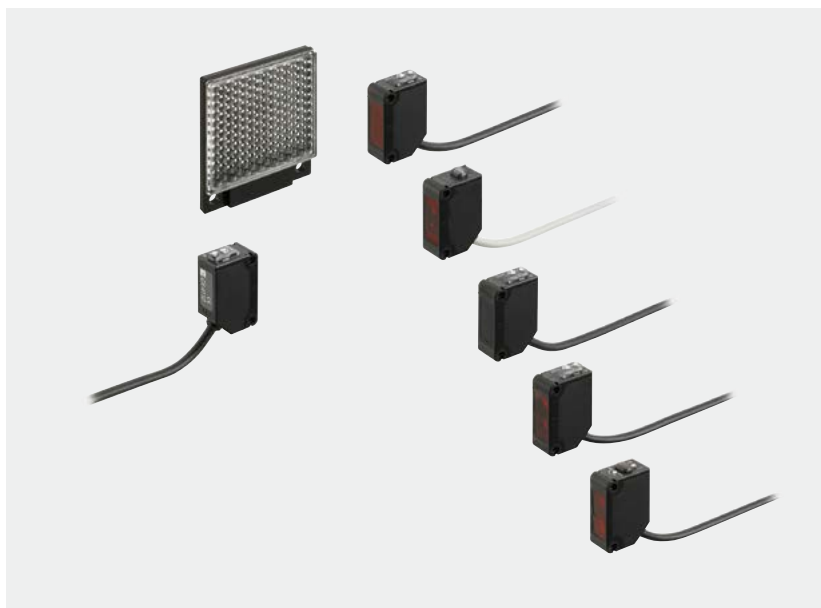


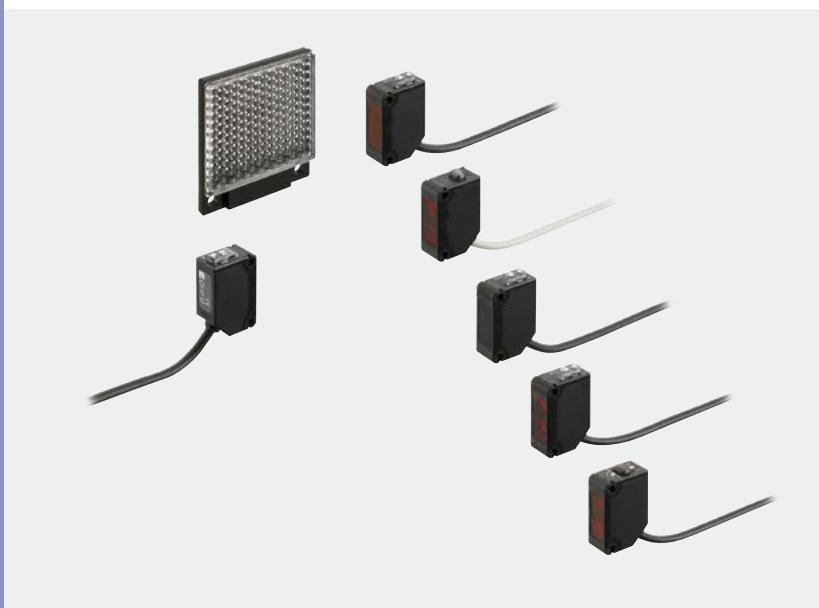
Amplifier Built-in

Compact Photoelectric Sensor

CX-400 SERIES Ver.2



CX-400 SERIES Ver.2



Sensors that are environmentally and user friendly.

Reducing environmental burdens further Up to 60% less power consumption

The various lineup covers through the inclusion of a newly developed custom integrated circuit. The **CX-400** series achieves reductions in power consumption of up to 60%, averaging 44% reduction when upgrading due to its unique design. These sensors reduce carbon emissions and contribute to environmental friendliness.

