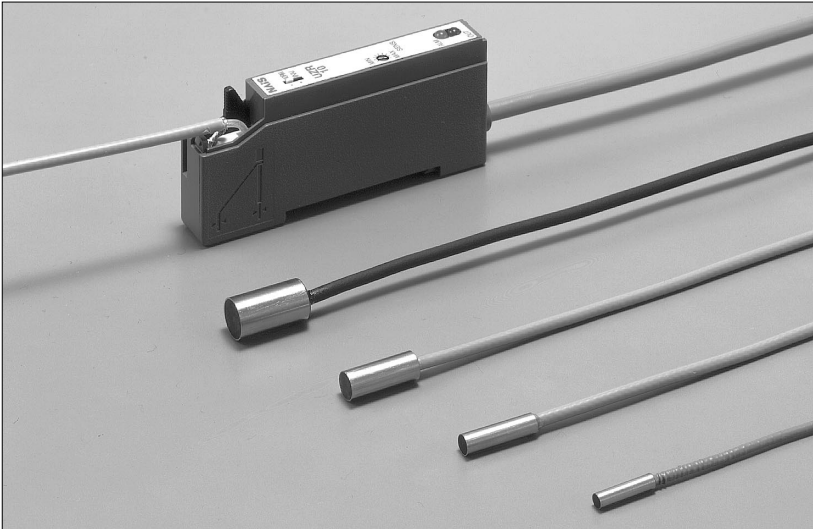
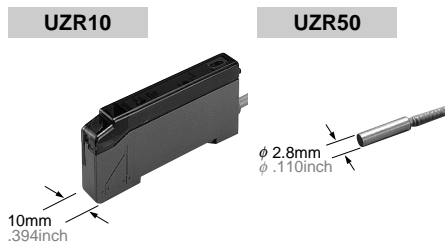


### THE HIGHEST ACCURACY FOR YOUR SENSING APPLICATIONS



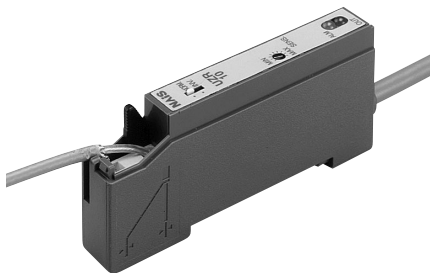
#### Slim & Microscopic

The amplifier is just 10mm .394inch wide, the smallest beyond anyone else. The style of it is equivalent to **UZF1**, **UZF3**, and **UZG** in shape and mounting style, thus all of these amplifiers can be settled in an orderly row on the DIN rail. The smallest sensor head **UZR50** is just 2.8mm .110inch diameter in this series.



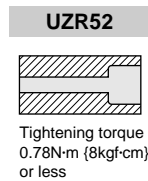
#### One-touch Cramping

The sensor head cable can be connected with the lever at a touch.



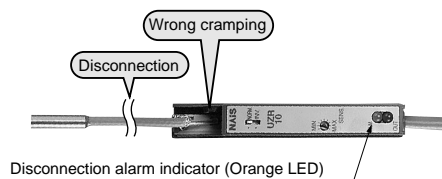
#### Reliable

The sensor heads, **UZR51**, **UZR52**, and **UZR53**, offer confident durability of IP67 to work under a harsh and greasy industrial environment. The side wall becomes also much thicker than conventional models, thus the allowable tightening torque has been improved.



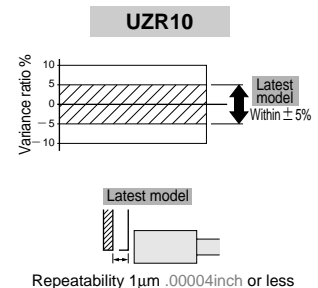
#### Disconnection Alarm Indicator

If the sensor head cable is damaged, or mis-connected, the disconnection alarm indicator (orange LED) lights up for your notice.



#### Accurate

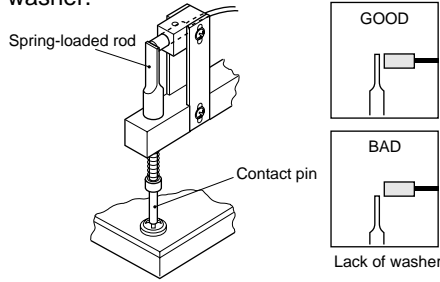
The sensitivity adjuster enables such a wide range of 18 turns that it gives you the finest adjustment. Besides, the repeat accuracy is 1μm .00004ft or less, and the temperature characteristic is within ±5%. So precise positioning is an easy job.



