

NAIS

SUPER-SLIM PHOTOELECTRIC SENSORS

UZH1/2 series

AMPLIFIER BUILT-IN EXTRAORDINARILY DOWN-SIZED



The Smallest Body Just 3.5mm .138inch Thick

Just $W10 \times H14.5 \times D3.5\text{mm}$ $W.394 \times H.571 \times D.138\text{inch}$ 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.



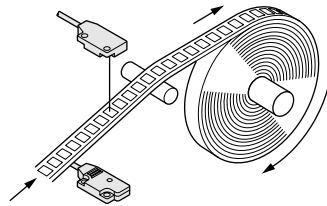
Visible Two-color Indicator

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.

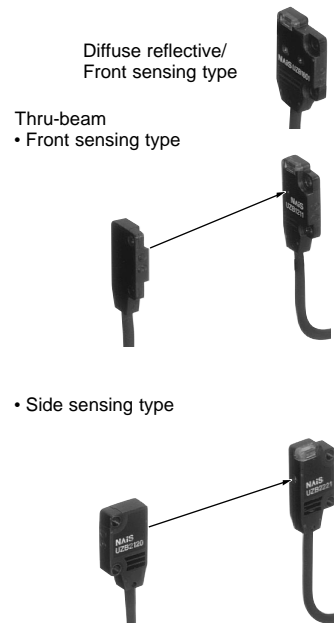
PNP output type available

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

Flexible Mounting

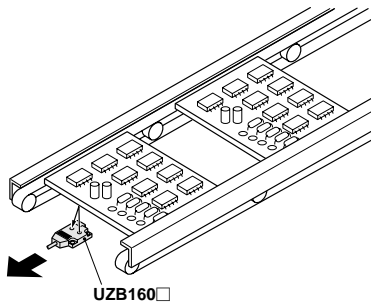
In the diffuse reflective mode, there is the front sensing type that keeps original flatness of the mounting base.

