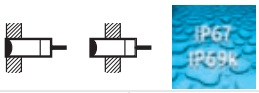
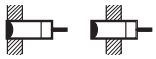
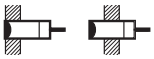
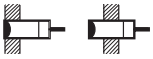
Inductive and Capacitive Sensors

General Purpose Inductive Proximity Switches

Overview

					
Housing	Cylindrical				
Model	E2A-M	E2A-S	E2F	E2E small diameter, TL, E2EL	E2A3
Type			Standard	Miniature	Long distance flush mounting
Housing Material	Brass	Stainless Steel	Plastic	Brass	
Features	• designed and tested for extra long life • highest quality consistancy in manufacturing • cost efficient solution		• high quality full body plastic housing for high water proof and chemical resistance requirements	• small diameters where mounting space is crucial	• long distance for flush mounting requirements
Key specifications	• NO, NC or NO+NC • DC 2-wire, DC 3-wire, DC 4-wire • 12 - 24 VDC (10 - 32 VDC) • IP67 • IP69k 		• NO or NC • DC 3-wire • 12 - 24 VDC (10 -30 VDC) • IP67, IP68 	• NO or NC • DC 3-wire • 12 - 24 VDC (10 - 32 VDC) • IP67 	• NO or NC • DC 3-wire • 12 - 24 VDC (10 - 32 VDC) • IP67 
Max sensing distance	M12: 8 mm M18: 16 mm M30: 30 mm	M8: 4 mm M12: 8 mm M18: 16 mm M30: 30 mm	M8: 1.5 mm M12: 2 mm M18: 5 mm M30: 10 mm	dia 4: 0.8 mm M5: 1 mm dia 5.4: 1 mm dia 6.5: 2 mm dia 8: 2 mm	M8: 3 mm M12: 6 mm M18: 11 mm M30: 20 mm
Connection	PVC M8, M12, customer specific Connector: M8, M12 		PVC M8, M12, customer specific 	PVC M8, M12, customer specific  Connector: M8 	PVC M8, M12, customer specific  Connector: M8, M12 
Page	D-9		D-29	E2E / Page D-45 TL / Page D-115 E2EL / Page D-99	D-35

General Purpose Inductive Proximity Switches

				
Housing	Square			
Model	TL-W	E2S	E2Q2	TL-T
Type	Standard (flat shape)	Miniature	Long distance	Standard (thin shape)
Housing Material	Plastic (ABS)	Plastic (polyarylate)	Plastic (PBT)	Plastic
Features	• High quality consistancy • High performance and cost efficient solution	• Small shapes where mounting space is crucial	• Long sensing distances • Changable postition of active face	• Thin shape for saving side-wall mounting
Key specifications	• NO or NC • DC 3-wire, (DC 2-wire) • 12 - 24 VDC (10 - 30 VDC) • IP67 	• NO or NC • DC 3-wire, DC 2-wire • 12 - 24 VDC • (10 - 30 VDC) • IP67 	• NO or NO+NC • DC 3-wire, DC 4-wire • 10 - 60 VDC • IP67 	• NO, NC or NO+NC • DC 3-wire, DC 4-wire • 12 - 24 VDC (10 - 30 VDC) • IP67 
Max sensing distance	25 x 8 x 5: 1.5 mm 22 x 8 x 6: 3 mm 31 x 18 x 10: 5 mm 53 x 40 x 23: 20 mm	19 x 6 x 2: 1.6 mm 23 x 8 x 8: 2.5 mm	67 x 40 x 40: 20, 30 or 40 mm 118 x 40 x 40: 20, 30 or 40 mm	xx: 4 mm
Connection	Cable: PVC	Cable: PVC	Connector: M12	Cable: PVC, PUR Connector: M8
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ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D12E-EN-01

In the interest of product improvement, specifications are subject to change without notice.

Special Purpose Inductive Proximity Switches

Overview

				
Housing	Cylindrical			
Model	E2AU	E2EZ	E2AX	E2EQ
Type	Vehicle usage certified (e1 mark)	AL and FE chip immune	ATEX 3D certified	Spatter resistance
Housing Material	Brass	Brass (ABS/ PBT sensing face)	Brass	PTFE coated brass (PTFE sensing face)
Features	• E1 mark for mobile usage • High EMC immunity (additional test up to 100 V/m) • Cable breakage protection • Available on request for all E2A types	• Specialized sensing method for immunity against small sized metal objects (e.g. chips)	• ATEX Cat 3D certification	• PTFE coating for preventing the attachment of sputters in welding applications
Application areas	• Utility vehicles • Mobile construction equipment • RCVs (refuse collecting vehicles) • Mobile agricultural equipment (e.g. harvester)	• Metal cutting in machine tool industry	• Powder handling and packaging (flour packaging) • Wood cutting/ wood chip handling	• Welding applications
Key specifications	• NO • DC 3-wire • 12 - 24 VDC (10 - 32 VDC) • IP67, IP69k	• NO or NC (DC 2-wire only) • DC 3-wire, DC 2-wire • 12 - 24 VDC (10 - 30 VDC) • IP67	• NO • DC 3-wire • 12 - 24 VDC (10 - 32 VDC) • IP67, IP69k	• NO • DC 2-wire • 12 - 24 VDC (10 - 32 VDC) • IP67
Max sensing distance	M12: 4 mm M18: 8 mm M30: 15 mm	M12: 2 mm (DC 2-wire only) M18: 4 mm M30: 8 mm	M12: 4 mm M18: 8 mm M30: 15 mm	M12: 4 mm M18: 8 mm M30: 15 mm
Connection	Cable: PVC (2 m) Connector: M12	Cable: PVC Connector: M12	Connector: M12	Cable: PVC Connector: M12
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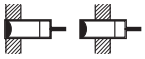
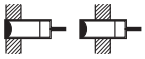
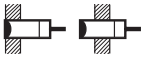
Special Purpose Inductive Proximity Switches

				
Housing	Cylindrical			
Model	E2F, E2E	E2E	E2C-EDA	E2EL
Type	AC power supply	Oil resistant	High precision positioning	Increased switching frequency for high speed applications
Housing Material	Plastic, brass	Brass	Brass	Brass, stainless steel
Features	• 24 - 240 VAC direct switching	• tested oil restistance • designed for automative users	• Accuracy 1µm	• Up to 5kHz switching frequency
Application areas	• Installations without controller/PLC and 230 VAC power supply	• Automative manufacturing lines	• Precision positioning	• Counting • Rotation speed control • CAM
Key specifications	• NO, NC • AC 2-wire • 24 - 240 VAC • IP67 	• NO, NC • DC 3-wire, DC 2-wire • 12 - 24 VDC (10 - 30 VDL) • IP 67	• 12 - 24 VDC (10 - 30 VDC) • IP67 (sensing heads) • IP50 (separate amplifier) 	• NO, NC • DC 3-wire • 10 - 35 VDC • IP67 
Max sensing distance	M8: 2 mm M12: 5 mm M18: 10 mm M30: 18 mm	M8: 4 mm M12: 8 mm M18: 14 mm M30: 20 mm	dia 3 mm: 0.6 mm dia 5.4 mm: 1 mm dia 8mm: 2 mm M10: 2 mm M18: 7 mm	dia 6.5 mm: 2 mm M8: 2 mm
Connection	Cable: PVC  Cable: M12  Connector: M12 	Cable: PVC Cable: M12 Connector: M12	Cable: PVC 	Cable: PVC  Cable connector: M8, M12, custom-er specific  Connector: M8 
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Housing	Cylindrical		
Model	E2EC	E2FQ	ZX-E
Type	Ultra flat/ sub miniature	Chemical resistance	High precision distance measurement
Housing Material	Brass (sensing face: ABS)	PTFE	
Features	• Ultra flat/ small size for applications where space is crucial • Dia 3 mm small housing size model • Ultra short 18 mm long M12 size housing model	• PTFE housing for increased chemical resistance	• 1 µm measurement resolution
Application areas	• Robotic applications (in robot hands)	• Application with aggressive chemicals (etching, cleaning, water treatment)	• Excentricity control
Key specifications	• NO, NC (DC 2-wire only) • DC 2-wire, DC 3-wire • 12 - 24 VDC (10 - 30 VDC) • IP67 	• NO • DC 2-wire • 12 - 24 VDC (10 - 30 VDC) • IP67 	• Linear 4 - 20 mA output • 12 - 24 VDC (10 - 30 VDC) • IP67
Max sensing distance	dia 3 mm: 0.8 mm dia 5.4 mm: 1.5 mm dia 8 mm: 3 mm M12: 4 mm	M12: 2 mm M18: 5 mm M30: 10 mm	dia 3 mm: 0.5 mm dia 5.4 mm: 1 mm dia 8 mm: 2 mm M10: 2 mm M18: 7 mm
Connection	Cable: PVC 	Cable: PVC 	Cable: PVC 
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Cat. No. D13E-EN-01

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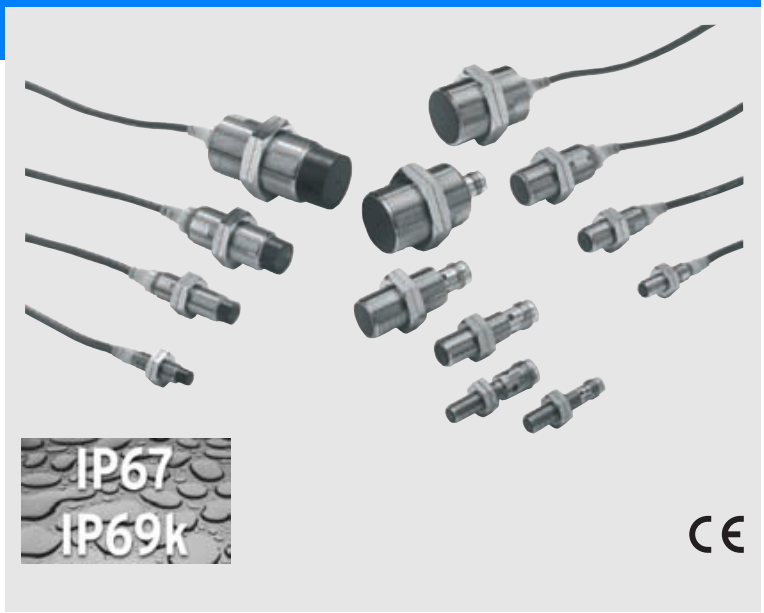
Cylindrical Proximity Sensor
E2A

High quality for extra long life in daily use

- wide portfolio range through modular concept
- designed and tested for extra long life
- IP67 and IP69k for highest protection in wet environments
- continuously high quality level through specialized manufacturing process
- DC 3-wire and DC 2-wire models
- Normally open (NO), normally closed (NC) and antivalent (NO+NC) models
- up to 30mm sensing distance
- Stainless steel and brass housings
- Pre-wired versions with different cable materials and diameters, M8 and M12 connector types, pre-wired types with cable end connectors



Ordering Information

DC 3-wire models (NO + NC: DC 4-wire) *2

Size		Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode NO	Operation mode NC
M8	Shielded	2.0 mm	Pre-wired	Stainless steel*1	27 (40)	PNP	E2A-S08KS02-WP-B1 2M	E2A-S08KS02-WP-B2 2M
						NPN	E2A-S08KS02-WP-C1 2M	E2A-S08KS02-WP-C2 2M
					49 (62)	PNP	E2A-S08LS02-WP-B1 2M	E2A-S08LS02-WP-B2 2M
						NPN	E2A-S08LS02-WP-C1 2M	E2A-S08LS02-WP-C2 2M
			M12 connector		27 (43)	PNP	E2A-S08KS02-M1-B1	E2A-S08KS02-M1-B2
						NPN	E2A-S08KS02-M1-C1	E2A-S08KS02-M1-C2
					49 (65)	PNP	E2A-S08LS02-M1-B1	E2A-S08LS02-M1-B2
						NPN	E2A-S08LS02-M1-C1	E2A-S08LS02-M1-C2
			M8 connector (3-pin)		27 (39)	PNP	E2A-S08KS02-M5-B1	E2A-S08KS02-M5-B2
						NPN	E2A-S08KS02-M5-C1	E2A-S08KS02-M5-C2
					49 (61)	PNP	E2A-S08LS02-M5-B1	E2A-S08LS02-M5-B2
						NPN	E2A-S08LS02-M5-C1	E2A-S08LS02-M5-C2
			M8 connector (4-pin)		27 (39)	PNP	E2A-S08KS02-M3-B1	E2A-S08KS02-M3-B2
						NPN	E2A-S08KS02-M3-C1	E2A-S08KS02-M3-C2
					49 (61)	PNP	E2A-S08LS02-M3-B1	E2A-S08LS02-M3-B2
						NPN	E2A-S08LS02-M3-C1	E2A-S08LS02-M3-C2
	Non-shielded	4.0 mm	Pre-wired		27 (40)	PNP	E2A-S08KN04-WP-B1 2M	E2A-S08KN04-WP-B2 2M
						NPN	E2A-S08KN04-WP-C1 2M	E2A-S08KN04-WP-C2 2M
					49 (62)	PNP	E2A-S08LN04-WP-B1 2M	E2A-S08LN04-WP-B2 2M
						NPN	E2A-S08LN04-WP-C1 2M	E2A-S08LN04-WP-C2 2M
			M12 connector		27 (43)	PNP	E2A-S08KN04-M1-B1	E2A-S08KN04-M1-B2
						NPN	E2A-S08KN04-M1-C1	E2A-S08KN04-M1-C2
					49 (65)	PNP	E2A-S08LN04-M1-B1	E2A-S08LN04-M1-B2
						NPN	E2A-S08LN04-M1-C1	E2A-S08LN04-M1-C2
			M8 connector (3-pin)		27 (39)	PNP	E2A-S08KN04-M5-B1	E2A-S08KN04-M5-B2
						NPN	E2A-S08KN04-M5-C1	E2A-S08KN04-M5-C2
					49 (61)	PNP	E2A-S08LN04-M5-B1	E2A-S08LN04-M5-B2
						NPN	E2A-S08LN04-M5-C1	E2A-S08LN04-M5-C2
			M8 connector (4 pin)		27 (39)	PNP	E2A-S08KN04-M3-B1	E2A-S08KN04-M3-B2
						NPN	E2A-S08KN04-M3-C1	E2A-S08KN04-M3-C2
					49 (61)	PNP	E2A-S08LN04-M3-B1	E2A-S08LN04-M3-B2
						NPN	E2A-S08LN04-M3-C1	E2A-S08LN04-M3-C2

Size		Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode NO	Operation mode NC	Operation mode NO + NC
M12	Shielded	4.0 mm	Pre-wired	Brass*3	34 (50)	PNP	E2A-M12KS04-WP-B1 2M	E2A-M12KS04-WP-B2 2M	E2A-M12KS04-WP-B3 2M
						NPN	E2A-M12KS04-WP-C1 2M	E2A-M12KS04-WP-C2 2M	E2A-M12KS04-WP-C3 2M
					56 (72)	PNP	E2A-M12LS04-WP-B1 2M	E2A-M12LS04-WP-B2 2M	E2A-M12LS04-WP-B3 2M
						NPN	E2A-M12LS04-WP-C1 2M	E2A-M12LS04-WP-C2 2M	E2A-M12LS04-WP-C3 2M
			M12 connector	Brass*3	34 (48)	PNP	E2A-M12KS04-M1-B1	E2A-M12KS04-M1-B2	E2A-M12KS04-M1-B3
						NPN	E2A-M12KS04-M1-C1	E2A-M12KS04-M1-C2	E2A-M12KS04-M1-C3
					56 (70)	PNP	E2A-M12LS04-M1-B1	E2A-M12LS04-M1-B2	E2A-M12LS04-M1-B3
						NPN	E2A-M12LS04-M1-C1	E2A-M12LS04-M1-C2	E2A-M12LS04-M1-C3
			M8 connector (3-pin)	Brass*3	34 (48)	PNP	E2A-M12KS04-M5-B1	E2A-M12KS04-M5-B2	n.a.
						NPN	E2A-M12KS04-M5-C1	E2A-M12KS04-M5-C2	n.a.
					56 (70)	PNP	E2A-M12LS04-M5-B1	E2A-M12LS04-M5-B2	n.a.
						NPN	E2A-M12LS04-M5-C1	E2A-M12LS04-M5-C2	n.a.
			M8 connector (4-pin)	Brass*3	34 (48)	PNP	E2A-M12KS04-M3-B1	E2A-M12KS04-M3-B2	n.a.
						NPN	E2A-M12KS04-M3-C1	E2A-M12KS04-M3-C2	n.a.
					56 (70)	PNP	E2A-M12LS04-M3-B1	E2A-M12LS04-M3-B2	n.a.
						NPN	E2A-M12LS04-M3-C1	E2A-M12LS04-M3-C2	n.a.
	Non-shielded	8.0 mm	Pre-wired	Brass*3	34 (50)	PNP	E2A-M12KN08-WP-B1 2M	E2A-M12KN08-WP-B2 2M	E2A-M12KN08-WP-B3 2M
						NPN	E2A-M12KN08-WP-C1 2M	E2A-M12KN08-WP-C2 2M	E2A-M12KN08-WP-C3 2M
					56 (72)	PNP	E2A-M12LN08-WP-B1 2M	E2A-M12LN08-WP-B2 2M	E2A-M12LN08-WP-B3 2M
						NPN	E2A-M12LN08-WP-C1 2M	E2A-M12LN08-WP-C2 2M	E2A-M12LN08-WP-C3 2M
			M12 connector	Brass*3	34 (48)	PNP	E2A-M12KN08-M1-B1	E2A-M12KN08-M1-B2	E2A-M12KN08-M1-B3
						NPN	E2A-M12KN08-M1-C1	E2A-M12KN08-M1-C2	E2A-M12KS08-M1-C3
					56 (70)	PNP	E2A-M12LN08-M1-B1	E2A-M12LN08-M1-B2	E2A-M12LS08-M1-B3
						NPN	E2A-M12LN08-M1-C1	E2A-M12LN08-M1-C2	E2A-M12LS08-M1-C3
			M8 connector (3-pin)	Brass*3	34 (48)	PNP	E2A-M12KN08-M5-B1	E2A-M12KN08-M5-B2	n.a.
						NPN	E2A-M12KN08-M5-C1	E2A-M12KN08-M5-C2	n.a.
					56 (70)	PNP	E2A-M12LN08-M5-B1	E2A-M12LN08-M5-B2	n.a.
						NPN	E2A-M12LN08-M5-C1	E2A-M12LN08-M5-C2	n.a.
			M8 connector (4-pin)	Brass*3	34 (48)	PNP	E2A-M12KN08-M3-B1	E2A-M12KN08-M3-B2	n.a.
						NPN	E2A-M12KN08-M3-C1	E2A-M12KN08-M3-C2	n.a.
					56 (70)	PNP	E2A-M12LN08-M3-B1	E2A-M12LN08-M3-B2	n.a.
						NPN	E2A-M12LN08-M3-C1	E2A-M12LN08-M3-C2	n.a.
M18	Shielded	8.0 mm	Pre-wired	Brass*3	39 (59)	PNP	E2A-M18KS08-WP-B1 2M	E2A-M18KS08-WP-B2 2M	E2A-M18KS08-WP-B3 2M
						NPN	E2A-M18KS08-WP-C1 2M	E2A-M18KS08-WP-C2 2M	E2A-M18KS08-WP-C3 2M
					61 (81)	PNP	E2A-M18LS08-WP-B1 2M	E2A-M18LS08-WP-B2 2M	E2A-M18LS08-WP-B3 2M
						NPN	E2A-M18LS08-WP-C1 2M	E2A-M18LS08-WP-C2 2M	E2A-M18LS08-WP-C3 2M
			M12 connector	Brass*3	39 (53)	PNP	E2A-M18KS08-M1-B1	E2A-M18KS08-M1-B2	E2A-M18KS08-M1-B3
						NPN	E2A-M18KS08-M1-C1	E2A-M18KS08-M1-C2	E2A-M18KS08-M1-C3
					61 (75)	PNP	E2A-M18LS08-M1-B1	E2A-M18LS08-M1-B2	E2A-M18LS08-M1-B3
						NPN	E2A-M18LS08-M1-C1	E2A-M18LS08-M1-C2	E2A-M18LS08-M1-C3
			M8 connector (3-pin)	Brass*3	39 (53)	PNP	E2A-M18KS08-M5-B1	E2A-M18KS08-M5-B2	n.a.
						NPN	E2A-M18KS08-M5-C1	E2A-M18KS08-M5-C2	n.a.
					61 (75)	PNP	E2A-M18LS08-M5-B1	E2A-M18LS08-M5-B2	n.a.
						NPN	E2A-M18LS08-M5-C1	E2A-M18LS08-M5-C2	n.a.
			M8 connector (4-pin)	Brass*3	39 (53)	PNP	E2A-M18KS08-M3-B1	E2A-M18KS08-M3-B2	n.a.
						NPN	E2A-M18KS08-M3-C1	E2A-M18KS08-M3-C2	n.a.
					61 (75)	PNP	E2A-M18LS08-M3-B1	E2A-M18LS08-M3-B2	n.a.
						NPN	E2A-M18LS08-M3-C1	E2A-M18LS08-M3-C2	n.a.
	Non-shielded	16.0 mm	Pre-wired	Brass*3	39 (59)	PNP	E2A-M18KN16-WP-B1 2M	E2A-M18KN16-WP-B2 2M	E2A-M18KN16-WP-B3 2M
						NPN	E2A-M18KN16-WP-C1 2M	E2A-M18KN16-WP-C2 2M	E2A-M18KN16-WP-C3 2M
					61 (81)	PNP	E2A-M18LN16-WP-B1 2M	E2A-M18LN16-WP-B2 2M	E2A-M18LN16-WP-B3 2M
						NPN	E2A-M18LN16-WP-C1 2M	E2A-M18LN16-WP-C2 2M	E2A-M18LN16-WP-C3 2M
			M12 connector	Brass*3	39 (53)	PNP	E2A-M18KN16-M1-B1	E2A-M18KN16-M1-B2	E2A-M18KN16-M1-B3
						NPN	E2A-M18KN16-M1-C1	E2A-M18KN16-M1-C2	E2A-M18KS16-M1-C3
					61 (75)	PNP	E2A-M18LN16-M1-B1	E2A-M18LN16-M1-B2	E2A-M18LS16-M1-B3
						NPN	E2A-M18LN16-M1-C1	E2A-M18LN16-M1-C2	E2A-M18LS16-M1-C3
			M8 connector (3-pin)	Brass*3	39 (53)	PNP	E2A-M18KN16-M5-B1	E2A-M18KN16-M5-B2	n.a.
						NPN	E2A-M18KN16-M5-C1	E2A-M18KN16-M5-C2	n.a.
					61 (75)	PNP	E2A-M18LN16-M5-B1	E2A-M18LN16-M5-B2	n.a.
						NPN	E2A-M18LN16-M5-C1	E2A-M18LN16-M5-C2	n.a.
			M8 connector (4-pin)	Brass*3	39 (53)	PNP	E2A-M18KN16-M3-B1	E2A-M18KN16-M3-B2	n.a.
						NPN	E2A-M18KN16-M3-C1	E2A-M18KN16-M3-C2	n.a.
					61 (75)	PNP	E2A-M18LN16-M3-B1	E2A-M18LN16-M3-B2	n.a.
						NPN	E2A-M18LN16-M3-C1	E2A-M18LN16-M3-C2	n.a.

Size		Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode NO	Operation mode NC	Operation mode NO + NC
M30	Shielded	15.0 mm	Pre-wired	Brass*3	44 (64)	PNP	E2A-M30KS15-WP-B1 2M	E2A-M30KS15-WP-B2 2M	E2A-M30KS15-WP-B3 2M
						NPN	E2A-M30KS15-WP-C1 2M	E2A-M30KS15-WP-C2 2M	E2A-M30KS15-WP-C3 2M
					66 (86)	PNP	E2A-M30LS15-WP-B1 2M	E2A-M30LS15-WP-B2 2M	E2A-M30LS15-WP-B3 2M
						NPN	E2A-M30LS15-WP-C1 2M	E2A-M30LS15-WP-C2 2M	E2A-M30LS15-WP-C3 2M
			M12 connector	Brass*3	44 (58)	PNP	E2A-M30KS15-M1-B1	E2A-M30KS15-M1-B2	E2A-M30KS15-M1-B3
						NPN	E2A-M30KS15-M1-C1	E2A-M30KS15-M1-C2	E2A-M30KS15-M1-C3
					66 (80)	PNP	E2A-M30LS15-M1-B1	E2A-M30LS15-M1-B2	E2A-M30LS15-M1-B3
						NPN	E2A-M30LS15-M1-C1	E2A-M30LS15-M1-C2	E2A-M30LS15-M1-C3
			M8 connector (3-pin)	Brass*3	44 (58)	PNP	E2A-M30KS15-M5-B1	E2A-M30KS15-M5-B2	n.a.
						NPN	E2A-M30KS15-M5-C1	E2A-M30KS15-M5-C2	n.a.
					66 (80)	PNP	E2A-M30LS15-M5-B1	E2A-M30LS15-M5-B2	n.a.
						NPN	E2A-M30LS15-M5-C1	E2A-M30LS15-M5-C2	n.a.
			M8 connector (4-pin)	Brass*3	44 (58)	PNP	E2A-M30KS15-M3-B1	E2A-M30KS15-M3-B2	n.a.
						NPN	E2A-M30KS15-M3-C1	E2A-M30KS15-M3-C2	n.a.
					66 (80)	PNP	E2A-M30LS15-M3-B1	E2A-M30LS15-M3-B2	n.a.
						NPN	E2A-M30LS15-M3-C1	E2A-M30LS15-M3-C2	n.a.
	Non-shielded	20.0 mm	Pre-wired	Brass*3	44 (64) (See note.)	PNP	E2A-M30KN20-WP-B1 2M	E2A-M30KN20-WP-B2 2M	E2A-M30KN20-WP-B3 2M
						NPN	E2A-M30KN20-WP-C1 2M	E2A-M30KN20-WP-C2 2M	E2A-M30KN20-WP-C3 2M
		30.0 mm			66 (86)	PNP	E2A-M30LN30-WP-B1 2M	E2A-M30LN30-WP-B2 2M	E2A-M30LN30-WP-B3 2M
						NPN	E2A-M30LN30-WP-C1 2M	E2A-M30LN30-WP-C2 2M	E2A-M30LN30-WP-C3 2M
		20.0 mm	M12 connector	Brass*3	44 (58) (See note.)	PNP	E2A-M30KN20-M1-B1	E2A-M30KN20-M1-B2	E2A-M30KN20-M1-B3
						NPN	E2A-M30KN20-M1-C1	E2A-M30KN20-M1-C2	E2A-M30KN20-M1-C3
		30.0 mm			66 (80)	PNP	E2A-M30LN30-M1-B1	E2A-M30LN30-M1-B2	E2A-M30LN30-M1-B3
						NPN	E2A-M30LN30-M1-C1	E2A-M30LN30-M1-C2	E2A-M30LN30-M1-C3
		20.0 mm	M8 connector (3-pin)	Brass*3	44 (58) (See note.)	PNP	E2A-M30KN20-M5-B1	E2A-M30KN20-M5-B2	n.a.
						NPN	E2A-M30KN20-M5-C1	E2A-M30KN20-M5-C2	n.a.
		30.0 mm			66 (80)	PNP	E2A-M30LN30-M5-B1	E2A-M30LN30-M5-B2	n.a.
						NPN	E2A-M30LN30-M5-C1	E2A-M30LN30-M5-C2	n.a.
		20.0 mm	M8 connector (4-pin)	Brass*3	44 (58) (See note.)	PNP	E2A-M30KN20-M3-B1	E2A-M30KN20-M3-B2	n.a.
						NPN	E2A-M30KN20-M3-C1	E2A-M30KN20-M3-C2	n.a.
		30.0 mm			66 (80)	PNP	E2A-M30LN30-M3-B1	E2A-M30LN30-M3-B2	n.a.
						NPN	E2A-M30LN30-M3-C1	E2A-M30LN30-M3-C2	n.a.

