NEW

OMRON

Proximity Sensors

E2V-X□

30 Years of Innovation

Long-distance Detection of Aluminum or Iron
A Proximity Sensor with a NEW Detection Principle

Smartclick
Pre-wired Connector Models
Standard Models

realizing

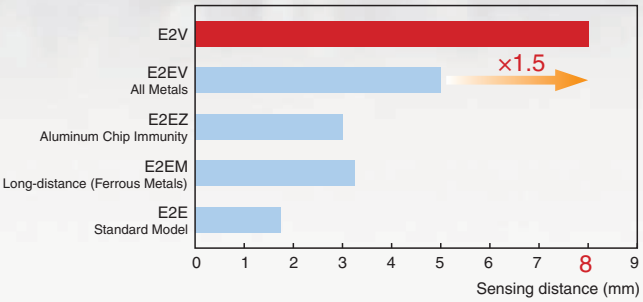
CE

Aluminum Detection Distance: 1.5 to 2 Times Previous Models

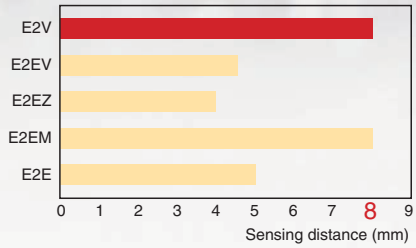
*In-house comparison of M18 Shielded Long-distance Models

Immunity against aluminum chips has enabled achieving long-distance detection of aluminum workpieces. The same detection distance has also been achieved for iron, allowing the E2V-X□ to be separated from workpieces made of either metal farther than any other Proximity Sensor.

Aluminum Excellent Performance, with Aluminum Chip Immunity!

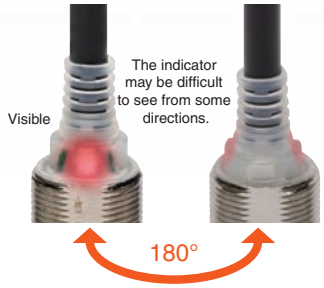


Iron Also Detects Iron at Long Distances!

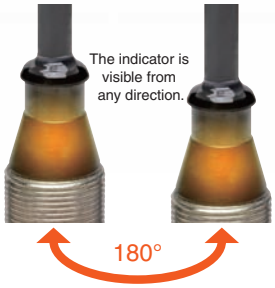


Detection Made Visible

An operation indicator that is visible from any direction is provided as a standard feature.
This indicator flashes under unstable conditions for easy installation condition verification at a glance.



Previous Sensor



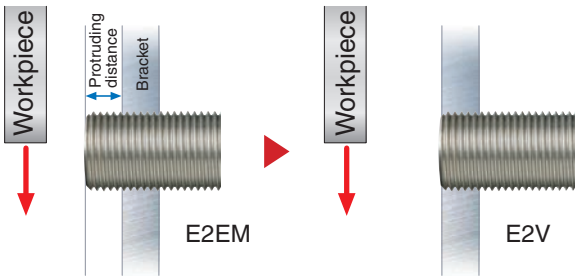
E2V Pre-wired Models and Pre-wired Connector Models

E2V Connector Models

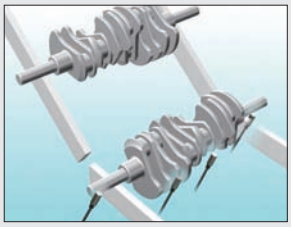
Embeddable in Metal.

The first Long-distance Sensor that is shielded. Possible to be completely embedded in metal.

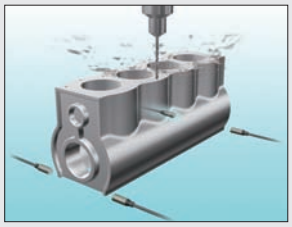
Embedded Mounting in Metal



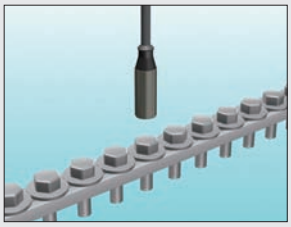
Applications



Long-distance Detection of Crankshafts



Cylinder Block Seating Detection

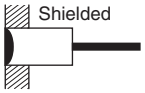


Detect Passing Parts

Ordering Information

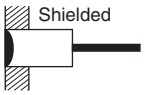
Standard-distance Sensors, DC 3-wire, Pre-wired Models (Standard Cable Length: 2 m)

Models with 5-m cables are also available and are ordered by adding "5M" to the end of the model number (e.g., E2V-X2B1 5M).

