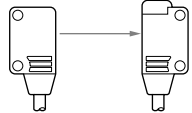

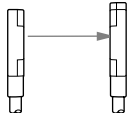
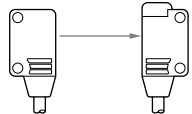
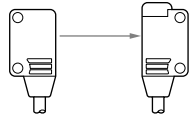
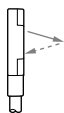
- **Not affected by background**
Its convergent reflection does not sense any background right opposed more than 100mm 3.937inch apart.



- **Black object securely detected**
As the other advantage of the convergent reflection, it can securely detect dark color objects.



ORDER GUIDE

			Appearance	Sensing range	Model No.	Output operation	Min. sensing object
NPN Output type	Thru-beam	Front sensing		150mm 5.906inch	UZH1011	Light-ON	Opaque object of $\phi 1\text{mm}$ $\phi .039\text{inch}$
					UZH1012	Dark-ON	
				500mm 19.685inch	UZH1021	Light-ON	Opaque object of $\phi 2\text{mm}$ $\phi .079\text{inch}$
					UZH1022	Dark-ON	
				1,000mm 19.685 inch	UZH1031	Light-ON	Opaque object of $\phi 2\text{mm}$ $\phi .079\text{inch}$
					UZH1032	Dark-ON	
	Side sensing			150mm 5.906inch	UZH2011	Light-ON	Opaque object of $\phi 1\text{mm}$ $\phi .039\text{inch}$
					UZH2012	Dark-ON	
				500mm 19.685inch	UZH2021	Light-ON	Opaque object of $\phi 2\text{mm}$ $\phi .079\text{inch}$
					UZH2022	Dark-ON	
	Fixed-focus reflective (diffused light type)	Front sensing		2 to 25 mm (*1) .079 to .984inch (Center : 10mm .394inch)	UZH1601	Light-ON	Opaque object of $\phi 0.1\text{mm}$ $\phi .004\text{inch}$ (Setting distance : 10mm .394inch)
					UZH1602	Dark-ON	
PNP Output type	Thru-beam	Front sensing		150mm 5.906inch	UZH10115	Light-ON	Opaque object of $\phi 1\text{mm}$ $\phi .039\text{inch}$
					UZH10125	Dark-ON	
				500mm 19.685inch	UZH10215	Light-ON	Opaque object of $\phi 2\text{mm}$ $\phi .079\text{inch}$
					UZH10225	Dark-ON	
				1,000mm 19.685 inch	UZH10315	Light-ON	Opaque object of $\phi 2\text{mm}$ $\phi .079\text{inch}$
					UZH10325	Dark-ON	
	Side sensing			150mm 5.906inch	UZH20115	Light-ON	Opaque object of $\phi 1\text{mm}$ $\phi .039\text{inch}$
					UZH20125	Dark-ON	
				500mm 19.685inch	UZH20215	Light-ON	Opaque object of $\phi 2\text{mm}$ $\phi .079\text{inch}$
					UZH20225	Dark-ON	
	Fixed-focus reflective (diffused light type)	Front sensing		2 to 25 mm (*1) .079 to .984inch (Center : 10mm .394inch)	UZH16015	Light-ON	Opaque object of $\phi 0.1\text{mm}$ $\phi .004\text{inch}$ (Setting distance : 10mm .394inch)
					UZH16025	Dark-ON	

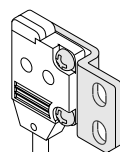
(*1) : The sensor does not detect even a specular background object if a distance of 100mm 3.937inch or more from a sensing surface.

OPTION

Designation	Model No.	Description
Sensor mounting bracket	UZH801	Mounting bracket for the front sensing type (SPCC) (The thru-beam sensor needs two brackets)
	UZH802	Mounting bracket for the side sensing type (SPCC) (The thru-beam sensor needs two brackets)
	UZH803	L-shaped mounting bracket (SPCC) (The thru-beam sensor needs two brackets)

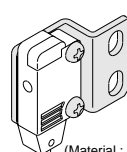
Sensor mounting bracket

• UZH801



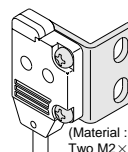
(Material : SPCC)
Two M2×4mm .157inch
pan head screws
are attached.

• UZH802



(Material : SPCC)
Two M2×8mm .315inch
pan head screws
are attached.

• UZH803



(Material : SPCC)
Two M2×4mm .157inch
pan head screws, and
two M2×8mm .315inch
pan head screws are
attached.