*1. Material specifications for stainless steel housing case: 1.4305 (W.-No.), SUS 303 (AISI), 2346 (SS). Please contact your OMRON representative for other stainless steel materials.
*2. Please contact your OMRON representative for DC 2-wire models.
*3. Stainless steel models are also available. Please contact your OMRON representative.
Note: M30 non-shielded Models with double sensing distance and short barrels cannot be mounted due to the necessary separation distance from the surrounding metal. Standard sensing models are thus available.

Connectivity

The E2A sensors are available with the following connectors and cable materials:

Pre-wired models

Standard cable lengths are 2m and 5m.
For other cable lengths please contact your OMRON representative.

Standard cable material: PVC (dia 4mm) -WP

Other available cable materials and sizes:

- PVC (dia 6mm) -WS
- PUR/PVC – PUR jacket (dia 4mm) -WA
- PUR/PVC – PUR jacket (dia 6mm) -WB
- PVC robotic cable (dia 4mm) -WR

Pre-wired models with cable end connectors

All pre-wired models can be fitted with cable and connectors.

Standard cable end connectors:

- M12 M1J
- M8 (4 pin) M3J
- M8 (3 pin) M5J

Other cable end connectors are available on request.

Connector models

Standard connectors: M12, M8 (4 or 3 pin) -M1, -M3, -M5

Model Number Legend

E2A□-□□□□□-□-□□-□□

1 2 3 4 5 6 7 8 9 10 11 12

Example: E2A-M12LS04-M1-B1 Standard, M12, long barrel, shielded, Sn=4 mm, M12 connector, PNP-NO
E2A-S08KN04-WP-B1 5M Standard, M8 stainless steel, short barrel, non-shielded, Sn=4 mm, pre-wired PVC cable, PNP-NO, cable length=5 m

1. Basic name

E2A

2. Sensing technology

Blank: Standard double distance

3. Housing shape and material

M: Cylindrical, metric threaded, brass

S: Cylindrical, metric threaded, stainless steel

4. Housing size

08: 8 mm

12: 12 mm

18: 18 mm

30: 30 mm

5. Barrel length

K: Standard length

L: Long body

6. Shield

S: Shielded

N: Non-shielded

7. Sensing distance

Numeral: Sensing distance: e.g. 02=2 mm, 16=16 mm

8. Kind of connection

WP: pre-wired, PVC, dia 4mm (standard)

WS: pre-wired, PVC, dia 6mm

WR: pre-wired, PVC, robotic cable, dia 4mm

WA: pre-wired, PUR/PVC (PUR jacket), dia 4mm

WB: pre-wired, PUR/PVC (PUR jacket), dia 6mm

M1: M12 connector (4 pin) *

M3: M8 connector (4 pin)

M5: M8 connector (3 pin)

M1J pre-wired with M12 cable end connector (4 pin)

M3J pre-wired with M8 cable end connector (4 pin)

M5J pre-wired with M8 cable end connector (3 pin)

9. Power source and output

B: DC, 3-wire, PNP open collector

C: DC, 3-wire, NPN open collector

D: DC, 2-wire

E: DC, 3-wire, NPN voltage output

F: DC, 3-wire, PNP voltage output

10. Operation mode

1: Normally open (NO)

2: Normally closed (NC)

3: Antivalent (NO+NC)

11. Specials (e.g., cable material, oscillating frequency)

12. Cable length

Blank: Connector type

Numeral: Cable length

Note: *In case of DC 2-wire models the M12 connector identifier is '-M1G'

Specifications

DC 3-wire Models / DC 4-wire (NO+NC)

Size		M8		M12	
Type		Shielded	Non-shielded	Shielded	Non-shielded
Item		E2A-S08□S02-□□-B1 E2A-S08□S02-□□-C1	E2A-S08□N04-□□-B1 E2A-S08□N04-□□-C1	E2A-M12□S04-□□-B□ E2A-M12□S04-□□-C□ E2A-S12□S04-□□-B□ E2A-S12□S04-□□-C□	E2A-M12□N08-□□-B□ E2A-M12□N08-□□-C□ E2A-S12□N08-□□-B□ E2A-S12□N08-□□-C□
Sensing distance		2 mm ±10%	4 mm ±10%	4 mm ±10%	8 mm ±10%
Setting distance		0 to 1.6 mm	0 to 3.2 mm	0 to 3.2 mm	0 to 6.4 mm
Differential travel		10% max. of sensing distance			
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)			
Standard target (mild steel ST37)		8×8×1 mm	12×12×1 mm	12×12×1 mm	24×24×1 mm
Response frequency (See note 1.)		1,500 Hz	1,000 Hz	1,000 Hz	800 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Current consumption (DC 3-wire)		10 mA max.			
Output type		-B models: PNP open collector -C models: NPN open collector			
Control output	Load current (See note 2.)	200 mA max. (32 VDC max.)			
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)			
Indicator		Operation indicator (Yellow LED)			
Operation mode (with sensing object approaching)		-B1/-C1 models: NO -B2/-C2 models: NC -B3/ -C3 models: NO+NC For details, refer to the timing charts. (See note 4.)			
Protection circuit		Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection		Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection	
Ambient air temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)			
Temperature influence (See note 2.)		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°C			
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%			
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance		500 m/s^2, 10 times each in X, Y and Z directions		1,000 m/s^2, 10 times each in X, Y and Z directions	
Standard and listings		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (See note 3.)			
Connection method		Pre-wired models (standard is dia 4mm PVC cable with length = 2m). Please see chapter 'Connectivity' for details on different cable materials and lenghts and M8 or M12 connectors.			
Weight (packaged)	Pre-wired model	Approx. 65 g		Approx. 85 g	
	Connector model	M12 connector models: Approx. 20 g M8 connector models: Approx. 15 g		Approx. 35 g	
Material	Case	Stainless steel		Brass-nickel plated or stainless steel	
	Sensing surface	PBT			
	Cable	Standard cable is PVC dia 4mm. For other cable materials or diameters please refer to chapter 'Connectivity'			
	Clamping nut	Brass-nickel plated		Brass-nickel plated for brass models stainless steel for steel models	

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 100 mA max.,

3. UL (CSA) [E196555]: Use class 2 circuit only.

4. -B3/ -C3 NO+NC models are available in M12, M18 and M30 housings with M12 connectors, pre-wired and with cable end connectors.

DC 3-wire Models / DC 4-wire (NO+NC)

Size		M18		M30		
Type		Shielded	Non-shielded	Shielded	Non-shielded	Non-shielded
	Item	E2A-M18□S08-□□-B□ E2A-M18□S08-□□-C□ E2A-S18□S08-□□-B□ E2A-S18□S08-□□-C□	E2A-M18□N16-□□-B□ E2A-M18□N16-□□-C□ E2A-S18□N16-□□-B□ E2A-S18□N16-□□-C□	E2A-M30□S15-□□-B□ E2A-M30□S15-□□-C□ E2A-S30□S15-□□-B□ E2A-S30□S15-□□-C□	E2A-M30KN20-□□-B□ E2A-M30KN20-□□-C□ E2A-S30KN20-□□-B□ E2A-S30KN20-□□-C□	E2A-M30LN30-□□-B□ E2A-M30LN30-□□-C□ E2A-S30LN30-□□-B□ E2A-S30LN30-□□-C□
Sensing distance		8 mm±10%	16 mm±10%	15 mm±10%	20 mm±10%	30 mm±10%
Setting distance		0 to 6.4 mm	0 to 12.8 mm	0 to 12 mm	0 to 16 mm	0 to 24 mm
Differential travel		10% max. of sensing distance				
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)				
Standard target (mild steel ST37)		24×24×1 mm	48×48×1 mm	45×45×1 mm	60×60×1 mm	90×90×1 mm
Response frequency (See note 1.)		500 Hz	400 Hz	250 Hz	100 Hz	100 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)				
Current consumption (DC 3-wire)		10 mA max.				
Output type		-B models: PNP open collector -C models: NPN open collector				
Control output	Load current (See note 2.)	200 mA max. (32 VDC max.)				
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)				
Indicator		Operation indicator (Yellow LED)				
Operation mode (with sensing object approaching)		-B1/-C1 models: NO -B2/-C2 models: NC -B3/ -C3 models: NO+NC For details, refer to the timing charts.				
Protection circuit		Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection				
Ambient air temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)				
Temperature influence (See note 2.)		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°C				
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%				
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%				
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case				
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case				
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions				
Shock resistance		1,000 m/s^2, 10 times each in X, Y and Z directions				
Standard and listings		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (See note 3.)				
Connection method		Pre-wired models (standard is dia 4mm PVC cable with length = 2m). Please see chapter 'Connectivity' for details on different cable materials and lenghts and M8 or M12 connectors.				
Weight (packaged)	Pre-wired model	Approx. 160 g		Approx. 280 g	Approx. 280 g	Approx. 370 g
	Connector model	Approx. 70 g		Approx. 200 g	Approx. 200 g	Approx. 260 g
Material	Case	Brass-nickel plated or stainless steel				
	Sensing surface	PBT				
	Cable	Standard cable is PVC dia 4mm. For other cable materials or diameters please refer to chapter 'Connectivity'				
	Clamping nut	brass-nickel plated for brass models stainless steel for steel models				

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 100 mA max.

3. UL (CSA) [E196555]: Use class 2 circuit only.

DC 2-wire Models

Size		M8		M12	
Type		Shielded	Non-shielded	Shielded	Non-shielded
Item		E2A-S08□S02-D□	E2A-S08□N04-D□	E2A-M12□S04-D□ E2A-S12□S04-D□	E2A-M12□N08-D□ E2A-S12□N08-D□
Sensing distance		2 mm ±10%	4 mm ±10%	4 mm ±10%	8 mm ±10%
Setting distance		0 to 1.6 mm	0 to 3.2 mm	0 to 3.2 mm	0 to 6.4 mm
Differential travel		10% max. of sensing distance			
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)			
Standard target		8×8×1 mm	12×12×1 mm	12×12×1 mm	24×24×1 mm
Response frequency (See note 1.)		1,500 Hz	1,000 Hz	1,000 Hz	800 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Leakage current		0.8 mA max.			
Output type		DC 2 wire type			
Control output	Load current (See note 2.)	3 to 100 mA			
	Residual voltage	3 V max. (under load current of 100 mA with cable length of 2 m)			
Indicator (see timing chart)		NO type: Operation indicator (Yellow), Setting indicator (Red) NC type: Operation indicator (Yellow)			
Operation mode		-D1 models: NO -D2 models: NC			
Protection circuit		Surget suppressor, Short circuit protection			
Ambient temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)			
Temperature influence		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°C			
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%			
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance		500 m/s^2, 10 times each in X, Y and Z directions		1,000 m/s^2, 10 times each in X, Y and Z directions	
Standard and listings		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (see note 3.)			
Connection method		Pre-wired models (standard is dia 4mm PVC cable with length = 2m). Please see chapter 'Connectivity' for details on different cable materials and lenghts and M8 or M12 connectors.			
Weight (packaged)	Pre-wired model	Approx. 65 g		Approx. 85 g	
	Connector model	M12 connector models: Approx. 20 g M8 connector models: Approx. 15 g		Approx. 35 g	
Material	Case	Stainless steel		Brass-nickel plated or stainless steel	
	Sensing surface	PBT			
	Cable	Standard cable is PVC dia 4mm. For other cable materials or diameters please refer to chapter 'Connectivity'			
	Clamping nut	Brass-nickel plated		Brass-nickel plated for brass models stainless steel for steel models	

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 50 mA max.

3. UL (CSA) [E196555]: Use class 2 circuit only.

DC 2-wire Models

Size		M18		M30	
Type		Shielded	Non-shielded	Shielded	Non-shielded
	Item	E2A-M18□S08-D□ E2A-S18□S08-D□	E2A-M18□N16-D□ E2A-S18□N16-D□	E2A-M30□S15-D□ E2A-S30□S15-D□	E2A-M30□N30-D□ E2A-M30□N20-D□ E2A-S30□N30-D□ E2A-S30□N20-D□
Sensing distance		8 mm ±10%	16 mm ±10%	15 mm ±10%	Short body: 20 m ±10% Long body: 30 m± 10%
Setting distance		0 to 6.4 mm	0 to 12.8 mm	0 to 12 mm	Short body: 0 to 16 mm Long body: 0 to 24 mm
Differential travel		10% max. of sensing distance			
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)			
Standard target		24x24x1 mm	48x48x1 mm	45x45x1 mm	Short body: 60x60x1 mm Long body: 90x90x1mm
Response frequency (See note 1.)		500 Hz	400 Hz	250 Hz	100 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Leakage current		0.8 mA max.			
Output type		DC 2 wire type			
Control output	Load current (See note 2.)	3 to 100 mA			
	Residual voltage	3 V max. (under load current of 100 mA with cable length of 2 m)			
Indicator (see timing chart)		NO type: Operation indicator (Yellow), Setting indicator (Red) NC type: Operation indicator (Yellow)			
Operation mode		-D1 models: NO -D2 models: NC			
Protection circuit		Surget suppressor, Short circuit protection			
Ambient temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)			
Temperature influence		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°C			
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%			
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance		500 m/s^2, 10 times each in X, Y and Z directions			
Standard and listings		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (see note 3.)			
Connection method		Pre-wired models (standard is dia 4mm PVC cable with length = 2m). Please see chapter 'Connectivity' for details on different cable materials and lenghts and M8 or M12 connectors.			
Weight (packaged)	Pre-wired model	Approx. 160 g		Approx. 280 g	short body: 280 g long body: 370 g
	Connector model	Approx. 70 g		Approx. 200 g	short body: 200 g long body: 260 g
Material	Case	Brass-nickel plated or stainless steel			
	Sensing surface	PBT			
	Cable	Standard cable is PVC dia 4mm. For other cable materials or diameters please refer to chapter 'Connectivity'			
	Clamping nut	brass-nickel plated for brass models stainless steel for steel models			

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

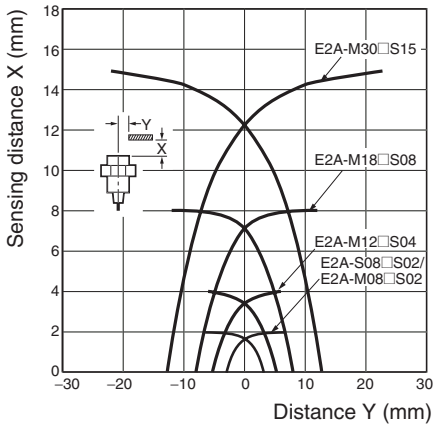
2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 50 mA max.

3. UL (CSA) [E196555]: Use class 2 circuit only.

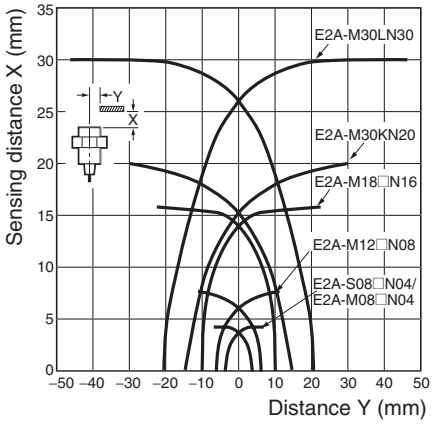
Engineering Data

Operating Range (Typical)

Shielded Models



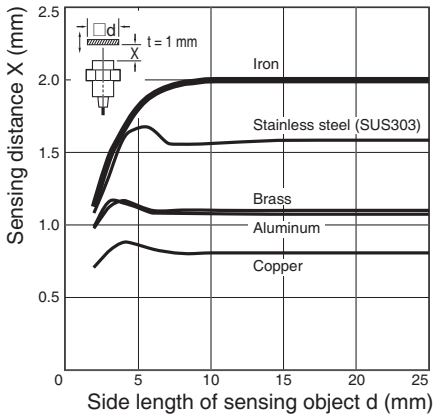
Non-shielded Models



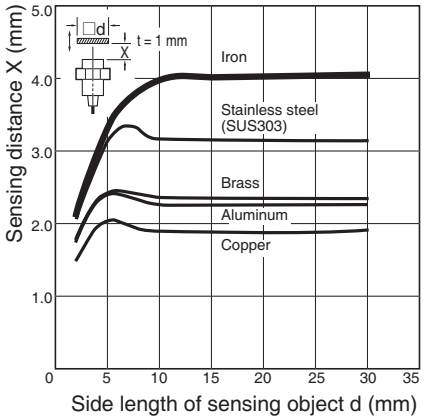
Influence of Sensing Object Size and Materials

Shielded Models

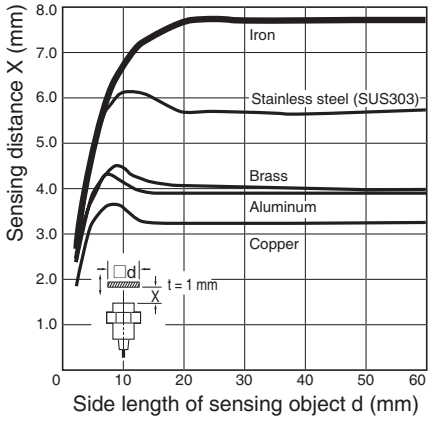
E2A-S08□S02



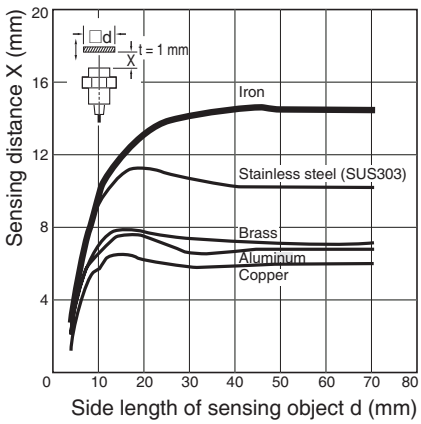
E2A-M12□S04/ E2A-S12□S04



E2A-M18□S08/E2A-S18□S08

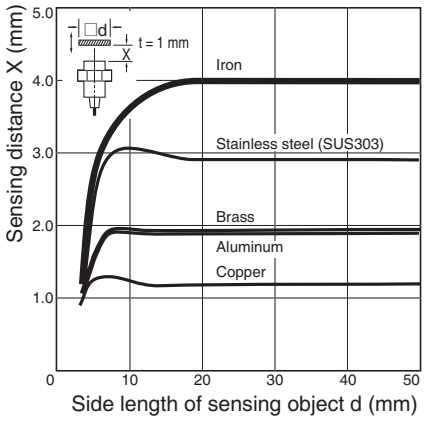


E2A-M30□S15/ E2A-S30□S15

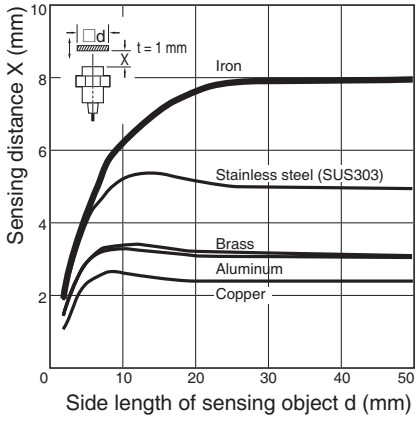


Non-shielded Models

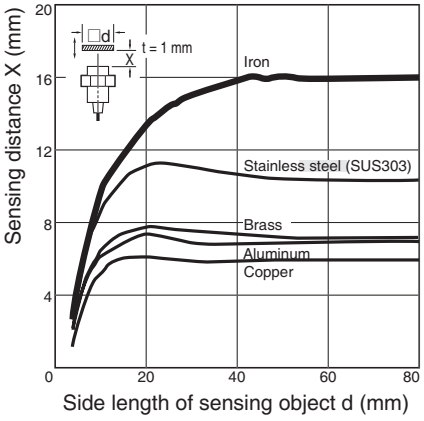
E2A-S08□N04



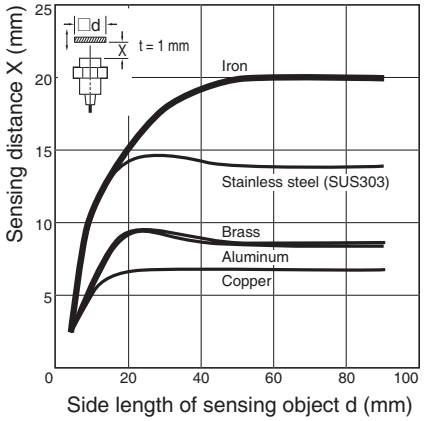
E2A-M12□N08/E2A-S12□N08



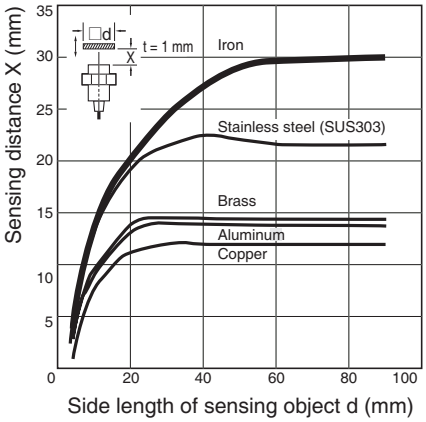
E2A-M18□N16/E2A-S18□N16



E2A-M30KN20/E2A-S30KN20



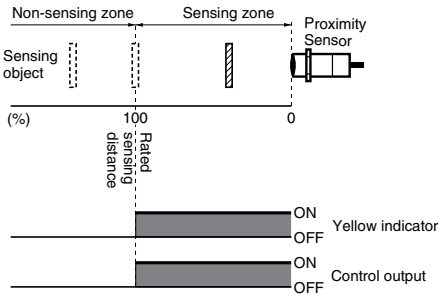
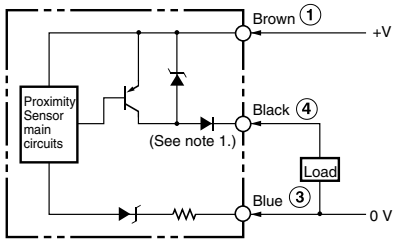
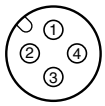
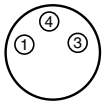
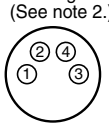
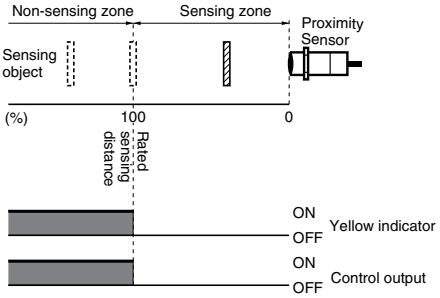
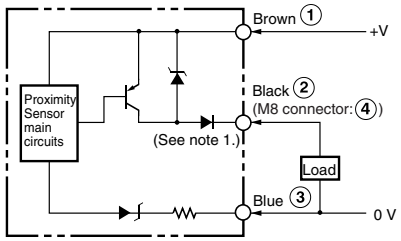
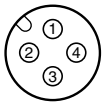
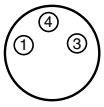
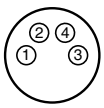
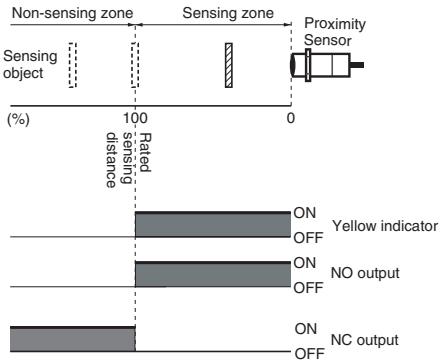
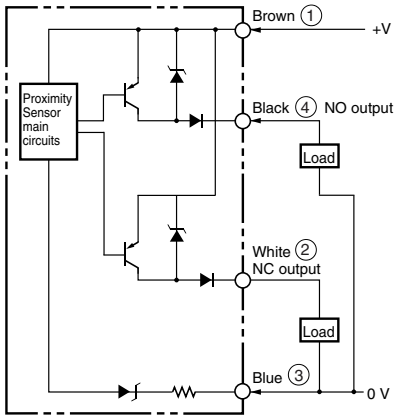
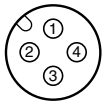
E2A-M30LN30/E2A-S30LN30



