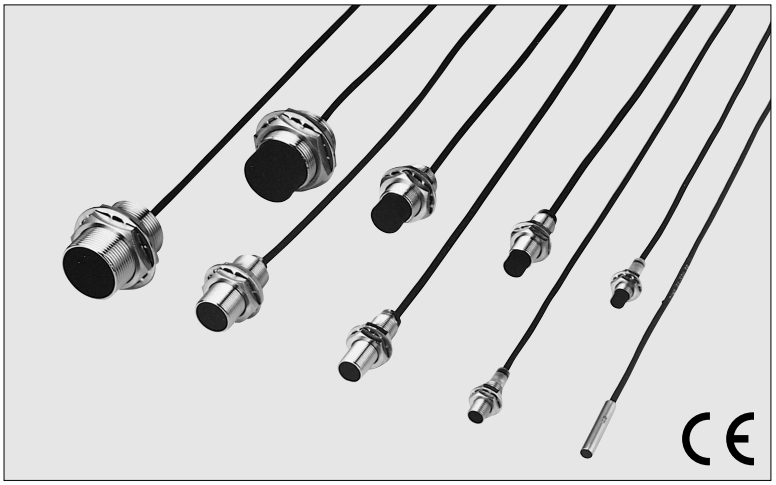
NAiS

DC TWO-WIRE CYLINDRICAL TYPE PROXIMITY SENSORS

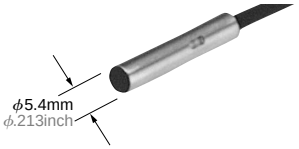
UZQ2 Series

HIGH PERFORMANCE & EASE OF USE



Compact Size : ϕ5.4mm ϕ.213inch

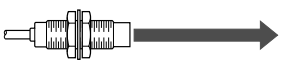
The **UZQ26** is just 5.4mm .213inch in diameter, the smallest in existing DC two-wire sensors. It saves you space.



Long Sensing Range

UZQ2 series makes possible long sensing ranges. This decreases the likelihood of a workpiece and sensor hitting each other.

UZQ2210



Two-color indicator

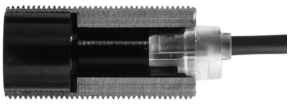
Approach ON type has a Two-color indicator. (Leave ON type has Operation indicator.)
Also, it is possible to confirm the operation from any angle because the indicator is built into the cable strain relief.

Increased Tightening Torque

Higher tightening torque is allowed because of the thick case. Higher torque can prevent loosening from vibration or shock.

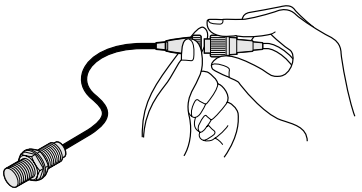
UZQ2300

80N·m max.



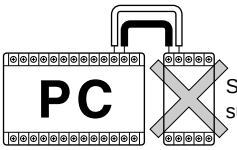
Wire-saving

The wiring cost is considerably reduced as it has only two wires.
Additionally, each of the **UZQ22**, **UZQ23**, **UZQ24** is available as the pig-tailed model (300mm 11.811inch-long cable attached with the connector) that makes replacement easier and quicker.



Low current consumption

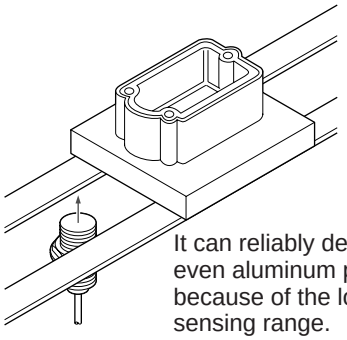
Current consumption is reduced to Max. 0.8mA. When connecting to PLC, it is not necessary to use a separate power supply for the sensor.



Separate power supply is not required.

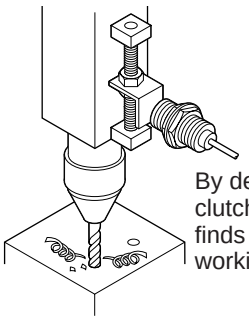
APPLICATIONS

Pass sensing of alluminum pallets



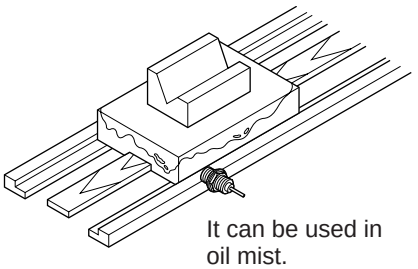
It can reliably detect even aluminum pallets because of the long sensing range.

Positioning of working machines



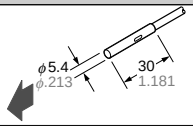
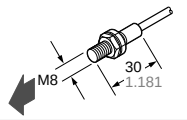
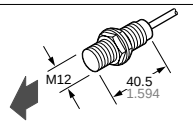
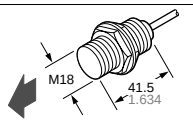
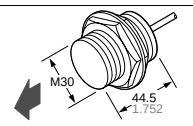
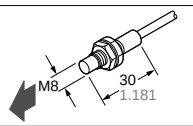
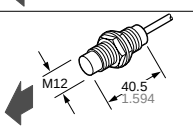
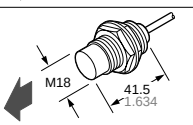
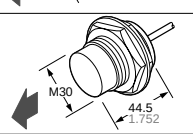
By detecting dog-clutch, the sensor finds the depth of working holes

Presence sensing of workpieces



It can be used in oil mist.