Slit mask

		For front sensing type				For side sensing type
		Hole diameter $\phi 1.2\text{mm}$ $\phi .047\text{inch}$		Hole diameter $\phi 1.5\text{mm}$ $\phi .059\text{inch}$		Hole diameter $\phi 1.2\text{mm}$ $\phi .047\text{inch}$
Model No.		UZH811		UZH812		UZH813
Applicable sensor		UZH102□	UZH103□	UZH102□	UZH103□	UZH202□
Min. sensing object	Slit on one side	$\phi 2\text{mm}$ $\phi .079\text{inch}$	$\phi 2\text{mm}$ $\phi .079\text{inch}$	$\phi 2\text{mm}$ $\phi .079\text{inch}$	$\phi 2\text{mm}$ $\phi .079\text{inch}$	$\phi 2\text{mm}$ $\phi .079\text{inch}$
	Slit on both sides	$\phi 1.2\text{mm}$ $\phi .047\text{inch}$	$\phi 1.2\text{mm}$ $\phi .047\text{inch}$	$\phi 1.5\text{mm}$ $\phi .059\text{inch}$	$\phi 1.5\text{mm}$ $\phi .059\text{inch}$	$\phi 1.2\text{mm}$ $\phi .047\text{inch}$
Sensing range	Slit on one side	250mm 9.843inch	600mm 23.622inch	350mm 13.780inch	800mm 31.496inch	250mm 9.843inch
	Slit on both sides	200mm 7.874inch	400mm 15.748inch	300mm 11.811inch	500mm 19.685inch	200mm 7.874inch

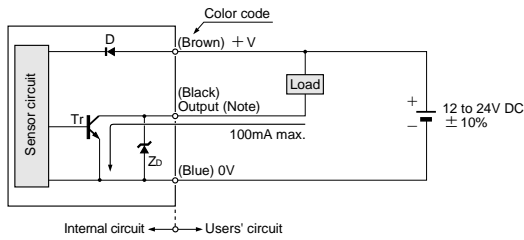
SPECIFICATIONS

Type			Thru-beam										Fixed-focus reflective (diffused light type)				
			Front sensing						Side sensing				Front sensing				
Item	Model No.	NPN output	UZB1011	UZB1012	UZB1021	UZB1022	UZB1031	UZB1032	UZB2011	UZB2012	UZB2021	UZB2022	UZB1601	UZB1602			
		PNP output	UZB1011S	UZB1012S	UZB1021S	UZB1022S	UZB1031S	UZB1032S	UZB2011S	UZB2012S	UZB2021S	UZB2022S	UZB1601S	UZB1602S			
Sensing range			150mm 5.901inch		500mm 19.685inch		1,000mm 39.37inch		150mm 5.901inch		500mm 19.685inch		2 to 25mm .079 to .984inch (Center: 10mm .394inch) (*1)				
Min. sensing object			Opaque object of φ1mm φ.039inch (Setting distance of the emitter & receiver : 150mm 5.901inch)		Opaque object of φ2mm φ.079inch (Setting distance of the emitter & receiver : 500mm 19.685inch)		Opaque object of φ2mm φ.079inch (Setting distance of the emitter & receiver : 1,000mm 39.37inch)		Opaque object of φ1mm φ.039inch (Setting distance of the emitter & receiver : 150mm 5.901inch)		Opaque object of φ2mm φ.079inch (Setting distance of the emitter & receiver : 500mm 19.685inch)		Copper wire of φ0.1mm φ.004inch (Setting distance : 10mm .394inch)				
Hysteresis													15% or less of the set range				
Repeatability (Perpendicular to axial direction)			0.05mm .002inch or less										0.1mm .004inch 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 • 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 • 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	Light-ON	Dark-ON	Light-ON	Dark-ON	Light-ON	Dark-ON	Light-ON	Dark-ON
			Short-circuit protection			Incorporated											
Response time			0.5ms or less														
Operation indicator			Red LED (lights up when output is ON)														
Stability indicator			Green LED (lights up under stable light received condition or stable dark condition)														
Environmental resistance	Pollution degree		3 (Industrial environment)														
	Protection		IP67 (IEC)														
	Ambient temperature		－25 to ＋55℃ －13 to ＋131°F (No dew condensation or icing allowed), Storage : －30 to ＋70℃ －22 to ＋158°F														
	Ambient humidity		35 to 85%RH, Storage : 35 to 85%RH														
	Ambient illuminance		Sunlight : 10,000lx at the light-receiving face, Incandescent : 3,000lx 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 in X, Y and Z directions for two hours each														
	Shock resistance		500m/s ² acceleration (50G approx.) In X, Y and Z directions for three times each														
Emitting element			Red LED (modulated)														
Material			Enclosure: Polyethylene terephthalate, Lens: Polyally late														
Cable			0.1mm ² 3 cores (thru-beam type emitter: 2-core) cabtyre cable, 2m 6.562ft long														
Cable extension			Extensible up to total 50m 164.04ft is possible with 0.3mm ² , or more, cable (thru-beam type: both emitter and receiver)														
Weight			Emitter: 20g .071oz approx. Receiver: 20g .071oz approx.										20g .071oz approx.				
Accessories			Mounting screws : 2 sets										Mounting screw : 1 set				