## APPLICATIONS

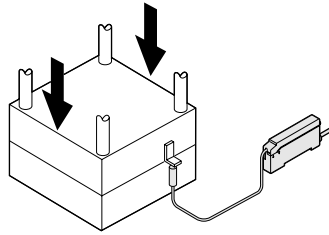
### Inspecting presence of washer

The sensor detects the spring-loaded rod that shifts up as much height as a washer.



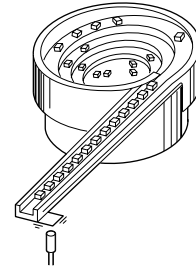
### Aligning press molds

The sensor detects the position of the upper die accurately.



### Observing vibration of parts-feeder

The sensor watches how much the feeder vibrates.



## ORDER GUIDE

### Amplifier

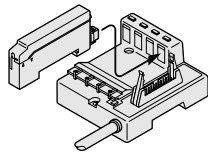
Appearance	Model No.	Supply voltage	Output
	<b>UZR10</b>	12 to 24V DC $\pm$ 10%	NPN open-collector transistor

### Plug-in connector type

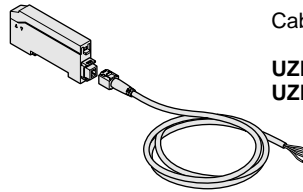
Integrated plug-in connector is available.

Model No.: **UZR10A**

Applicable with the **UZZ70** or the **UZZ72** of the sensor block for simple wiring; or the **UZF851** or the **UZF852** cable with a connector.



Sensor block for simple wiring  
**UZZ70, UZZ72**



Cable with a connector

**UZF851** (2m 6.562ft long)  
**UZF852** (5m 16.404ft long)

## Sensor head

Type	Appearance	Sensing range (*1)	Model No.	Hysteresis
Cylindrical type		Maximum operation distance 1.2mm (.047inch) Secure sensing range 0 to 0.6mm .024inch	<b>UZR50</b>	0.07mm .003inch or less
		1.8mm (.071inch) 0 to 0.8mm .031inch	<b>UZR51</b>	0.05mm .002inch or less
		2.4mm (.095inch) 0 to 1.0mm .039inch	<b>UZR52</b>	
		4.0mm (.157inch) 0 to 2.0mm .079inch	<b>UZR53</b>	0.04mm .002inch or less
Spatter-resistant type		4.0mm (.157inch) 0 to 2.0mm .079inch	<b>UZR531</b>	

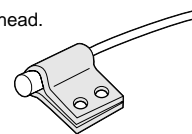
(\*1): The secure sensing range represents the sensing range that the sensor can perform all capabilities written in the specifications with the standard sensing object. The maximum operation distance represents the distance that the sensor can detect the standard sensing object at the maximum under +20°C +68°F constant. The usage within the secure sensing range is recommended for the accurate sensing applications.

## OPTION

Designation	Model No.	Description
Sensor head mounting bracket	<b>UZR811</b>	Mounting bracket for <b>UZR51</b>
	<b>UZR813</b>	Mounting bracket for <b>UZR52</b>
	<b>UZR814</b>	Mounting bracket for <b>UZR53, UZR531</b>

## Sensor head mounting bracket

Easy to fix the sensor head.