ORDER GUIDE

Type		Appearance (mm inch)	Sensing range (*1)	Model No.	Output operation
Shielded type	Cylindrical type		(1.5mm) (.059nch) Rated sensing range 1.2mm .047inch Normal sensing range	**UZQ2600**	Approach ON
				UZQ2601	Leave ON
	Threaded type		(2mm) (.079inch) 1.6mm .063inch	**UZQ2100**	Approach ON
				UZQ2101	Leave ON
			(3mm) (.118inch) 2.4mm .094inch	**UZQ2200**	Approach ON
				UZQ2201	Leave ON
			(7mm) (.276inch) 5.6mm .220inch	**UZQ2300**	Approach ON
				UZQ2301	Leave ON
			(10mm) (.394inch) 8mm .315inch	**UZQ2400**	Approach ON
				UZQ2401	Leave ON
Non-shielded type	Threaded type		(4mm) (.157inch) 3.2mm .126inch	**UZQ2110**	Approach ON
				UZQ2111	Leave ON
			(8mm) (.315inch) 6.4mm .252inch	**UZQ2210**	Approach ON
				UZQ2211	Leave ON
			(15mm) (.591inch) 12mm .472inch	**UZQ2310**	Approach ON
				UZQ2311	Leave ON
			(22mm) (.866inch) 17.6mm .693inch	**UZQ2410**	Approach ON
				UZQ2411	Leave ON

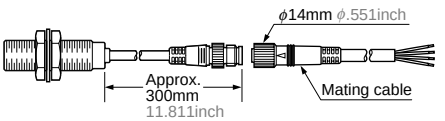
(*1): The rated sensing range is indicated as the maximum sensing range for a standard target.
The normal setting range is indicated as the sensing range at which the sensor can stably detect the standard target even if there is an ambient temperature drift or supply voltage fluctuations (within specified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

Pigtailed type

The pigtailed sensors are optionally available, that 300mm 11.811inch long cable intermediates between the sensor and the connector.
(Standard type is attached with the cable 2m 6.562ft. long. No pigtail option with the **UZQ26, UZQ21**.)
When ordering this type, add suffix. “A” at the end of the model No.
(e.g.) The model **UZQ2200** with pigtailed is identified as **“UZQ2200A”**.

• Mating cable

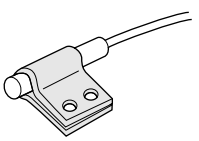
Model No.	Description	
UZC8231	Length 2m 6.562ft.	Two of four wires are used. The arrangement of wires varies in types, Approach ON or Leave ON.
UZC8232	Length 5m 16.404ft.	



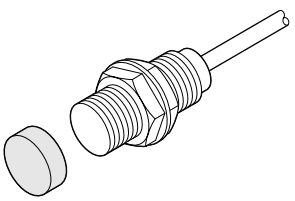
OPTION

Component	Model No.	Description	
Sensor mounting bracket	**UZQ841**	For **UZQ260**□	The sensor is simply mountable with it.
Protective cover	**UZQ821**	For **UZQ220**□	It protects the sensing surface from welding sparks (spatter), etc.
	UZQ822	For **UZQ230**□	
	UZQ823	For **UZQ240**□	