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

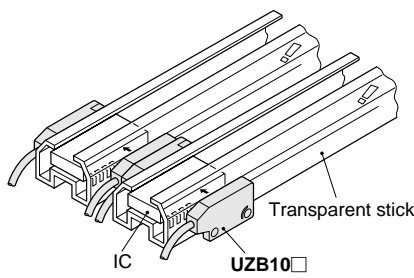


APPLICATIONS

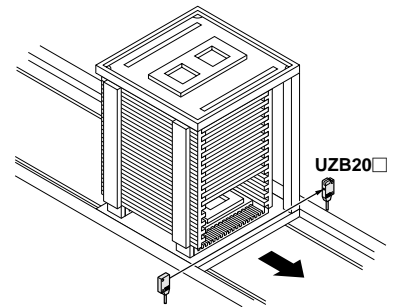
Verifying position of PCBs



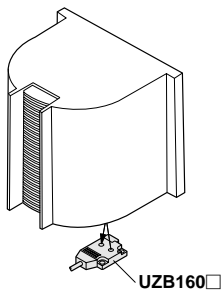
Detecting ICs



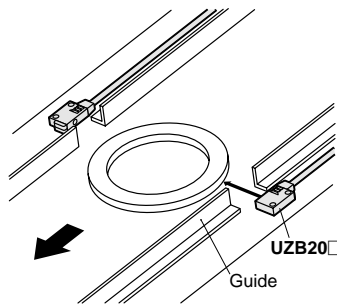
Detecting PCB rack



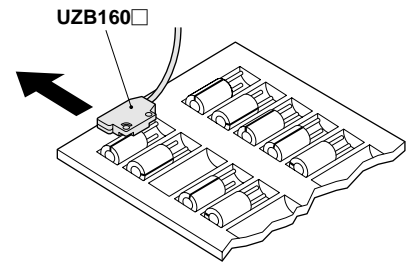
Detecting wafer cassette



Detecting thin ring

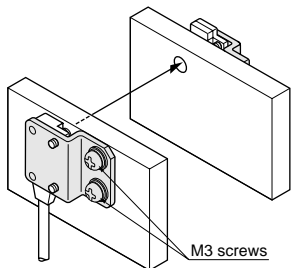


Checking for absence of capacitor in tray

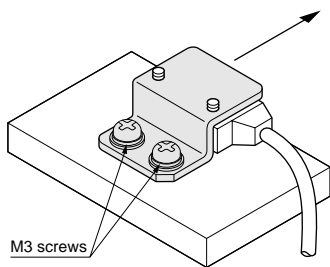


Mountable with M3 Screws

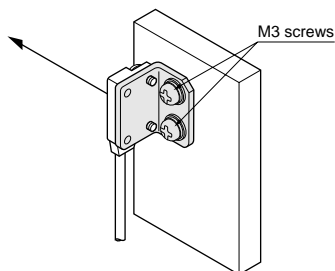
- UZB801 (SPCC) (mounting bracket for the front sensing type)



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

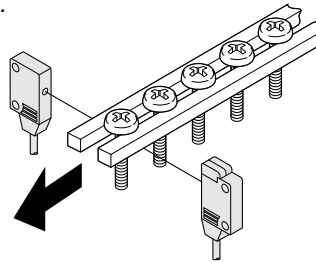


- UZB803 (SPCC) (L-shaped mounting bracket)



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.

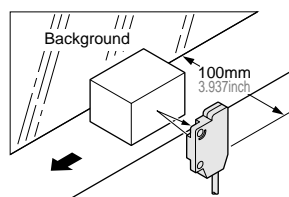


Long Sensing Range : 1,000mm 39.37inch

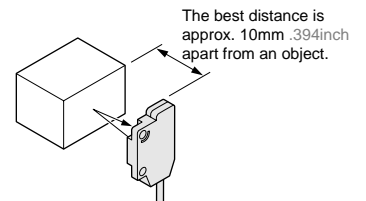
A sensing range of 1,000mm 39.37inch has been realized with a slim size of just 3.5mm .138inch. It can be used for wide objects. Moreover, the visible red LED beam projected from the emitter helps you to align the sensor heads.

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	UZB1011	Light-ON	Opaque object of ϕ 1mm ϕ .039inch
					UZB1012	Dark-ON	
				500mm 19.685inch	UZB1021	Light-ON	Opaque object of ϕ 2mm ϕ .079inch
		UZB1022			Dark-ON		
		1,000mm 19.685 inch		UZB1031	Light-ON	Opaque object of ϕ 2mm ϕ .079inch	
				UZB1032	Dark-ON		
	Side sensing	150mm 5.906inch	UZB2011	Light-ON	Opaque object of ϕ 1mm ϕ .039inch		
			UZB2012	Dark-ON			
		500mm 19.685inch	UZB2021	Light-ON	Opaque object of ϕ 2mm ϕ .079inch		
UZB2022	Dark-ON						
Fixed-focus reflective (diffused light type)	Front sensing		2 to 25 mm (*1) .079 to .984inch (Center : 10mm .394inch)	UZB1601	Light-ON	Opaque object of ϕ 0.1mm ϕ .004inch (Setting distance : 10mm .394inch)	
				UZB1602	Dark-ON		
PNP Output type	Thru-beam	Front sensing		150mm 5.906inch	UZB10115	Light-ON	Opaque object of ϕ 1mm ϕ .039inch
					UZB10125	Dark-ON	
				500mm 19.685inch	UZB10215	Light-ON	Opaque object of ϕ 2mm ϕ .079inch
		UZB10225			Dark-ON		
		1,000mm 19.685 inch		UZB10315	Light-ON	Opaque object of ϕ 2mm ϕ .079inch	
				UZB10325	Dark-ON		
	Side sensing	150mm 5.906inch	UZB20115	Light-ON	Opaque object of ϕ 1mm ϕ .039inch		
			UZB20125	Dark-ON			
		500mm 19.685inch	UZB20215	Light-ON	Opaque object of ϕ 2mm ϕ .079inch		
UZB20225	Dark-ON						
Fixed-focus reflective (diffused light type)	Front sensing		2 to 25 mm (*1) .079 to .984inch (Center : 10mm .394inch)	UZB16015	Light-ON	Opaque object of ϕ 0.1mm ϕ .004inch (Setting distance : 10mm .394inch)	
				UZB16025	Dark-ON		