Operation

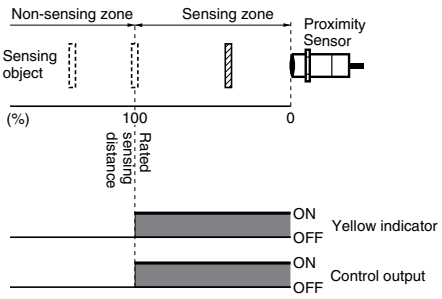
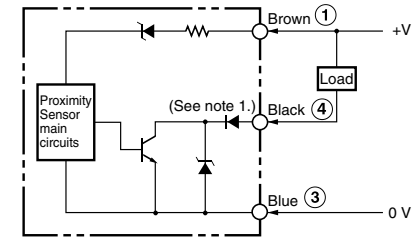
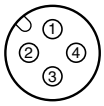
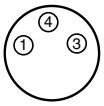
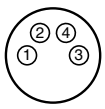
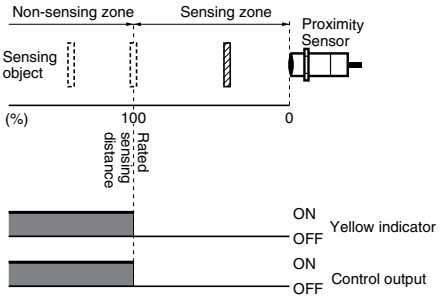
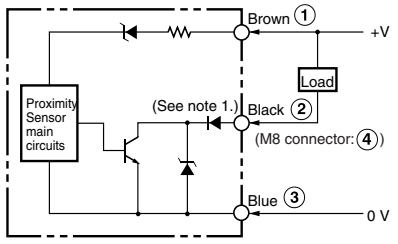
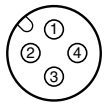
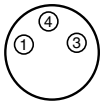
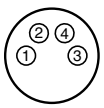
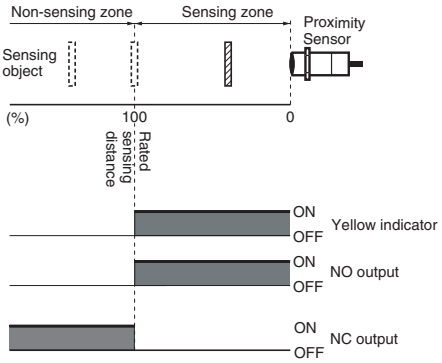
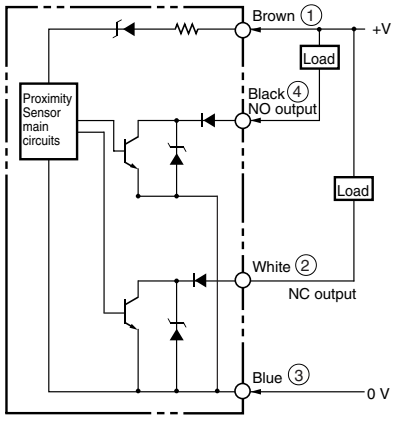
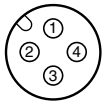
DC 3-wire models

PNP Output

Operation mode	Model	Timing chart	Output circuit
NO	E2A-□-□-B1		 **Note 1:** With M8 connector models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 connector (3 pin) Pin Arrangement  M8 Connector (4 pin) Pin Arrangement (See note 2.)  **Note 2:** Pin 2 of the M12 connector and M8 connector is not used.
NC	E2A-□-□-B2		 **Note 1:** With M8 connector models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 connector (3 pin) Pin Arrangement  M8 Connector (4 pin) Pin Arrangement (See note 2.)  **Note 2:** Pin 4 of the M12 connector and M8 connector is not used.
NO + NC	E2A-□-□-B3		 M12 Connector Pin Arrangement 

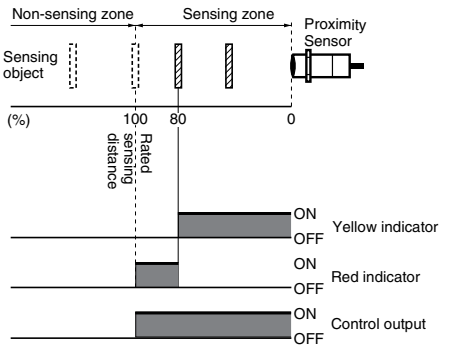
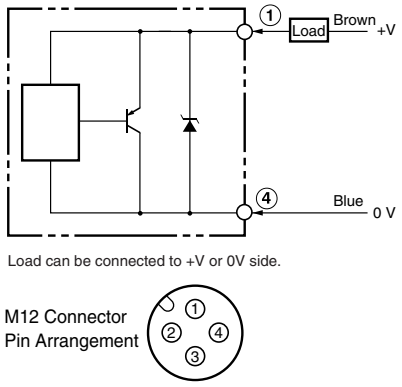
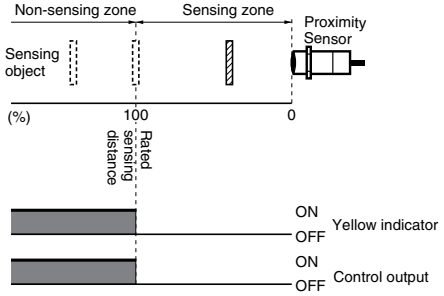
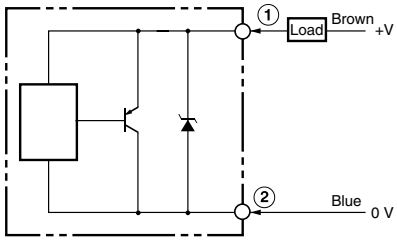
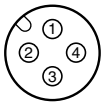
DC 3-wire models

NPN Output

Operation mode	Model	Timing chart	Output circuit
NO	E2A-□-□-C1		 **Note 1:** With M8 connector models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 connector (3 pin) Pin Arrangement  M8 Connector (4 pin) Pin Arrangement (See note 2.)  **Note 2:** Pin 2 of the M12 connector and M8 connector is not used.
NC	E2A-□-□-C2		 **Note 1:** With M8 connector models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 connector (3 pin) Pin Arrangement  M8 Connector (4 pin) Pin Arrangement (See note 2.)  **Note 2:** Pin 4 of the M12 connector and M8 connector is not used.
NO + NC	E2A-□-□-C3		 M12 Connector Pin Arrangement 

DC 2-wire models

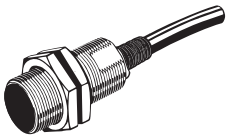
Output Circuit Diagrams (Operation)

Operation mode	Model	Timing chart	Output circuit
NO	E2A-□-**D**1		 Load can be connected to +V or 0V side. M12 Connector Pin Arrangement
NC	E2A-□-**D**2		 Load can be connected to +V or 0V side. M12 Connector Pin Arrangement 

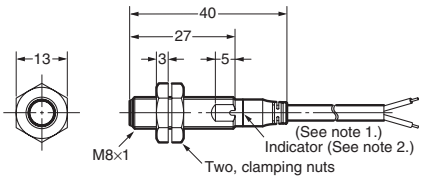
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Pre-wired Models (Shielded)

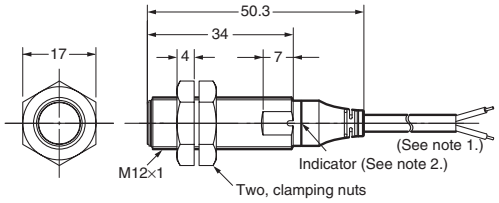


E2A-S08KS02-WP-□□



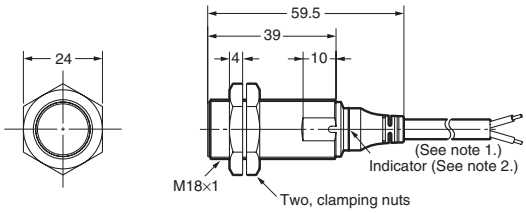
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M12KS04-WP-□□/E2A-S12KS04-WP-□



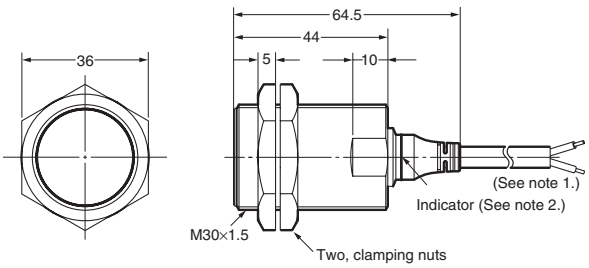
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)
3. for NO+NC (-B3 / -C3) models the total length is 4 mm longer

E2A-M18KS08-WP-□□/E2A-S18KS08-WP-□



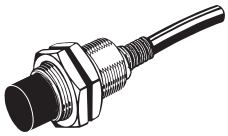
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M30KS15-WP-□□/E2A-S30KS15-WP-□

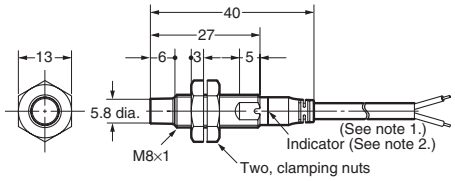


Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

Pre-wired Models (Non-shielded)

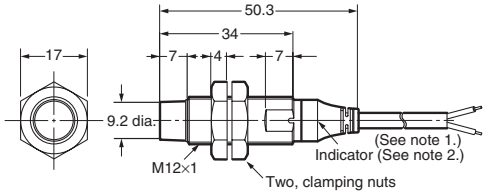


E2A-S08KN04-WP-□□



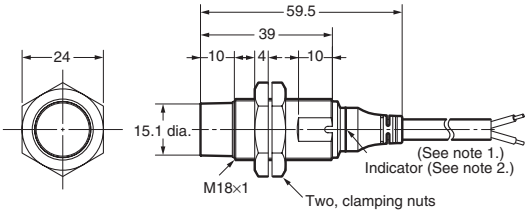
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M12KN08-WP-□□/E2A-S12KN08-WP-□



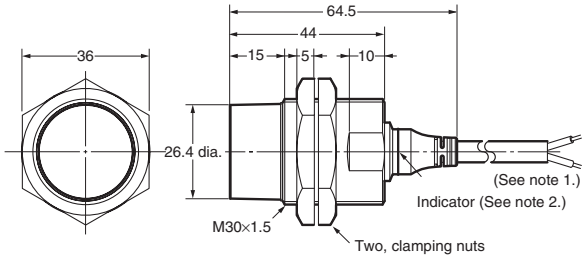
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)
3. for NO+NC (-B3 / -C3) models the total length is 4 mm longer

E2A-M18KN16-WP-□□/E2A-S18KN16-WP-□



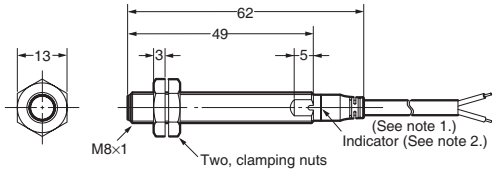
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M30KN20-WP-□□/E2A-S30KN20-WP-□



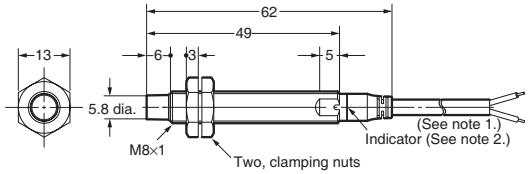
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-S08LS02-WP-□□



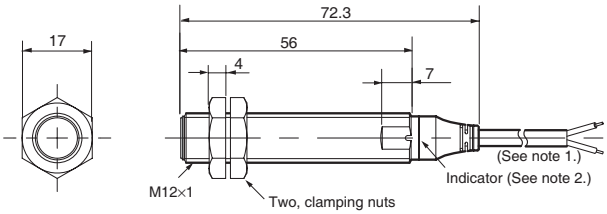
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-S08LN04-WP-□□



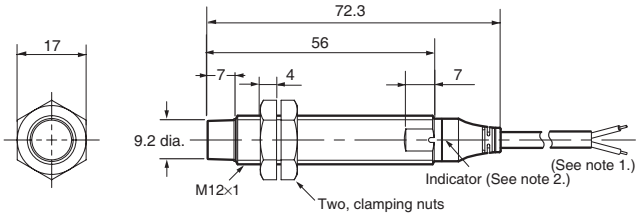
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M12LS04-WP-□□/E2A-S12LS04-WP-□



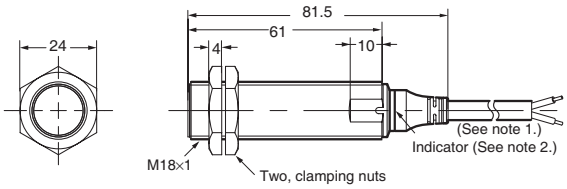
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M12LN08-WP-□□/E2A-S12LN08-WP-□



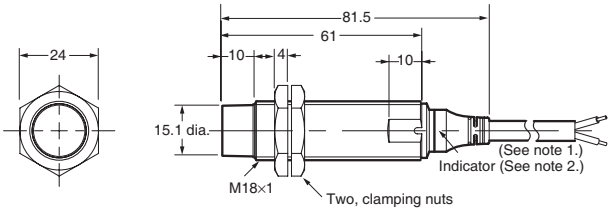
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M18LS08-WP-□□/E2A-S18LS08-WP-□



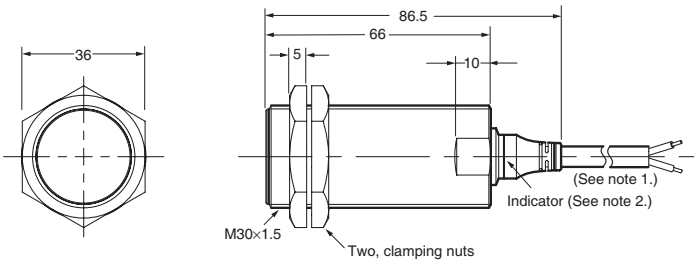
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M18LN16-WP-□□/E2A-S18LN16-WP-□



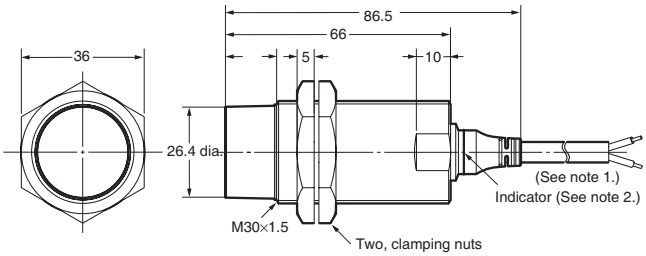
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M30LS15-WP-□□/E2A-S30LS15-WP-□



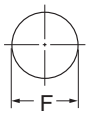
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M30LN30-WP-□□/E2A-S30LN30-WP-□



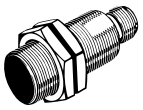
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

Mounting Hole Cutout Dimensions

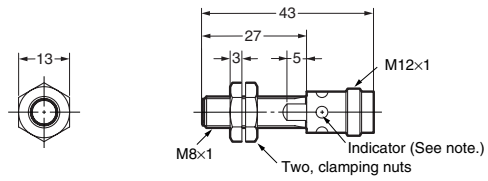


External diameter of Proximity Sensor	Dimension F (mm)
M8	8.5 dia.$^{+0.5}_{0}$
M12	12.5 dia.$^{+0.5}_{0}$
M18	18.5 dia.$^{+0.5}_{0}$
M30	30.5 dia.$^{+0.5}_{0}$

M12 Connector Models (Shielded)

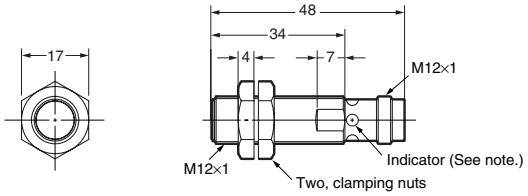


E2A-S08KS02-M1-□□



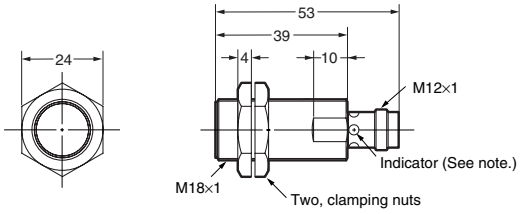
Note: Operation indicator (yellow LED, 4×90°)

E2A-M12KS04-M1-□□/E2A-S12KS04-M1-□



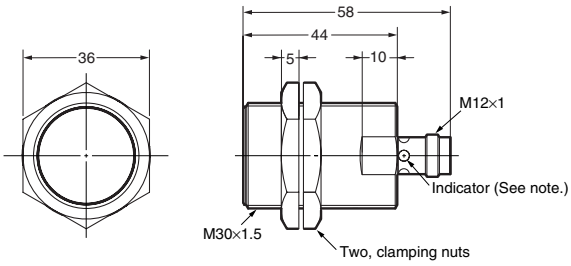
Note 1: Operation indicator (yellow LED, 4×90°)
Note 2: for NO+NC (-B3 / -C3) models the total length is 4 mm longer

E2A-M18KS08-M1-□□/E2A-S18KS08-M1-□



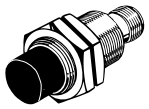
Note: Operation indicator (yellow LED, 4×90°)

E2A-M30KS15-M1-□□/E2A-S30KS15-M1-□

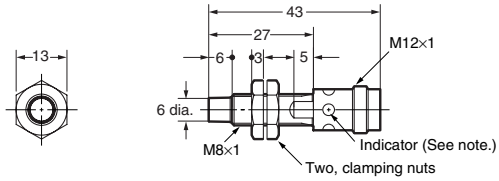


Note: Operation indicator (yellow LED, 4×90°)

M12 Connector Models (Non-shielded)

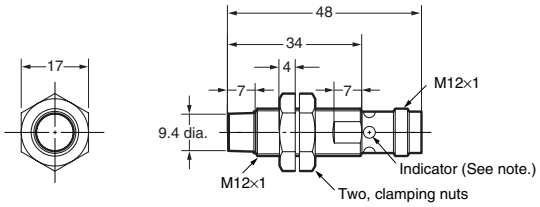


E2A-S08KN04-M1-□□



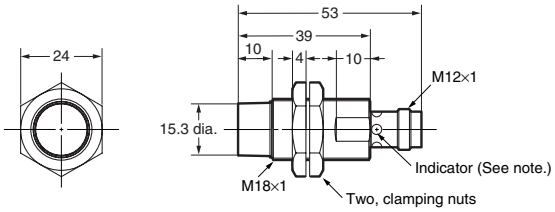
Note: Operation indicator (yellow LED, 4×90°)

E2A-M12KN08-M1-□□/E2A-S12KN08-M1-□



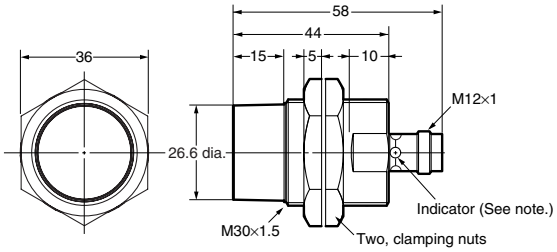
Note 1: Operation indicator (yellow LED, 4×90°)
Note 2: for NO+NC (-B3 / -C3) models the total length is 4 mm longer

E2A-M18KN16-M1-□□/E2A-S18KN16-M1-□



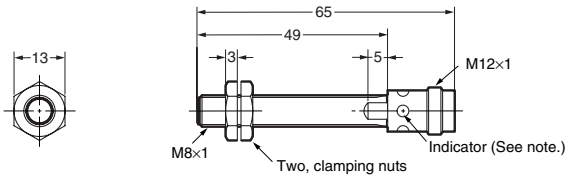
Note: Operation indicator (yellow LED, 4×90°)

E2A-M30KN20-M1-□□/E2A-S30KN20-M1-□



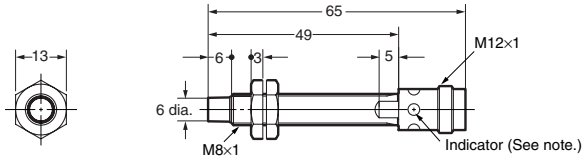
Note: Operation indicator (yellow LED, 4×90°)

E2A-S08LS02-M1-□□



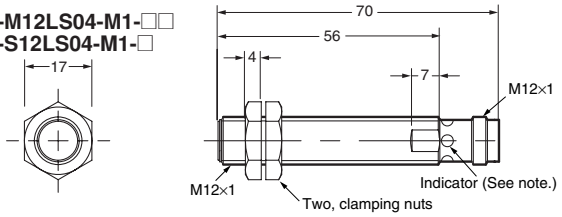
Note: Operation indicator (yellow LED, 4×90°)

E2A-S08LN04-M1-□□



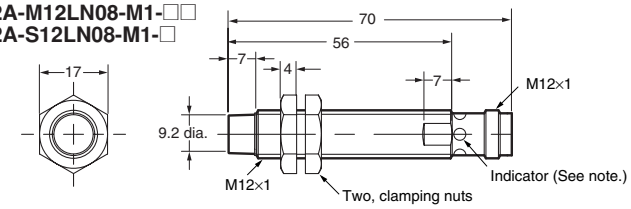
Note: Operation indicator (yellow LED, 4×90°)

E2A-M12LS04-M1-□□
E2A-S12LS04-M1-□



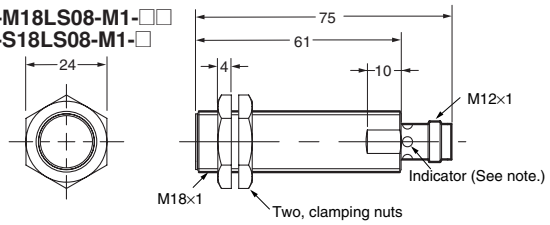
Note: Operation indicator (yellow LED, 4×90°)

E2A-M12LN08-M1-□□
E2A-S12LN08-M1-□



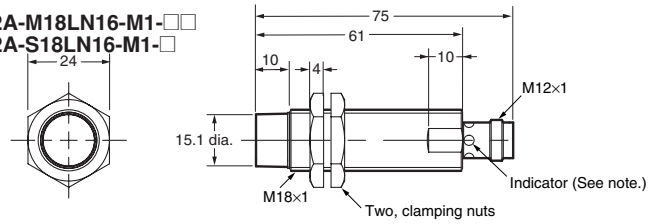
Note: Operation indicator (yellow LED, 4×90°)

E2A-M18LS08-M1-□□
E2A-S18LS08-M1-□



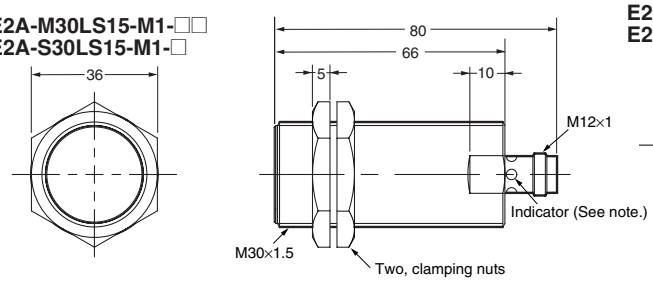
Note: Operation indicator (yellow LED, 4×90°)

E2A-M18LN16-M1-□□
E2A-S18LN16-M1-□



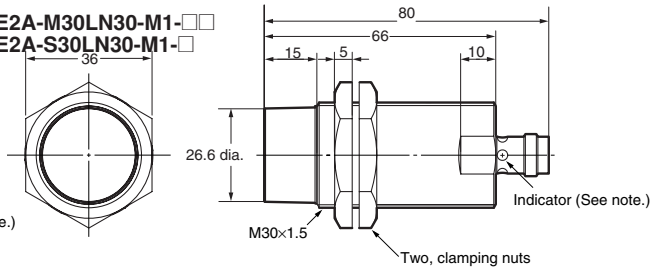
Note: Operation indicator (yellow LED, 4×90°)

E2A-M30LS15-M1-□□
E2A-S30LS15-M1-□



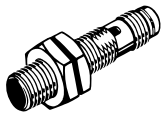
Note: Operation indicator (yellow LED, 4×90°)

E2A-M30LN30-M1-□□
E2A-S30LN30-M1-□

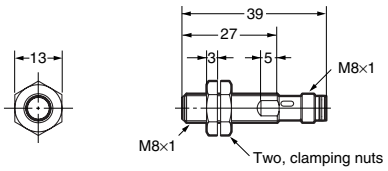


Note: Operation indicator (yellow LED, 4×90°)

M8 Connector Models (Shielded)

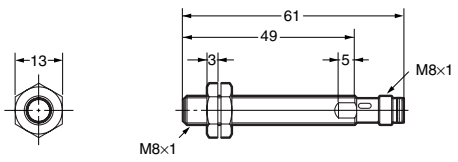


E2A-S08KS02-M5-□□/E2A-S08KS02-M3-□



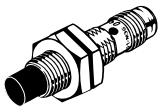
Note: Operation indicator (yellow LED, 4×90°)

E2A-S08LS02-M5-□□/E2A-S08LS02-M3-□

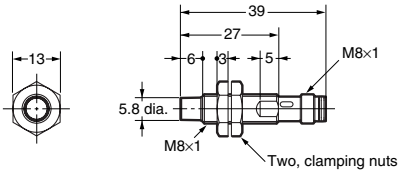


Note: Operation indicator (yellow LED, 4×90°)

M8 Connector Models (Non-shielded)

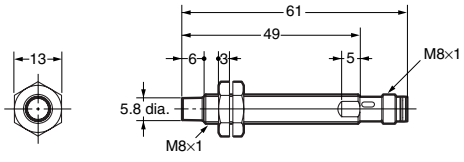


E2A-S08KN04-M5-□□/E2A-S08KN04-M3-□



Note: Operation indicator (yellow LED, 4×90°)

E2A-S08LN04-M5-□□/E2A-S08LN04-M3-□



Note: Operation indicator (yellow LED, 4×90°)

Note: Please contact your OMRON sales representative for dimension drawings not listed here.