Sensor mounting bracket



Protective cover



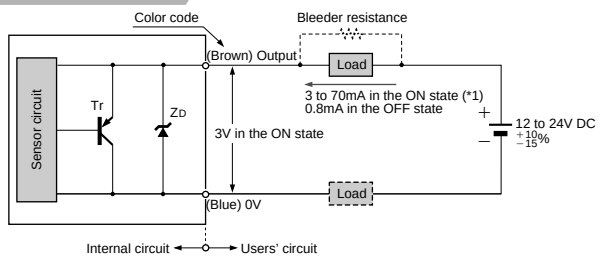
SPECIFICATIONS

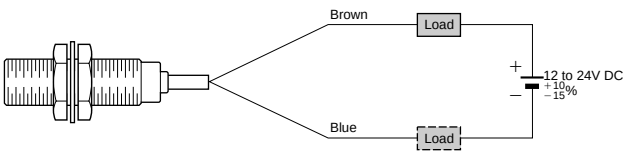
Item	Type	Shielded type					Non-shielded type			
		Cylindrical type	Threaded type							
Model No.	Approach ON	**UZQ2600**	**UZQ2100**	**UZQ2200**	**UZQ2300**	**UZQ2400**	**UZQ2110**	**UZQ2210**	**UZQ2310**	**UZQ2410**
	Leave ON	**UZQ2601**	**UZQ2101**	**UZQ2201**	**UZQ2301**	**UZQ2401**	**UZQ2111**	**UZQ2211**	**UZQ2311**	**UZQ2411**
Rated sensing range (*1)		1.5mm .059inch ±10%	2mm .079inch ±10%	3mm .118inch ±10%	7mm .276inch ±10%	10mm .394inch ±10%	4mm .157inch ±10%	8mm .315inch ±10%	15mm .591inch ±10%	22mm .866inch ±10%
Normal setting range (*1)		0 to 1.2mm 0 to .047inch	0 to 1.6mm 0 to .063inch	0 to 2.4mm 0 to .094inch	0 to 5.6mm 0 to .220inch	0 to 8mm 0 to .315inch	0 to 3.2mm 0 to .126nch	0 to 6.4mm 0 to .252inch	0 to 12mm 0 to .472inch	0 to 17.6mm 0 to .693inch
Standard sensing object		Iron steel 6×6×t1mm .236×.236×t.039inch	Iron steel 8×8×t1mm .315×.315×t.039inch	Iron steel 12×12×t1mm .472×.472×t.039inch	Iron steel 18×18×t1mm .709×.709×t.039inch	Iron steel 30×30×t1mm 1.181×1.181×t.039inch	Iron steel 20×20×t1mm .787×.787×t.039inch	Iron steel 30×30×t1mm 1.181×1.181×t.039inch	Iron steel 50×50×t1mm 1.969×1.969×t.039inch	Iron steel 70×70×t1mm 2.756×2.756×t.039inch
Hysteresis		20% or less of an operation distance								
Supply voltage		12 to 24V DC $^{+10}_{-15}$% Ripple P-P: 10% or less								
Consumption (*2)		0.8mA or less								
Output		Non-contact DC two-wire type Load current: 3 to 70mA (*3) Residual voltage: Max. 3V (*4)								
	Short-circuit protection	Equipped								
Max. response frequency		1.7kHz	1.2kHz	1.2kHz	500Hz	350Hz	1kHz	650Hz	350Hz	220Hz
Operation indicator		Leave ON type: Orange LED lights when the output is in the ON state.								
Two-color indicator		Approach ON type: Green LED lights in the stable sensing condition. Orange LED lights in the unstable sensing condition.								
Environmental resistance	Protection	IP67 (IEC)								
	Ambient temperature	–25 to +70°C –13 to +158°F, Storage: –30 to +80°C –22 to +176°F								
	Ambient humidity	45 to 85%RH, Storage: 35 to 95%RH								
	Noise	Power line: 240Vp with 0.5μs pulse duration (supply voltage: 24V DC, load current: 20mA, by a noise simulator)								
	Withstand voltage	1,000V AC applied between the live parts and enclosure for 1 min.								
	Insulation	50MΩ or more when 250 V DC applied between the live parts and enclosure								
	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	1,000m/s^2 {approx. 100G} impulse in each of X, Y and Z directions for 3 times each in the power OFF state								
Sensing range variation	Temperature	Between +10% 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								
Material		Enclosure: Brass (Nickel plated) [Stainless steel (SUS 303) for **UZQ260**□, **UZQ210**□, **UZQ211**□ Sensing parts: Polyarilate, Indicator part: Polyarilate [excluding **UZQ260**□]								
Cable		0.3mm^2×2 cores of oil, heat and cold resistant cable of 2m 6.56ft long								
Cable extension		Extendable up to 50m 164.04ft by using a min. 0.3mm^2 cable								
Weight (*5)		Approx. 20g 0.71oz	Approx. 30g 1.06oz	Approx. 55g 1.94oz	Approx. 95g 3.35oz	Approx. 220g 7.76oz	Approx. 30g 1.06oz	Approx. 55g 1.94oz	Approx. 95g 3.35oz	Approx. 220g 7.76oz
Accessories		Nut: 2 pcs., Toothed lock washer: 1 pc.								

(*1): The rated sensing range is indicated as the maximum sensing range for a standard target.
The normal setting range is indicated as the sensing range at which the sensor can stably detect the standard target even if there is an ambient temperature drift or supply voltage fluctuations (within specified ranges).
(*2): It is the leakage current when the output is in the OFF state.
(*3): Maximum load current varies depending on the ambient temperature. Refer to **TYPICAL WIRING DIAGRAMS** for more details.
(*4): When the cable is extended, the residual voltage becomes larger depending on the type of cable.
(*5): The weight is the value including the nut and toothed lock washer.

TYPICAL WIRING DIAGRAMS

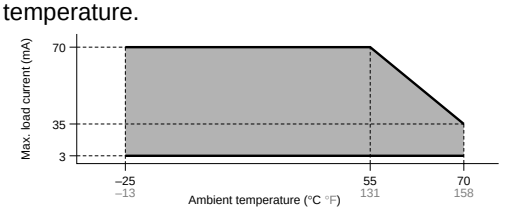
UZQ2□□□





Symbol ... ZD: Surge absorption zener diode
Tr: PNP output transistor

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



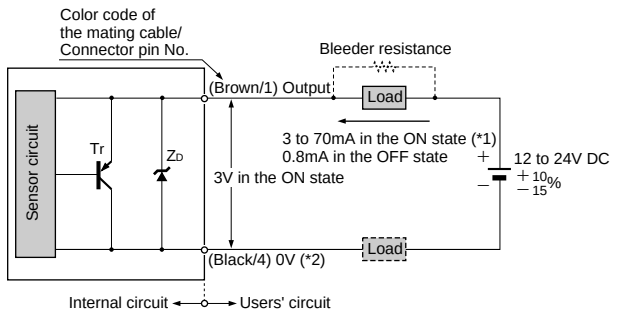
Conditions for the load

1) Load should not be actuated by the leakage current in the OFF state (0.8mA).
2) Load should be actuated by (supply voltage–3V) in the ON state.
3) Current in the ON state should be between 3 to 70mA DC.
[Bleeder resistance must be connected so that the current can be 3mA or more if it is less than 3mA.]