(*1) : The sensing range of convergent reflective type sensor is specified for white non-glossy paper (50×50mm 1.969×1.969inch) as the object.

I/O CIRCUIT DIAGRAMS

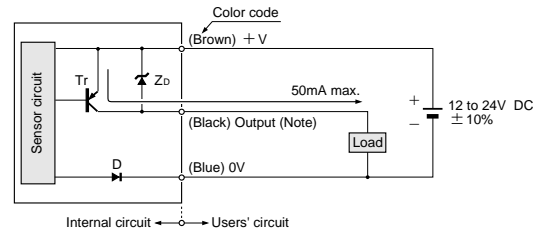
NPN output type



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

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

PNP output type



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

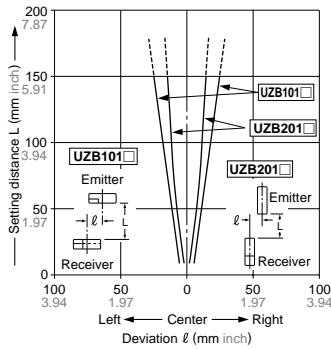
Symbol...D : Reverse polarity protection diode
Zd : Surge absorption zener diode
Tr : PNP output transistor

SENSING FIELDS

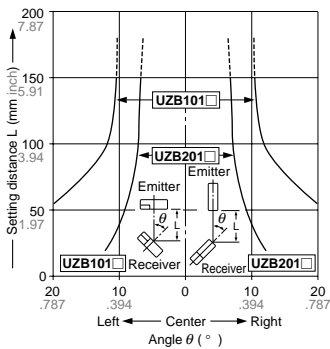
There are typical sensing fields, which may slightly change from model to model.