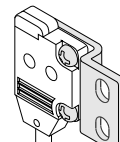
(*1) : The sensor does not detect even a specular background object if a distance of 100mm 3.937inch or more from a sensing surface.

OPTION

Designation	Model No.	Description
Sensor mounting bracket	UZB801	Mounting bracket for the front sensing type (SPCC) (The thru-beam sensor needs two brackets)
	UZB802	Mounting bracket for the side sensing type (SPCC) (The thru-beam sensor needs two brackets)
	UZB803	L-shaped mounting bracket (SPCC) (The thru-beam sensor needs two brackets)

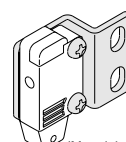
Sensor mounting bracket

• UZB801



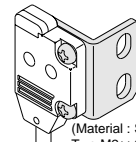
(Material : SPCC)
Two M2 \times 4mm .157inch
pan head screws
are attached.

• UZB802



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

• UZB803



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

Slit mask

		For front sensing type				For side sensing type
		Hole diameter ϕ 1.2mm ϕ .047inch		Hole diameter ϕ 1.5mm ϕ .059inch		Hole diameter ϕ 1.2mm ϕ .047inch
Model No.		UZB811		UZB812		UZB813
Applicable sensor		UZB102 □	UZB103 □	UZB102 □	UZB103 □	UZB202 □
Min. sensing object	Slit on one side	ϕ 2mm ϕ .079inch	ϕ 2mm ϕ .079inch	ϕ 2mm ϕ .079inch	ϕ 2mm ϕ .079inch	ϕ 2mm ϕ .079inch
	Slit on both sides	ϕ 1.2mm ϕ .047inch	ϕ 1.2mm ϕ .047inch	ϕ 1.5mm ϕ .059inch	ϕ 1.5mm ϕ .059inch	ϕ 1.2mm ϕ .047inch
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

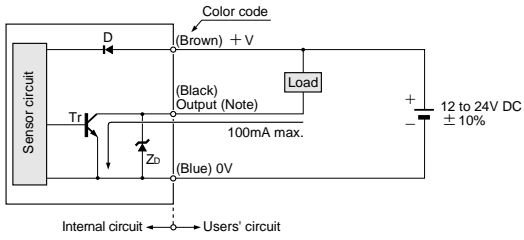
SPECIFICATIONS

Item	Model No.	Type	Thru-beam										Fixed-focus reflective (diffused light type)	
			Front sensing					Side sensing					Front sensing	
			NPN output	UZH1011	UZH1012	UZH1021	UZH1022	UZH1031	UZH1032	UZH2011	UZH2012	UZH2021	UZH2022	UZH1601
PNP output	UZH1011S	UZH1012S	UZH1021S	UZH1022S	UZH1031S	UZH1032S	UZH2011S	UZH2012S	UZH2021S	UZH2022S	UZH1601S	UZH1602S		
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 ϕ 1mm ϕ .039inch (Setting distance of the emitter & receiver : 150mm 5.901inch)		Opaque object of ϕ 2mm ϕ .079inch (Setting distance of the emitter & receiver : 500mm 19.685inch)		Opaque object of ϕ 2mm ϕ .079inch (Setting distance of the emitter & receiver : 1,000mm 39.37inch)		Opaque object of ϕ 1mm ϕ .039inch (Setting distance of the emitter & receiver : 150mm 5.901inch)		Opaque object of ϕ 2mm ϕ .079inch (Setting distance of the emitter & receiver : 500mm 19.685inch)		Copper wire of ϕ 0.1mm 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 \pm 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°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		Sunlight : 10,000 lx at the light-receiving face, Incandescent : 3,000 lx 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		20M Ω 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