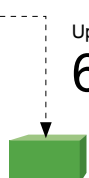


Providing stable detection with low power consumption

Includes an analog CMOS processor ASIC



Previous **CX-482**
25 mA



New **CX-482**
10 mA

Upgrade for up to
60% reduction



Contributing to reduced carbon dioxide emissions

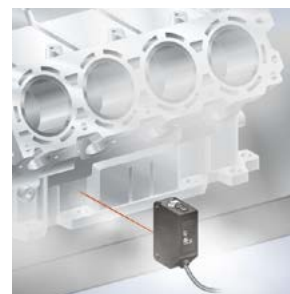
Electricity consumed by the **CX-400** series has been reduced on average 10.5 mA. Calculating 8 hours/day, 260 days (operating 5 days/week) for a total of 2,080 hours/year leads to:

► The **CX-400** contributes

Approx. 84.6 t annually in carbon dioxide reductions to the world

Strong against oil and coolant liquids **CX-41□/42□/49□**

The lens material for the thru-beam type, retroreflective type (excluding the **CX-48□**) and the diffuse reflective type are made of a strong acrylic that resists the harmful effects of coolants. These sensors can be used with confidence even around metal processing machinery that disperses oil mists. The protection mechanism also conforms to IP67 (IEC).



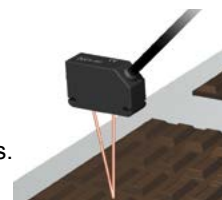
Test Oil	JIS Standard	Product Name
Lubricant	-	Velocity Oil No. 3
Water-insoluble cutting oil	2-5	Daphnecut AS-30D
	2-11	Yushiron Oil No.2ac (Note)
Water-soluble cutting oil	W1-1	Yushiron Lubic HWC68 (Note)
	W2-1	Yushiroken S50N (Note)

1,000 hours; Immersion (depth 0 m); Insulation resistance 20 MΩ/250 V

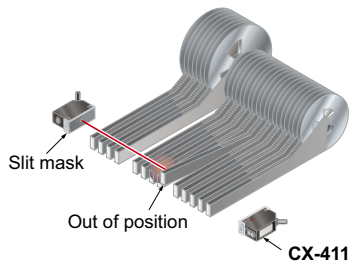
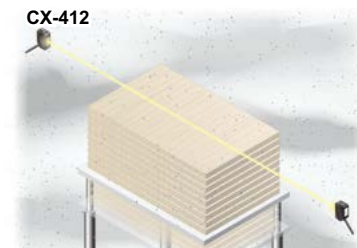
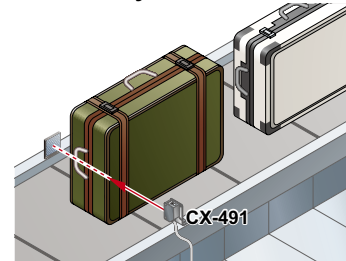
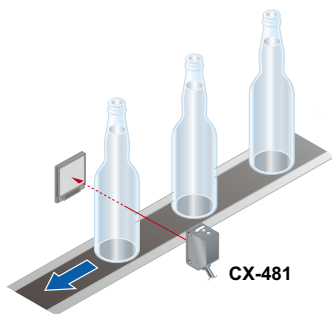
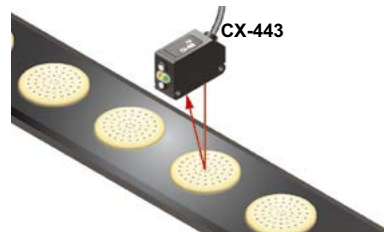
Note: Yushiron and Yushiroken are registered trademarks of Yushiro Chemical Industry Co., Ltd.

Strong against ethanol **CX-44□/48□**

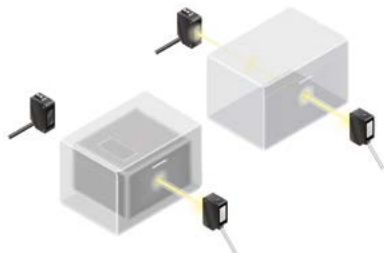
A strong, ethanol resistant polycarbonate was used for the front and display covers. Safe even for installing near food processing machinery that disperses ethanol based detergents. The protection mechanism also conforms to IP67 (IEC).



Caution: Set the **CX-48□** so that cleaning liquid will not get on to the attached reflector.

APPLICATIONS**Detecting out of position tape feeder cassette****Detecting objects in dusty environment****Passage confirmation of object on a conveyor belt****Detecting transparent glass bottles****Detecting a small tablet****Detecting a biscuit****BASIC PERFORMANCE****Strong infrared beam****CX-412/413**

Remarkable penetrating power enables applications such as package content detection.



Note: When sensing utilizing penetrating power, make sure to verify using the actual sensor.