## SPECIFICATIONS

### Amplifier

Model No.		<b>UZR10</b>
Item		<b>UZR10</b>
Applicable sensor head		<b>UZR5 series</b>
Supply voltage		12 to 24V DC±10% Ripple P-P 10% or less
Current consumption		25mA or less
Sensing output		NPN open-collector transistor <ul style="list-style-type: none"> <li>• Maximum sink current : 100mA</li> <li>• Applied voltage : 30V DC or less</li> <li>• Residual voltage : 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)</li> </ul>
	Output operation	Switchable either Normally Open or Normally Closed
	Short-circuit protection	Incorporated
Disconnection alarm output		NPN open-collector transistor <ul style="list-style-type: none"> <li>• Maximum sink current : 100mA</li> <li>• Applied voltage : 30V DC or less</li> <li>• Residual voltage : 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)</li> </ul>
	Output operation	ON when the sensor head cable is cut off or mis-connected
	Short-circuit protection	—
Max. response frequency		3.3kHz
Operation indicator		Red LED (lights up when the sensing output is activated)
Disconnection alarm indicator		Orange LED (lights up when the disconnection alarm output is activated)
Sensitivity adjuster		18-turn trimmer
Environmental resistance	Ambient temperature	−10 to+60°C +14°F to +140°F (No dew condensation nor icing allowed), Storage : −20 to+70°C −4 to +158°F
	Ambient humidity	35 to 85%RH, Storage : 35 to 85%RH
	Noise immunity	Power line : 240Vp, 10ms cycle, and 0.5μs pulse duration, Radiation : 300Vp, 10ms cycle, and 0.5μs pulse duration (with noise simulator)
	Voltage withstandability	1,000V AC for one min. between all terminals connected and enclosure
	Insulation resistivity	20MΩ or more at 250V DC Megger between all terminals connected and enclosure
	Vibration-proof	10 to 150Hz frequency, 0.75mm .030inch amplitude, and X, Y, and Z directions each for two hours (unenergized)
	Shock-proof	100m/s <sup>2</sup> acceleration {approx. 10G}, and X, Y, and Z directions each for five times (unenergized)
Temperature characteristic (*1)		Within ±5%
Material		Enclosure : Heat-resistant ABS, Case cover : Polycarbonate, Cable lock lever : PPS
Cable		Cabtyre cable 2m 6.562ft long with four 0.2mm <sup>2</sup> conductors
Cable extension		Maximum extension is 100m 328.084ft overall with an equivalent cable with conductors 0.3mm <sup>2</sup> or more
Weight		Approx. 65g 2.29oz
Accessories		<b>UZF811</b> (Mounting bracket) : 1 pc., Adjusting screw-driver : 1pc.

(\*1) : The value of the temperature characteristics represents the variance of the operation distance that has been set within the secure sensing range at 20°C 68°F under the condition the ambient temperature drifts from 0 to+55°C +32 to 131°F.

# SPECIFICATIONS

## Sensor head

Item	Type	Cylindrical type				Spatter-resistant type
	Model No.	UZR50	UZR51	UZR52	UZR53	UZR531
Applicable amplifier	UZR10 series					
Secure sensing range (*1)	0 to 0.6mm 0 to .024inch	0 to 0.8mm 0 to .031inch	0 to 1.0mm 0 to .039inch	0 to 2.0mm 0 to .079inch		
Max. operation distance (*1)	1.2mm .047inch	1.8mm .071inch	2.4mm .094inch	4.0mm .157inch		
Standard sensing object	Iron steel 5×5×11mm .197×.197×t.039inch			Iron steel 10×10×11mm .394×.394×t.039inch		
Hysteresis (*2)	0.07mm .003inch or less	0.05mm .002inch or less		0.04mm .002inch or less		
Repeatability (*2)	Axial direction, Perpendicular to axial direction : 1μm 0.00004inch or less					
Environmental resistance	Protection	IP50 (IEC)	IP67 (IEC)			
	Ambient temperature	-10 to +60°C +14 to +140°F, Storage : -20 to +70°C -4 to +158°F				
	Ambient humidity	35 to 85%RH, Storage : 35 to 85%RH				
	Vibration-proof	10 to 55Hz frequency, 1.5mm .059inch amplitude, and X, Y, and Z directions each for two hours (unenergized)				
	Shock-proof	500m/s <sup>2</sup> acceleration (approx. 50G), and X, Y, and Z directions each for five times (unenergized)				
Temperature characteristic (*3)	Within ±7%	Within ±5%	Within ±4%			
Material	Enclosure : SUS303, Sensing face : PVC	Enclosure : SUS303, Sensing face : ABS	Enclosure : SUS303, Sensing face : PAR	Enclosure : SUS303, Sensing face : ABS	Enclosure : SUS303, Sensing face : Fluorine resin	
Cable (*4)	Oil resistant high-frequency coaxial cable 3m 9.843ft long					Spatter-resistant cable (sheath : fluorine resin)
Weight	Approx. 15g .53oz	Approx. 30g 1.06oz		Approx. 40g 1.41oz	Approx. 55g 1.94oz	

(\*1) : The secure sensing range represents the sensing range that the sensor can perform all capabilities written in the specifications with the standard sensing object.