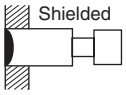
Appearance		Sensing distance	Output	Model	
				Operation mode NO	Operation mode NC
 Shielded	M12	2mm	PNP	E2V-X2B1	E2V-X2B2
			NPN	E2V-X2C1	E2V-X2C2
	M18	5mm	PNP	E2V-X5B1	E2V-X5B2
			NPN	E2V-X5C1	E2V-X5C2
	M30	10mm	PNP	E2V-X10B1	E2V-X10B2
			NPN	E2V-X10C1	E2V-X10C2

Long-distance Sensors, DC 3-wire, Pre-wired Models (Standard Cable Length: 2 m)

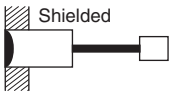
Models with 5-m cables are also available and are ordered by adding "5M" to the end of the model number (e.g., E2V-X4B1 5M).

Appearance		Sensing distance	Output	Model	
				Operation mode NO	Operation mode NC
 Shielded	M12	4mm	PNP	E2V-X4B1	E2V-X4B2
			NPN	E2V-X4C1	E2V-X4C2
	M18	8mm	PNP	E2V-X8B1	E2V-X8B2
			NPN	E2V-X8C1	E2V-X8C2
	M30	15mm	PNP	E2V-X15B1	E2V-X15B2
			NPN	E2V-X15C1	E2V-X15C2

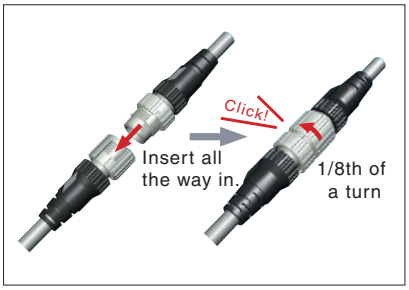
Long-distance Sensors, DC 3-wire, Connector Models

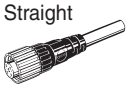
Appearance		Sensing distance	Output	Model	
				Operation mode NO	Operation mode NC
 Shielded	M12	4mm	PNP	E2V-X4B1-M1	E2V-X4B2-M1
			NPN	E2V-X4C1-M1	E2V-X4C2-M1
	M18	8mm	PNP	E2V-X8B1-M1	E2V-X8B2-M1
			NPN	E2V-X8C1-M1	E2V-X8C2-M1
	M30	15mm	PNP	E2V-X15B1-M1	E2V-X15B2-M1
			NPN	E2V-X15C1-M1	E2V-X15C2-M1

Long-distance Sensors, DC 3-wire, Smartclick Pre-wired Connector (M12) Models

Appearance		Sensing distance	Output	Model
				Operation mode NO
 Shielded	M12	4mm	PNP	E2V-X4B1-M1TJ
			NPN	E2V-X4C1-M1TJ
	M18	8mm	PNP	E2V-X8B1-M1TJ
			NPN	E2V-X8C1-M1TJ
	M30	15mm	PNP	E2V-X15B1-M1TJ
			NPN	E2V-X15C1-M1TJ

Standard "Twist-and-Click" Smartclick Connectors



Appearance	Type	Cable length (m)	Model	Applicable Proximity Sensor Models
Smartclick Connector, Straight 	Standard cable	2	XS5F-D421-D80-A	E2V-X□□□-M1/M1TJ
		5	XS5F-D421-G80-A	E2V-X□□□-M1/M1TJ
	Vibration-proof robot cable	2	XS5F-D421-D80-F	E2V-X□□□-M1/M1TJ
		5	XS5F-D421-G80-F	E2V-X□□□-M1/M1TJ
	Oil-resistant polyurethane cable	2	XS5F-D421-D80-P	E2V-X□□□-M1/M1TJ
		5	XS5F-D421-G80-P	E2V-X□□□-M1/M1TJ