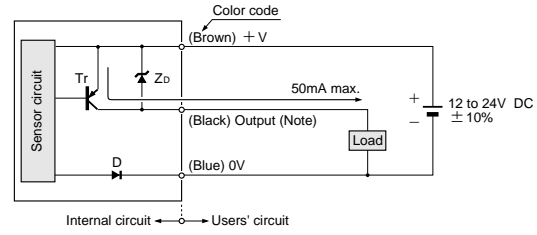
NPN output type



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.

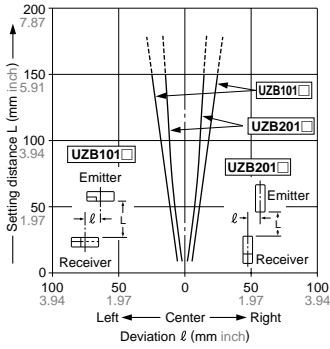
Symbol...D : Reverse polarity protection diode
 ZD: Surge absorption zener diode
 Tr : PNP output transistor

SENSING FIELDS

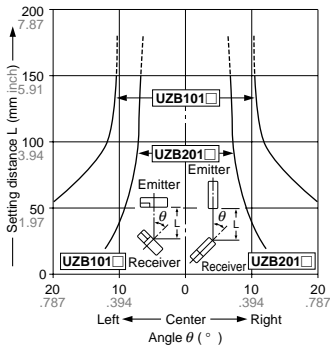
There are typical sensing fields, which may slightly change from model to model.

UZB1011 UZB2011 UZB1012 UZB2012

Parallel deviation

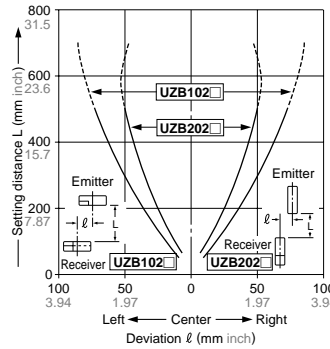


Angular deviation

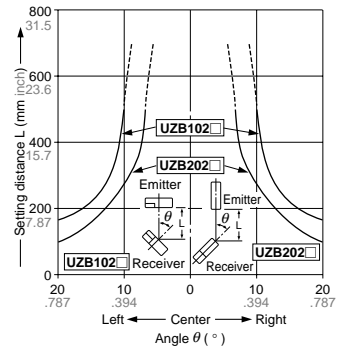


UZB1021 UZB2021 UZB1022 UZB2022

Parallel deviation



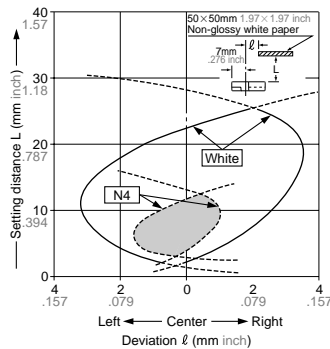
Angular deviation



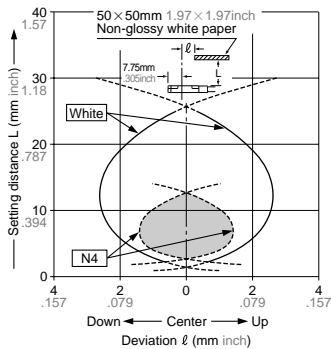
UZB1601 UZB1602

Sensing field

• Horizontal (left & right) direction

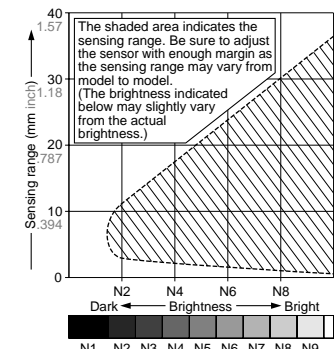


• Vertical (up & down) direction



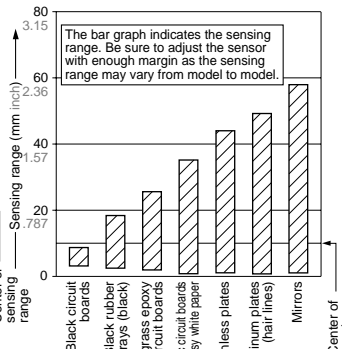
Brightness

– Sensing range correlation



Material (50×50mm 1.969×1.969inch)