Precautions

Safety Precautions

Power Supply

Do not impose an excessive voltage on the E2A, otherwise it may be damaged. Do not impose AC current (100 to 240 VAC) on any DC model, otherwise it may be damaged.

Load Short-circuit

Do not short-circuit the load, or the E2A may be damaged.

The E2A's short-circuit protection function will be valid if the polarity of the supply voltage imposed is correct and within the rated voltage range.

Wiring

Be sure to wire the E2A and load correctly, otherwise it may be damaged.

Connection with No Load

Be sure to insert loads when wiring. Make sure to connect a proper load to the E2A in operation, otherwise it may damage internal elements.

Do not expose the product to flammable or explosive gases.

Do not disassemble, repair, or modify the product.

Correct Use

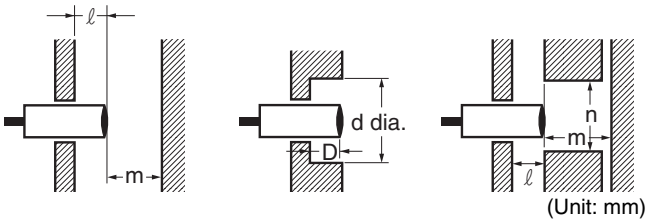
Designing

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms (160ms for NO+NC -B3 / -C3 types) after power is supplied. If power supplies are connected to the Proximity Sensor and load respectively, be sure to supply power to the Proximity Sensor before supplying power to the load.

Effects of Surrounding Metal

When mounting the E2A within a metal panel, ensure that the clearances given in the following table are maintained.



(Unit: mm)

Type	Dimension	M8	M12	M18	M30	
					Short barrel	Long barrel
Shielded	l	0	0	0 (See note 1.)	0 (See note 2.)	
	m	4.5	12	24	45	
	d	---	---	27	45	
	D	0	0	1.5	4	
	n	12	18	27	45	
Non-shielded	l	12	15	22	30	40
	m	8	20	48	70	90
	d	24	40	70	90	120
	D	12	15	22	30	40
	n	24	40	70	90	120

Note 1. In the case of using the supplied nuts.
If true flash mounting is necessary, apply a free zone of 1.5 mm.

2. In the case of using the supplied nuts.
If true flush mounting is necessary, apply a free zone of 4 mm.

Power OFF

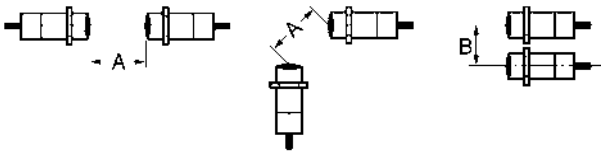
The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Mutual Interference

When installing two or more Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



(Unit: mm)

Type	Dimension	M8	M12	M18	M30	
					Short barrel	Long barrel
Shielded	A	20	30	60	110	
	B	15	20	35	70	
Non-shielded	A	80	120	200	300	300
	B	60	100	120	200	300

Wiring

High-tension Lines

Wiring through Metal Conduit**:**
If there is a power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Cable Extension

Standard cable length is less than 200 m.

The tractive force is 50 N.

Mounting

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Do not tighten the nut with excessive force. A washer must be used with the nut.

Type		Torque
M8	Stainless steel type	9 Nm
	Brass type	4 Nm
M12		30 Nm
M18		70 Nm
M30		180 Nm

Maintenance and Inspection

Periodically perform the following checks to ensure stable operation of the Proximity Sensor over a long period of time.

1. Check for mounting position, dislocation, looseness, or distortion of the Proximity Sensor and sensing objects.
2. Check for loose wiring and connections, improper contacts, and line breakage.
3. Check for attachment or accumulation of metal powder or dust.
4. Check for abnormal temperature conditions and other environmental conditions.
5. Check for proper lighting of indicators (for models with a set indicator.)

Never disassemble or repair the Sensor.

Environment

Water Resistivity

The Proximity Sensors are tested intensively on water resistance, but in order to ensure maximum performance and life expectancy avoid immersion in water and provide protection from rain or snow.

Operating Environment

Ensure storage and operation of the Proximity Sensor within the given specifications.

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor, in which case connect the load to the Proximity Sensor through a relay.

<SUITABILITY FOR USE>

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

<CHANGE IN SPECIFICATIONS>

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D03E-EN-02

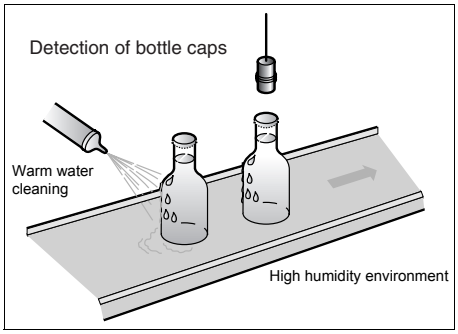
In the interest of product improvement, specifications are subject to change without notice.

Cylindrical Proximity Sensor in Plastic Housing

E2F

- High quality full body plastic housing for high water proof requirements
- Polyarylate housing for light chemical resistance

Applications



Ordering Information

Sensors

Model		Sensing distance	Output specifications	Model	
				Operating status	
				NO	NC
Shielded	M8	1.5mm	DC 3-wire NPN	**E2F-X1R5E1**	**E2F-X1R5E2**
			AC 2-wire Models	**E2F-X1R5Y1**	**E2F-X1R5Y2**
	M12	2mm	DC 3-wire NPN	**E2F-X2E1** *1	**E2F-X2E2** *1
			AC 2-wire Models	**E2F-X2Y1** *1	**E2F-X2Y2** *1
	M18	5mm	DC 3-wire NPN	**E2F-X5E1** *1	**E2F-X5E2** *1
			AC 2-wire Models	**E2F-X5Y1** *1 *2	**E2F-X5Y2** *1 *2
	M30	10mm	DC 3-wire NPN	**E2F-X10E1** *1	**E2F-X10E2** *1
			AC 2-wire Models	**E2F-X10Y1** *1 *2	**E2F-X10Y2** *1 *2

*1. A different frequency type is available. (E2F-X□□5; e.g.E2F-X5E15)
*2. A short-circuit protection type is available. (E2F-X□Y□-53; e.g. E2F-X5Y1-53) Power supply voltage: 100 to 120 VAC

Accessories (Order Separately)

Rating/performance

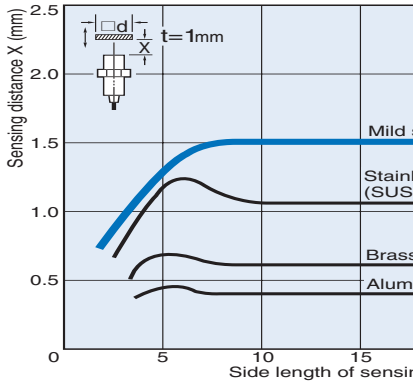
Item \ Model		E2F-X1R5E□ E2F-X1R5Y□	E2F-X2E□ E2F-X2Y□	E2F-X5E□ E2F-X5Y□	E2F-X10E□ E2F-X10Y□
Sensing distance		1.5 mm ±10%	2 mm ±10%	5 mm ±10%	10 mm ±10%
Setting distance		0 to 1.2 mm	0 to 1.6 mm	0 to 4 mm	0 to 8 mm
Differential distance		10% max.			
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)			
Standard sensing object		Iron, 8 × 8 × 1 mm	Iron, 12 × 12 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm
Response frequency*1		E models: 2 kHz, Y models: 25 Hz	E models: 1.5 kHz, Y models: 25 Hz	E models: 600 Hz, Y models: 25 Hz	E models: 400 Hz, Y models: 25 Hz
Power supply(Operating voltage range)		E models: 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max. Y models: 24 to 240 VAC (20 to 264 VAC)			
Current consumption		E models: 17 mA max.			
Leakage current		Y models: 1.7 mA at 200 VAC			
Control output	Switching capacity	E models: 200 mA max. Y models: 5 to 100 mA		E models: 200 mA max. Y models: 5 to 300 mA	
	Residual voltage	E models: 2 V max. (load current: 200 mA with cable length: 2 m) Y models: Refer to the Specifications			
Indicator lamp		E models: Detection indicator (red LED) Y models: Operation indicator (red LED)			
Operating status (with sensing object approaching)		E1, Y1 models: ON E2, Y2 models: NC			
Protective circuits		E models: Reverse connection protection, load short-circuit protection, surge absorber Y models: None			
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)			
Ambient humidity		Operating/Storage: 35% to 95%RH			
Temperature influence		A maximum fluctuation of ±10% max. of sensing distance at 23°C in temperature range of -25°C and 70°C			
Voltage influence		E models: ±2.5% max. of sensing distance within a range of ±15% of rated power supply voltage Y models: ±1% max. of sensing distance within a range of ±10% of rated power supply voltage			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		E models: 1,000 VAC, 50/60 Hz for 1 min between current carry parts and case			
Vibration resistance		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/s^2 for 10 times each in X, Y, and Z directions			
Protective structure		IEC IP67			
Connection method		Pre-wired models (standard length: 2 m)			
Weight (Packed state)		Approx.40g	Approx. 50 g	Approx. 130 g	Approx. 170 g
Material	Case	Polyarylate			
	Sensing surface				
	Clamping nut	Polyallylate resin			
Accessories		Instruction manual			

*1. The response frequencies are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

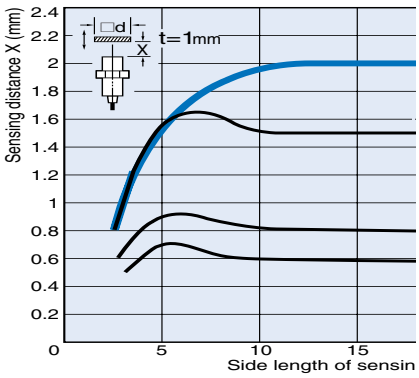
Characteristic data (typical)

Sensing Distance vs. Sensing Object

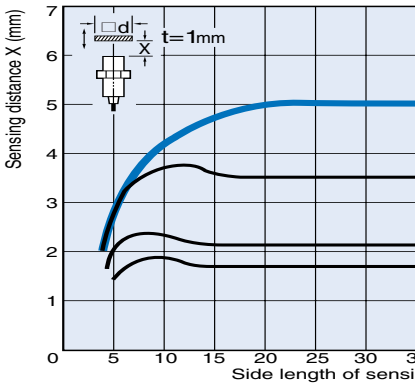
E2F-X1R5□□



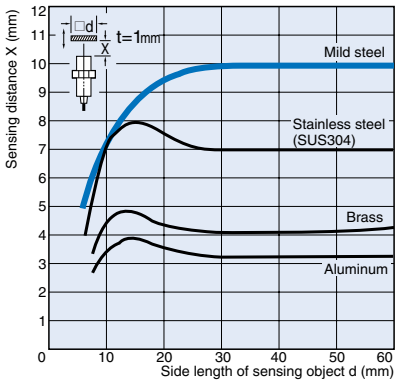
E2F-X2□□



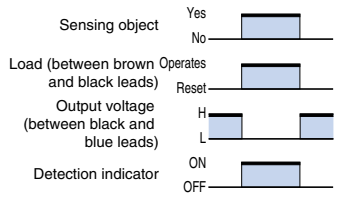
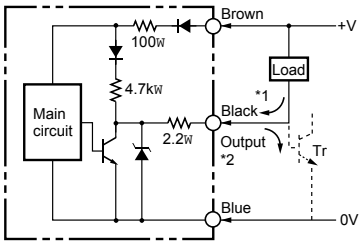
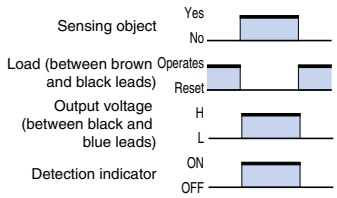
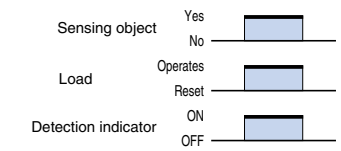
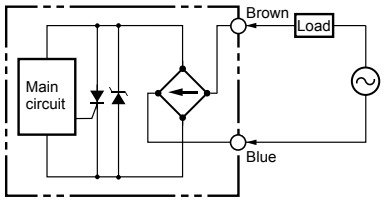
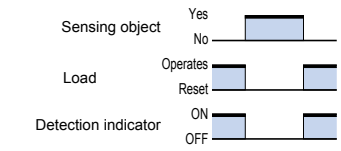
E2F-X5□□



E2F-X10□□



Output Circuit Diagram

Output	Operating status	Model	Timing chart	Output circuit
DC 3-wire	NO	E2F-X1R5E1 E2F-X2E1 E2F-X5E1 E2F-X10E1		 *1. 200 mA max. (source current) *2. When connecting to the transistor circuit.
	NC	E2F-X1R5E2 E2F-X2E2 E2F-X5E2 E2F-X10E2		
AC 2-wire Models	NO	E2F-X1R5Y1 E2F-X2Y1 E2F-X5Y1 E2F-X10Y1		
	NC	E2F-X1R5Y2 E2F-X2Y2 E2F-X5Y2 E2F-X10Y2		

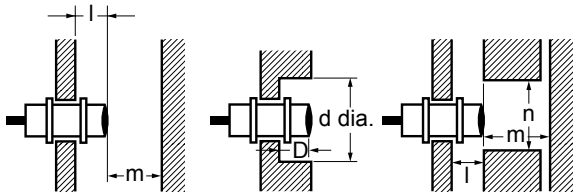
Precautions

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance as shown in the table below between the Sensor and the surrounding metal.

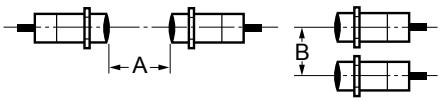


Effects of Surrounding Metal(Unit: mm)

Model / Item	l	d	D	m	n
E2F-X1R5□□	0	8	0	4.5	12
E2F-X2□□		12		8	18
E2F-X5□□		18		20	27
E2F-X10□□		30		40	45

Mutual Interference

When installing two or more Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



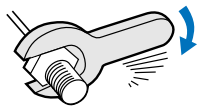
Mutual Interference (Unit: mm)

Model / Item	A	B
E2F-X1R5□□	20	15
E2F-X2□□	30 (20)	20(12)
E2F-X5□□	50 (30)	35 (18)
E2F-X10□□	100(50)	70(35)

Note: Figures in parentheses are for an E2F used in combination with an E2F (i.e., E2F-X□□□5) that is operating at a different frequency.

Mounting

Do not apply excessive torque when tightening any nuts.



Model	Tensile strength (torque)
E2F-X1R5□□	0.78 N•m
E2F-X2□□	
E2F-X5□□	2 N•m
E2F-X10□□	

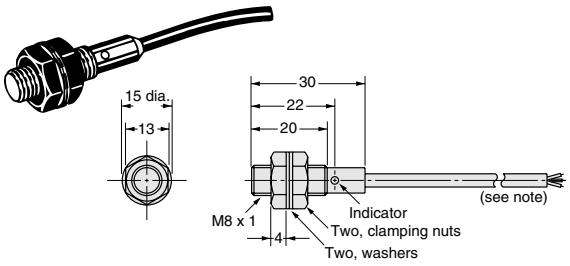
● Maintenance and Inspection

Do not use the AC 2-wire models (sensing surface is broken), where directly exposed to water. There is fear of an electric shock.

Dimensions (Unit: mm)

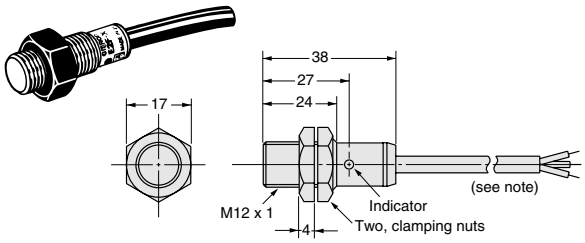
DC 3-wire Models

E2F-X1R5E□



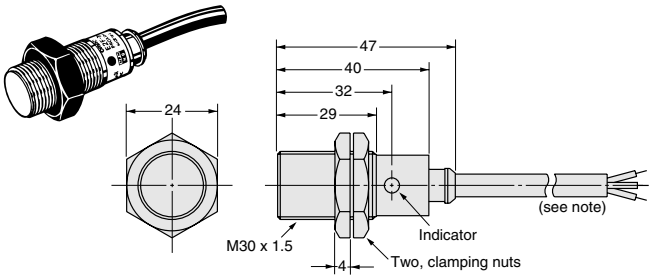
Note:
Vinyl-insulated round cord, 3.5 dia.,
3 cores (0.12 dia. x 13); Standard length: 2m

E2F-X2E□



Note:
Oil-and vibration-resistant,
vinyl-insulated round cord, 6 dia.,
0.5 dia. x 3 cores; Standard length: 2m
The cord can be extended up to 200 m
in an independent metal conduit.

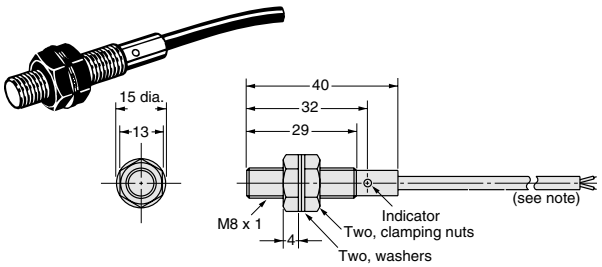
E2F-X5E□



Note:
Oil-and vibration-resistant,
vinyl-insulated round cord, 6 dia.,
0.5 dia. x 2 cores; Standard length: 2m
The cord can be extended up to 200 m
in an independent metal conduit.

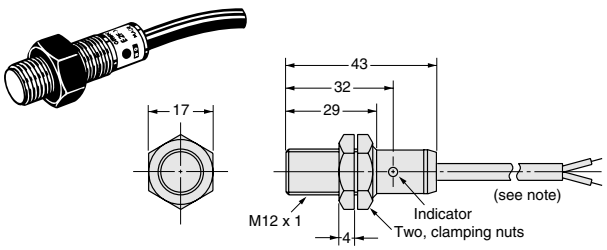
AC 2-wire Models

E2F-X1R5Y□



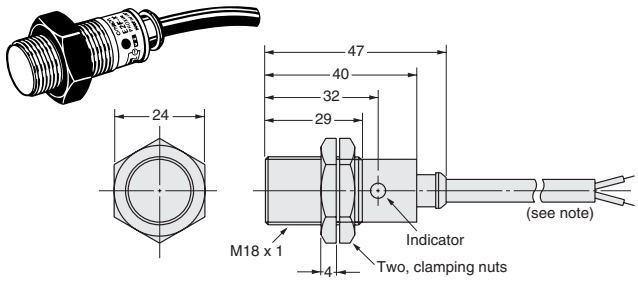
Note:
Vinyl-insulated round cord, 3.5 dia.,
3 cores (0.12 dia. x 13); Standard length: 2m

E2F-X2Y□



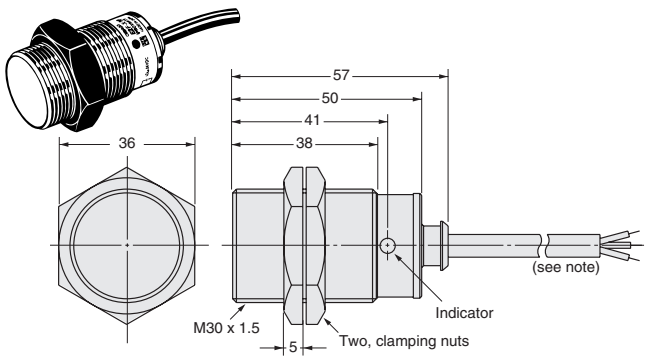
Note:
Oil-and vibration-resistant,
vinyl-insulated round cord, 6 dia.,
0.5 dia. x 2 cores; Standard length: 2m
The cord can be extended up to 200 m
in an independent metal conduit.

E2F-X5Y□



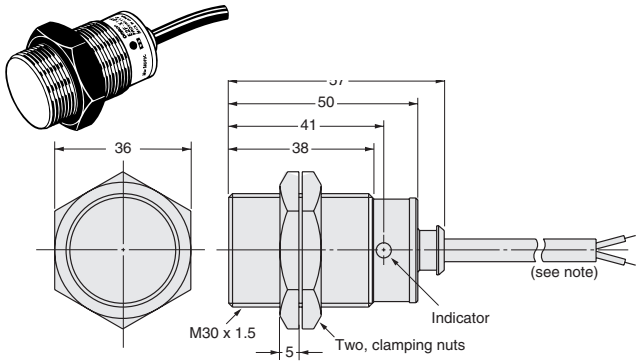
Note:
Oil-and vibration-resistant,
vinyl-insulated round cord, 6 dia.,
0.5 dia. x 2 cores; Standard length: 2m
The cord can be extended up to 200 m
in an independent metal conduit.

E2F-X10E□



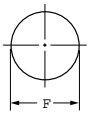
Note:
Oil-and vibration-resistant,
vinyl-insulated round cord, 6 dia.,
0.5 dia. x 3 cores; Standard length: 2m
The cord can be extended up to 200 m
in an independent metal conduit.

E2F-X10Y□



Note:
Oil-and vibration-resistant,
vinyl-insulated round cord, 6 dia.,
0.5 dia. x 2 cores; Standard length: 2m
The cord can be extended up to 200 m
in an independent metal conduit.

Mounting Hole Dimension



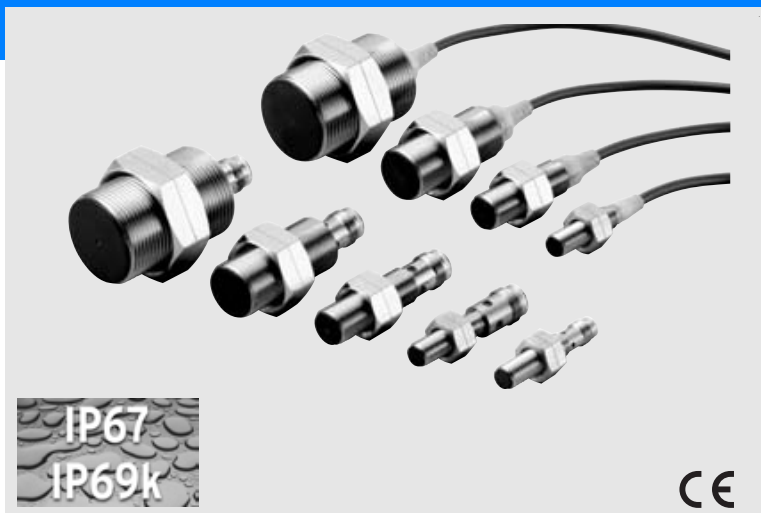
Model	**E2F-X1R5□□**	**E2F-X2□□**	**E2F-X5□□**	**E2F-X10□□**
F (mm)	8.5-mm dia. $^{+0}$	12.5-mm dia. $^{+0}$	18.5-mm dia. $^{+0}$	30.5-mm dia. $^{+0}$

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D07E-EN-01 In the interest of product improvement, specifications are subject to change without notice.

Long Distance Cylindrical Proximity Sensor

E2A3



Extra long distance for increased protection and sensing performance

- triple distance proximity sensors for flush mounting requirements.
- designed and tested for extra long life.

Ordering Information

DC 3-wire Models

Size	Type	Sensing distance	Connection	Body material	Thread length	Output	Operation mode: NO	Operation mode: NC
M8	Shielded	3.0mm	Pre-wired	Stainless steel (See note.)	27 (40) mm	PNP	E2A3-S08KS03-WP-B1 2M	E2A3-S08KS03-WP-B2 2M
						NPN	E2A3-S08KS03-WP-C1 2M	E2A3-S08KS03-WP-C2 2M
			M12 connector		27 (44) mm	PNP	E2A3-S08KS03-M1-B1	E2A3-S08KS03-M1-B2
						NPN	E2A3-S08KS03-M1-C1	E2A3-S08KS03-M1-C2
			M8 connector (3-pin)		27 (40) mm	PNP	E2A3-S08KS03-M5-B1	E2A3-S08KS03-M5-B2
						NPN	E2A3-S08KS03-M5-C1	E2A3-S08KS03-M5-C2
M12	Shielded	6.0mm	Pre-wired	Brass	34 (50) mm	PNP	E2A3-M12KS06-WP-B1 2M	E2A3-M12KS06-WP-B2 2M
						NPN	E2A3-M12KS06-WP-C1 2M	E2A3-M12KS06-WP-C2 2M
			M12 connector		34 (49) mm	PNP	E2A3-M12KS06-M1-B1	E2A3-M12KS06-M1-B2
						NPN	E2A3-M12KS06-M1-C1	E2A3-M12KS06-M1-C2
M18	Shielded	11.0mm	Pre-wired	Brass	39 (60) mm	PNP	E2A3-M18KS11-WP-B1 2M	E2A3-M18KS11-WP-B2 2M
						NPN	E2A3-M18KS11-WP-C1 2M	E2A3-M18KS11-WP-C2 2M
			M12 connector		39 (54) mm	PNP	E2A3-M18KS11-M1-B1	E2A3-M18KS11-M1-B2
						NPN	E2A3-M18KS11-M1-C1	E2A3-M18KS11-M1-C2
M30	Shielded	20.0mm	Pre-wired	Brass	44 (65) mm	PNP	E2A3-M30KS20-WP-B1 2M	E2A3-M30KS20-WP-B2 2M
						NPN	E2A3-M30KS20-WP-C1 2M	E2A3-M30KS20-WP-C2 2M
			M12 connector		44 (59) mm	PNP	E2A3-M30KS20-M1-B1	E2A3-M30KS20-M1-B2
						NPN	E2A3-M30KS20-M1-C1	E2A3-M30KS20-M1-C2

Note: Material specifications for stainless steel housing case: 1.4305 (W.-No.), SUS303 (AISI), 2346 (SS).