Ratings and Specifications

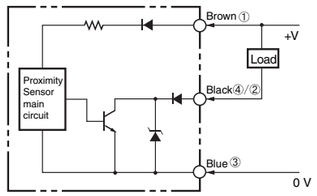
Size		M12		M18		M30	
Item \ Model		E2V-X2□□	E2V-X4□□	E2V-X5□□	E2V-X8□□	E2V-X10□□	E2V-X15□□
Sensing distance		2mm±10%	4mm±10%	5mm±10%	8mm±10%	10mm±10%	15mm±10%
Set distance		0 to 1.6 mm	0 to 3.2 mm	0 to 4.0 mm	0 to 6.4 mm	0 to 8.0 mm	0 to 12.0 mm
Differential travel		10% max. of sensing distance					
Detectable object		Ferrous metals and non-ferrous metals (The sensing distance depends on the material of the sensing object. Refer to *Engineering Data (Typical)*.)					
Standard sensing object		Aluminum: 12 × 12 × 3 mm	Aluminum: 12 × 12 × 3 mm	Aluminum: 18 × 18 × 3 mm	Aluminum: 24 × 24 × 3 mm	Aluminum: 30 × 30 × 3 mm	Aluminum: 45 × 45 × 3 mm
Response frequency*		150Hz	40Hz	70Hz	40Hz	70Hz	30Hz
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
Current consumption		450 mW max. (Current consumption: 15 mA max. at power supply voltage of 30 V)					
Control output	Load current	Open-collector output, 100 mA max.					
	Residual voltage	2 V max. (Load current: 100 mA, Cable length: 2 m)					
Indicators		NO Models: Operation indicator (yellow) (flashing), Setting indicator (yellow) (lit); NC Models: Operation indicator (yellow) (lit)					
Operation mode		B1/C1 Models: NO B2/C2 Models: NC (Refer to the timing charts under *I/O Circuit Diagrams* for details.)					
Protection circuits		Power supply reverse polarity protection, reversed output polarity protection, load short-circuit protection, surge suppressor					
Ambient temperature		Operating/Storage: –25 to 70°C (with no icing or condensation)					
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)					
Temperature influence		Based on the sensing distance at 23°C in the temperature range of –25 to 70°C					
		±10% max.	±15% max.	±10% max.	±15% max.	±10% max.	±15% max.
Voltage influence		±1.5% max. of sensing distance at rated voltage in the rated voltage ±15% range					
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case					
Dielectric strength		1,000 VAC, 50/60 Hz for 1 minute between current-carrying parts and case					
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
Shock resistance		Destruction: 1,000 m/s² 10 times each in X, Y, and Z directions					
Degree of protection		IEC IP67 (Pre-wired Models and Pre-wired Connector Models are oil-resistant to the OMRON in-house standard.)					
Connection method		Pre-wired Models (Standard cable length: 2 m), Connector Models, Pre-wired Connector Models (Standard cable length: 300 mm)					
Weight (packed state)	Cable	Approx. 120 g		Approx. 150 g		Approx. 200 g	
	Connector	Approx. 30 g		Approx. 45 g		Approx. 120 g	
	Pre-wired Connector Models	Approx. 50 g		Approx. 70 g		Approx. 140 g	
Materials	Case	Nickel-plated brass					
	Sensing surface	Heat-resistant ABS					
	Clamping nuts	Nickel-plated brass					
	Toothed washer	Zinc-plated iron					
Accessories		Instruction manual					

* The response frequency is an average value.
Measurement conditions are as follows: Standard sensing object, a distance between target objects of twice the size of the standard sensing object, and a set distance of half the sensing distance.

