

NAIS

DC THREE-WIRE CYLINDRICAL TYPE PROXIMITY SENSORS

UZQ1 Series

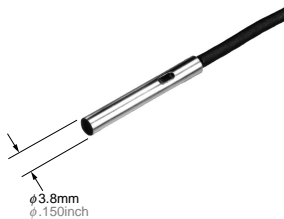
SPECIAL FEATURES – ROBUST HOUSING TYPE, INFLECTION RESISTANT CABLE TYPE



Micro-Assembly

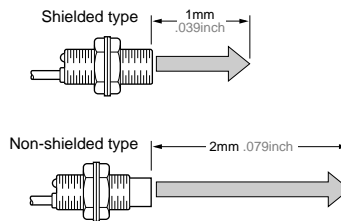
UZQ100 is an amplifier built-in inductive proximity sensor which diameter is $\phi 3.8\text{mm}$ $\phi .150\text{inch}$, the smallest in the industry.

UZQ100 type



Long Sensing Range

Non-shielded type sensors have double the sensing range of shielded type sensors although the dimensions are the same.



Equipped with an Operation Indicator

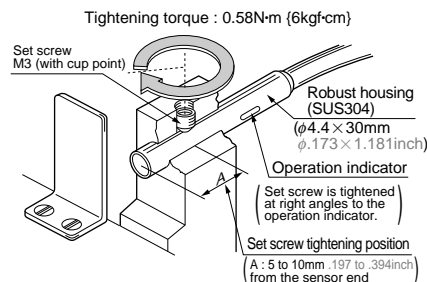
All types of **UZQ1** series sensor are equipped with an operation indicator for easy sensing adjustment and maintenance.

For Various Applications

UZQ1 series can be used for many applications because of its wide supply voltage range, open-collector output, high switching capacity and IP67 protection.

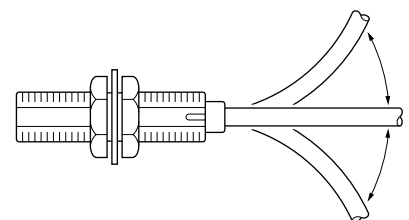
Robust Housing

UZQ110 type uses a robust stainless steel housing. The tightening torque can be up to $0.58\text{N}\cdot\text{m}$ $\{6\text{kgf}\cdot\text{cm}\}$.



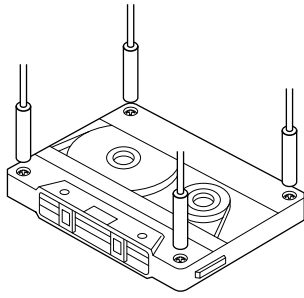
High Inflection Resistance

A special alloy core in the cable increases the inflection resistance 10 times over ordinary cables.