TYPICAL WIRING DIAGRAMS

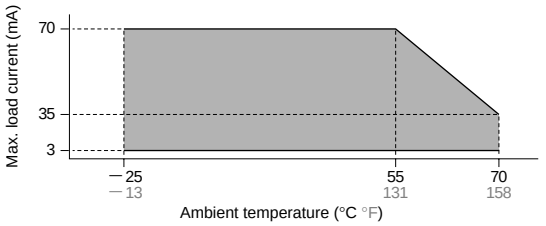
UZQ2□□□A

I/O circuit diagram

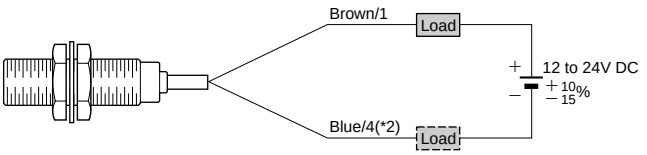


Symbol ... Z_D: Surge absorption zener diode
Tr: PNP output transistor

(*1): The maximum load current varies depending on ambient temperatures.



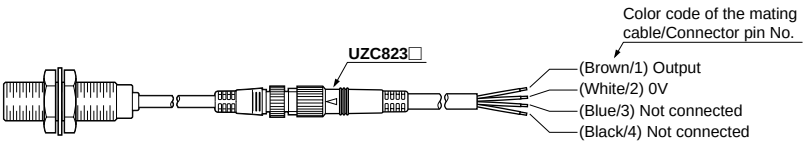
Wiring diagram



Conditions for the load

1) A load should not be actuated by the leak current (0.8mA) in the OFF state.
2) A load should be actuated at (supply voltage–3V) in the ON state.
3) The current in the ON state should be between 3 to 70mA DC.
[In case the current is less than 3mA, connect a bleeder resistance in parallel to the load so that the current flows at 3mA or more.]

(*2): The 0V wire is identified as White/2 with the **UZQ2□□1A** Approach ON sensor.

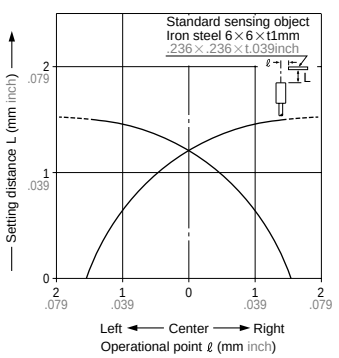


SENSING FIELDS

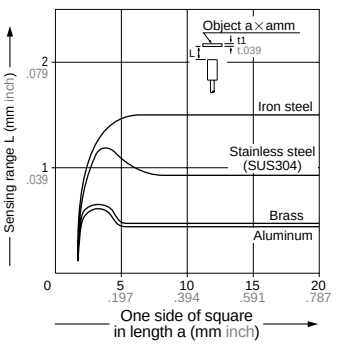
These are typical sensing fields, which may vary slightly from unit to unit.

UZQ2600
UZQ2601

Sensing field



Target size - Sensing range correlation



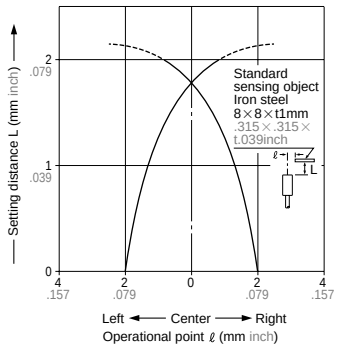
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 6×6×t1mm .236×.236×t.039inch) as shown in the graph on the left.

SENSING FIELDS

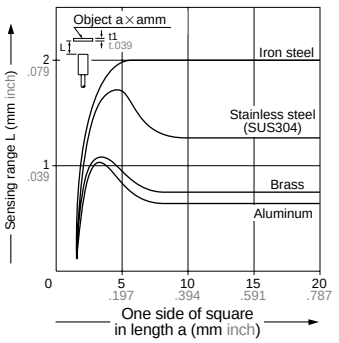
These are typical sensing fields, which may vary slightly from unit to unit.

UZQ2100
UZQ2101

Sensing field



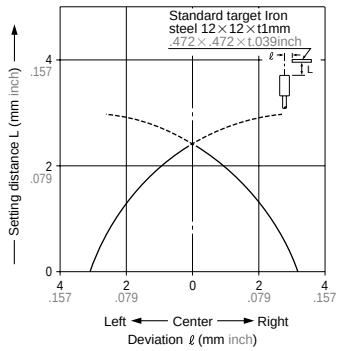
Target size - Sensing range correlation



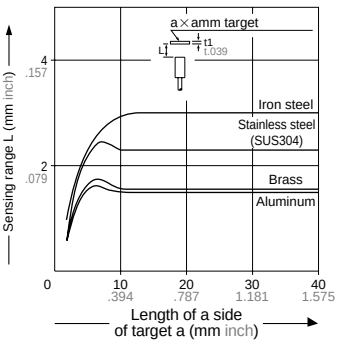
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 8×8×t1mm .315×.315×t.039inch) as shown in the graph on the left.

UZQ2200
UZQ2201

Sensing field



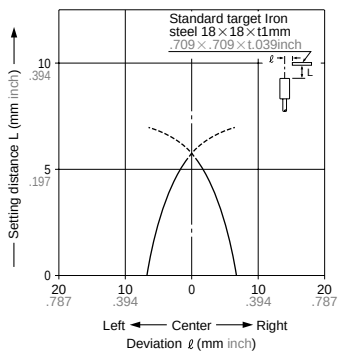
Target size - Sensing range correlation



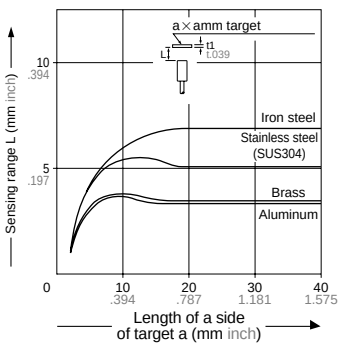
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 12×12×t1mm .472×.472×t.039inch) as shown in the graph on the left.