Connectivity

E2A3 Sensors are available with the following connectors and cable materials:

Pre-wired Models

Standard cable lengths are 2 m and 5 m.
For other cable lengths, please contact your OMRON representative.

Standard cable material: PVC (4-mm dia.) -WP

Connector Models

Standard connectors: M12, M8 (3-pin) -M1, -M5

Model Number Legend

E2A□-□□□□□-□-□□-□□

1 2 3 4 5 6 7 8 9 10 11 12

Example: E2A3-M12KS06-M1-B1 Triple distance, M12, standard barrel, shielded, Sn = 6 mm, M12 connector, PNP-NO
E2A3-S08KS03-WP-B1 2M Triple distance, M8 stainless steel, standard barrel, shielded, Sn = 3 mm, pre-wired PVC cable, PNP-NO, cable length = 2 m

1. Basic name
E2A

2. Sensing technology
Blank: Standard double distance
3: Triple distance

3. Housing shape and material
M: Cylindrical, metric threaded, brass
S: Cylindrical, metric threaded, stainless steel

4. Housing size
08: 8 mm
12: 12 mm
18: 18 mm
30: 30 mm

5. Barrel length
K: Standard length
L: Long body

6. Shield
S: Shielded
N: Non-shielded

7. Sensing distance
Numeral: Sensing distance: e.g., 03 = 3 mm, 11 = 11 mm

8. Kind of connection
WP: Pre-wired, PVC, 4-mm dia.
M1: M12 connector (4-pin) *
M5: M8 connector (3-pin)

9. Power source and output
B: DC, 3-wire, PNP open collector
C: DC, 3-wire, NPN open collector

10. Operation mode
1: Normally open (NO)
2: Normally closed (NC)

11. Specials (e.g., cable material, oscillating frequency)

12. Cable length
Blank: Connector Model
Numeral: Cable length

Specifications

DC 3-wire Models

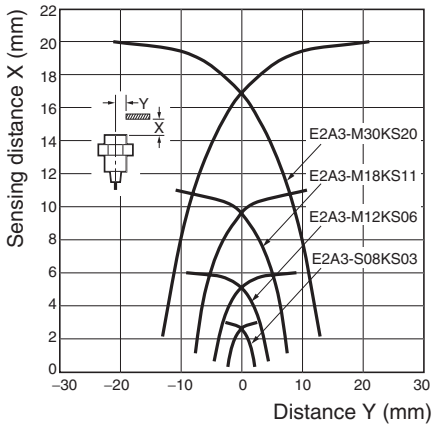
Size		M8	M12	M18	M30
Type		Shielded	Shielded	Shielded	Shielded
	Item	E2A3-S08KS03-□□-B□ E2A3-S08KS03-□□-C□	E2A3-M12KS06-□□-B□ E2A3-M12KS06-□□-C□	E2A3-M18KS11-□□-B□ E2A3-M18KS11-□□-C□	E2A3-M30KS20-□□-B□ E2A3-M30KS20-□□-C□
Sensing distance		3 mm ±10%	6 mm ±10%	11 mm ±10%	20 mm ±10%
Setting distance	Ambient temp. of −25 to 70°C	0 to 2.1 mm	0 to 4.2 mm	0 to 7.7 mm	0 to 14 mm
	Ambient temp. of −10 to 60°C	0 to 2.4 mm	0 to 4.8 mm	0 to 8.8 mm	0 to 16 mm
Differential travel		20% max. of sensing distance			
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)			
Standard sensing object		9 × 9 × 1 mm	18 × 18 × 1 mm	33 × 33 × 1 mm	60 × 60 × 1 mm
Response frequency (See note 1.)		700 Hz	350 Hz	250 Hz	80 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Current consumption		10 mA max.			
Output type		-B models: PNP open collector -C models: NPN open collector			
Control output	Load current	200 mA max. (32 VDC max.)			
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)			
Indicator		Operation indicator (Yellow LED)			
Operation mode		-B1/-C1 models: NO -B2/-C2 models: NC For details, refer to the timing charts.			
Protection circuits		Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection	Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection		
Ambient air temperature		Operating: −25°C to 70°C, Storage: −25°C to 70°C			
Temperature influence		±20% max. of sensing distance at 23°C within temperature range of −25°C to 70°C −10% to +20% of sensing distance at 23°C within temperature range of −10°C to 60°C			
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%			
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case			
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current-carrying parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		500 m/s², 10 times each in X, Y, and Z directions	1,000 m/s², 10 times each in X, Y and Z directions		
Standards and listings		IP67 after IEC 60529 IP69K after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (See note 2.)			
Connection method		-WP models: Pre-wired Models (4-mm dia. PVC cable with length of 2 m) -M1 models: M12 4-pin Connector Models -M5 models: M8 3-pin Connector Models			
Weight (packed state)	Pre-wired Models	Approx. 65 g	Approx. 85 g	Approx. 160 g	Approx. 280 g
	Connector Models	M12 Connector Models: Approx. 20 g	Approx. 35 g	Approx. 70 g	Approx. 200 g
Material	Case	Stainless steel	Brass-nickel plated		
	Sensing surface	PBT			
	Cable	PVC			
	Clamping nut	Stainless steel	Brass-nickel plated		

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object length between sensing objects, and a set distance of half the sensing distance.

2. UL (CSA) [E196555]: Use class 2 circuit only.

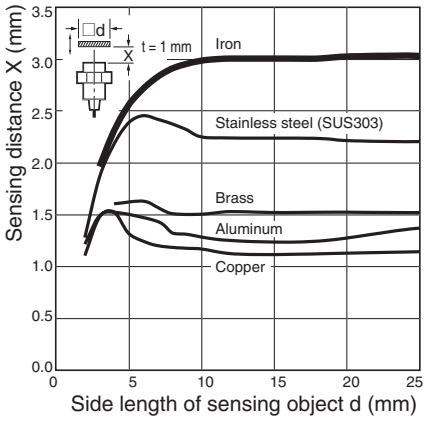
Engineering Data

Operating Range (Typical)

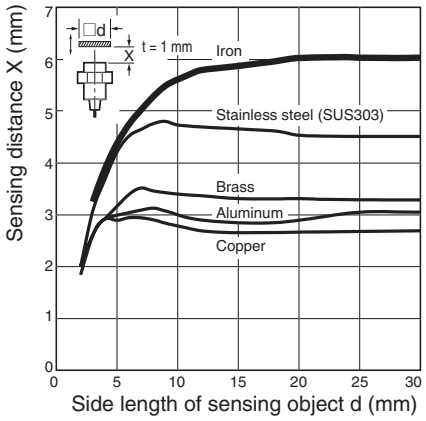


Influence of Sensing Object Size and Materials

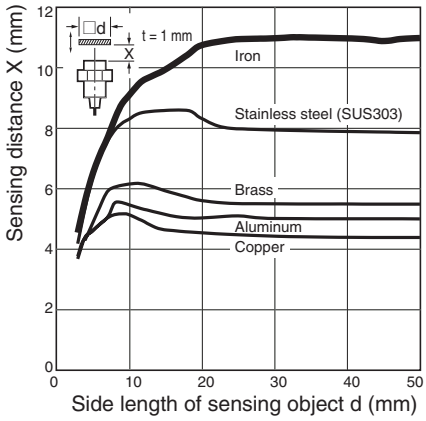
E2A3-S08KS03



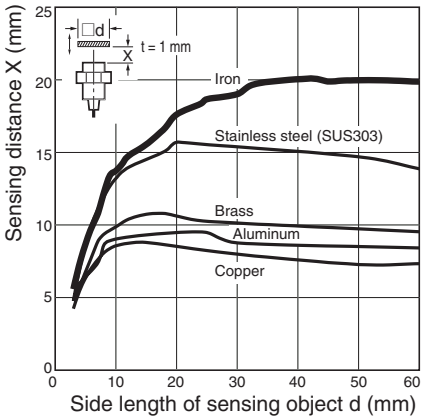
E2A3-M12KS06



E2A3-M18KS11



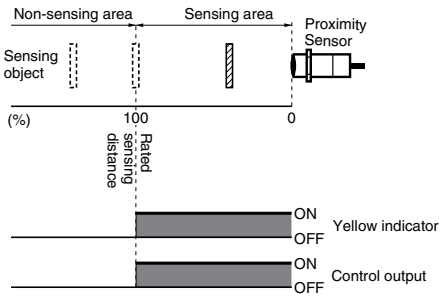
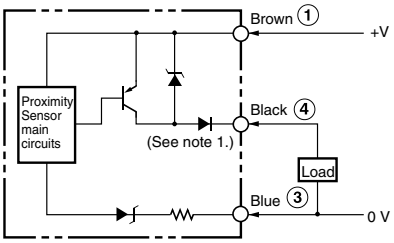
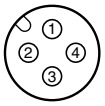
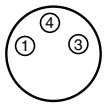
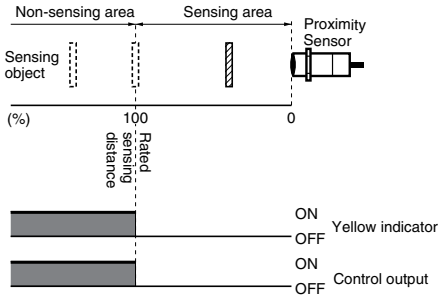
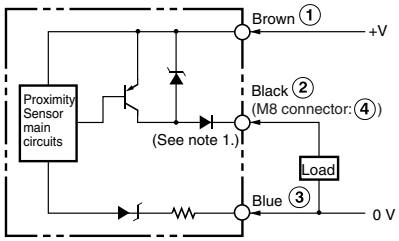
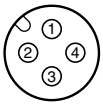
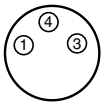
E2A3-M30KS20



Operation

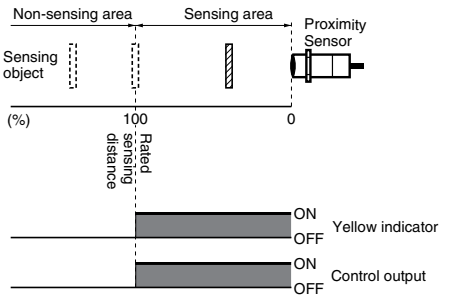
DC 3-wire Models

PNP Output

Operation mode	Model	Timing chart	Output circuit
NO	E2A3-□-□-B1		 **Note 1:** With M8 Size Models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 Connector (3-pin) Pin Arrangement  **Note 2:** Terminal 2 of the M12 connector is not used.
NC	E2A3-□-□-B2		 **Note 1:** With M8 Size Models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 Connector (3-pin) Pin Arrangement  **Note 2:** Terminal 4 of the M12 connector is not used.

DC 3-wire Models

NPN Output

<table>
<tr><th>Operation mode</th><th>Model</th><th>Timing chart</th><th>Output circuit</th></tr>
<tr>
<td>NO</td>
<td>E2A3-□-□-C1</td>
<td> 
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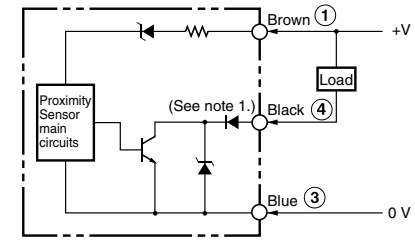
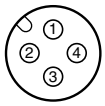
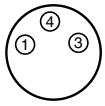
<td> 

Note 1: With M8 Size Models, there is no output reverse polarity protection diode.
M12 Connector Pin Arrangement (See note 2.)


M8 Connector (3-pin) Pin Arrangement


Note 2: Terminal 2 of the M12 connector is not used.</td>
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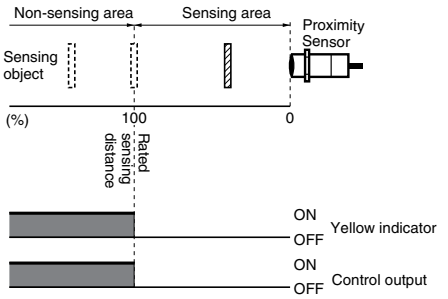
<tr>
<td>NC</td>
<td>E2A3-□-□-C2</td>
<td> 
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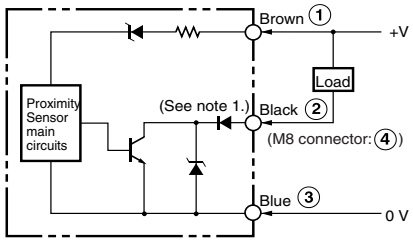
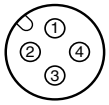
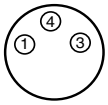
<td> 

Note 1: With M8 Size Models, there is no output reverse polarity protection diode.
M12 Connector Pin Arrangement (See note 2.)


M8 Connector (3-pin) Pin Arrangement


Note 2: Terminal 4 of the M12 connector is not used.</td>
</tr>
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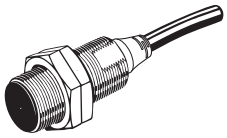
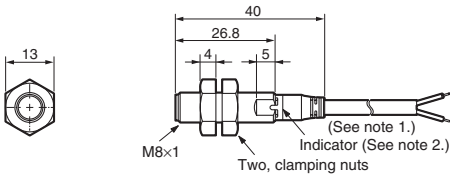
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Pre-wired Models



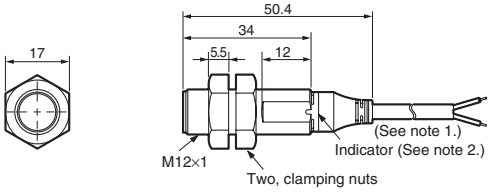
E2A3-S08KS03-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

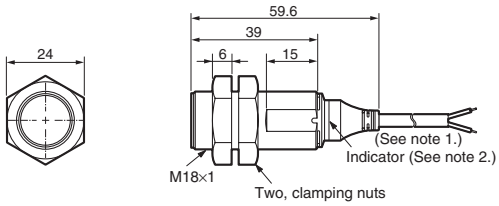
E2A3-M12KS06-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

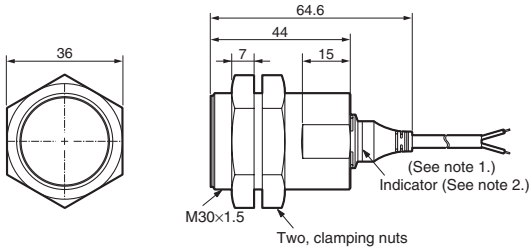
E2A3-M18KS11-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

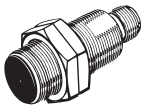
E2A3-M30KS20-WP-□□



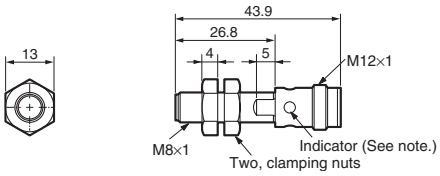
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

M12 Connector Models

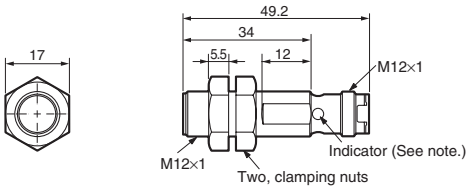


E2A3-S08KS03-M1-□□



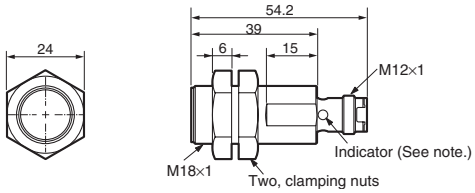
Note: Operation indicator (yellow LED, 4× 90°)

E2A3-M12KS06-M1-□□



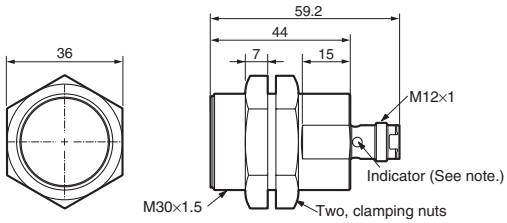
Note: Operation indicator (yellow LED, 4× 90°)

E2A3-M18KS11-M1-□□



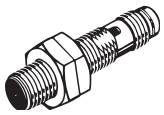
Note: Operation indicator (yellow LED, 4× 90°)

E2A3-M30KS20-M1-□□

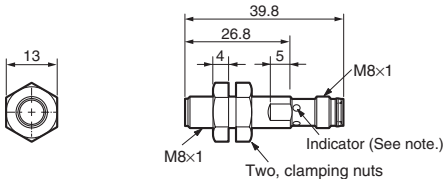


Note: Operation indicator (yellow LED, 4× 90°)

M8 Connector Models

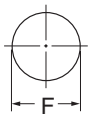


E2A3-S08KS03-M5-□□



Note: Operation indicator (yellow LED, 4× 90°)

Mounting Hole Cutout Dimensions



External diameter of Proximity Sensor	Dimension F (mm)
M8	8.5 dia.$^{+0.5}_{0}$
M12	12.5 dia.$^{+0.5}_{0}$
M18	18.5 dia.$^{+0.5}_{0}$
M30	30.5 dia.$^{+0.5}_{0}$

Safety Precautions

Precautions for Safe Use

⚠ WARNING

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

Power Supply

Do not impose an excessive voltage on the E2A3, otherwise it may be damaged. Do not impose AC current (100 to 240 VAC) on any DC Model, otherwise it may be damaged.

Load Short-circuit

Do not short-circuit the load, or the E2A3 may be damaged.

The E2A3's short-circuit protection function will be valid if the polarity of the supply voltage is correct and within the rated voltage range.

Wiring

Be sure to wire the E2A3 and load correctly, otherwise it may be damaged.

Connection with No Load

Be sure to insert a load when wiring. Make sure to connect a proper load to the E2A3 during operation, otherwise it may damage internal elements.

Do not expose the product to flammable or explosive gases.

Do not disassemble, repair, or modify the product.

Precautions for Correct Use

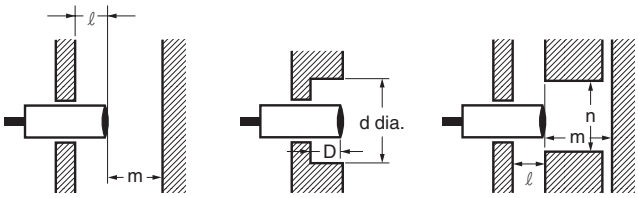
Designing

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If separate power supplies are connected to the Proximity Sensor and load, be sure to supply power to the Proximity Sensor before supplying power to the load.

Effects of Surrounding Metal

When mounting the E2A3 within a metal panel, ensure that the clearances given in the following tables are maintained.



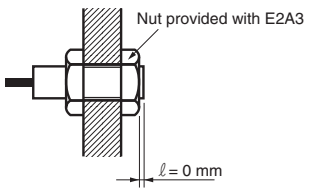
(Unit: mm)

Model	Dimension	M8		M12	
	Material of surrounding metal	Ferrous metal	Non-ferrous metal	Ferrous metal	Non-ferrous metal
E2A3 Shielded	l	0.5 (*)	2 (*)	2 (*)	1 (*)
	m	9		18	
	d	24		36	
	D	0.5	2	2	1
	n	24		36	

(Unit: mm)

Model	Dimension	M18		M30	
	Material of surrounding metal	Ferrous metal	Non-ferrous metal	Ferrous metal	Non-ferrous metal
E2A3 Shielded	l	4 (*)	2.5 (*)	6 (*)	4 (*)
	m	33		60	
	d	54		90	
	D	4	2.5	6	4
	n	54		90	

* Using the nuts provided with the E2A3 allows mounting in the way shown below.



Power OFF

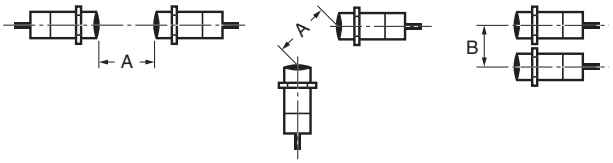
The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Mutual Interference

When installing two or more Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



(Unit: mm)

Type	Dimension	M8	M12	M18	M30
Shielded	A	25	35	70	110
	B	20	25	45	70

Wiring

High-tension Lines

Wiring through Metal Conduit**:**
If there is a power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Cable Extension

The standard cable length is less than 200 m.

The tractive force is 50 N.

Mounting

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistance.

Do not tighten the nut with excessive force. A washer must be used with the nut.

Type		Torque
M8	Stainless Steel Model	9 N·m
	Brass Model	---
M12		20 N·m
M18		60 N·m
M30		150 N·m

Maintenance and Inspection

Periodically perform the following checks to ensure stable operation of the Proximity Sensor over a long period of time.

1. Check for mounting position, dislocation, looseness, or distortion of the Proximity Sensor and sensing objects.
2. Check for loose wiring and connections, improper contacts, and line breakage.
3. Check for attachment or accumulation of metal powder or dust.
4. Check for abnormal temperature conditions and other environmental conditions.
5. Check for proper lighting of indicators (for models with a set indicator).

Never attempt to disassemble or repair the Sensor.

Environment

Water Resistivity

The Proximity Sensors are tested intensively on water resistance, but to ensure maximum performance and life expectancy, avoid immersion in water and provide protection from rain or snow.

Operating Environment

Store and operate the Proximity Sensor only within the given specifications.

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor. Connect the load to the Proximity Sensor through a relay.

<SUITABILITY FOR USE>

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

<CHANGE IN SPECIFICATIONS>

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D102-E2-01-X

In the interest of product improvement, specifications are subject to change without notice.

Miniature Cylindrical Proximity Sensor

E2E

High performance in small sizes

- pre-wired and M8 connector models
- 4 mm, 5.4 mm and M5 sizes
- response frequency up to 3 kHz

Ordering Information

Size		Sensing Distance	Connection	Housing Material	Output	Operation mode NO	Operation mode NC
dia 4 mm	shielded	0.8mm	pre-wired	brass	PNP	E2E-CR8C1	E2E-CR8C2
					NPN	E2E-CR8C1	E2E-CR8C2
			M8 connector		PNP	E2E-CR8C1-M5	E2E-CR8C2-M5
					NPN	E2E-CR8C1-M5	E2E-CR8C2-M5
M5		1mm	pre-wired		PNP	E2E-X1B1	E2E-X1B2
					NPN	E2E-X1C1	E2E-X1C2
			M8 connector		PNP	E2E-X1B1-M5	E2E-X1B2-M5
					NPN	E2E-X1C1-M5	E2E-X1C2-M5
dia 5.4 mm			pre-wired		PNP	E2E-C1B1	E2E-C1B2
					NPN	E2E-C1C1	E2E-C1C2

E2E-C□C□/B□, E2E-X1C□/B□ DC 3-wire Models

Size		4 dia.	M5	5.4 dia.
Type		Shielded		
Item		E2E-CR8C□/B□	E2E-X1C□/B□	E2E-C1C□/B□
Sensing distance		0.8 mm ±15%	1 mm ±15%	
Set distance		0 to 0.5 mm	0 to 0.7 mm	
Differential travel		15% max. of sensing distance		
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to *Engineering Data*.)		
Standard sensing object		Iron: 5 x 5 x 1 mm		
Response speed (See note.)		3 kHz		
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.		
Current consumption		17 mA max.		
Control output	Load current	Open-collector output 100 mA max. (at 30 VDC max.)		
	Residual voltage	2 V max. (Load current: 100 mA , Cable length: 2 m)		
Indicator		Operation indicator (red LED)		
Operation mode (with sensing object approaching)		C1/-B1 Models:NO C2/-B2 Models:NC For details, refer to *Timing Charts*.		
Protection circuits		Power supply reverse polarity protection, surge suppressor		
Ambient temperature		Operating/Storage: –25°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating/Storage: 35% to 95%		
Temperature influence		±15% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C		
Voltage influence		±2.5% max. of sensing distance in the rated voltage range ±15%		
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case		
Dielectric strength		500 VAC at 50/60 Hz for 1 min between current-carrying parts and case		
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		

Size		4 dia.	M5	5.4 dia.
Type		Shielded		
Item		E2E-CR8C□/B□	E2E-X1C□/B□	E2E-C1C□/B□
Shock resistance		500 m/s² 10 times each in X, Y, and Z directions		
Degree of protection		IEC 60529 IP67 (Pre-wired models: JEM standard IP67g (waterproof, oil-proof))		
Connection method		Pre-wired models (standard length 2 m), connector models		
Weight (packed state)	Pre-wired models	Approx. 60 g		
	Connector models	Approx. 12 g	Approx. 15 g	---
Material	Case	Stainless steel (SUS303)	Brass-nickel plated	
	Sensing surface	Heat-resistant ABS		
	Clamping nuts	Brass-nickel plated		
	Toothed washer	Iron-zinc plated		
Accessories		Instruction manual		

Note: The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

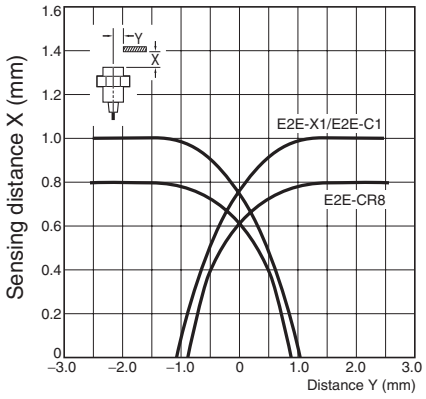
Engineering Data

E2E

Operating Range (Typical)

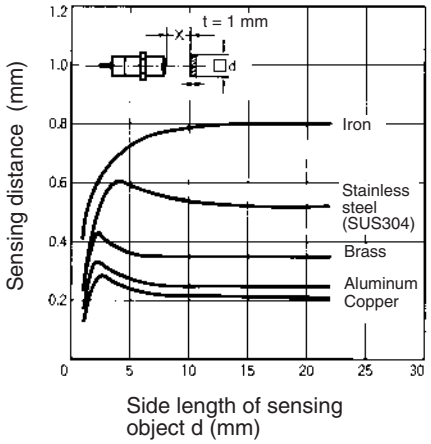
Shielded Models

E2E-C□C□/B□
E2E-X□C□/B□

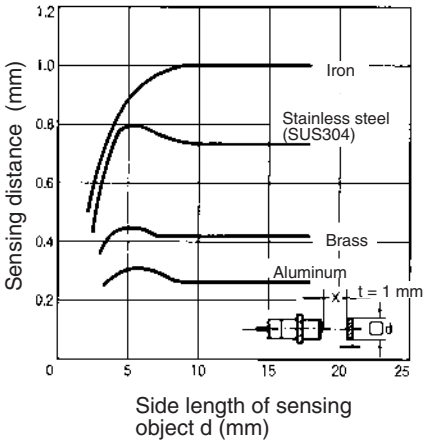


Sensing Distance vs. Sensing Object (Typical)

E2E-CR8□□



E2E-X1□□
E2E-C1□□

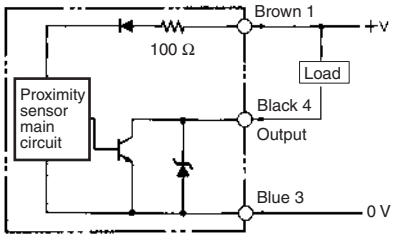


Output Circuits and Timing Charts

Output Circuits

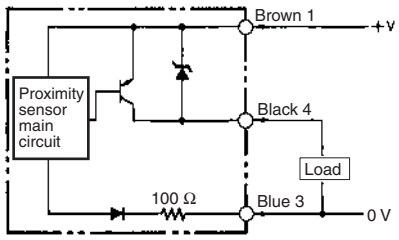
DC 3-wire Models

E2E-C/X□C□
NPN Open-collector Output



* Pin 4 is an NO contact, and pin 2 is an NC contact.