Can sense differences as small as 0.4 mm **0.016 in**, with hysteresis of 2 % or less **CX-441/443**

An advanced optical system provides sensing performance that is 2.5 times approx. than conventional models. Even ultra-small differences of 0.4 mm **0.016 in** can be detected accurately.

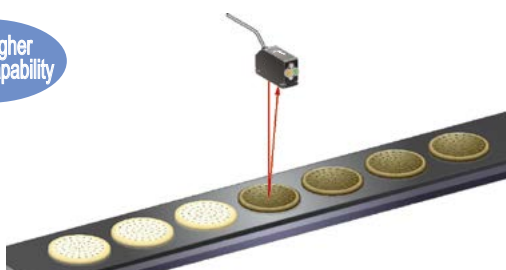
2.5 times the sensing capability!

Height differences of as little as 0.4 mm **0.016 in** can be detected at a setting distance of 20 mm **0.787 in**

**Hardly affected by colors****CX-441/443**

Both black and white objects can be sensed at the same distances. No adjuster control is needed, even when products of different colors are moving along the production line.

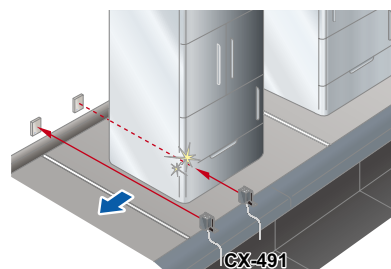
30 % higher sensing capability



[The difference in sensing ranges is 1% or less between non-glossy white paper with a setting distance of 50 mm **1.969 in** and non-glossy gray paper with a brightness level of 5.]

Retroreflective type with polarizing filters **CX-491**

Built-in polarizing filters ensure stable sensing even on a specular object.

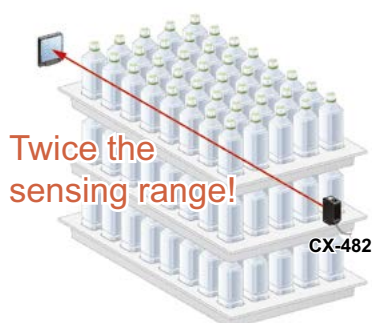


BASIC PERFORMANCE

Introducing the transparent object sensing type sensor

CX-48□

Our unique optical system and transparent object sensing circuitry provide stable sensing of even thinner transparent objects than the conventional models.



Transparent objects detectable with **CX-48□** (Typical examples)

Sensing object	Sensing object size (mm in)
Glass sheet	50 × 50 1.969 × 1.969 t = 0.7 0.028
Cylindrical glass	ø50 ø1.969 ℓ = 50 1.969 t = 1.3 0.051
Acrylic board	50 × 50 1.969 × 1.969 t = 1.0 0.039
Styrol (Floppy case)	50 × 50 1.969 × 1.969 t = 0.9 0.035
Food wrapping film	50 × 50 1.969 × 1.969 t = 10 μm 0.394 mil
Cigarette case film	50 × 50 1.969 × 1.969 t = 20 μm 0.787 mil
Vinyl sack	50 × 50 1.969 × 1.969 t = 30 μm 1.181 mil
PET bottle (500ml)	ø66 ø2.598

Reflector setting range **CX-481**: 300 to 500 mm 11.811 to 19.685 in,
CX-482: 1 to 2 m 3.281 to 6.562 ft

[with the **RF-230** reflector at the optimum condition (Note)]

Each object should pass across the beam at the center between the sensor and the reflector.

ℓ: Length of cylindrical glasses

t: Thickness of sensing object

Note: The optimum condition is defined as the condition in which the sensitivity level is set such that the stability indicator just lights up when the object is absent.

Long sensing range of 5 m 16.4 ft **CX-493**

A long 5 m 16.4 ft sensing range is possible with the red LED type that is easy to align with the beam axis. Can be used for wide automatic door shutters.



Ultra-long sensing range of 30 m 98.4 ft **CX-413**

The **CX-413** achieves the ultra-long sensing range of 30 m 98.4 ft. It can be used for a stacker crane or a multilevel parking structure.

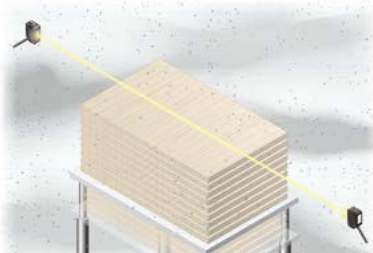


ENVIRONMENTAL RESISTANCE

Strong on dust and dirt

CX-412/413

Because the light source is an infrared light, it is strong on dust and dirt compared to the red beam type.