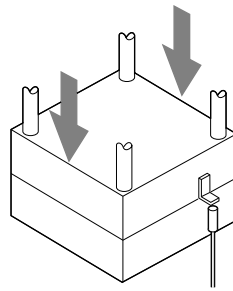


APPLICATIONS

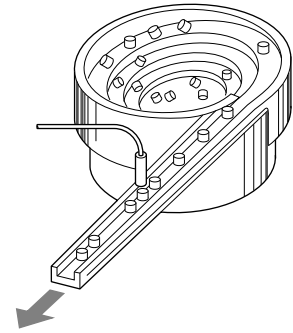
Presence sensing of cassette screws



Positioning of metal molds



Counting of parts



ORDER GUIDE

		Appearance (mm inch)	Sensing range (*1)	Model No. (*2)	Supply voltage	Output operation	
Shielded type	Cylindrical type		(0.8mm) (.031inch) Rated sensing range	UZQ100	12 to 24V DC ±10%	Approach ON	
				UZQ101		Leave ON	
			UZQ100B	Approach ON			
			UZQ101B	Leave ON			
		(0.8mm) (.031inch) Normal setting range 0.6mm .024inch	UZQ110	Approach ON			
			UZQ110B	Leave ON			
	Threaded type		(0.8mm) (.031inch) 0.6mm .024inch	UZQ111	10 to 30V DC	Approach ON	
				UZQ111B		Leave ON	
				UZQ111B		Approach ON	
			(1mm) (.039inch) 0.8mm .031inch	UZQ120		12 to 24V DC ±10%	Approach ON
				UZQ121			Leave ON
				UZQ120B			Approach ON
Non-shielded type	Threaded type		(0.8mm) (.031inch) 0.6mm .024inch	UZQ121B	10 to 30V DC		Leave ON
				UZQ130			Approach ON
				UZQ130B			Leave ON
		(1mm) (.039inch) 0.8mm .031inch	UZQ131	12 to 24V DC ±10%		Approach ON	
			UZQ131B			Leave ON	
			UZQ131B			Approach ON	
	(2mm) (.079inch) 1.6mm .063inch	UZQ140	10 to 30V DC		Approach ON		
		UZQ141			Leave ON		
		UZQ140B			Approach ON		
	(2mm) (.079inch) 1.6mm .063inch	UZQ141B		10 to 30V DC	Leave ON		
		UZQ150			Approach ON		
		UZQ151			Leave ON		

(*1): The rated sensing range is indicated as the maximum sensing range for a standard sensing target.
 The normal setting range is indicated as the sensing range by which the sensor can stably detect the standard sensing object even if there is ambient temperature drift or supply voltage fluctuations.

(*2): The inflection resistance cable type is indicated by "B" suffix at the end of the model No.

SPECIFICATIONS

Cylindrical type

Data	Type	Shielded type											
		Inflection resistance cable				Inflection resistance cable				Inflection resistance cable			
Model No.		UZQ100	UZQ101	UZQ100B	UZQ101B	UZQ110	UZQ111	UZQ110B	UZQ111B	UZQ120	UZQ121	UZQ120B	UZQ121B
Rated sensing range (*1)		0.8mm .031inch ±15%								1mm .039inch ±15%			
Normal setting range (*1)		0 to 0.6mm 0 to .024inch								0 to 0.8mm 0 to .031inch			
Standard sensing object		Steel 5 × 5 × t1mm .197 × .197 × t.039inch								Steel 6 × 6 × t1mm .236 × .236 × t.039inch			
Hysteresis		15% or less of an operation range											
Repeatability		20µm .0008inch or less								8µm .0003inch or less			
Supply voltage		12 to 24V DC ±10% Ripple P-P: 10% or less								10 to 30V DC ±10% Ripple P-P: 10% or less			
Consumption		15mA or less											
Output		NPN open-collector transistor Sink current: Max. 50mA Applied voltage: 30V DC or less Residual voltage: 0.4V or less (at 50mA sink current)								NPN open-collector transistor Sink current: Max. 200mA (*2) Applied voltage: 30V DC or less Residual voltage: 1.5V or less (at 200mA sink current) 0.4V or less (at 50mA sink current)			
	Output operation	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON
Short-circuit protection		—								Provided			
Max. response frequency		1kHz								1.5kHz			
Operation indicator		Red LED (turns on when the output is in the ON state)											
Environmental resistance	Protection	IP67 (IEC)											
	Ambient temperature	-25 to +70°C -13 to +158°F, Storage: -25 to +80°C -13 to +176°F											
	Ambient humidity	35 to 95%RH, Storage: 35 to 95%RH								35 to 85%RH, Storage: 35 to 95%RH			
	Withstand voltage	500V AC applied between the live parts and enclosure for 1 min.											
	Insulation	Min. 5MΩ between the live parts and enclosure at 250V DC								Min. 50MΩ between the live parts and enclosure at 500V DC			
	Vibration	1.5mm .059inch amplitude at the frequency of 10 to 55Hz in each of X, Y and Z directions for 2 hours each in the power OFF state											
Shock		200m/s ² (approx. 20G) impulse in each of X, Y and Z directions for 10 times each in the power OFF state								300m/s ² (approx. 30G) impulse in each of X, Y and Z directions for 10 times each in the power OFF state			
Sensing range variation	Temperature	Max. ±20% of an operation range at 20°C 68°F in -25 to +70°C -13 to +158°F temperature range								Max. ±15% of an operation range at 20°C 68°F in -25 to +70°C -13 to +158°F temperature range			
	Voltage	Max. ±2% at ±10% fluctuation of the supply voltage								Max. ±2.5% at ±15% fluctuation of the supply voltage			
Material		Enclosure: Stainless steel (SUS304) Resin part: TPX				Enclosure: Stainless steel (SUS304) Resin part: TPX				Enclosure: Brass (nickel plating) Resin part: ABS			
Cable		0.08mm ² × 3 cores with 3m 9.84ft of oil, heat and cold resistant cable	0.1mm ² × 3 cores of inflection resistance with 3m 9.84ft of oil and heat resistant cable	0.08mm ² × 3 cores with 3m 9.84ft of oil, heat and cold resistant cable	0.1mm ² × 3 cores of inflection resistance with 3m 9.84ft of oil and heat resistant cable	0.14mm ² × 3 cores with 3m 9.84ft of oil, heat and cold resistant cable	0.15mm ² × 3 cores of inflection resistance with 3m 9.84ft of oil and heat resistant cable						
Cable extension		Extensible up to 100m 328.08ft by using 0.3mm ² or more cable											
Weight		Approx. 30g 1.06oz								Approx. 55g 1.94oz			
Accessories		UZQ811 (mounting bracket): 1 pc. UZQ812 (C bracket): 1 pc.				—				UZQ813 (mounting bracket): 1 pc.			