I/O Circuit Diagrams and Timing Charts

■ Output Circuit Diagrams and Connections

E2V-X□C□ (-M1/-M1TJ)

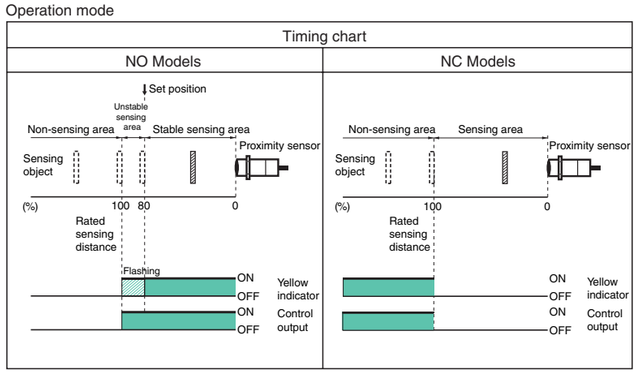


Note: Connector Models
NO Models: ①④③
NC Models: ①②③

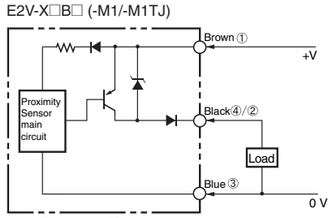
M1: ② ① ③ ④
M1TJ:

Compatible Connector Cables: XS5F Series
XS2F Series

Operation mode



E2V-X□B□ (-M1/-M1TJ)



Note: Connector Models
NO Models: ①④③
NC Models: ①②③

M1: ② ① ③ ④
M1TJ:

Compatible Connector Cables: XS5F Series
XS2F Series

Safety Precautions

⚠ WARNING

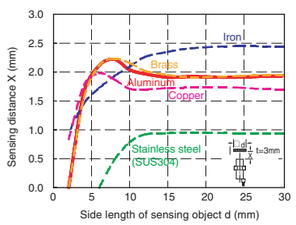
This product is not designed or rated for ensuring safety of persons. Do not use it for such purposes.

Never use the product with an AC power supply. Otherwise, explosion may result.

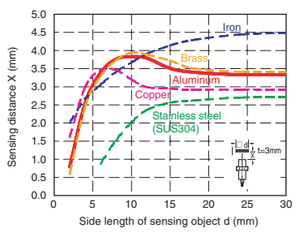
Engineering Data (Typical)