The maximum operation distance represents the distance that the sensor can detect the standard sensing object at the maximum under 20°C 68°F constant. The usage within the secure sensing range is recommended for the accurate sensing applications.

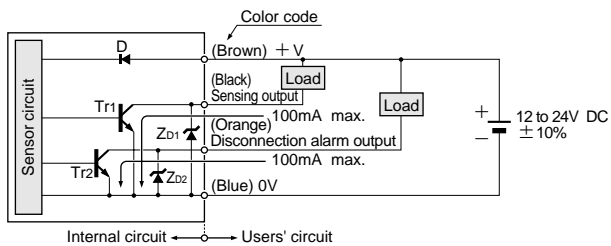
(\*2) : Each value is given within the secure sensing range.

(\*3) : Each value represents the variance of the operation distance that has been set within the secure sensing range at 20°C 68°F under the condition the ambient temperature drifts from 0 to +55°C 32 to +131°F.

(\*4) : Do not change the length of the sensor head cable by any reasons.

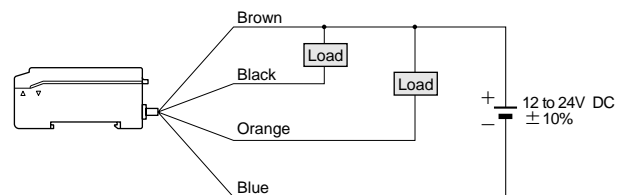
## I/O CIRCUIT AND WIRING DIAGRAMS

### I/O circuit diagram

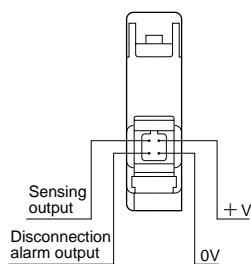


Symbol . . . D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : NPN output transistor

### Wiring diagram



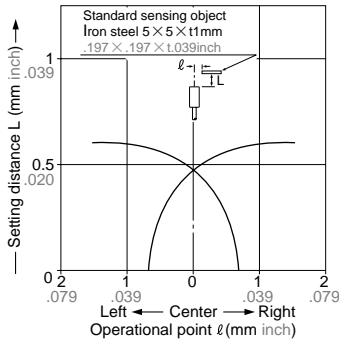
### Plug-in connector type (UZR10A) Pin position



# SENSING FIELDS (TYPICAL)

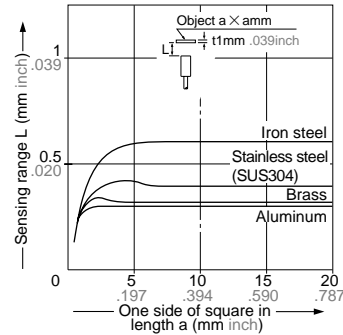
## UZR50

### Sensing field



The left graph is plotted on condition with the sensitivity having been adjusted at 0.6mm .024inch of the sensing distance exactly detectable with the iron steel of 5×5×1mm .197×.197×t.039inch.

### Correlation between object size and sensing range

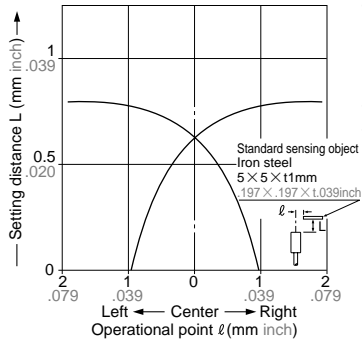


As an object size becomes smaller than the standard (iron steel 5×5×1mm .197×.197×t.039inch), the sensing range shortens.

The left graph is plotted on condition with the sensitivity having been adjusted at 0.6mm .024inch of the sensing distance exactly detectable with the iron steel of 5×5×1mm .197×.197×t.039inch.

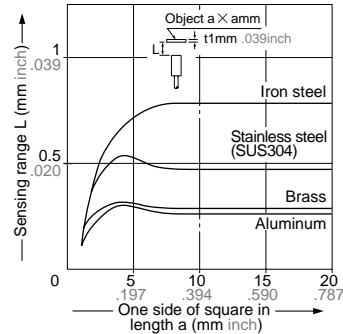
## UZR51

### Sensing field



The left graph is plotted on condition with the sensitivity having been adjusted at 0.8mm .031inch of the sensing distance exactly detectable with the iron steel of 5×5×1mm .197×.197×t.039inch.