(*1): The rated sensing range is indicated as the maximum sensing range for a standard sensing object.

The normal setting range is indicated as the sensing range by which the sensor can stably detect the standard sensing object even if there is ambient temperature drift or supply voltage fluctuations.

(*2): Maximum sink current varies depending on the ambient temperature. Refer to **TYPICAL WIRING DIAGRAMS** for more details.

SPECIFICATIONS

Threaded type

Data	Model No.	Shielded type								Non-shielded type	
		Inflection resistance cable				Inflection resistance cable					
		UZQ130	UZQ131	UZQ130B	UZQ131B	UZQ140	UZQ141	UZQ140B	UZQ141B	UZQ150	UZQ151
Rated sensing range (*1)		0.8mm .031inch ±15%				1mm .039inch ±15%				2mm .079inch ±15%	
Normal setting range (*1)		0 to 0.6mm 0 to .024inch				0 to 0.8mm 0 to .031inch				0 to 1.6mm 0 to .063inch	
Standard sensing object		Steel 5×5×1mm .197×.197×t.039inch				Steel 8×8×1mm .315×.315×t.039inch				Steel 12×12×1mm .472×.472×t.039inch	
Hysteresis		15% or less of an operation range				10% or less of an operation range					
Repeatability		20µm .0008inch or less				8µm .0003inch or less				0.04mm.002inch or less	
Supply voltage		12 to 24V DC ±10% Ripple P-P: 10% or less				10 to 30V DC ±10% Ripple P-P: 10% or less					
Consumption						15mA or less					
Output		NPN open-collector transistor Sink current: Max. 50mA Applied voltage: 30V DC or less Residual voltage: 0.4V or less (at 50mA sink current)				NPN open-collector transistor Sink current: Max. 200mA (*2) Applied voltage: 30V DC or less Residual voltage: 1.5V or less (at 200mA sink current) 0.4V or less (at 50mA sink current)					
	Output operation	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON	Approach ON	Leave ON
	Short-circuit protection	—				Provided					
Max. response frequency		1kHz				500Hz					
Operation indicator		Red LED (turns on when the output is in the ON state)									
Environmental resistance	Protection	IP67 (IEC)									
	Ambient temperature	-25 to +70°C -13 to +158°F, Storage: -25 to +80°C -13 to +176°F									
	Ambient humidity	35 to 95%RH, Storage: 35 to 95%RH				35 to 85%RH, Storage: 35 to 95%RH					
	Withstand voltage	500V AC applied between the live parts and enclosure for 1 min.									
	Insulation	Min. 5MΩ between the live parts and enclosure at 250V DC				Min. 50MΩ between the live parts and enclosure at 500V DC					
	Vibration	1.5mm .059inch amplitude at the frequency of 10 to 55Hz in each of X, Y and Z directions for 2 hours each in the power OFF state									
Sensing range variation	Temperature	Max. ±20% of an operation range at 20°C 68°F in -25 to +70°C -13 to +158°F temperature range				Max. between +15% and -10% of an operation range at 20°C 68°F in -25 to +70°C -13 to +158°F temperature range					
	Voltage	Max. ±2% at ±10% fluctuation of the supply voltage				Max. ±2.5% at ±15% fluctuation of the supply voltage					
Material		Enclosure: Brass (nickel plating) Resin part: TPX				Enclosure: Brass (nickel plating) Resin part: ABS					
Cable		0.08mm ² ×3 cores with 3m 9.84ft of oil, heat and cold resistant cable	0.1mm ² ×3 cores of inflection resistance with 3m 9.84ft of oil and heat resistant cable	0.14mm ² ×3 cores with 3m 9.84ft of oil, heat and cold resistant cable	0.15mm ² ×3 cores of inflection resistance with 3m 9.84ft of oil and heat resistant cable	0.14mm ² ×3 cores with 3m 9.84ft of oil, heat and cold resistant cable					
Cable extension		Extensible up to 100m 328.08ft by using 0.3mm ² or more cable								Extensible up to 100m 328.08ft by using 0.14mm ² or more cable.	
Weight (*3)		Approx. 30g 1.06oz				Approx. 60g 2.12oz					
Accessories		Nut: 2 pcs. Toothed lock washer: 1 pc.	Nut: 2 pcs. Toothed lock washer: 2 pcs.	Nut: 2 pcs. Toothed lock washer: 1 pc.	Nut: 2 pcs. Toothed lock washer: 2 pcs.	Nut: 2 pcs. Toothed lock washer: 1 pc.					