UZQ2300
UZQ2301

Sensing field



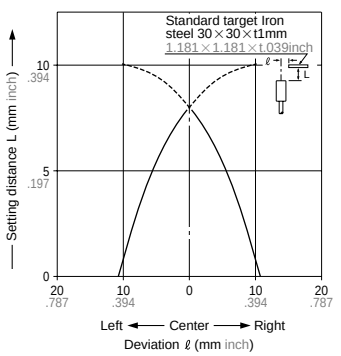
Target size - Sensing range correlation



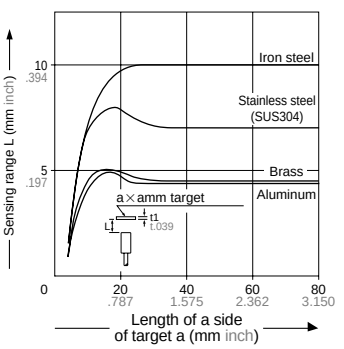
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 18×18×t1mm .709×.709×t.039inch) as shown in the graph on the left.

UZQ2400
UZQ2401

Sensing field



Target size - Sensing range correlation



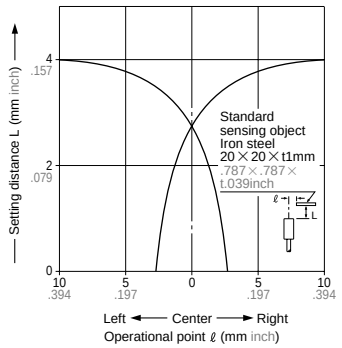
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 30×30×t1mm 1.181×1.181×t.039inch) as shown in the graph on the left.

SENSING FIELDS

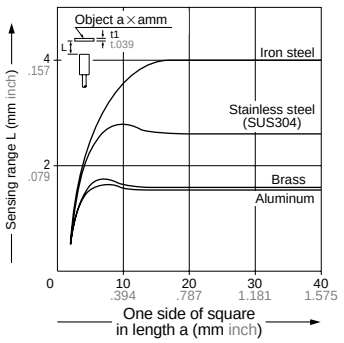
These are typical sensing fields, which may vary slightly from unit to unit.

UZQ2110 UZQ2111

Sensing field



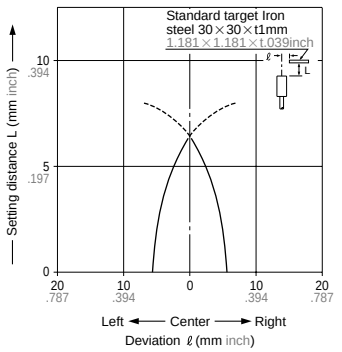
Target size - Sensing range correlation



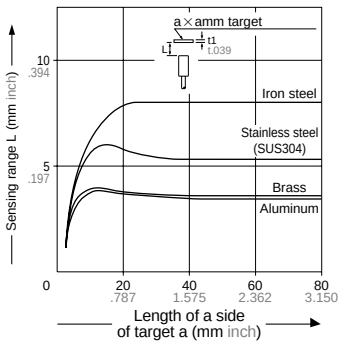
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 20×20×t1mm .787×.787×t.039inch) as shown in the graph on the left.

UZQ2210 UZQ2211

Sensing field



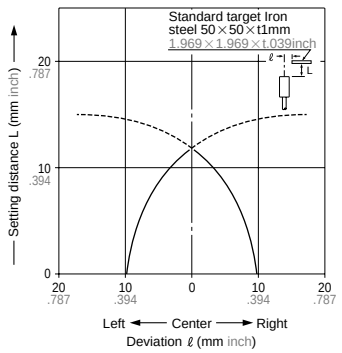
Target size - Sensing range correlation



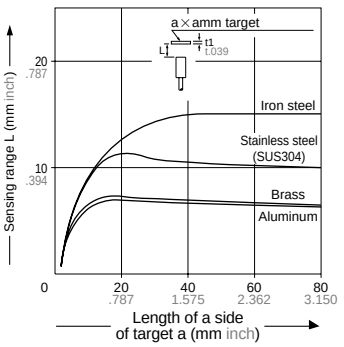
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 30×30×t1mm 1.181×1.181×t.039inch) as shown in the graph on the left.

UZQ2310 UZQ2311

Sensing field



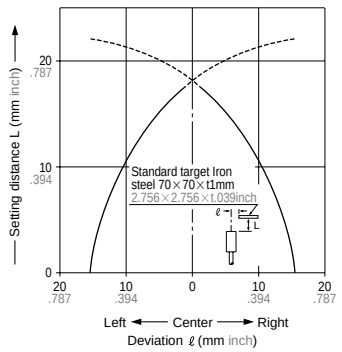
Target size - Sensing range correlation



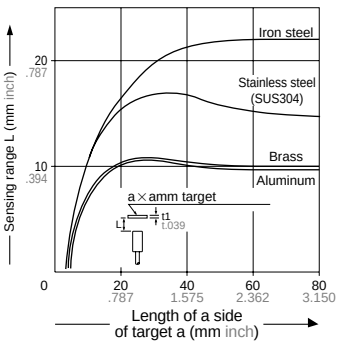
Note that the sensing range decreases if the target is smaller than the standard size (iron steel 50×50×t1mm 1.969×1.969×t.039inch) as shown in the graph on the left.