### Correlation between object size and sensing range

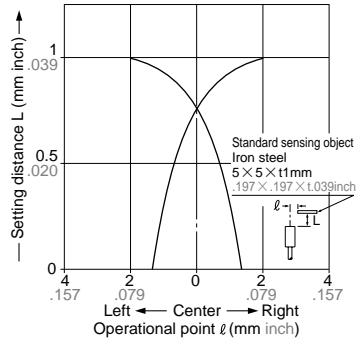


As an object size becomes smaller than the standard (iron steel 5×5×1mm .197×.197×t.039inch), the sensing range shortens.

The left graph is plotted on condition with the sensitivity having been adjusted at 0.8mm of the sensing distance exactly detectable with the iron steel of 5×5×1mm .197×.197×t.039inch.

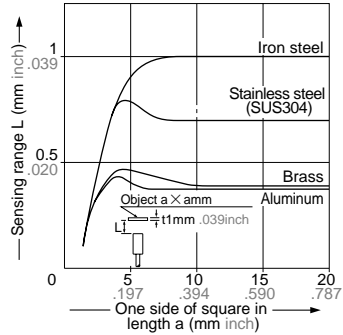
## UZR52

### Sensing field



The left graph is plotted on condition with the sensitivity having been adjusted at 1.0mm .039inch of the sensing distance exactly detectable with the iron steel of 5×5×1mm .197×.197×t.039inch.

### Correlation between object size and sensing range

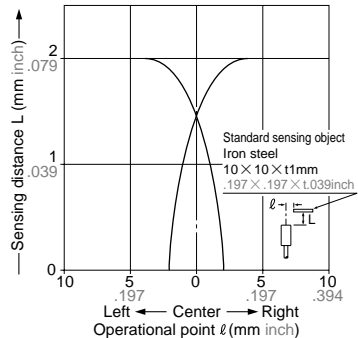


As an object size becomes smaller than the standard (iron steel 5×5×1mm .197×.197×t.039inch), the sensing range shortens.

The left graph is plotted on condition with the sensitivity having been adjusted at 1.0mm of the sensing distance exactly detectable with the iron steel of 5×5×1mm .197×.197×t.039inch.

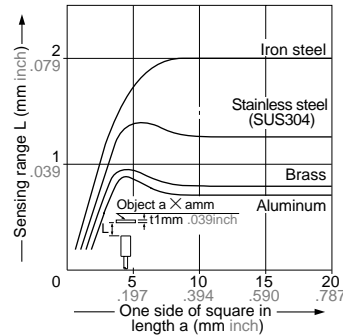
## UZR53 UZR531

### Sensing field



The left graph is plotted on condition with the sensitivity having been adjusted at 2.0mm .079inch of the sensing distance exactly detectable with the iron steel of 10×10×1mm .394×.394×t.039inch.

### Correlation between object size and sensing range



As an object size becomes smaller than the standard (iron steel 10×10×1mm .394×.394×t.039inch), the sensing range shortens.

The left graph is plotted on condition with the sensitivity having been adjusted at 2.0mm .079inch of the sensing distance exactly detectable with the iron steel of 10×10×1mm .394×.394×t.039inch.

## PRECAUTIONS FOR PROPER USE



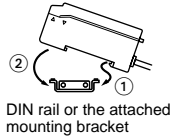
These products are **not** safety sensors and are **not** designed or intended to be used to protect life and prevent bodily injury or property damage.

### Mounting

- Make sure to connect the **UZR5 series** sensor head to the **UZR10** amplifier correctly or malfunction will occur.
- Do not shorten or lengthen the sensor head cable.

### How to mount the amplifier

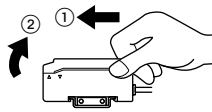
- ① Hook the rear part to the attached mounting bracket (**UZF811**) or DIN rail.
- ② Press the front of the amplifier down on the bracket or DIN rail.



DIN rail or the attached mounting bracket

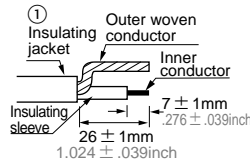
### How to remove the amplifier

- ① Push the amplifier front ward.
- ② With keeping on it, lift up the front part of the amplifier.