(*1): The rated sensing range is indicated as the maximum sensing range for a standard sensing object.

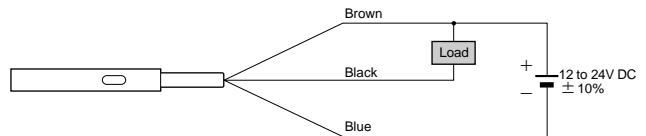
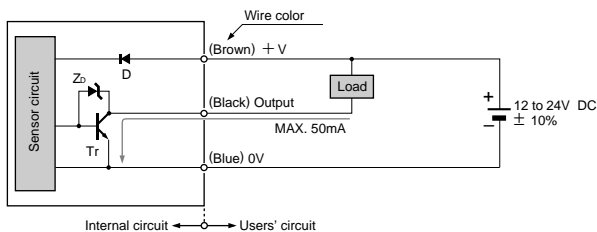
The normal setting range is indicated as the sensing range by which the sensor can stably detect the standard sensing object even if there is ambient temperature drift or supply voltage fluctuations.

(*2): Maximum sink current varies depending on the ambient temperature. Refer to **TYPICAL WIRING DIAGRAMS** for more details.

(*3): The weight is the value including the nut and the toothed lock washer.

TYPICAL WIRING DIAGRAMS

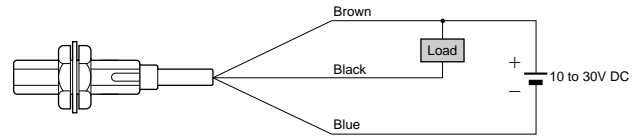
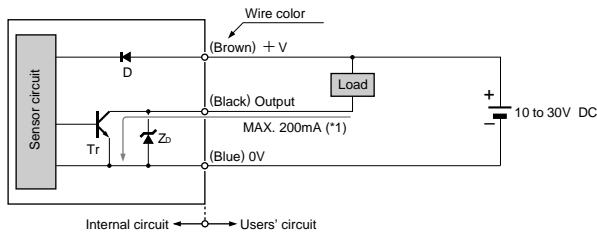
UZQ100 (B) UZQ110 (B) UZQ130 (B)
UZQ101 (B) UZQ111 (B) UZQ131 (B)