UZH1011 UZH2011 UZH1012 UZH2012

Parallel deviation

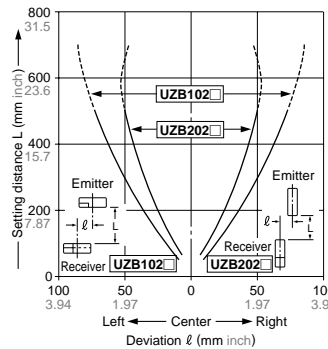


Angular deviation

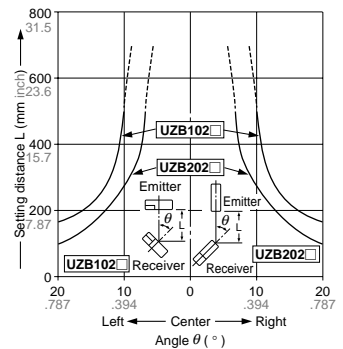


UZH1021 UZH2021 UZH1022 UZH2022

Parallel deviation



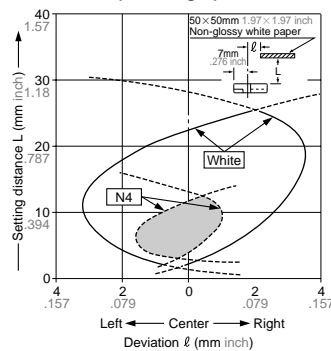
Angular deviation



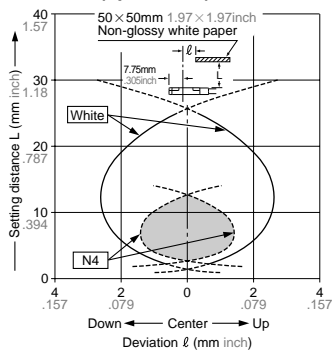
UZH1601 UZH1602

Sensing field

• Horizontal (left & right) direction

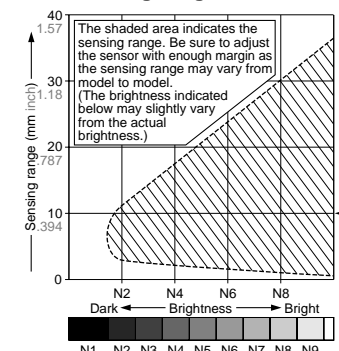


• Vertical (up & down) direction



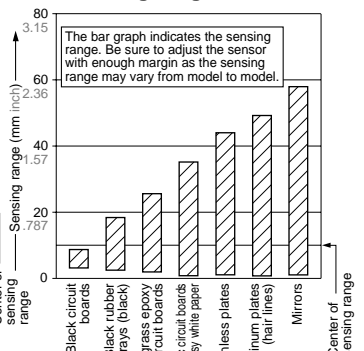
Brightness

– Sensing range correlation



Material (50×50mm 1.969×1.969inch)

– Sensing range correlation



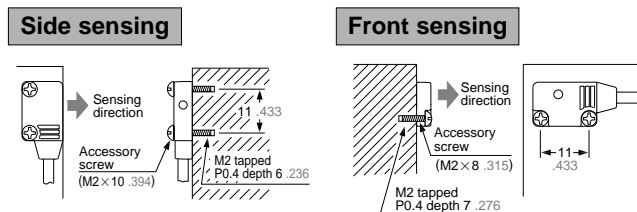
PRECAUTIONS FOR PROPER USE



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.

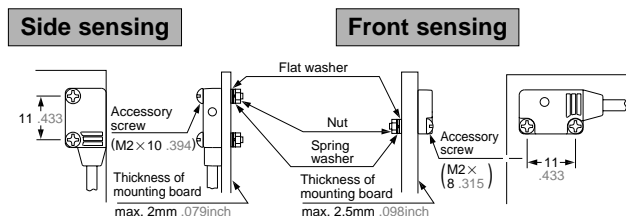
Mounting

When making a tap for mounting



Tightening torque must not exceed $0.2\text{N}\cdot\text{m}$ ($2.04\text{kgf}\cdot\text{cm}$).

When using an accessory screw and nut



Tightening torque must not exceed $0.2\text{N}\cdot\text{m}$ ($2.04\text{kgf}\cdot\text{cm}$).

Others

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

Do not use the sensor where it may be exposed to steam or dusts, or immersed in water.

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.

Wiring

Power supply should be turned off before wiring. Verify voltage fluctuation so that it should 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.

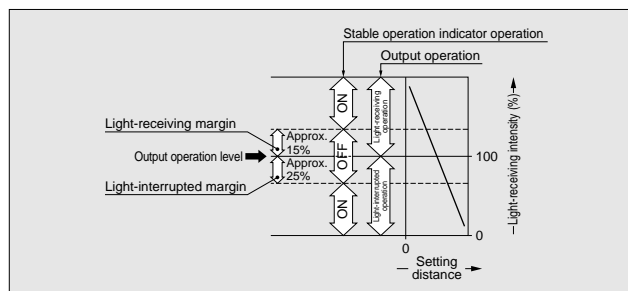
When using an equipment which generates the noises (switching regulator or inverter motor, etc.) near the sensor, ground the frame ground (F.G.) terminal of the equipment.

Do not run sensor cables near high-voltage lines or power lines, nor put them together in the same raceway.

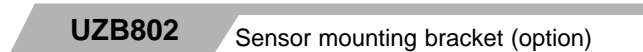
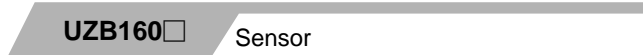
Doing so may cause malfunctions due to inductive interference.

Stable operation indicator

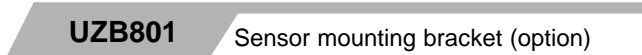
The stable operation indicator (green) lights when the light-receiving intensity of the signal light is sufficient against the operation level. If the light-receiving level where the stable operation indicator lights, the sensor can detect stably without affecting the temperature and the voltage changes at the light-receiving and the light-interrupted operations.



UZH101 ☐ UZH102 ☐
UZH103 ☐ Sensor



Material : SPCC
2 pieces of M2×8mm .315inch
pan head screws are attached



Material : SPCC
2 pieces of M2×4mm .157inch
pan head screws are attached

Material : SPCC

2 pieces of M2×4mm .157inch
and 2 pieces of M2×8mm .315inch
pan head screws are attached