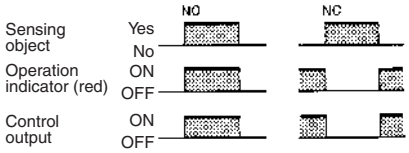
E2E-C/X□B□
PNP Open-collector Output



* Pin 4 is an NO contact, and pin 2 is an NC contact.

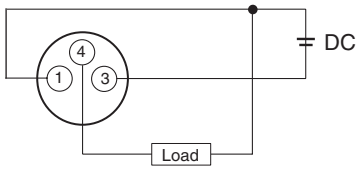
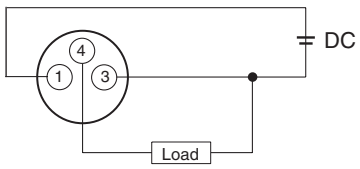
Timing Charts

E2E-C/X□C□/B□
NPN/PNP Open-collector Output



Pin Arrangement

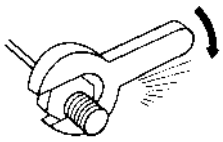
E2E-CR8C□/CR8B□/**X1C**□/**X1B**□-M5 DC 3-wire Models

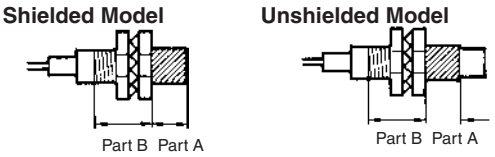
Connector	Operation mode	Applicable models	Pin arrangement
M8-3pin	NO/NC	E2E-CR8C□-M5 E2E-X1C□-M5	
	NO/NC	E2E-CR8B□-M5 E2E-X1B□-M5	

Precautions

Mounting

Do not tighten the nut with excessive force. A washer must be used with the nut.

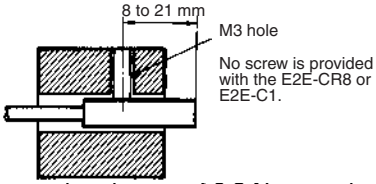




Note: The table below shows the tightening torques for part A and part B nuts. In the previous examples, the nut is on the sensor head side (part B) and hence the tightening torque for part B applies. If this nut is in part A, the tightening torque for part A applies instead.

Model	Part A		Part B
	Length	Torque	Torque
M5	1 N·m		

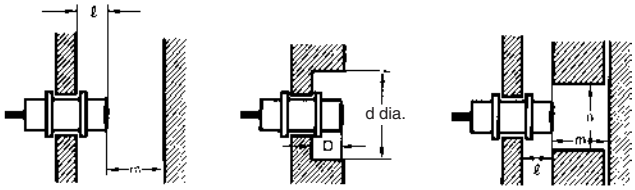
Refer to the following to mount the E2E-CR8 and E2E-C1 non-screw models.



Tighten the screw to a torque of 0.2 N·m maximum to secure the E2E-CR8 and a torque of 0.4 N·m maximum to secure the E2E-C1.

Effects of Surrounding Metal

When mounting the E2E within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the sensor.



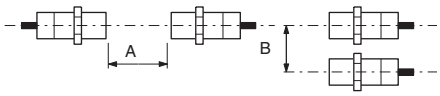
Model		Item	4 dia.	M5	5.4 dia.
E2E-X□C□ E2E-X□B□ E2E-C□C□ E2E-C□B□ DC 3-wire	Shielded	l	0 mm	0 mm	0 mm
		d	4 mm	5 mm	5.4 mm
		D	0 mm	0 mm	0 mm
		m	2.4 mm	3 mm	3 mm
		n	6 mm	8 mm	8 mm

Relationship between Sizes and Models

Model		Model No.
4 dia.	Shielded	E2E-CR8C□ E2E-CR8B□
M5		E2E-X1C□ E2E-X1B□
5.4 dia.		E2E-C1C□ E2E-C1B□

Mutual Interference

When installing two or more Sensors face to face or side by side, ensure that the minimum distances given in the following table are maintained.



Model		Item	4 dia.	M5	5.4 dia.
E2E-X□B□ E2E-X□C□ E2E-C□B□ E2E-C□C□ DC 3-wire	Shielded	A	20 mm		
		B	15 mm		

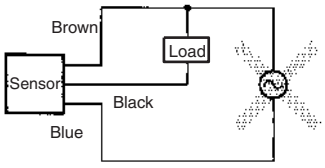
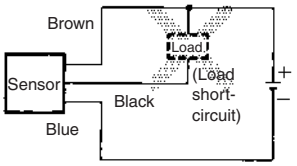
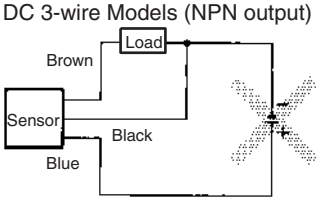
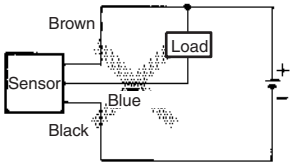
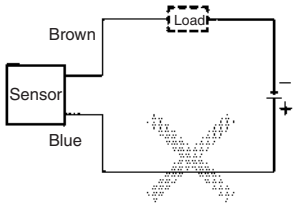
Note: Values in parentheses apply to Sensors operating at different frequencies.

⚠ WARNING

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

Precautions for Safe Use

The colors in parentheses are previous wire colors.

Item	Examples
Power supply Do not impose an excessive voltage on the E2E, otherwise it may explode or burn. Do not impose 100 VAC on any E2E DC Model, otherwise it may explode or burn.	DC 3-wire Models  **Incorrect**
Load short-circuit Do not short-circuit the load, or the E2E may explode or burn. The E2E's short-circuit protection function is valid if the polarity of the supply voltage imposed is correct and within the rated voltage range.	DC 3-wire Models (NPN output)  **Incorrect**
Wiring Be sure to wire the E2E and load correctly, otherwise it may explode or burn.	DC 3-wire Models (NPN output)  **Incorrect**  **Incorrect**
Connection with no load Make sure to connect a proper load to the E2E in operation, otherwise it may explode or burn.	DC 3-wire Models  **Incorrect**

Precautions for Correct Use

Installation

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If power supplies are connected to the Proximity Sensor and load respectively, be sure to supply power to the Proximity Sensor before supplying power to the load.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended to turn OFF the load before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Sensing Object

Metal Coating:
The sensing distances of the Proximity Sensor vary with the metal coating on sensing objects.

Wiring

High-tension Lines

Wiring through Metal Conduit
If there is a power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Cable Tractive Force

Do not pull on cables with tractive forces exceeding the following.

Diameter	Tractive force
4 dia. max.	30 N max.
4 dia. min.	50 N max.

Mounting

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Environment

Water Resistivity

Do not use the Proximity Sensor underwater, outdoors, or in the rain.

Operating Environment

Be sure to use the Proximity Sensor within its operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistive, a cover to protect the Proximity Sensor from water or water soluble machining oil is recommended so that its reliability and life expectancy can be maintained.
Do not use the Proximity Sensor in an environment with chemical gas (e.g., strong alkaline or acid gasses including nitric, chromic, and concentrated sulfuric acid gases).

Connection to a PLC

Required Conditions

Connection to a PLC is possible if the specifications of the PLC and the Proximity Sensor satisfy the following conditions. (The meanings of the symbols are given below.)

1. The ON voltage of the PLC and the residual voltage of the Proximity Sensor must satisfy the following.
   $V_{ON} \leq V_{CC} - V_R$
2. The OFF current of the PLC and the leakage current of the Proximity Sensor must satisfy the following.
   $I_{OFF} \geq I_{leak}$
   (If the OFF current is not listed in the specifications, take it to be 1.3 mA.)
3. The ON current of the PLC and the control output (I_{OUT}) of the Proximity Sensor must satisfy the following.
   $I_{OUT(min)} \leq I_{ON} \leq I_{OUT(max)}$
   The ON current of the PLC will vary, however, with the power supply voltage and the input impedance used as shown in the following equation.
   $I_{ON} = (V_{CC} - V_R - V_{PC})/R_{IN}$

Example

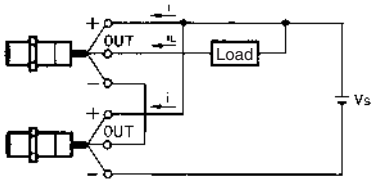
In this example, the above conditions are checked for when the PLC model is the C200H-ID212, the Proximity Sensor model is the E2E-X7D1-N, and the power supply voltage is 24 V.

1. V_{ON} (14.4 V) $\leq V_{CC}$ (20.4 V) – V_R (3 V) = 17.4 V: OK
2. I_{OFF} (1.3 mA) $\geq I_{leak}$ (0.8 mA): OK
3. $I_{ON} = [V_{CC}$ (20.4 V) – V_R (3 V) – V_{PC} (4 V)]/R_{IN} (3 kΩ)
   $\approx$ 4.5 mA
   Therefore,
   $I_{OUT(min)}$ (3 mA) $\leq I_{ON}$ (4.5 mA): OK

V_{ON}: ON voltage of PLC (14.4 V)
I_{ON}: ON current of PLC (typ. 7 mA)
I_{OFF}: OFF current of PLC (1.3 mA)
R_{IN}: Input impedance of PLC (3 kΩ)
V_{PC}: Internal residual voltage of PLC (4 V)

V_R: Output residual voltage of Proximity Sensor (3 V)
I_{leak}: Leakage current of Proximity Sensor (0.8 mA)
I_{OUT}: Control output of Proximity Sensor (3 to 100 mA)
V_{CC}: Power supply voltage (PLC: 20.4 to 26.4 V)
Values in parentheses are for the following PLC model and Proximity Sensor model.
PLC: C200H-ID212
Proximity Sensor: E2E-X7D1-N

Note: please refer to complete E2E/E2E2 datasheet for details on E2E-X7D1-N

Model	Connection type	Method	Description
DC 3-wire	AND (serial connection)	**Correct** 	The Sensors connected together must satisfy the following conditions. $i_L + (N-1) \times i \leq$ Upper-limit of control output of each Sensor $V_S - N \times V_R \geq$ Load operating voltage N: No. of Sensors V_R: Residual voltage of each Sensor V_S: Supply voltage i: Current consumption of the Sensor i_L: Load current If the MY Relay, which operates at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to the load.

Dimensions

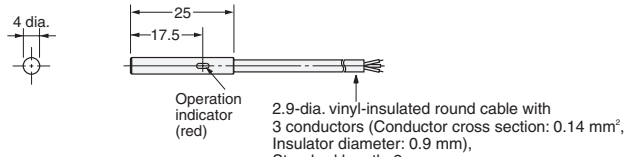
Note: All units are in millimeters unless otherwise indicated.

E2E

Model			DC 3-wire	
			Model No.	Figure No.
Pre-wired	**Shielded**	**4 dia.**	E2E-CR8□□	1
		M5	E2E-X1□□	3
		5.4 dia.	E2E-C1□□	2
Connector (M8-3 pin)	**Shielded**	**4 dia.**	E2E-CR8□□-M5	35
		M5	E2E-X1□□-M5	36

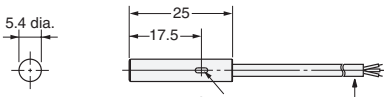
Pre-wired Models (Shielded)

Fig. 1 : E2E-CR8□□



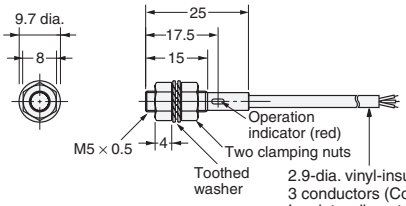
2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 2 m
Robotics cable Models: 2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm), Standard length: 2 m
The cable can be exteded up to 100 m (separate metal conduit).

Fig. 2 : E2E-C1□□



2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 2 m
Robotics cable Models: 2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm), Standard length: 2 m
The cable can be exteded up to 100 m (separate metal conduit).

Fig. 3 : E2E-X1□□



2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 2 m
Robotics cable Models: 2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm), Standard length: 2 m
The cable can be exteded up to 100 m (separate metal conduit).

M8 (3 pin) Connector Models (Shielded)

Fig. 35 : E2E-CR8□□-M5

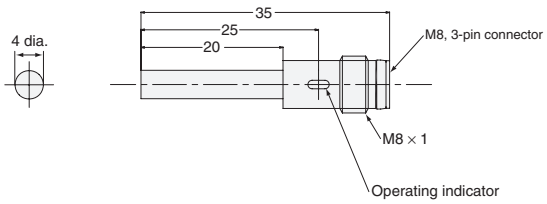
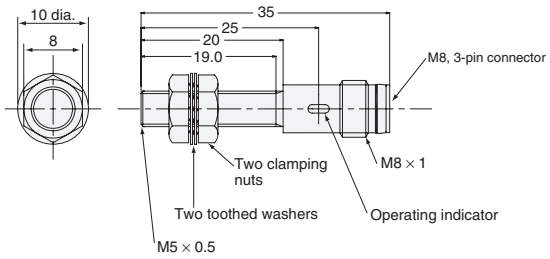
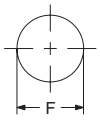


Fig. 36 : E2E-X1□□-M5



Mounting Holes



Dimensions	M4	M5	5.4 dia.
F (mm)	$4.2^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$5.7^{+0.5}_{0}$ dia.

Warranties and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

THE PRODUCTS CONTAINED IN THIS CATALOG ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D11E-EN-02

In the interest of product improvement, specifications are subject to change without notice.

Standard Flat Inductive Proximity Sensors

TL-W

- Front and side facing surface
- IP67
- DC 2-wire and DC 3-wire models

Ordering Information

DC 2-wire Models

Shape	Sensing distance	Model	
		Output and operating status	
		NO	NC
	5mm	**TL-W5MD1**[*1]	**TL-W5MD2**[*1]

*1. Models with different response frequency are available. These model numbers take the form TL-W5MD□5 (e.g., TL-W5MD15)

DC 3-wire Models

Shape	Sensing distance	Output specifications	Model			
			Output and operating status			
			PNP-NO	PNP-NC	NPN-NO	NPN-NC
	1.5mm	DC 3-wire	**TL-W1R5MB1**	---	**TL-W1R5MC1**[*1]	---
	3mm		**TL-W3MB1**	**TL-W3MB2**	**TL-W3MC1**[*1]	**TL-W3MC2**
	5mm		**TL-W5MB1**	**TL-W5MB2**	**TL-W5MC1**[*1]	**TL-W5MC2**
	20mm		---	---	**TL-W20ME1**[*1]	**TL-W20ME2**[*1]
Shielded	5mm	DC 3-wire	**TL-W5F1**	**TL-W5F2**	**TL-W5E1**	**TL-W5E2**

*1. Models with different response frequency are available. These model numbers take the form TL-W5MD□5 (e.g., TL-W5MD15)

Rating/Performance

DC 2-wire Models

Item / Model		TL-W5MD□
Sensing distance		5 mm ±10%
Setting distance		0 to 4 mm
Differential distance		10% max.
Sensing object		Ferrous metal(Sensitivity decreases with non-ferrous metals)
Standard sensing object		Iron, 18 x 18 x 1 mm
Response frequency		0.5 kHz
Rated supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.
Leakage current		0.8 mA max.
Control output	Switching capacity	3 to 100 mA
	Residual voltage	3.3 V max. (under load current of 100 mA with cable length of 2 m)
Indicator lamp		D1 models: Operation indicator (Red LED), Operation set indicator (Green LED) D2 models: Operation indicator (Red LED)
Operating status (with sensing object approaching)		D1 models: NO D2 models: NC
Protective circuits		Surge absorber, short-circuit protection
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)
Temperature influence		±10% max. of sensing distance at 23°C within a temperature range of -25°C and 70°C
Voltage influence		±2.5% max. of Sensing distance within a rated voltage range ±15%.
Insulation resistance		50 M min. (at 500 VDC) between energized parts and case
Dielectric strength		1,000 VAC for 1 min between energized parts and case
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance		Destruction: 500 m/s^2 for 3 times each in X, Y, and Z directions
Protective structure		IEC60529 IP67
Connection method		Pre-wired models (standard length: 2 m)
Weight (Packed state)		Approx. 45 g
Material	Case	Heat-resistant ABS resin
	Sensing surface	
Accessories		Instruction manual

* The response frequencies for DC switching are average values measured under the condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

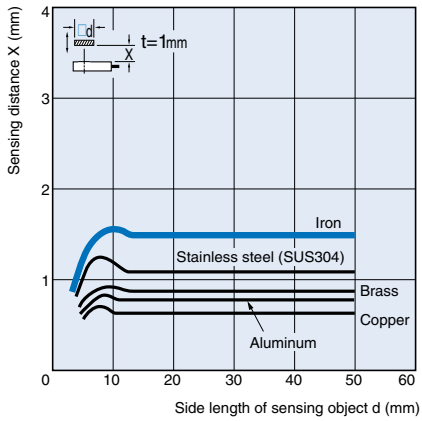
DC 3-wire Models

Item \ Model	TL-W1R5M□1	TL-W3M□□	TL-W5M□□	TL-W5E□/F□	TL-W20ME□
Sensing distance	1.5 mm ±10%	3 mm ±10%	5 mm ±10%		20 mm ±10%
Setting distance	0 to 1.2 mm	0 to 2.4 mm	0 to 4 mm		0 to 16 mm
Differential distance	10% max.				1% to 15% of sensing distance
Sensing object	Ferrous metal (refer to Engineering Data for non-ferrous metal on page E-55)				
Standard sensing object	Iron, 8 x 8 x 1 mm	Iron, 12 x 12 x 1 mm	Iron, 18 x 18 x 1 mm		Iron, 50 x 50 x 1 mm
Response frequency	1 kHz min.	600 Hz min.	500 Hz min.	300 Hz min.	40 Hz min.
Power supply (Operating voltage range)	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.			10 to 30 VDC with a ripple (p-p) of 20% max.	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.
Current consumption	15 mA max. at 24 VDC (no-load)		10 mA max.	15mA max. at 24 VDC (no-load)	8 mA at 12 VDC, 15 mA at 24 VDC
Control output: Switching capacity	NPN open collector 100 mA max. (30 VDC max.)		NPN open collector 12 VDC 50 mA max. (30 VDC max.) 24 VDC 100 mA max. (30 VDC max.)	200 mA	12 VDC 100mA max., 24 VDC 200 mA max.
Control output: Residual voltage	1 V max. (under load current of 100 mA with cable length of 2 m)		1 V max. (under load current of 50 mA with cable length of 2 m)	2 V max. (under load current of 200 mA with cable length of 2 m)	1 V max. (under load current of 200 mA with cable length of 2 m)
Indicator lamp	Detection indicator (red LED)				
Operating status (with sensing object approaching)	NO	C1 models: NO C2 type: NC		E1 models, F1 models: NO E2 models, F2 models: NC	
Protective circuits	Reverse connection protection, surge absorber				
Ambient temperature	Operating/Storage: -25°C to 70°^C (with no icing or condensation)				
Ambient humidity	Operating/Storage: 35% to 95%RH (with no condensation)				
Temperature influence	±10% max. of sensing distance at 23°C within the temperature range of -25°C and 70°C				
Voltage influence	±2.5% max. of sensing distance within a range of ±10% of rated power supply voltage		±2.5% max. of sensing distance within a range of ±20% of rated power supply voltage	±2.5% max. of sensing distance within a range of ±10% of rated power supply voltage	
Insulation resistance	50 M min. (at 500 VDC) between energized parts and case				
Dielectric strength	1000 VAC 50/60 Hz for 1 min between energized part and case				
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions				
Shock resistance	Destruction: 500 m/s^2 for 3 times each in X, Y, and Z directions				Destruction: 500 m/s2 for 10 times each in X, Y, and Z directions
Protective structure	IEC60529 IP67				
Connection method	Pre-wired models (standard length: 2 m)				
Weight (Packed state)	30 g		Approx. 45 g	Approx. 70 g	Approx. 180 g
Material: Case	Heat-resistant ABS resin			Diecast aluminum	Heat-resistant ABS resin
Material: Sensing surface	Heat-resistant ABS resin				
Accessories	Mounting bracket, instruction manual		Instruction manual		

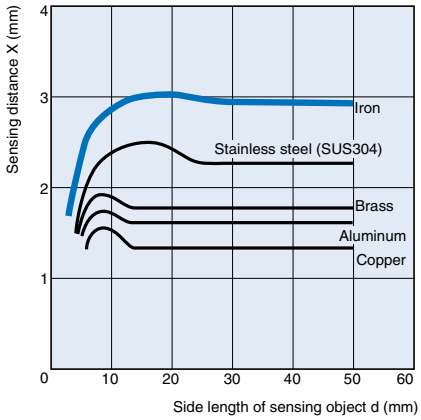
Characteristic data (typical)

Sensing Distance vs. Sensing Object

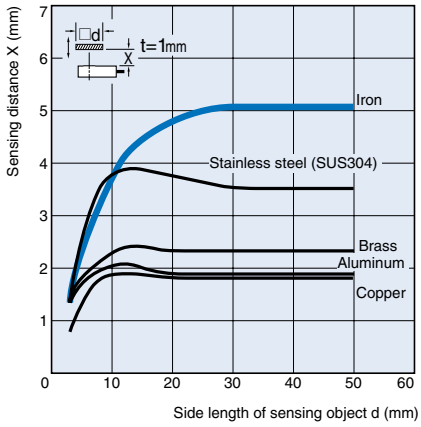
TL-W1R5M□



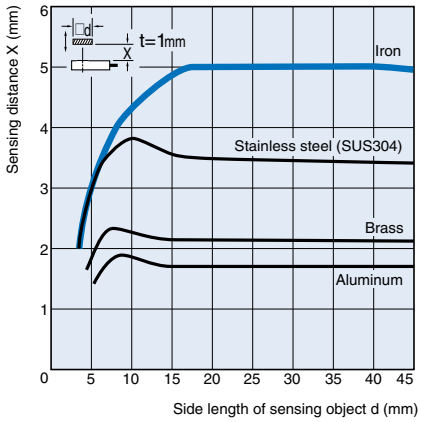
TL-W3M□



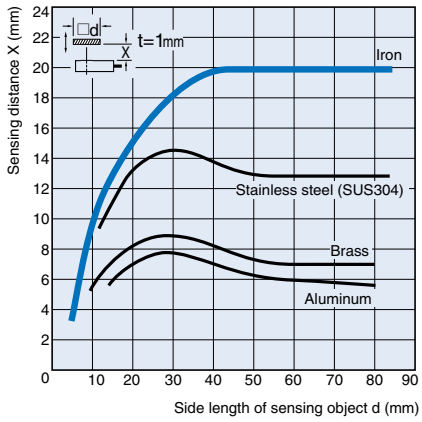
TL-W5MB□/C□



TL-W5E□/-W5F□/-W5MD□

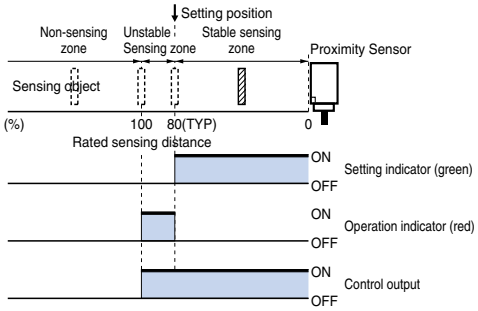
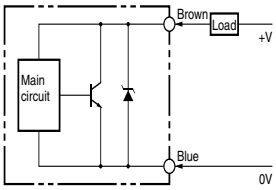
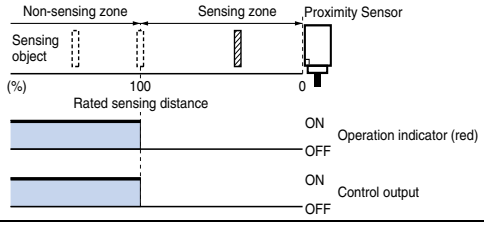


TL-W20□

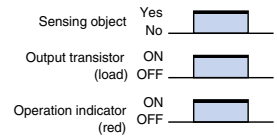
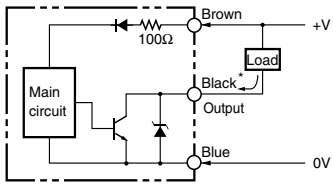
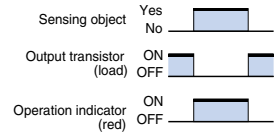
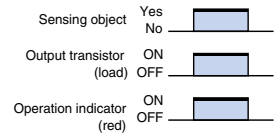
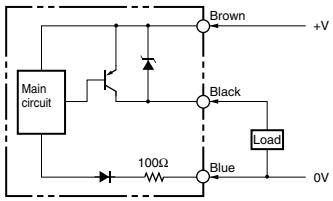
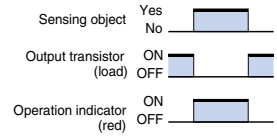
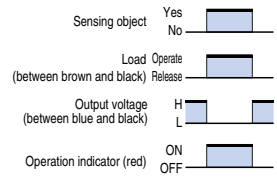
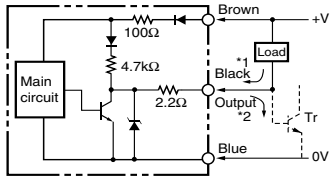
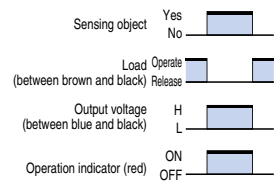


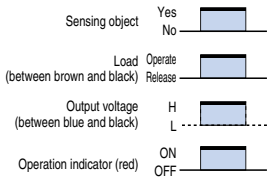
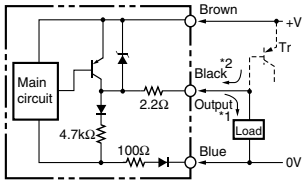
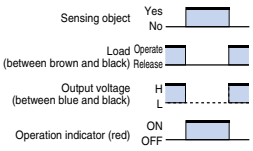
Output Circuit Diagram

DC 2-wire Models

Operating status	Model	Timing chart	Output circuit
NO	**TL-W5MD1**		 Note: The Load can be connected to either the +V and 0-V side.
NC	**TL-W5MD2**		

DC 3-wire Models

Operating status	Model	Timing chart	Output circuit
NO	**TL-W1R5M□1** **TL-W3M□1** **TL-W5M□1**		 * Maximum load current: 100 mA
NC	**TL-W3M□2** **TL-W5MC2**		
NO	**TL-W1R5B1** **TL-W3MB1** **TL-W5MB1**		
NC	**TL-W3MB2** **TL-W5MB2**		
NO	**TL-W5E1** **TL-W20ME1**		 * Maximum load current: 100 mA * 2. Current flows in this direction if the circuit incorporates the transistor.
NC	**TL-W5E2** **TL-W20ME2**		

Operating status	Model	Timing chart	Output circuit
NO	**TL-W5F1**		
NC	**TL-W5F2**		

* 1. Maximum load current: 200 mA
* 2. Current flows in this direction if the circuit incorporates the transistor.