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

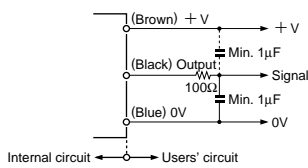
TYPICAL WIRING DIAGRAMS

UZQ120 (B) UZQ140 (B) UZQ150
UZQ121 (B) UZQ141 (B) UZQ151



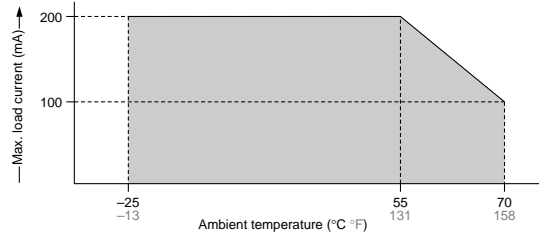
Symbol ... D: Reverse polarity protection diode
ZD: Surge absorption zener diode
Tr: NPN output transistor

- Insert a 100 V resistor in series as shown in the figure below if a capacitor of 1 μ F or more is connected between the output and 0V or + V.



This is to prevent a delayed response. (Though delay is momentary, it will occur as a result of the actuation of overcurrent protection due to the charge or discharge current of the capacitor.)

(*1): Maximum sink current varies depending on the ambient temperature.



SENSING FIELDS

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

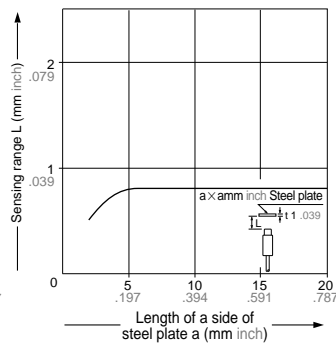
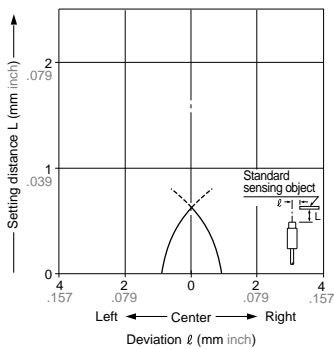
Note that the sensing range decreases if a sensing object is smaller than the standard size, as shown in the graph.

UZQ100 (B) UZQ110 (B) UZQ130 (B)
UZQ101 (B) UZQ111 (B) UZQ131 (B)

UZQ120 (B)
UZQ121 (B)

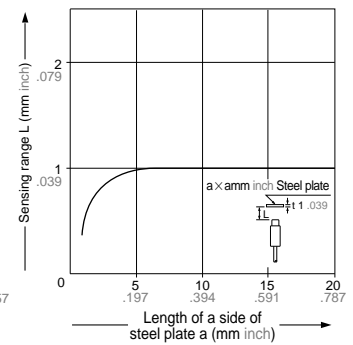
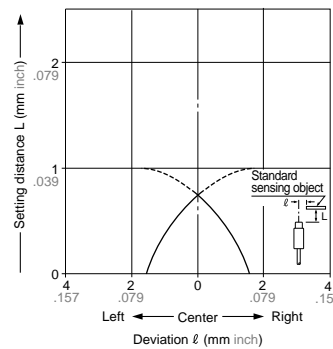
Sensing field

Object size - Sensing range correlation



Sensing field

Object size - Sensing range correlation

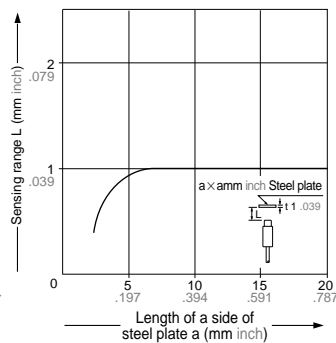
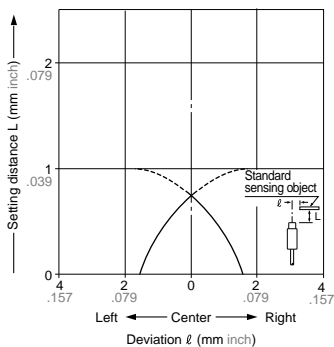