– Sensing range correlation



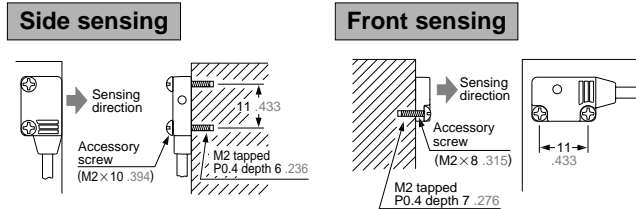
PRECAUTIONS FOR PROPER USE



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.

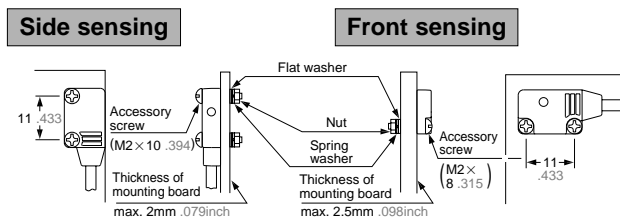
Mounting

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.

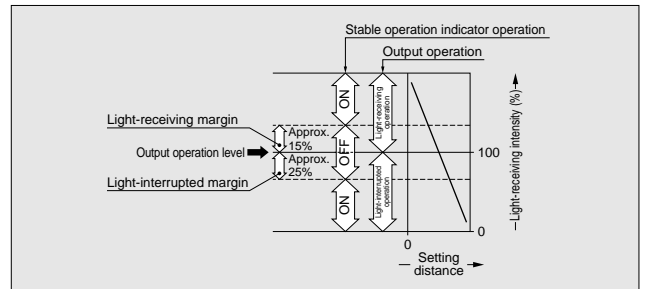
When using an equipment which generates the noises (switching regulator or inverter motor, etc.) near the sensor, ground the frame ground (F.G.) terminal of the equipment.

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.

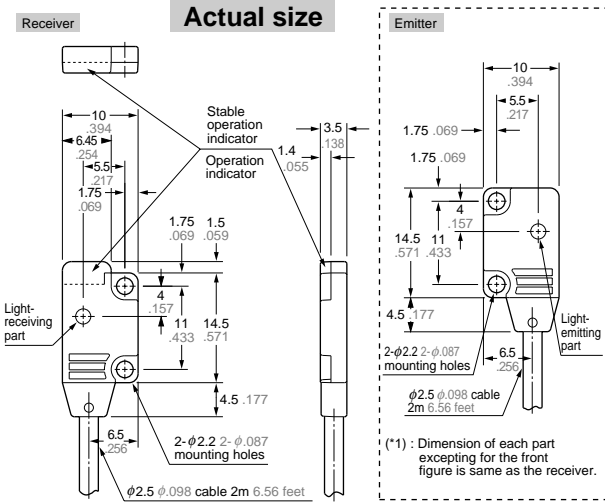
Stable operation indicator

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.