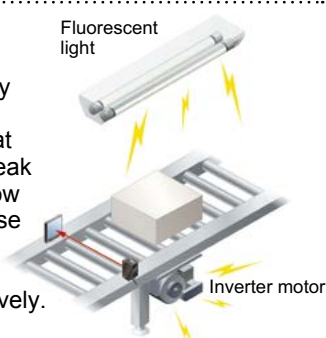


Strong even in cold environments

Stable performance can be maintained even in environments of -25 °C -13 °F.

Stronger noise resistance

The **CX-400** series has a higher noise resistance than its previous model. By incorporating an inverter countermeasure circuit that appropriately shifts with peak wavelength, the sensor now resists high-frequency noise from high-voltage inverter motors and inverter lights more effectively.



ECO

Thoroughly eliminating unnecessary waste, Reducing many environmental burdens



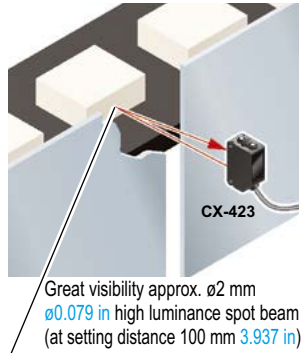
The **CX-400** series has three different cable length types and uses very simple packaging to reduce waste. The bag is made of polyethylene and does not emit toxic gasses.



MOUNTING

Beam axis alignment made easy with a high luminance spot beam **CX-423**

These sensors have a high luminance red LED spot beam which provides bright visibility enabling the sensing position to be checked at a glance. Because it achieved small beam spot approx. $\varnothing 2$ mm $\varnothing 0.079$ in at setting distance 100 mm 3.937 in, approx. $\varnothing 5$ mm $\varnothing 0.197$ in at setting distance 200 mm 7.874 in, even the minutest object can be accurately detected.



The bright spot makes beam axis alignment easy **CX-441**

These sensors have a high luminance red spot that provides bright visibility. The sensing position can be checked at a glance. Because the **CX-441** sensor has the smallest spot in its class $\varnothing 2$ mm $\varnothing 0.079$ in approx., even the minutest object can be accurately detected.



OPERABILITY

Reduction of volume adjustment labor **CX-420**

Because these sensors possess many variations depending on the sensing range, enables you to make optimal volume adjustment easily.

CX-422: 800 mm 31.496 in

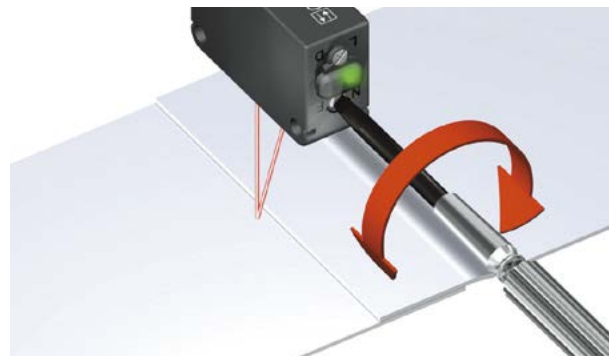
CX-421: 300 mm 11.811 in

CX-424: 100 mm 3.937 in



Can be used for sensing minute differences **CX-440**

Equipped with a 5-turn adjuster so that even challenging range settings can be handled with ease.



VARIETIES

Basic type available

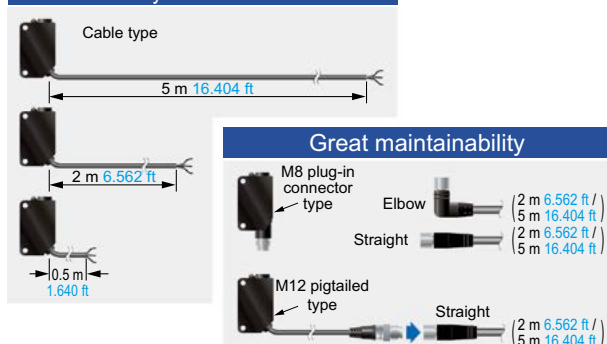
Omit the sensitivity adjuster and operation mode switch and release a basic type cable 0.5 m 1.641 ft in length. If the usage is clear, quick construction can be performed onsite without detailed adjustments and the cost can be controlled.