UZQ2410 UZQ2411

Sensing field



Target size - Sensing range correlation



Note that the sensing range decreases if the target is smaller than the standard size (iron steel 70×70×t1mm 2.756×2.756×t.039inch) as shown in the graph on the left.

PRECAUTIONS FOR PROPER USE

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

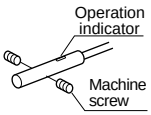
Mounting

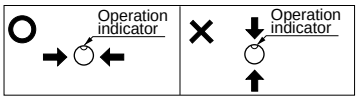
Tightening torque should be the value as shown below.

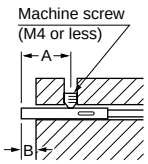
Mounting with machine screw

[Cylindrical type]

- Use a machine screw M4 or less and tighten it as the indented head of the screw thrusts on the side wall of the sensor. Do not fix it at the tail where the indicator is located.



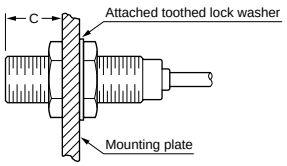




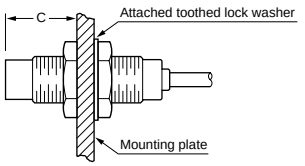
Model No.	A (mm inch)	B (mm inch)	Tightening torque
UZQ260□	5 to 30 .197 to 1.181	3 .118	0.78N·m {8kgf·cm}

Mounting with nut

[Shielded type]



[Non-shielded type]



Model No.	Dimension of C (mm inch)	Tightening torque
UZQ210□	3 to 10.3 .118 to .406	5.9N·m{60kgf·cm} or less
	10.3 .406 or more	11.8N·m{120kgf·cm} or less
UZQ220□	3.5 to 13.5 .138 to .531 or more	10N·m{102kgf·cm} or less
	13.5 .531 or more	20N·m{204kgf·cm} or less
UZQ230□	4 to 18 .157 to .709	45N·m{459kgf·cm} or less
	18 .709 or more	80N·m{816kgf·cm} or less
UZQ240□	5 to 21 .197 to .827	80N·m{816kgf·cm} or less
	21 .827 or more	180N·m{1,836kgf·cm} or less
UZQ211□	12 .472 or more	11.8N·m{120kgf·cm} or less
UZQ221□	15 .591 or more	20N·m{204kgf·cm} or less
UZQ231□	25 .984 or more	80N·m{816kgf·cm} or less
UZQ241□	30 1.181 or more	180N·m{1,836kgf·cm} or less

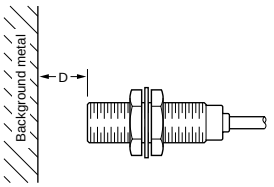
(*1): The nut should be threaded completely onto the sensor.

Distance from the surrounding metals

As the metal around the sensor may affect the sensing performance, pay attention to the following points.

Influence of surrounding metal

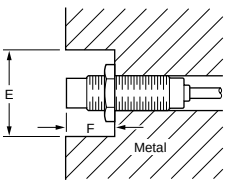
If there are metals near the sensor, it may affect the sensing ability. Keep them the minimum distance away specified below.



Model No.	D (mm inch)
UZQ260□	4.5 .177
UZQ210□	4.5 .177
UZQ220□	8 .315
UZQ230□	20 .787
UZQ240□	40 1.575
UZQ211□	8 .315
UZQ221□	22 .866
UZQ231□	45 1.772
UZQ241□	75 2.953

Embedding of the sensor in metal

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



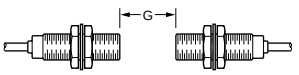
Model No.	E (mm inch)	F (mm inch)
UZQ260□	ϕ12 .472	3 .118
UZQ211□	ϕ24 .945	12 .472
UZQ221□	ϕ50 1.969	15 .591
UZQ231□	ϕ75 2.953	25 .984
UZQ241□	ϕ105 4.134	30 1.181

(*1): Non-shielded type's sensing distance may vary depending on position of nut.

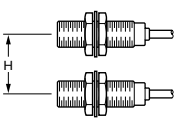
Crosstalk prevention

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

Face to face mounting



Parallel mounting



Model No.	G (mm inch)	H (mm inch)
UZQ260□	19 .748	14 .551
UZQ210□	20 .787	15 .591
UZQ220□	35 1.378	20 .787
UZQ230□	70 2.756	45 1.772
UZQ240□	115 4.528	70 2.756
UZQ211□	60 2.362	45 1.772
UZQ221□	145 5.709	95 3.740
UZQ231□	250 9.843	165 6.496
UZQ241□	350 13.780	250 9.843

PRECAUTIONS FOR PROPER USE

Sensing range

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

Correction coefficient

Material / Model No.	Iron steel	Stainless steel (SUS304)	Brass	Aluminum
UZQ260□	1	Approx. 0.63	Approx. 0.32	Approx. 0.30
UZQ210□	1	Approx. 0.59	Approx. 0.32	Approx. 0.29
UZQ220□	1	Approx. 0.75	Approx. 0.51	Approx. 0.49
UZQ230□	1	Approx. 0.75	Approx. 0.50	Approx. 0.48
UZQ240□	1	Approx. 0.69	Approx. 0.44	Approx. 0.42
UZQ211□	1	Approx. 0.64	Approx. 0.38	Approx. 0.38
UZQ221□	1	Approx. 0.67	Approx. 0.44	Approx. 0.43
UZQ231□	1	Approx. 0.68	Approx. 0.45	Approx. 0.43
UZQ241□	1	Approx. 0.67	Approx. 0.44	Approx. 0.43

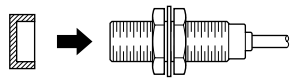
(*1): Note that the sensing range varies if the object is plated.