UZQ140 (B)
UZQ141 (B)

UZQ150
UZQ151

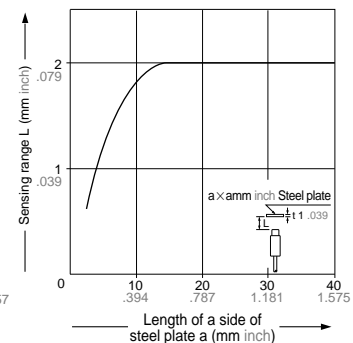
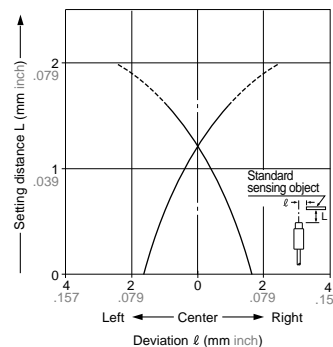
Sensing field

Object size - Sensing range correlation



Sensing field

Object size - 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.

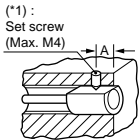
Mounting

When mounting a sensor, the tightening torque must not exceed the figures in the tables below.

Mounting with set a screw

Shielded and threaded type

Do not compress the flat part of the sensor with excess force. Use a set screw with a cup point.

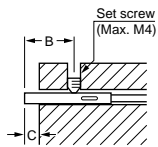


(*1):
Set screw
(Max. M4)

(*1): For the UZQ13□ (B), use a max. M3 set screw.

Model No.	Dimension of A (mm inch)	Tightening torque
UZQ13□ (B)	5 to 10 .197 to .394	0.29N·m {3kgf·cm}
UZQ14□ (B)	8 to 22 .315 to .866	0.29N·m {3kgf·cm}

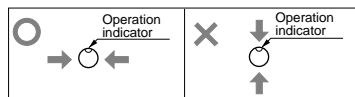
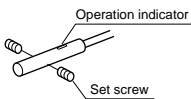
Cylindrical type and Non-shielded and threaded type



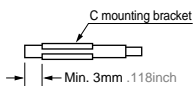
Model No.	B (mm inch)	C (mm inch)	Tightening torque
UZQ10□ (B)	5 to 10 .197 to .394	3 .118	0.29N·m {3kgf·cm}
When using the C bracket			0.58N·m {6kgf·cm}
UZQ11□ (B)	5 to 10 .197 to .394	3 .118	0.58N·m {6kgf·cm}
UZQ12□ (B)	5 to 30 .197 to 1.181	5 .197	0.29N·m {3kgf·cm}
UZQ15□	13 to 22 .512 to .866	10 .394	0.29N·m {3kgf·cm}

(*1): Keep the min. of distance C (mm inch) to maintain the sensing range.

For the UZQ10□ (B) and UZQ11□ (B), use a max. M3 set screw and tighten it on an axis perpendicular to the operation indicator.



Use the C bracket 3mm .118inch away from the end of the sensor.

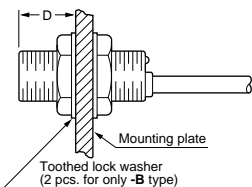


For the non-shielded or threaded type, lock the flat part in place with a set screw.

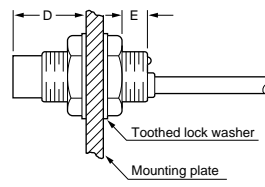
Mounting with a nut

Note that the max. tightening torque differs in accordance with the location of the nut.