■ Influence of Sensing Object Size and Material

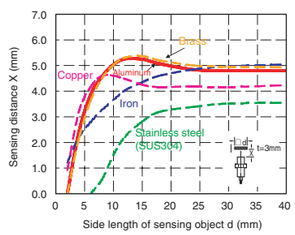
E2V-X2



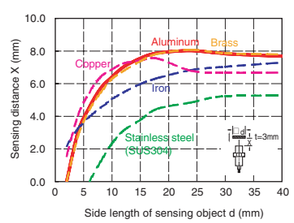
E2V-X4



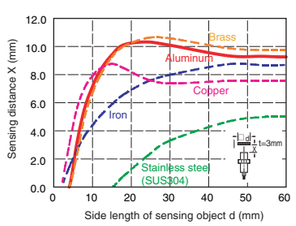
E2V-X5



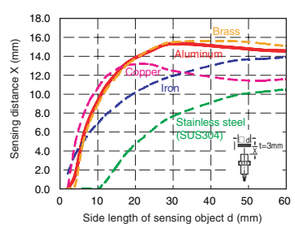
E2V-X8



E2V-X10

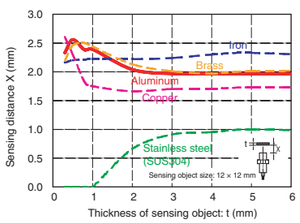


E2V-X15

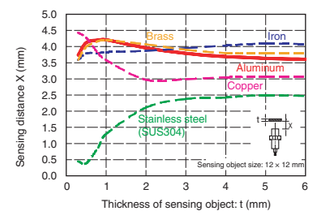


■ Influence of Sensing Object Size and Material

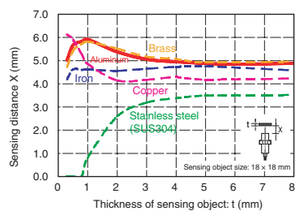
E2V-X2



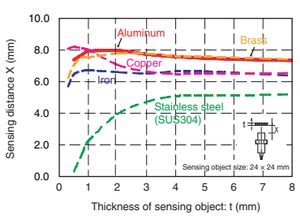
E2V-X4



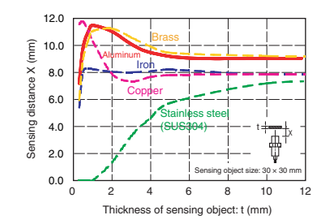
E2V-X5



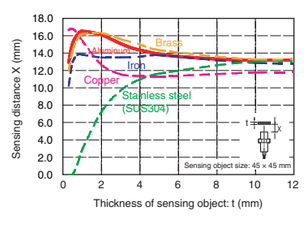
E2V-X8



E2V-X10

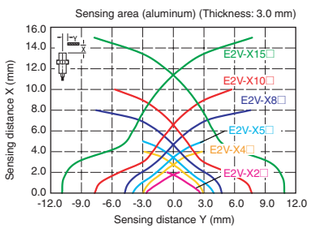


E2V-X15

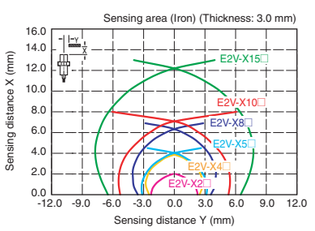


■ Sensing Area

Sensing area (aluminum) (Thickness: 3.0 mm)



Sensing area (Iron) (Thickness: 3.0 mm)



Influence of Surrounding Metal

When embedding the Sensor in metal, be sure that the clearances given in the following table are maintained.

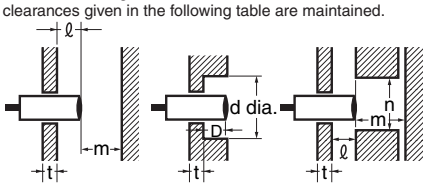


Table 1. Influence of Surrounding Metal (Unit: mm)

Item \ Model	E2V-X2	E2V-X5	E2V-X10
ℓ	0	0	0
d dia.	12	18	30
D	0	0	0
m	12	24	45
n	18	27	45

Item \ Model	E2V-X4	E2V-X8	E2V-X15
ℓ	0	0	0 (See Note 1.)
d dia.	12	18	30 (See Note 1.)
D	0	0	0 (See Note 1.)
m	12	24	45
n	18	27	45

Note 1: If the thickness of the mounting bracket (t) exceeds 5 mm, be sure to install the Sensor so that ℓ ≥ 2, d (dia.) ≥ 45, and D ≥ 2.

Mutual Interference

When installing Sensors face-to-face or side-by-side, be sure that the minimum distances given in table 2 are maintained.

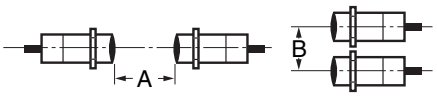


Chart 2. Mutual Interference (Unit: mm)

Item \ Model	E2V-X2	E2V-X5	E2V-X10
A	30	50	100
B	20	30	50

Item \ Model	E2V-X4	E2V-X8	E2V-X15
A	35	60	120
B	25	35	70

Other Information

Sensing Distance

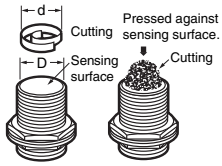
- The sensing distance depends on the sensing object size, material, and thickness.
- If the sensing object has a thickness of less than 1 mm, the sensing distance will decrease.
- In some cases, it may not be possible to detect stainless steel. Use the following graph and the *Influence of Sensing Object Size and Material* information in *Engineering Data (Typical)* as a reference.

Aluminum and Iron Cuttings

Normally aluminum or iron cuttings will not be detected even if they adhere to or accumulate on the sensing surface. Detection signals may be output for the following. If this occurs, remove the cuttings from the sensing surface.

Diameter of cutting = d and diameter of sensing surface = D

Cuttings in center of sensing surface with d ≥ 2/3D



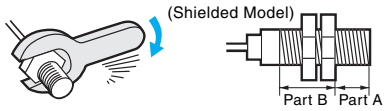
(Unit: mm)

Model \ Size	D
E2V-X2□/X4□	10
E2V-X5□/X8□	16
E2V-X10□/X15□	28

Tightening Torque

Do not tighten the nut with excessive force.