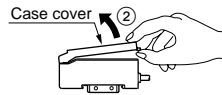


### Sensor head cable connection

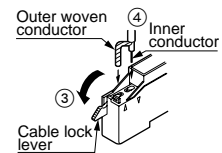
- ① Treat the cable end as the figure shown on the right, and strand the outer woven conductor and the inner conductor respectively. If not so, it will result in mis-insertion as no conductivity.



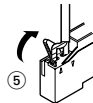
- (\*1) : Separate the outer woven conductor from the core wire.
- ② Remove the case cover.



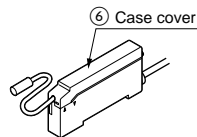
- ③ Flip the cable lock lever down.
- ④ Insert both conductors straight down without their crookedness.  
[▼] side : Inner conductor  
[▲] side : Outer woven conductor



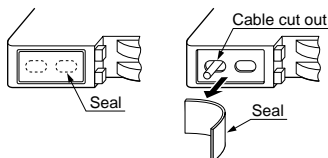
- ⑤ Flip up the cable lock lever to lock the cable.



- ⑥ Make sure to put the case cover on the amplifier.

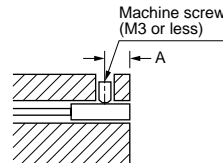


- (\*2) : If there is a shred of the cable inside the amplifier, remove it. Turn the amplifier upside down, and tap it around the inlet. If the shred still remains, peel the bottom seal off the amplifier, and drop it out. (The bottom seal is re-useable.) Be sure of no shred inside, and connect the cable again.



### How to mount the sensor head

- The tightening torques should be under the value. The indented head of the machine screw should thrust the sensor at the side.

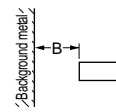


Model No.	Tightening torque	A (mm inch)
<b>UZR50</b>	0.17N·m {1.8kgf·cm}	3 .118 or more
<b>UZR51</b>	0.17N·m {1.8kgf·cm}	4 .157 or more
<b>UZR52</b>	0.78N·m {8kgf·cm}	5 .197 or more
<b>UZR53</b> <b>UZR531</b>	0.59N·m {6kgf·cm}	5 .197 or more

(\*1) Do not tight it excessively.

### Distance from surrounding metals

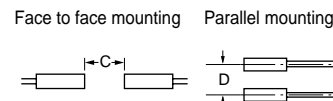
- The sensor head must be separated from the opposed metal over the value specified in the table below.



Model No.	B (mm inch)
<b>UZR50</b>	3 .118
<b>UZR51</b>	4 .157
<b>UZR52</b>	5 .197
<b>UZR53</b> <b>UZR531</b>	9 .354

### Crosstalk prevention

- When plural inductive proximity sensors are mounted in parallel or face to face, keep the separation distance specified below at the minimum to avoid crosstalk.



Model No.	C (mm inch)	D (mm inch)
<b>UZR50</b>	15 .591	10 .394
<b>UZR51</b>	20 .787	15 .591
<b>UZR52</b>	25 .984	20 .787
<b>UZR53</b> <b>UZR531</b>	40 1.575	26 1.024

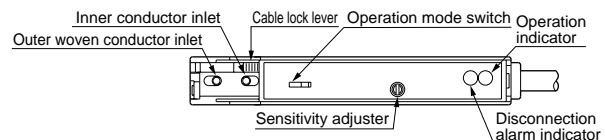
### Sensing range

- Sensing range is specified with using the standard sensing object. With a non-ferrous object, the sensing range is obtained by multiplying the correction coefficient specified below.

### Correction coefficient

Metal	Model No.	UZR50	UZR51	UZR52	UZR53, UZR531
Iron steel		1	1	1	1
Stainless steel (SUS304)		Approx. 0.68	Approx. 0.55	Approx. 0.69	Approx. 0.64
Brass		Approx. 0.53	Approx. 0.35	Approx. 0.41	Approx. 0.37
Aluminum		Approx. 0.51	Approx. 0.33	Approx. 0.39	Approx. 0.32