Less processing time



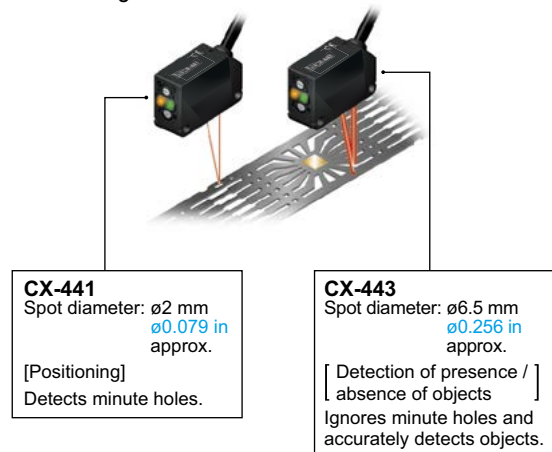
M8 plug-in connector type and M12 pigtailed type are available. This contributes to less time spent in setting up. In addition, cable types are available with cable lengths of 0.5 m 1.640 ft, 2 m 6.562 ft and 5 m 16.404 ft. This results in less wastage.

No unnecessary cables or terminal blocks



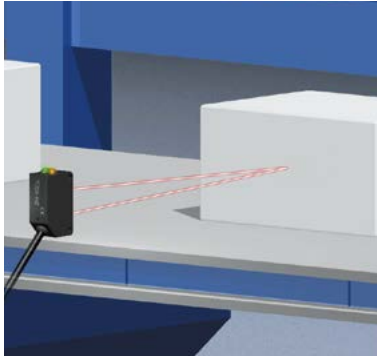
Select from 2 spot diameters as per the application **CX-441/443**

Within the choice of 50 mm 1.969 in sensing range sensors, we offer small spot approx. $\varnothing 2$ mm $\varnothing 0.079$ in type optimal for detecting minute object and large approx. $\varnothing 6.5$ mm $\varnothing 0.256$ in spot type capable of sensing object covered with holes and grooves.

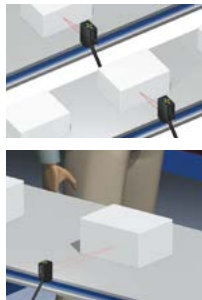


FUNCTIONS**BGS/FGS functions make even the most challenging settings possible!****CX-44□****The BGS function is best suited for the following case****Background not present**

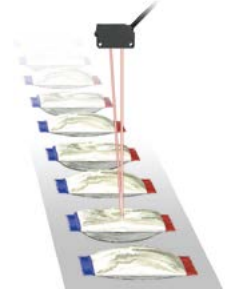
When object and background are separated

BGS

Not affected if the background color changes or someone passes behind the conveyor.

**The FGS function is best suited for the following case****Background present**When object and background are close together
When the object is glossy or uneven**FGS**

Unaffected by gloss, color or uneven surfaces when sensing objects present on a conveyor belt.

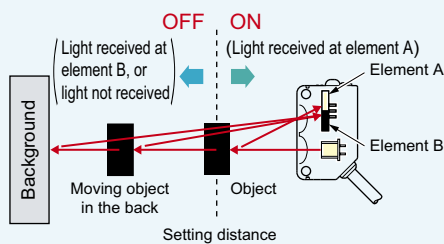


Caution: Please use the FGS function together with a conveyor or other background unit.

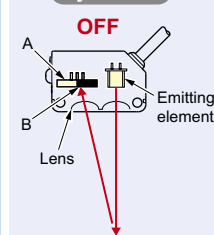
BGS (Background suppression) function

The sensor judges that an object is present when light is received at position A of the light-receiving element (2-segment element).

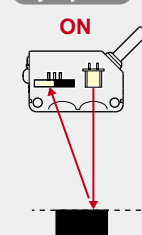
This is useful if the object and background are far apart. The distance adjustment method is the same as the conventional adjustment method for adjustable range reflective type sensors.

**FGS (Foreground suppression) function**

The sensor judges that an object is present when no light is received at position B of the light-receiving element (2-segment element). Accordingly, even objects that are glossy can be sensed. This is useful if the object and background are close together, or if the object being sensed is glossy.