A washer must be used with the nut.



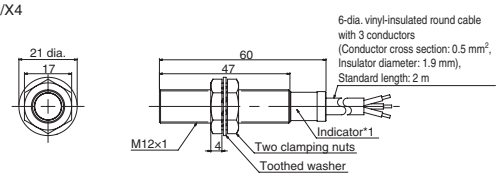
Model \ Tightening Torque	Part A		Part B
	Dimension(mm)	Torque	Torque
E2V-X2/X4	17	5.9N•m	9.8N•m
E2V-X5/X8	22	15N•m	45N•m
E2V-X10/X15	26	39N•m	78N•m

Dimensions

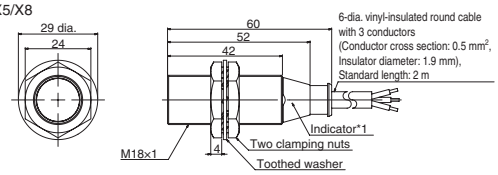
(Unit:mm)

Pre-wired Models

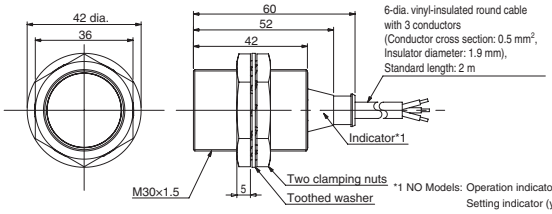
E2V-X2/X4



E2V-X5/X8



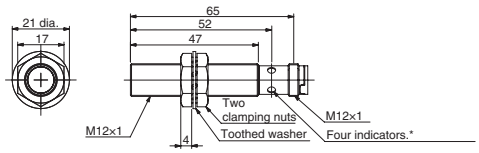
E2V-X10/X15



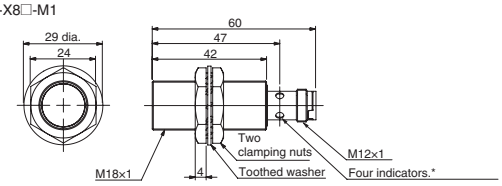
*1 NO Models: Operation indicator (yellow) (flashing)
Setting indicator (yellow) (ON)
NC Models: Operation indicator (yellow) (ON)

Connector Models

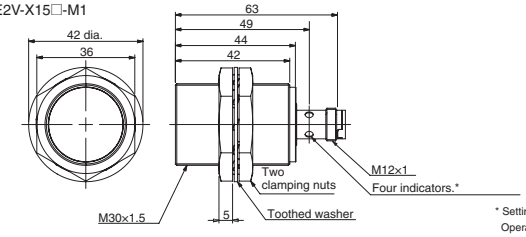
E2V-X4□-M1



E2V-X8□-M1

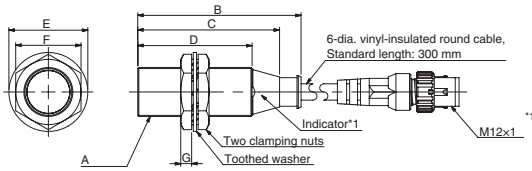


E2V-X15□-M1



* Setting indicator (ON)
Operation indicator (flashing)

Pre-wired Connector Models



*1 NO Models: Operation indicator (yellow) (flashing)
Setting indicator (yellow) (ON)
NC Models: Operation indicator (yellow) (ON)

Pre-wired Connector Models

Item \ Model	E2V-X4□-M1TJ	E2V-X8□-M1TJ	E2V-X15□-M1TJ
A	M12×1	M18×1	M30×1.5
B	60	60	60
C	---	52	52
D	47	42	42
E	21 dia.	29 dia.	42 dia.
F	17	24	36
G	4	4	5

Mounting Hole Dimensions

Proximity Sensor dimensions	M12	M18	M30
Dimension H (mm)	12.5 $^{+0.5}_{0}$ dia.	18.5 $^{+0.5}_{0}$ dia.	30.5 $^{+0.5}_{0}$ dia.

This document provides information mainly for selecting suitable models. Please read the document Instruction Sheet carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

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