Shielded and threaded type



Non-shielded and threaded type



Model No.	Length of D (mm inch)	Tightening torque
UZQ13□ (B)	2 to 3 .079 to .118	0.49N·m {5kgf·cm} or less
	3 .118 or more	1.47N·m {15kgf·cm} or less
UZQ14□ (B)	3 to 11 .118 to .433	1.47N·m {15kgf·cm} or less
	11 .433 or more	3.43N·m {35kgf·cm} or less
UZQ15□	9 to 11 .354 to .433	0.98N·m {10kgf·cm} or less
	11 .433 or more	3.43N·m {35kgf·cm} or less

(*1): Mount the sensor so that the nut is completely on the thread of the sensor.

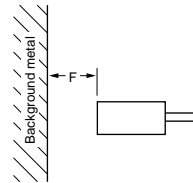
Distance from the surrounding metals

To prevent malfunctions caused by metals around the sensor, pay attention to the following points.

Influence of surrounding metals

The following clearance should be maintained in order to prevent interference by surrounding metals.

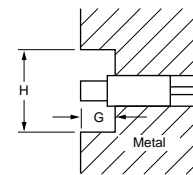
Cylindrical type and threaded type



Model No.	F (mm inch)
UZQ10□ (B)	3 .118
UZQ11□ (B)	3 .118
UZQ12□ (B)	4 .157
UZQ13□ (B)	3 .118
UZQ14□ (B)	4 .157
UZQ15□	8 .315

Embedding of the sensor in metal

Sensing range may decrease if the sensor is completely embedded in metal. Especially for the cylindrical non-shielded type, keep the following distances.

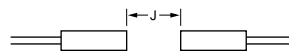


Model No.	G (mm inch)	H (mm inch)
UZQ10□ (B)	3 .118	φ12 φ.472
UZQ11□ (B)	3 .118	φ12 φ.472
UZQ12□ (B)	5 .197	φ15.4 φ.606
UZQ15□	10 .394	φ30 φ1.181

Crosstalk prevention

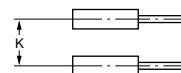
When mounting multiple inductive proximity sensors close together, maintain the clearance shown in the table below to avoid crosstalk.

Face to face mounting



Model No.	J (mm inch)	K (mm inch)
UZQ10□ (B)	16 .630	16 .630
UZQ11□ (B)	16 .630	16 .630
UZQ12□ (B)	20 .787	15 .591
UZQ13□ (B)	10 .394	10 .394
UZQ14□ (B)	20 .787	15 .591
UZQ15□	50 1.969	30 1.181

Parallel mounting



Sensing range

Sensing range listed in the specification is for a standard target. For non-ferrous targets, the sensing range is obtained by multiplying the standard range by the correction coefficient specified below.

Correction coefficient

Model No.	UZQ10□ (B) UZQ11□ (B)	UZQ13□ (B)	All models except for the model Nos. on the left
Steel	1.0	1.0	1.0
Stainless steel (SUS304)	Approx. 0.65	Approx. 0.83	Approx. 0.7
Brass	Approx. 0.36	Approx. 0.61	Approx. 0.4
Aluminum	Approx. 0.30	Approx. 0.58	Approx. 0.35

(*1): Note that the sensing range varies if the object is plated.

Wiring

Power supply should be turned off before wiring.

Verify that voltage fluctuations do not exceed the rated value.

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

When using equipment which generates noise (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.

PRECAUTIONS FOR PROPER USE

Others

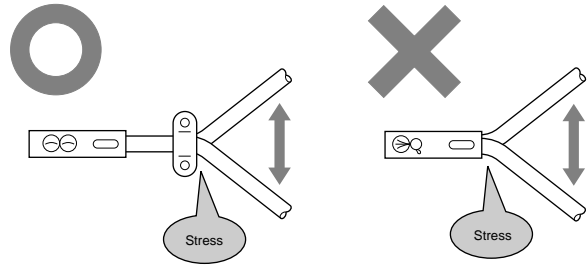
Do not use the sensor output signal for 10ms immediately after the power is supplied to the sensor.

Make the connection securely.
(The output of **UZQ10□ (B)**, **UZQ11□ (B)** and **UZQ13□ (B)** are not equipped with short-circuit protection.)

Avoid placement where the sensor may be exposed to chemical agents such as thinner or organic solvents.