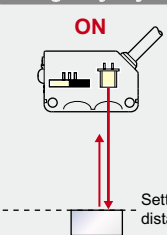
OFF in this condition only**Object absent**

Conveyor

Light received at position B
(A conveyor or other back-ground must be present)**ON in all other conditions****Object present**

Conveyor

Light received at position A

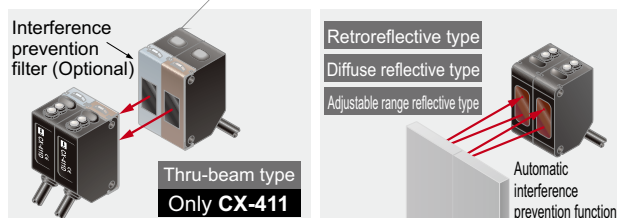
For glossy object

Conveyor

Light is not received at position B, so a object is judged to be present




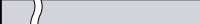




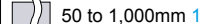






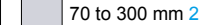



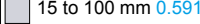
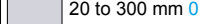
Strong against interference

The interference prevention function lets two sensors to be mounted close together precisely.



ORDER GUIDE

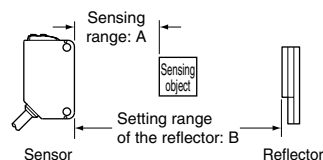
Standard type

Type	Appearance	Sensing range	Model No. (Note 1)		Output operation	Emitting element
			NPN output	PNP output		
Thru-beam		 10 m 32.808 ft	CX-411	CX-411-P	Switchable either Light-ON or Dark-ON	Red LED
		 15 m 49.213 ft	CX-412	CX-412-P		Infrared LED
		 30 m 98.425 ft	CX-413	CX-413-P		Infrared LED
Retroreflective		 3 m 9.843 ft (Note 2)	CX-491	CX-491-P	Switchable either Light-ON or Dark-ON	Red LED
		 5 m 16.404 ft (Note 2)	CX-493	CX-493-P		Red LED
		 50 to 500 mm 1.969 to 19.685 in (Note 2)	CX-481	CX-481-P		Infrared LED
		 50 to 1,000mm 1.969 to 39.37 in (Note 2)	CX-483	CX-483-P		
		 0.1 to 2 m 0.328 to 6.562 ft (Note 2)	CX-482	CX-482-P		
Diffuse reflective		 100 mm 3.937 in	CX-424	CX-424-P	Switchable either Light-ON or Dark-ON	Infrared LED
		 300 mm 11.811 in	CX-421	CX-421-P		
		 800 mm 31.496 in	CX-422	CX-422-P		
		 70 to 300 mm 2.756 to 11.811 in	CX-423	CX-423-P		Red LED
Adjustable range reflective		 2 to 50 mm 0.079 to 1.969 in	CX-441	CX-441-P	Switchable either Detection-ON or Detection-OFF	Red LED
		 15 to 100 mm 0.591 to 3.937 in	CX-443	CX-443-P		
		 20 to 300 mm 0.787 to 11.811 in	CX-444	CX-444-P		
		 20 to 300 mm 0.787 to 11.811 in	CX-442	CX-442-P		

NOTE: Mounting bracket is not supplied with the sensor. Please select from the range of optional sensor mounting brackets.

Notes: 1) The model No. with "E" shown on the label affixed to the thru-beam type sensor is the emitter, "D" shown on the label is the receiver.

2) The sensing range of the retroreflective type sensor is specified for the **RF-230** (optional) reflector. The sensing range represents the actual sensing range of the sensor. The sensing ranges itemized in "A" of the table below may vary depending on the shape of sensing object. Be sure to check the operation with the actual sensing object.



	CX-491 □	CX-493 □	CX-481 □	CX-483 □	CX-482 □
A	0 to 3 m 0 to 9.843 ft	0 to 5 m 0 to 16.404 ft	50 to 500 mm 1.969 to 19.685 in	50 to 1,000 mm 1.969 to 39.37 in	0.1 to 2 m 0.328 to 6.562 ft
B	0.1 to 3 m 0.328 to 9.843 ft	0.1 to 5 m 0.328 to 16.404 ft	100 to 500 mm 3.937 to 19.685 in	100 to 1,000 mm 3.937 to 39.37 in	0.8 to 2 m 2.625 to 6.562 ft