Protective cover (option)

It protects the sensing surface from welding sparks (spatter), etc.

Mounting method

Protective cover Sensor



Material: Fluorine resin

Model No.	Applicable model No.
UZQ821	**UZQ220□**
UZQ822	**UZQ230□**
UZQ823	**UZQ240□**

(*1): To fit the protective cover correctly make sure there is no space between the protective cover and the sensing surface of the sensor.

Others

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 invertor motor, etc.) near the sensor, ground the frame ground (F.G.) terminal of the equipment.

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

Do not run sensor cables near high-voltage lines or power lines, or put them together in the same raceway. Doing so may cause malfunctions due to inductive interference.

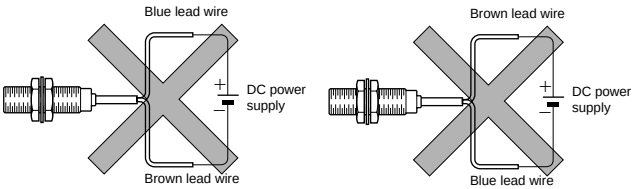
Avoid placement where the sensor may be exposed to chemical agents such as thinner or organic solvents.

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

Stress should not be applied to the sensor cable at the joint.

Wiring

Always connect the sensor to the power supply through a load. If the sensor is connected to the power supply directly, the short-circuit protection will operate and the sensor will not work (The output will stay in the OFF state and the indicator will not light.) In such a case, if the power supply is reconnected to the sensor with a load, the sensor will operate normally. Also, be careful not to connect the power with reverse polarity as this will damage the sensor if load is not connected.



When using series connection (AND circuit) or parallel connection (OR circuit), be aware of the followings.

Series connection (AND circuit)

Load voltage V_{RL} when all sensors are in the ON state

$V_{RL} = V_{CC} - n \times 3(V)$

V_{CC}: supply voltage (24V DC MAX.)
n: number of sensors

Be careful of the wrong operation of the load.

(*1): Even if the indicator is dark or does not light on, the output operation is normal.

Parallel connection (OR circuit)

Leakage current I_{CC} flows to the load when all sensors are in the OFF state.

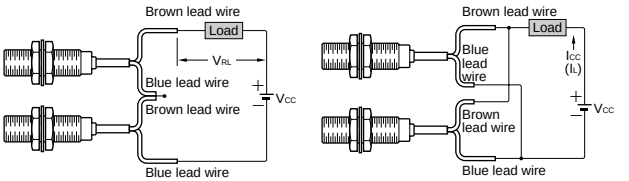
$I_{CC} = n \times 0.8(mA)$ (n: number of sensors)

Be careful of the wrong operation of the load.

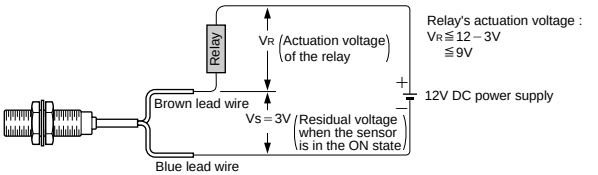
(*1): Load current in the ON state

$$I_L = \frac{V_{CC} - 3V}{\text{load resister}} \ (mA)$$

However, load current is;
$3mA \times n \leqq I_L \leqq 70mA$
(n: number of sensors in the ON state)

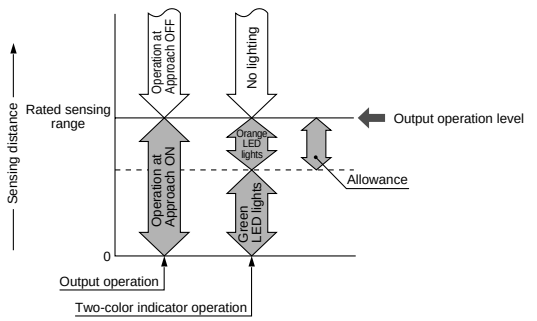


Residual voltage in the sensor is 3V. When connecting the relay, be aware of the actuation voltage of the relays. (12V relays may not be connected as loads.)



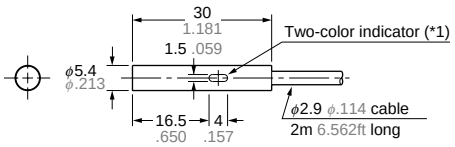
Two-color indicator (Only for approach ON type)

When the sensing object is in the stable sensing range, a green LED lights, and when the sensing object is in the unstable sensing range, an orange LED lights. If a green LED lights, the stable sensing will occur without being affected by temperature drift or voltage fluctuation.



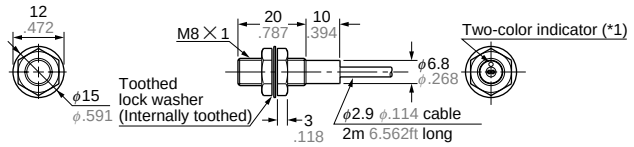
DIMENSIONS (Unit: mm inch)

UZQ2600 UZQ2601 Sensor



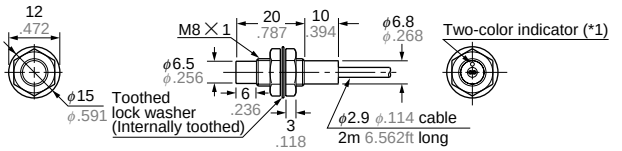
(*1): Leave ON type has the operation indicator (orange) instead of the two-color indicator.