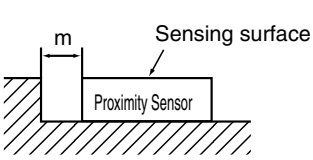
Precautions

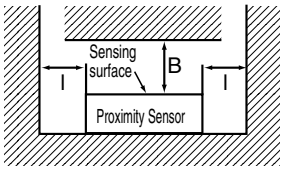
Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.
Front Surface Sensing Type (Not exceeding the sensor head height).



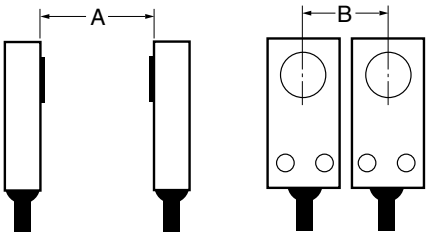


Effects of Surrounding Metal(Unit: mm)

Model / Length	l	m	n
TL-W1R5M□	2	0	8
TL-W3M□	3		12
TL-W5MD□	5		20
TL-W5M□			
TL-W20ME□	25	16	100
TL-W5E□/-W5F□	0	0	20

Mutual Interference

If two or more Sensors are mounted face to face or side by side, keep them separate at the following minimum distance.



Mutual Interference (unit: mm)

Model / Length	A	B
TL-W1R5M□	75 (50)	120(60)
TL-W3MC□	90 (60)	200(100)
TL-W5MD□	120(80)	60(30)
TL-W5MC□		
TL-W20ME□	200(100)	200(100)
TL-W5E□/-W5F□	50	35

Note: The above values in parentheses are applicable when using two sensors with different frequencies.

Installation

- Use M3 flat-head screws to install TL-W1R5M□ and
- TL-W3M□.
- Ensure that the resin cover should be tightened with
- a torque according to the following table.

Model	Tensile strength (torque)
TL-W1R5MC1	0.98 Nm
TL-W3MC□	
TL-W5MD□	
TL-W20M□	1.5 Nm

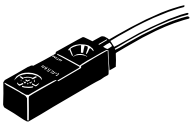
● Adjustment

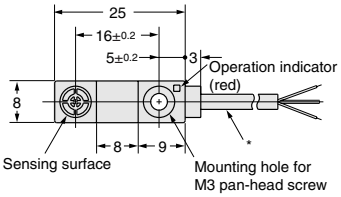
Power ON

Please note that the power injection AND connection generate an error pulse for approximately 1 ms.

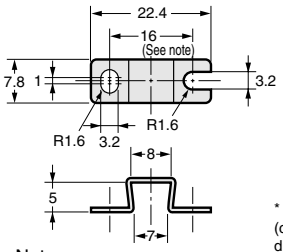
Dimensions (Unit: mm)

TL-W1R5M□1

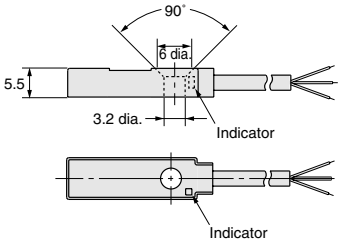




Mounting Bracket (Attachment)

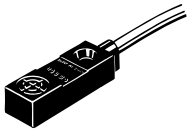


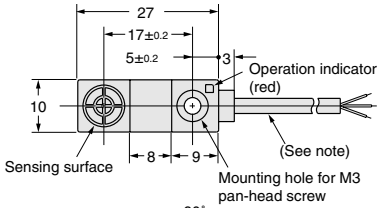
Note:
Mounting dimensions: 17±0.2



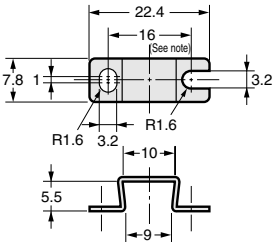
* Vinyl-insulated round cable with three conductors, 2.9 dia. (conductor cross-sectional area: 0.15 mm²; insulation diameter: 0.9 mm); standard length: 2 m

TL-W3M□□

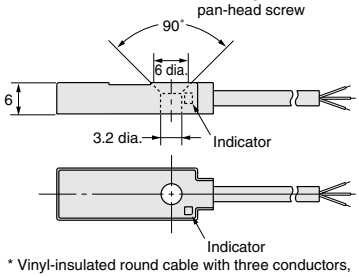




Mounting Bracket (Attachment)

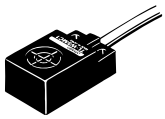


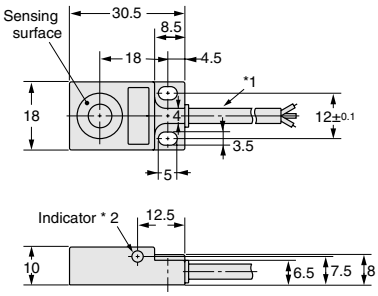
Note: Mounting dimensions: 17±0.2



* Vinyl-insulated round cable with three conductors, 2.9 dia. (conductor cross-sectional area: 0.14 mm²; insulation diameter: 0.9 mm); standard length: 2 m

TL-W5M□□

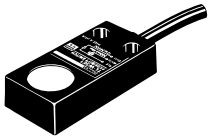




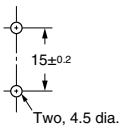
* 1. TL-W5MC1: Vinyl-insulated round cable with three conductors, 4 dia. (conductor cross-sectional area: 0.2 mm²; insulation diameter: 1.2 mm); standard length: 2 m
TL-W5MD□: Vinyl-insulated round cable with two conductors, 4 dia. (conductor cross-sectional area: 0.3 mm²; insulation diameter: 1.3 mm); standard length: 2 m

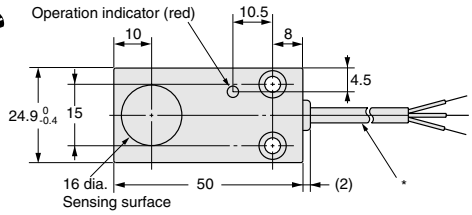
* 2. C type: Operation indicator (red)
D type: Operation indicator (red), Setting indicator (green)

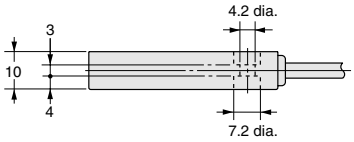
TL-W5E□
TL-W5F□



Mounting Holes

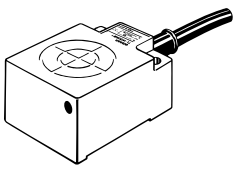


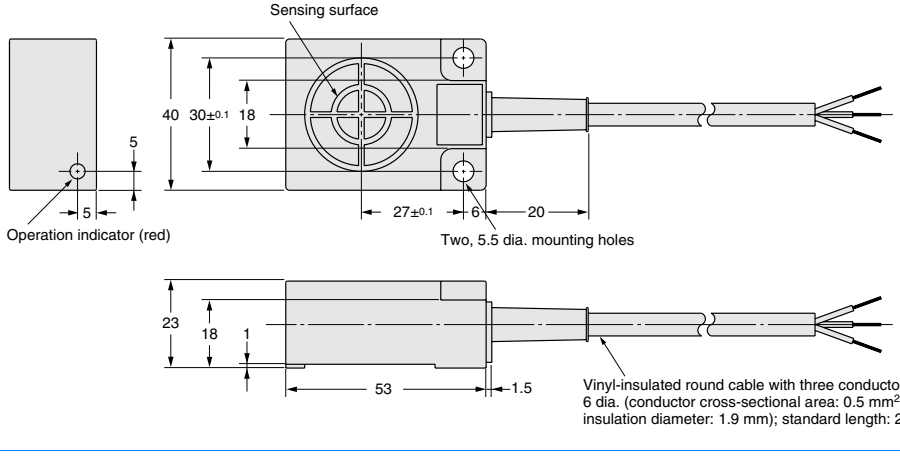




* Vinyl-insulated round cable with three conductors, 4 dia. (conductor cross-sectional area: 0.2mm²; insulation diameter: 1.2 mm); standard length: 2 m

TL-W20ME□





ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E221-E2-03-X In the interest of product improvement, specifications are subject to change without notice.

Miniature Square Inductive Proximity Sensor

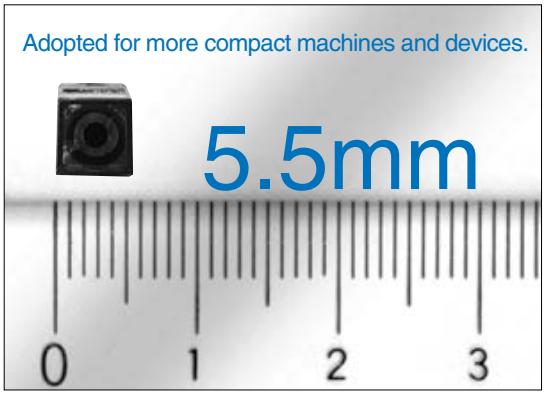
E2S

- Miniature housing with long sensing ranges
- Front ans side facing sensing surfaces

Features

5.5 mm Ultra small housing

The 5.5 mm x 5.5 mm type permits smaller, space-saving machines and devices.



1 kHz High-Speed Response

IP67 Environment-Resistant Types

Full sealing structure housing, degree of protection IEC60529 IP67.

1/20 Low Current Consumption (Compared to conventional models)

Significantly lower current consumption. The 0.8 mA (for 24 VDC) leakage current for the DC 2-wire type has a ratio of approximately 1/20 compared to the conventional DC 3-wire type. Optimum solution for multiple-sensor applications such as cam switches.

Ordering Information

Sensors

DC 2-wire Models

Shape	Sensing surface	Sensing distance	Model	
			Operating status	
			NO	NC
Unshielded 	Front face	1.6mm	**E2S-W11 ***	**E2S-W12**
	End face		**E2S-Q11 ***	**E2S-Q12**
	Front face	2.5mm	**E2S-W21 ***	**E2S-W22**
	End face		**E2S-Q21 ***	**E2S-Q22**

* Models with different response frequency are available (NO only). These model numbers take the form E2S-□□□B (e.g., E2S-W11B)

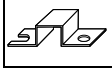
DC 3-wire Models

Shape	Sensing surface	Sensing distance	Output specifications	Model	
				Operating status	
				NO	NC
Unshielded 	Front face	1.6mm	NPN	**E2S-W13***	**E2S-W14**
	End face			**E2S-Q13***	**E2S-Q14**
	Front face	2.5mm		**E2S-W23***	**E2S-W24**
	End face			**E2S-Q23***	**E2S-Q24**
	Front face	1.6mm	PNP	**E2S-W15***	**E2S-W16**
	End face			**E2S-Q15***	**E2S-Q16**
	Front face	2.5mm		**E2S-W25***	**E2S-W26**
	End face			**E2S-Q25***	**E2S-Q26**

* Models with different response frequency are available (NO only). These model numbers take the form E2S-□□□B (e.g., E2S-W11B)

Accessories (Order Separately)

Mounting Brackets

Shape	Model	Quantity	Remarks
	**Y92E-C1R6**	1	Provided with E2S-□1□□
	**Y92E-C2R5**		Provided with E2S-□2□□
	**Y92E-D1R6**		---
	**Y92E-D2R5**		---

Nomenclature

E2S - □ □ □ □ □

① Compact square series

② Sensing direction
W: Front face sensing
Q: End face sensing

③ Size and sensing distance (standard sensing object)
1: 5.5 x 5.5 mm, 1.6 mm (iron)
2: 8 x 8 mm, 2.5 mm (iron)

④ Output
1: DC 2-wire NO
2: DC 2-wire NC
3: DC 3-wire NPN NO
4: DC 3-wire NPN NC
5: DC 3-wire PNP NO
6: DC 3-wire PNP NC

⑤ Different response frequency
No: Standard
B: Different response frequency

Rating/Performance

DC 2-wire Models

Item \ Model		E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
Sensing surface		Front face	End face	Front face	End face
Sensing distance		1.6 mm ±10%		2.5 mm ±15%	
Setting distance		0 to 1.2 mm		0 to 1.9 mm	
Differential distance		10% max.			
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)			
Standard sensing object		Iron, 12 x 12 x 1 mm		Iron, 15 x 15 x 1 mm	
Response frequency		1 kHz min.			
Rated supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Leakage current		0.8 mA max.			
Control output	Switching capacity	3 to 50 mA DC max.			
	Residual voltage	3 V max. (under load current of 50 mA with cable length of 1 m)			
Indicator lamp		□□1 models: Operation indicator(red LED), Operation set indicator(green LED) □□2 models: Operation indicator(red LED)			
Operating status (with sensing object approaching)		□□1 models: NO □□2 models: NC			

* The response frequencies for DC switching are average values measured under the condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

DC 3-wire Models

Item \ Model		E2S-W13 E2S-W14	E2S-Q13 E2S-Q14	E2S-W23 E2S-W24	E2S-Q23 E2S-Q24	E2S-W15 E2S-W16	E2S-Q15 E2S-Q16	E2S-W25 E2S-W26	E2S-Q25 E2S-Q26
Sensing surface		Front face	End face	Front face	End face	Front face	End face	Front face	End face
Sensing distance		1.6 mm ±10%		2.5 mm ±15%		1.6 mm ±10%		2.5 mm ±15%	
Setting distance		0 to 1.2 mm		0 to 1.9 mm		0 to 1.2 mm		0 to 1.9 mm	
Differential distance		10% max.							
Sensing object		Ferrous metal							
Standard sensing object		Iron, 12 x 12 x 1 mm		Iron, 15 x 15 x 1 mm		Iron, 12 x 12 x 1 mm		Iron, 15 x 15 x 1 mm	
Response frequency		1 kHz min.							
Rated supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Current consumption		13 mA max. (24 VDC, unload)							
Control output	Switching capacity	NPN open collector 100 mA max. (30 VDC max.)				PNP open collector 50 mA max. (30 VDC max.)			
	Residual voltage	1 V max. (under load current of 50 mA with cable length of 1 m)							
Indicator lamp		Operation indicator (orange)							
Operating status (with sensing object approaching)		□□3 models: NO □□4 models: NC				□□5 models: NO □□6 models: NC			

* The response frequencies for DC switching are average values measured under the condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

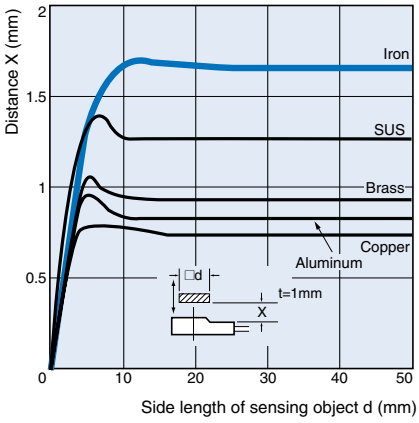
Specifications

Item	Model	E2S-□□□
Protective circuits		Reverse polarity connection and surge absorber
Ambient temperature		Operating: -25°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)
Ambient humidity		Operating: 35% to 90%RH, Storage: 35% to 95%RH (with no condensation)
Temperature influence		±15% max. of sensing distance at 23°C in temperature range of -25°C to 70°C
Voltage influence		±2.5% max. of sensing distance within a range of ±10% of rated supply voltage
Insulation resistance		50 M min. (at 500 VDC) between energized parts and case
Dielectric strength		1,000 VAC for 1 min between energized parts and case
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance		Destruction: 500 m/s2 for 3 times each in X, Y, and Z directions
Protective structure		IEC60529 IP67
Connection method		Pre-wired models (Standard length: 3 m)
Weight (Packed state)		Approx. 10 g
Material	Case	Polyarylate
Accessories		Mounting Brackets

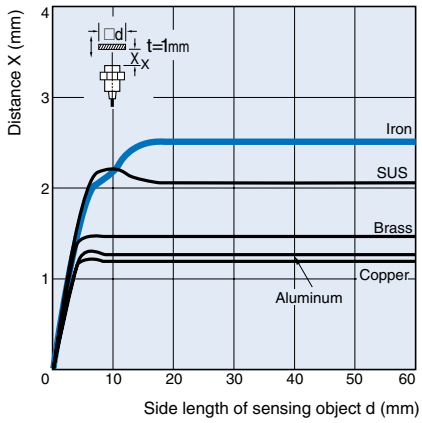
Characteristic data (typical)

Sensing Distance vs. Sensing Object

E2S-W1□/-Q1□

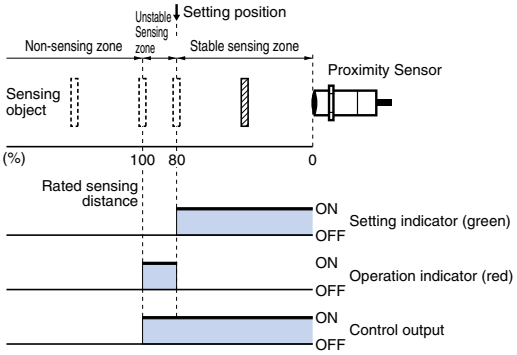
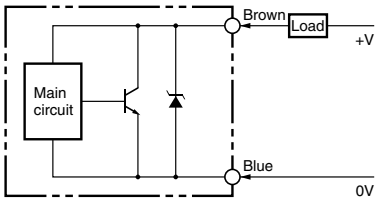
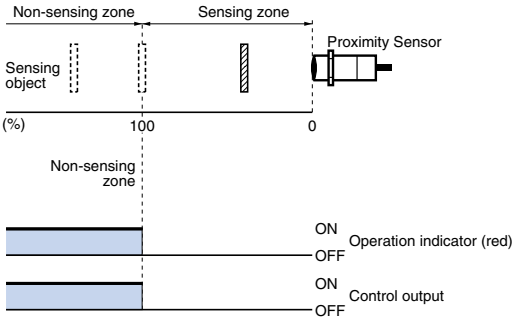


E2S-W2□/-Q2□

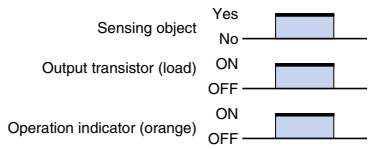
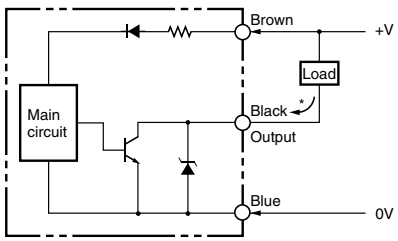
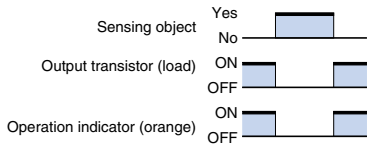
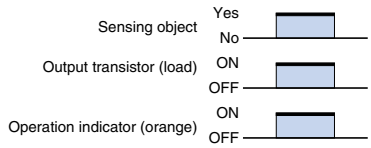
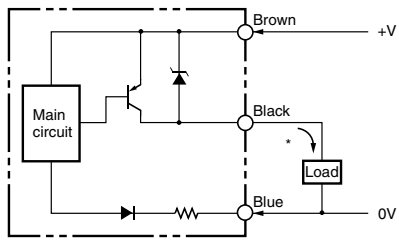
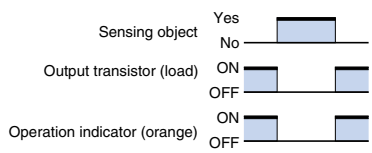


Output Circuit Diagram

DC 2-wire Models

Operating status	Model	Timing chart	Output circuit
NO	**E2S-W11 E2S-W21 E2S-Q11 E2S-Q21**		
NC	**E2S-W12 E2S-W22 E2S-Q12 E2S-Q22**		

DC 3-wire Models

Operating status	Output specifications	Model	Timing chart	Output circuit
NO	NPN	**E2S-W13 E2S-W23 E2S-Q13 E2S-Q23**		 * Maximum load current: 50 mA
NC		**E2S-W14 E2S-W24 E2S-Q14 E2S-Q24**		
NO	PNP	**E2S-W15 E2S-W25 E2S-Q15 E2S-Q25**		 * Maximum load current: 50 mA
NC		**E2S-W16 E2S-W26 E2S-Q16 E2S-Q26**		

Precautions

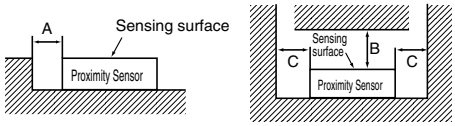
Correct Use

Design

Effects of Surrounding Metal

• Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

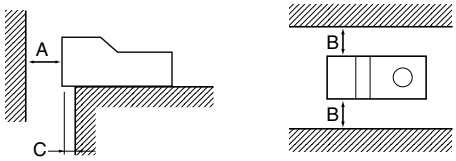
• Front Surface Sensing Type (Not exceeding the sensor head height)



(Unit: mm)

Model / Length	A	B	C
E2S-W1□	0	8	2
E2S-W2□		15	10

• End Surface Sensing Type



(Unit: mm)

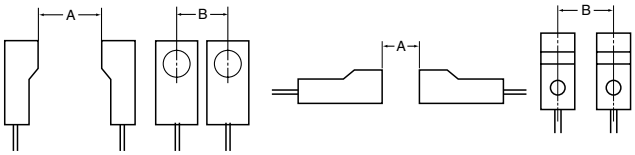
Model / Length	A	B	C
E2S-Q1□	8	3	2
E2S-Q2□	15	10	3

Mutual Interference

If more than one Sensor is located face to face or in parallel, be sure to maintain enough space between adjacent Sensors to suppress mutual interference as provided in the following diagram,.

• Front Surface Sensing Type

• End Surface Sensing Type



(Unit: mm)

Model / Length	A	B
E2S-W(Q)1□	50 (40)	20 (5.5)
E2S-W1□	75 (50)	25 (8)

Note: The above values in parentheses are applicable when using two sensors with different frequencies.

Mounting

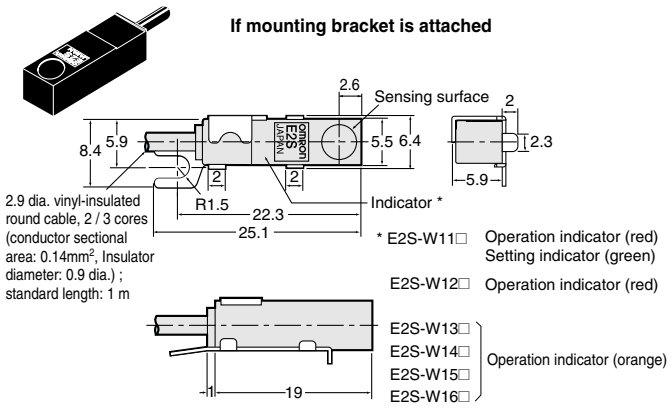
Tightening torgues

Do not tighten the E2S-W(Q)2□mounting screws to a torque exceeding 0.7 Nm.