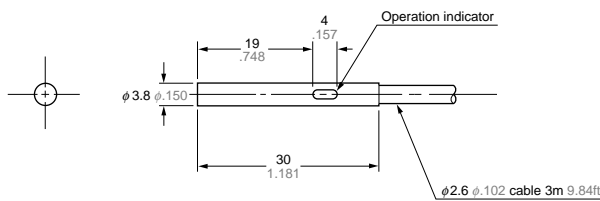
Metal dust or spatter covering the sensing face may cause a malfunction.

Stress should not be applied to the sensor cable root, if the sensor is used in moving application.
The sensor with inflection resistant cable (model No. with "B" suffix) is also available.

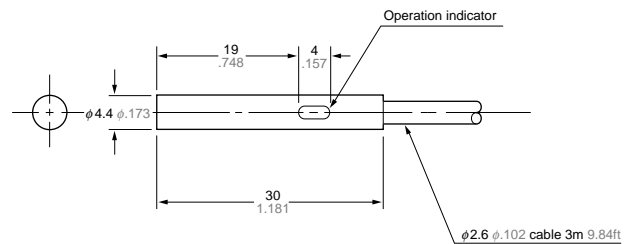


DIMENSIONS (Unit: mm inch)

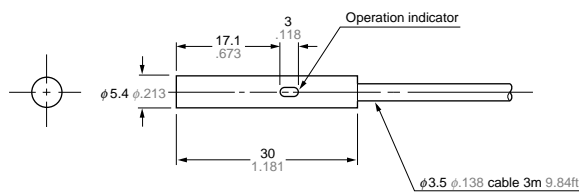
UZQ100 (B)
UZQ101 (B) Sensor



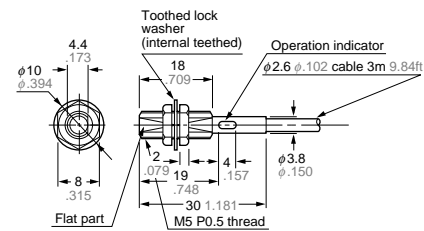
UZQ110 (B)
UZQ111 (B) Sensor



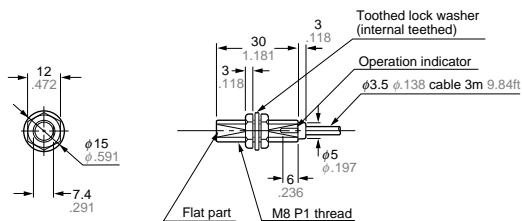
UZQ120 (B)
UZQ121 (B) Sensor



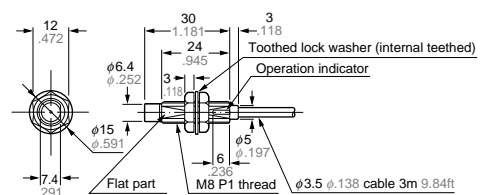
UZQ130 (B)
UZQ131 (B) Sensor



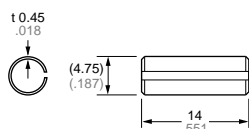
UZQ140 (B)
UZQ141 (B) Sensor



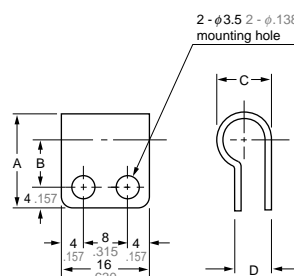
UZQ150
UZQ151 Sensor



UZQ812 C bracket for **UZQ100** type (accessories)



UZQ811
UZQ813 Mounting bracket for **UZQ100** type (accessories)
Mounting bracket for **UZQ120** type (accessories)



Symbol	A	B	C	D	Applicable model No.
UZQ811	16 .630	9 .354	6.3 .248	4.9 .193	UZQ100 (B) UZQ101 (B)
UZQ813	18 .709	10 .394	8.3 .327	6.1 .240	UZQ120 (B) UZQ121 (B)

• Material: 66 nylon

(*1): By using this bracket, the tightening torque can be twice stronger than the normal one.