### Designation



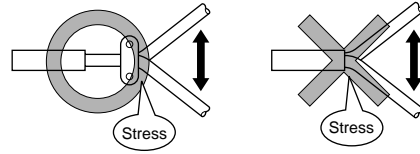
# PRECAUTIONS FOR PROPER USE

## Sensitivity adjustment

Procedure	Sensing style	Adjustment	Sensitivity adjuster
(1)	Turn the operation mode switch in NORM.(Initialization)	• Turn the sensitivity adjuster counterclockwise fully.	
(2)	Lengthwise movement 	• Place an object within the secure sensing range. • Turn the sensitivity adjuster clockwise and set it at the point (A) where the operation indicator lights up.	
	Sidewise movement 	• Place an object within the secure sensing range. • Turn the sensitivity adjuster clockwise, and set it at the optimal sensing point (B) a little beyond the point (A) where the operation indicator lights up.	
(3)	Select the operation mode for your application. (NORM. : Normally open, INV : Normally closed)		

## Others

- The transient time duration is 500ms after power-up.
- Do not install the sensor where vibrated heavily. It will cause a malfunction.
- Any stress should not be applied to the sensor cable at the joint, even the sensor is mounted on a moving base.

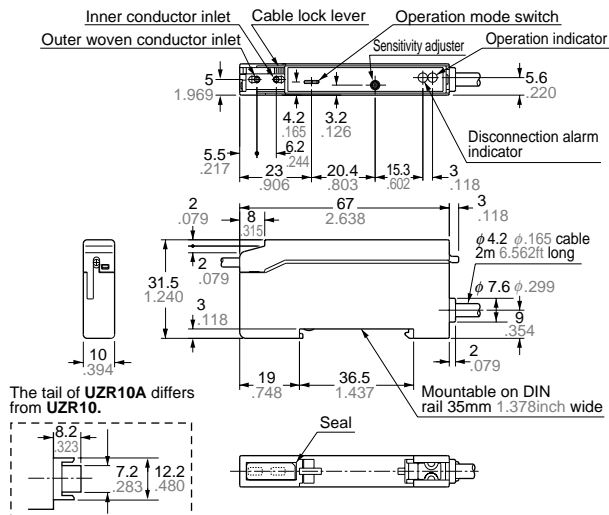


- Even if the spatter-resistant sensor head **UZR531** is used, the amplifier must be placed out of spatter as it is not spatter-resistant.

## DIMENSIONS (Unit : mm inch)

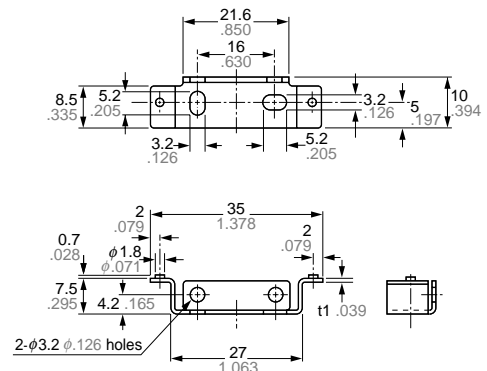
### UZR10

### Amplifier



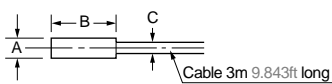
### UZF811

### Amplifier mounting bracket (Accessory)



### UZR50,UZR51,UZR52 UZR53,UZR531

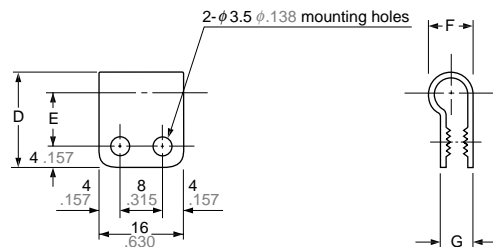
### Sensor head



Model No.	A (mm inch)	B (mm inch)	C (mm inch)
UZR50	φ2.8 φ.110	12 .472	φ1.6 φ.063
UZR51	φ3.8 φ.150	15 .591	φ2.5 φ.098
UZR52	φ5.4 φ.213	15 .591	φ2.5 φ.098
UZR53	φ8.0 φ.315	15 .591	φ2.5 φ.098
UZR531	φ8.0 φ.315	15 .591	φ2.65 φ.104

### UZQ811,UZQ813 UZQ814

### Sensor head mounting bracket (Option)



Symbol	Model No.	UZQ811	UZQ813	UZQ814
D		16 .630	18 .709	20 .787
E		9 .354	10 .394	11 .433
F		6.3 .248	8.3 .327	10.3 .406
G		4.9 .193	6.1 .240	6.5 .256
Applicable sensor head model No.		UZR51	UZR52	UZR53, UZR531