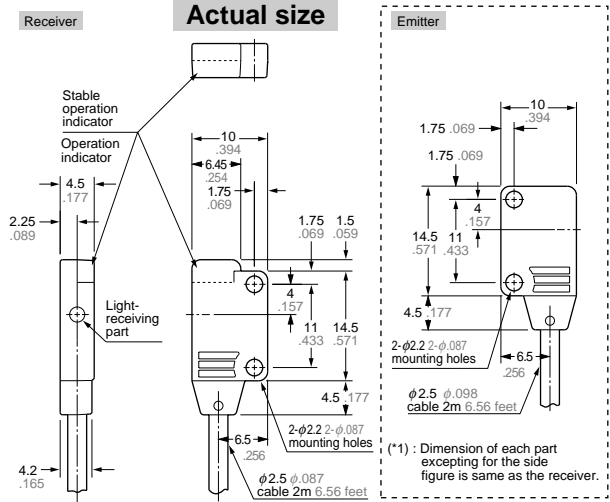


DIMENSIONS (Unit : mm inch)

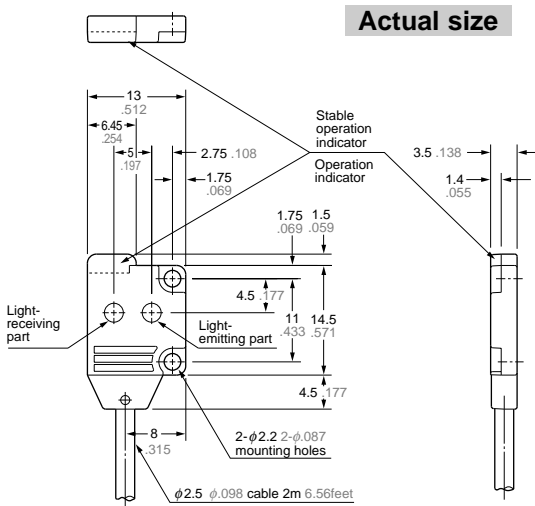
UZH101 UZH102 UZH103 Sensor



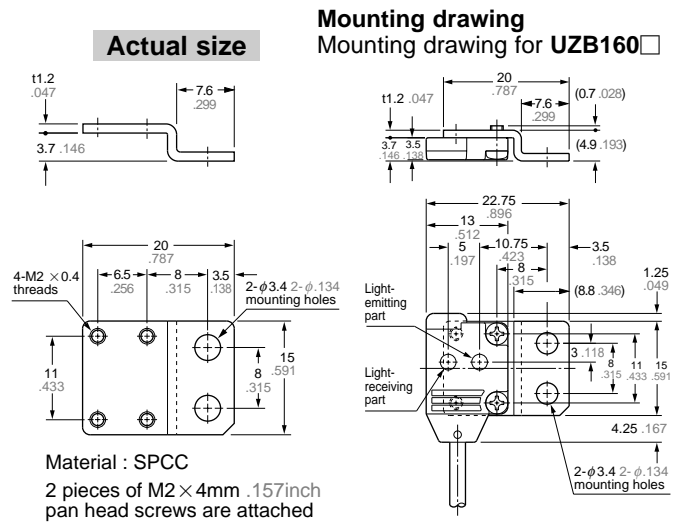
UZH201 UZH202 Sensor



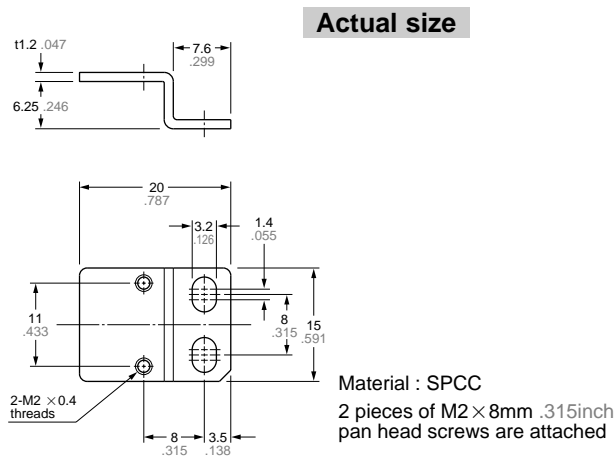
UZH160 Sensor



UZH801 Sensor mounting bracket (option)



UZH802 Sensor mounting bracket (option)



UZH803 Sensor mounting bracket (option)