UZQ2100 UZQ2101 Sensor



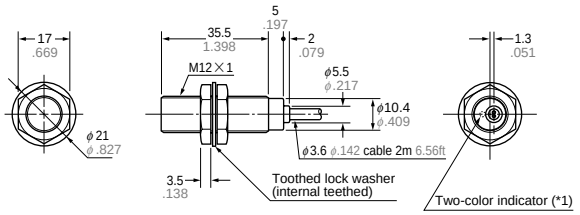
(*1): Leave ON type has the operation indicator (orange) instead of the two-color indicator.

UZQ2110 UZQ2111 Sensor



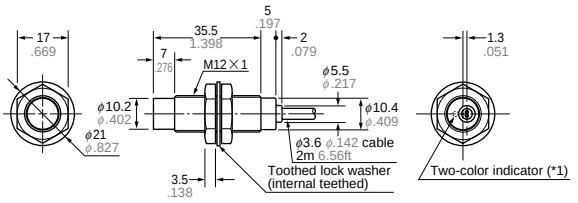
(*1): Leave ON type has the operation indicator (orange) instead of the two-color indicator.

UZQ2200 UZQ2201 Sensor



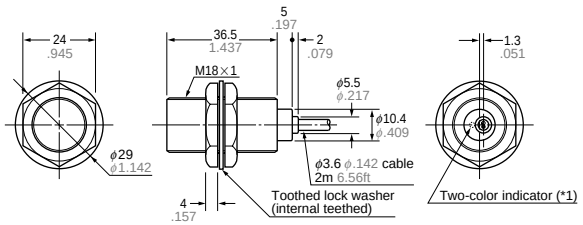
(*1): Leave ON type has operation indicator (orange) instead of Two-color indicator.

UZQ2210 UZQ2211 Sensor



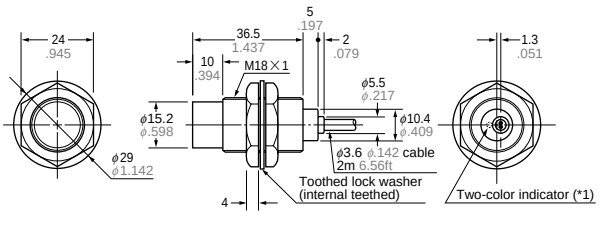
(*1): Leave ON type has operation indicator (orange) instead of Two-color indicator.

UZQ2300 UZQ2301 Sensor



(*1): Leave ON type has operation indicator (orange) instead of Two-color indicator.

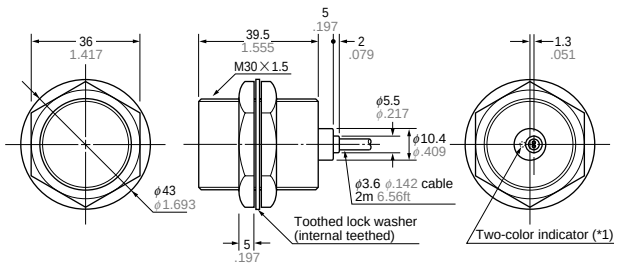
UZQ2310 UZQ2311 Sensor



(*1): Leave ON type has operation indicator (orange) instead of Two-color indicator.

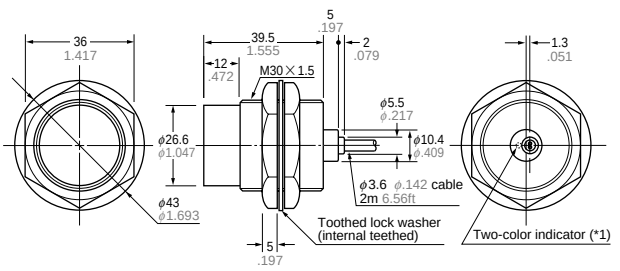
DIMENSIONS (Unit: mm inch)

UZQ2400 UZQ2401 Sensor



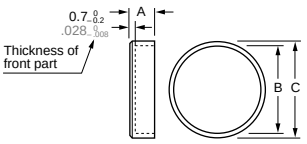
(*1): Leave ON type has operation indicator (orange) instead of Two-color indicator.

UZQ2410 UZQ2411 Sensor



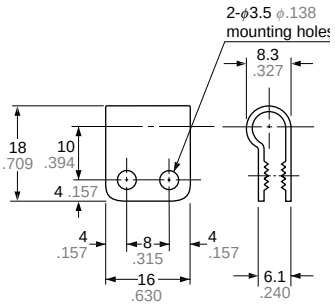
(*1): Leave ON type has operation indicator (orange) instead of Two-color indicator.

UZQ821, UZQ822 UZQ823 Protective cover (option)



Symbol / Model No.	A	B	C	Applicable model No.
UZQ821	5 .197	ϕ11.5 ϕ.453	ϕ14 ϕ.551	**UZQ220**□
UZQ822	6 .236	ϕ17.5 ϕ.689	ϕ20 ϕ.787	**UZQ230**□
UZQ823	8 .315	ϕ29.4 ϕ1.157	ϕ33 ϕ1.299	**UZQ240**□

UZQ841 Sensor mounting bracket for **UZQ260**□ (Option)



Material: 66 nylon