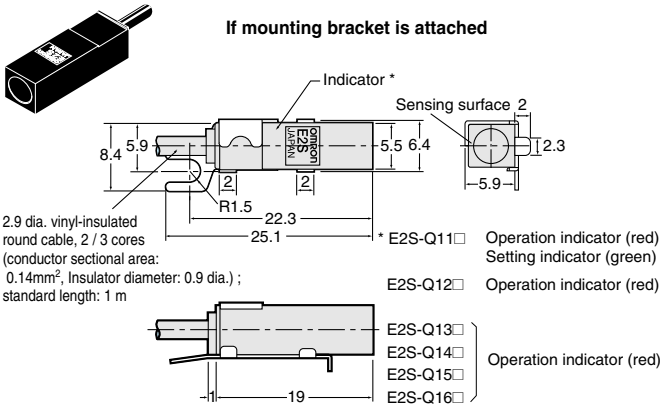
Dimensions (Unit: mm)

Sensors

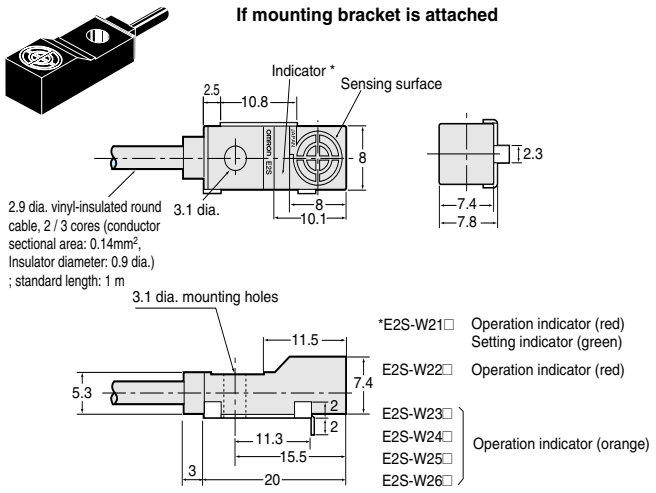
E2S-W1□



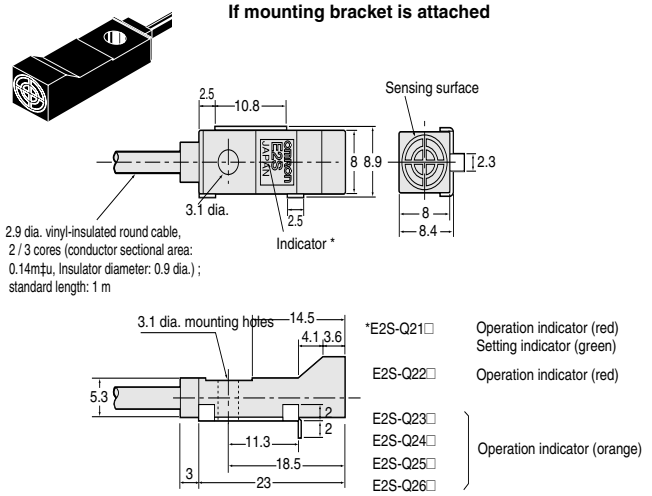
E2S-Q1□



E2S-W2□

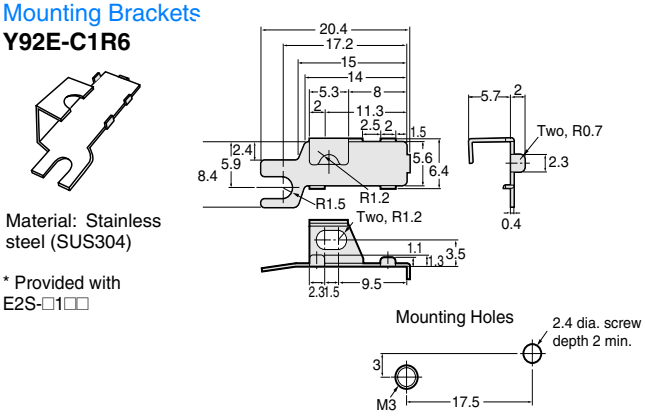


E2S-Q2□

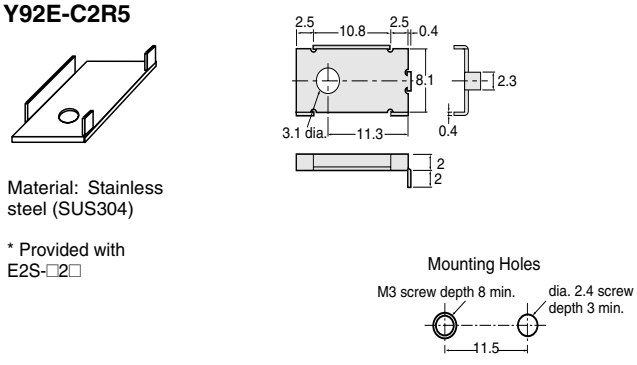


Accessories (Order Separately*)

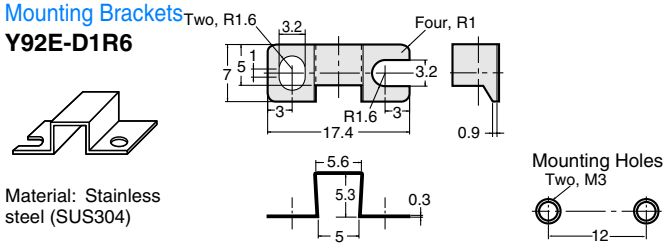
Mounting Brackets
Y92E-C1R6



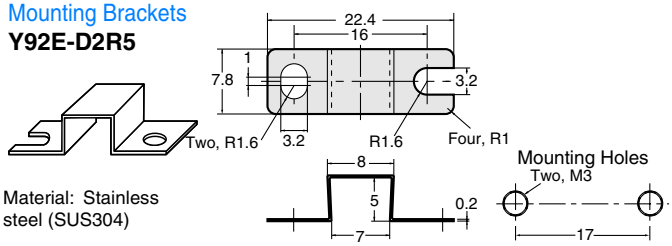
Mounting Brackets
Y92E-C2R5



Mounting Brackets
Y92E-D1R6



Mounting Brackets
Y92E-D2R5



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E902-E2-02-X In the interest of product improvement, specifications are subject to change without notice.

Long Distance Square Inductive Proximity Sensor

E2Q2

- Terminal Housing
- Active face direction changeable
- Easy to install and same mounting dimensions as a standard style electro-mechanical limit switch
- Integrated short circuit and reverse polarity protection
- Robust body with stainless steel screws

Square Proximity Sensor

Ordering Information

DC type

Sensing distance	Connection	Active face		Output	
				NO	NO + NC
20 mm shielded	Terminals	Changeable	NPN	E2Q2-N20E1-H	E2Q2-N20E3-□
			PNP	E2Q2-N20F1-H	E2Q2-N20F3-□
30 mm non-shielded			NPN		E2Q2-N30ME3-□
			PNP		E2Q2-N30MF3-□
40 mm non-shielded			NPN		E2Q2-N40ME3-□
			PNP		E2Q2-N40MF3-□

□ = H: terminal conduit M20x1,5
U: terminal conduit 1/2“ NPT

AC type

Sensing distance	Connection	Active face		Output	
				NO	NO or NC
15 mm shielded	Terminals	Changeable	AC		E2Q2-N15Y4-□
30 mm shielded			AC		E2Q2-N30MY4-□

□ = H: terminal conduit M20x1,5
U: terminal conduit 1/2“ NPT

Weld-Field Immune DC type (100mT)

Sensing distance	Connection	Active face		Output	
				NO	NO + NC
15 mm shielded	Terminal conduit ½“ NPT	Changeable	PNP	E2Q2-N15F1-51	

Weld-Field Immune AC type (100mT)

Sensing distance	Connection	Active face		Output	
				NO	NO or NC
15 mm shielded	Terminal conduit ½“ NPT	Changeable	AC		E2Q2-N15Y4-51

Rating/performance

DC type

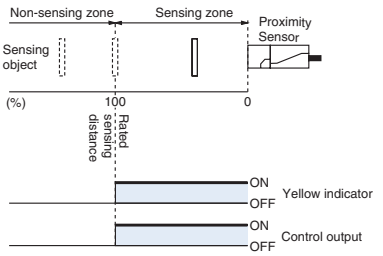
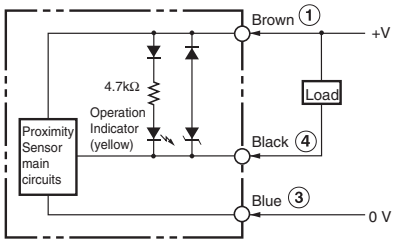
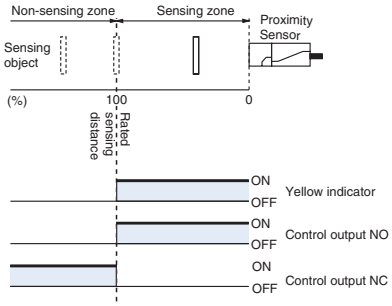
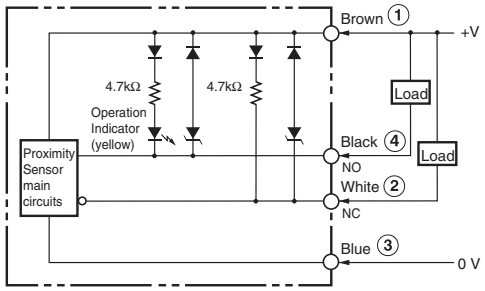
Item \ Model	shielded		non-shielded	
	E2Q2-N15F1-51 weld-immune type	E2Q2-N20□□-□	E2Q2-N30□□-□	E2Q2-N40□□-□
Sensing distance Sn	15 mm ± 10%	20 mm ± 10%	30 mm ± 10%	40 mm ± 10%
Standard target size, L x W x H, Fe 37	45 x 45 x 1 mm	60 x 60 x 1 mm	90 x 90 x 1 mm	120 x 120 x 1 mm
Setting distance	0 to 12,15 mm	0 to 16,2 mm	0 to 24,3 mm	0 to 32,4 mm
Switching frequency	10 Hz (weld-field immune type)	150 Hz	100 Hz	30 Hz
Sensing object	Ferrous metals			
Differential travel	15% max. of sensing distance Sn			
Operating voltage	10 to 30 VDC	10 to 60 VDC		
Current consumption	20 mA max.		10 mA max.	20 mA max.
Control output – Type	E2Q2-N□□□E1-□□: NPN - NO E2Q2-N□□□E3-□□: NPN - NO + NC E2Q2-N□□□F1-□□: PNP - NO E2Q2-N□□□F3-□□: PNP - NO + NC			
Control output – Load	200 mA max.			
Control output – On-stage voltage drop	3 VDC max. (at 200 mA load current)			
Circuit protection	Reverse polarity, output short circuit			
Alternating magnetic field	100 mT	---		
Indicator	Operating indicator (yellow LED), operating voltage (green LED)			
Ambient temperature	Operating: -25° to 70°C			
Ambient humidity	35 to 95% RH			
Influence of temperature	± 10% max. of Sn at 23° in temperature range of -25° to 70°C			
Dielectric strength	1.500 VAC, 50/60 Hz for 1 min. between current carry parts and case			
Electromagnetic compatibility EMC	EN 60947-5-2			
Vibration resistance	10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6			
Shock resistance	Approx. 30 G for 11 ms according to IEC 60068-2-27			
Protection degree	IEC 60529 IP 67			
Connection – Terminals	Up to 2,5 mm²			
Material – Case Terminal base	PBT Al PBT (...-H type)			
Material – Sensing face	PBT			
Approvals	CSA CERTIFIED UL LISTED			

AC type

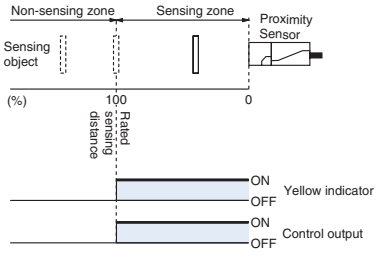
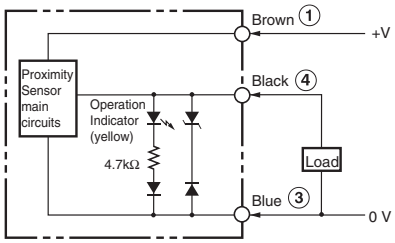
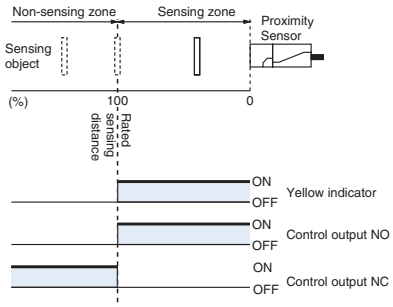
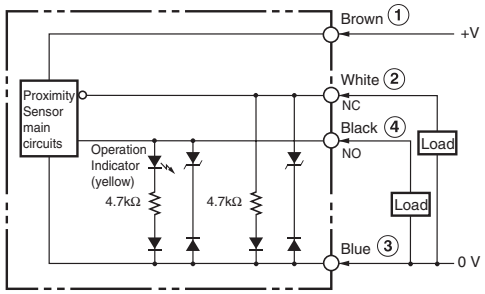
Item \ Model		shielded		non-shielded
		E2Q2-N15Y4-51 weld-immune type	E2Q2-N15□□-□	E2Q2-N30□□-□
Sensing distance Sn		15 mm ± 10%		30 mm ± 10%
Standard target size, L x W x H, Fe 37		45 x 45 x 1 mm		90 x 90 x 1 mm
Setting distance		0 to 12,15 mm		0 to 24,3 mm
Switching frequency		20 Hz		
Sensing object		Ferrous metals		
Differential travel		15% max. of sensing distance Sn		
Operating voltage		20 to 253 VAC		
Off-state current		2,5 mA max.	1,9 mA max.	
Control output	Type	AC - NO or NC		
	Load	500 mA max.		
		10 mA min.	8 mA min.	
	On-stage voltage drop	12 VAC max. (at 500 mA load current)		
Circuit protection		---		
Alternating magnetic field		100 mT	---	
Indicator		Operating indicator (yellow LED), operating voltage (green LED)		
Ambient temperature		Operating: -25° to 70°C		
Ambient humidity		35 to 95% RH		
Influence of temperature		± 10% max. of Sn at 23° in temperature range of -25° to 70°C		
Dielectric strength		1.500 VAC / 2500 VAC (E2Q2-...-H), 50/60 Hz for 1 min. between current carry parts and case		
Electromagnetic compatibility EMC		EN 60947-5-2		
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6		
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27		
Protection degree		IEC 60529 IP 67		
Connection	Terminals	Up to 2,5 mm²		
Material	Case Terminal base	PBT Al PBT (...-H type)		
	Sensing face	PBT		
Approvals		CSA CERTIFIED	UL LISTED	

Output Circuit Diagram

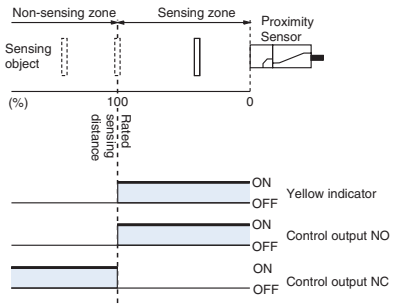
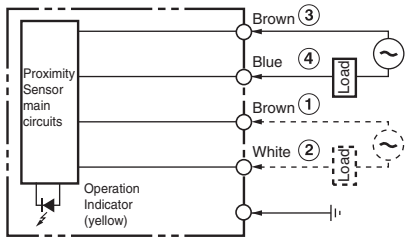
NPN output

Model	Operation mode	Timing chart	Output circuit
E2Q2-N20E1-H	NO		
E2Q2-N20E3-□ E2Q2-N30ME3-□ E2Q2-N40ME3-□	NO + NC		

PNP output

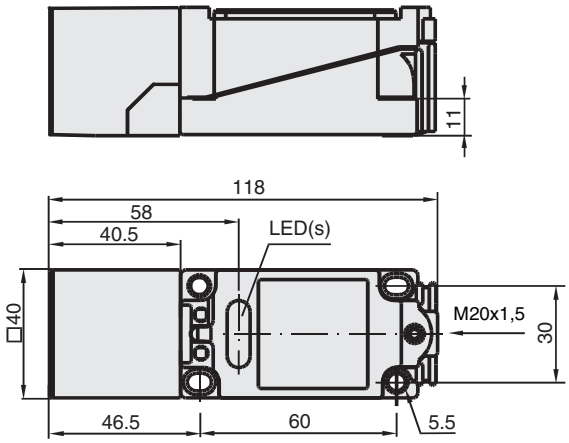
Model	Operation mode	Timing chart	Output circuit
E2Q2-N20F1-H E2Q2-N15F1-51	NO		
E2Q2-N20F3-□ E2Q2-N30MF3-□ E2Q2-N40ME3-□	NO + NC		

AC output

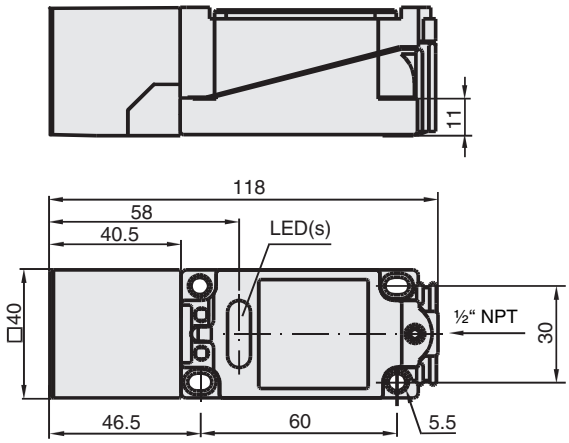
Model	Operation mode	Timing chart	Output circuit
E2Q2-N15Y4-51	NO or NC		 Note: Only one load allowed!

Dimensions (Unit: mm)

E2Q2-...-H type

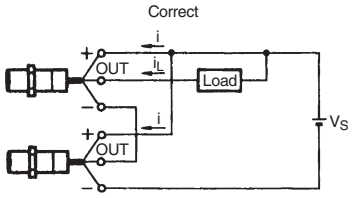
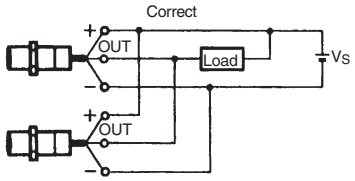


E2Q2-...-U and -51 type

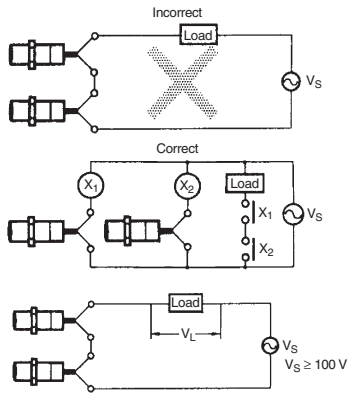
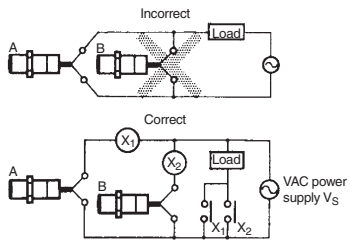


Connection

DC type

Connection type	Method	Description
AND (serial connection)		The Sensors connected together must satisfy the following conditions: $i_L + (N-1) \times i \leq$ Upper-limit of control output of each Sensor $V_S - N \times V_R \geq$ Load operating voltage N = No. of Sensors V_R = Residual voltage of each Sensor V_S = Supply voltage i = Current consumption of the Sensor i_L = Load current If the MY Relay, which operate at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to the load.
OR (parallel connection)		A minimum of three Sensors with current outputs can be connected in parallel. The number of Sensors connected in parallel varies with the Proximity Sensor model.

AC type

Connection type	Method	Description
AND (serial connection)		If 100 or 200 VAC is imposed on the Proximity Sensors, V_L (i.e., the voltage imposed on the load) will be obtained from the following. $V_L = V_S$ - (residual voltage x no. of Proximity Sensors) (V) Therefore, if V_L is lower than the load operating voltage, the load will not operate. A maximum of three Proximity Sensors can be connected in series provided that the supply voltage is 100 V minimum.
OR (parallel connection)		In principle, more than two Proximity Sensors cannot be connected in parallel. Provided that Proximity Sensor A does not operate with Proximity Sensor B simultaneously and there is no need to keep the load operating continuously, the Proximity Sensors can be connected in parallel. In this case, however, due to the total leakage current of the Proximity Sensors, the load may not reset properly. It is not possible to keep the load operating continuously with Proximity Sensors A and B in simultaneous operation to sense sensing objects due to the following reason. When Proximity Sensor A is ON, the voltage imposed on Proximity Sensor A will drop to approximately 10 V and the load current flows into Proximity Sensor A, and when one of the sensing objects is close to Proximity Sensor B, Proximity Sensor B will not operate because the voltage imposed on Proximity Sensor B is 10 V, which is too low. When Proximity Sensor A is OFF, the voltage imposed on Proximity Sensor B will reach the supply voltage and Proximity Sensor B will be ON. Then, Proximity Sensor A as well as Proximity Sensor B will be OFF for approximately 10 ms, which resets the load for an instant. To prevent the instantaneous resetting of the load, use a relay as shown on the left.

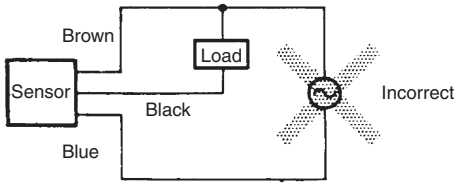
Precautions

⚠ Caution

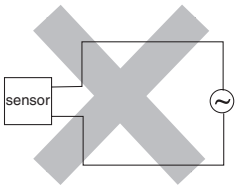
Power supply

Do not impose an excessive voltage on the E2Q2, otherwise it may explode or burn.

Do not connect an AC power supply to any DC model. If AC power (100 VAC or more) is supplied to the sensor, it may explode or burn.



Do not connect the AC types without load to the power supply. The sensor will be damaged.



Be sure to abide by the following precautions for the safe operation of the Sensor.

Wiring

Power Supply Voltage and Output Load Power Supply Voltage

Make sure that the power supply to the Sensor is within the rated voltage range. If a voltage exceeding the rated voltage range is supplied to the Sensor, it may explode or burn.

Load Short-circuiting

Do not short-circuit the load, otherwise the Sensor may be damaged.

Connection without Load

Do not connect the power supply to the Sensor with no load connected, otherwise the internal elements may explode or burn.

Operating Environment

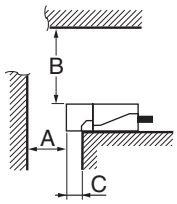
Do not use the Sensor in locations with explosive or flammable gas.

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

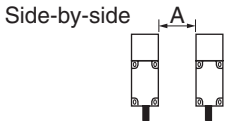


Effects of Surrounding Metal (Unit: mm)

Model Length	A	B	C
E2Q2-N15□□-□□ E2Q2-N20□□-□	45	0	0
E2Q2-N30M□□-□	90	250	30
E2Q2-N40M□□-□	120	300	40

Mutual Interference

If more than one Sensor is located in parallel, ensure to maintain enough space between adjacent Sensors to suppress mutual interference as provided in the following diagram.



Mutual Interference (Unit: mm)

Model Length	A
E2Q2-N15□□-□□ E2Q2-N20□□-□	40
E2Q2-N30M□□-□	120
E2Q2-N40M□□-□	150

Power Reset Time

The Sensor is ready to operate within 300 ms after the Sensor is turned ON. If the load and Sensor are connected to independent power supplies respectively, be sure to turn ON the Sensor before supplying power to the load.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Sensing Object

The sensing distance of the Proximity Sensor vary with the metal coating on sensing objects.

Wiring

High-tension cables

Wiring through Metal Conduit:

If there is power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunction.

Mounting

Mounting the Sensor

The Proximity Sensor must be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Maintenance and Inspection

Periodically perform the following checks to ensure stable operation of the Proximity Sensor over a long period of time.

- Check for mounting position, dislocation, looseness or distortion of the Proximity Sensor and sensing objects.
- Check for loose wiring and connections, improper contacts and line breakage.
- Check for attachment or accumulation of metal powder or dust.
- Check for abnormal temperature conditions and other environmental conditions.

Never disassemble or repair the Sensor.

Environment

Water Resistivity

Do not use the Proximity Sensor underwater, outdoors or in the rain.

Operating Environment

Be sure to use the Proximity Sensor within its operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistive, a cover to protect the Proximity Sensor from water or water-soluble machining oil is recommended so that its reliability and life expectancy can be maintained.

Do not use the Proximity Sensor in an environment with chemical gas (e.g., strong alkaline or acid gasses including nitric, chromic and concentrated sulfuric acid gases).

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor, in this case connect the load to the Proximity Sensor through a Relay

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D01E-EN-02

In the interest of product improvement, specifications are subject to change without notice.

Long Distance Square Inductive Proximity Sensor

E2Q4

Square Proximity Sensor

- Slim, compact size
- M12 Plug-in connection
- Integrated short circuit and reverse polarity protection
- Active face positioning: Y-axis 15°, X-axis 90° incremets

Ordering Information

DC type

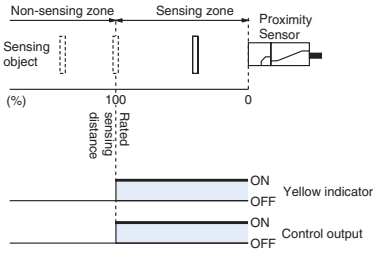
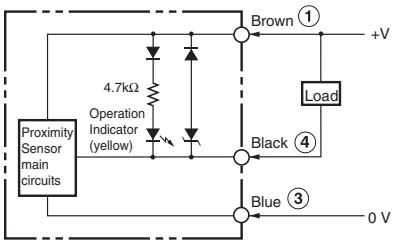
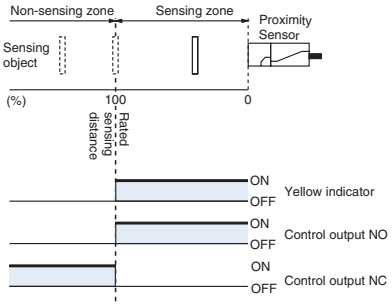
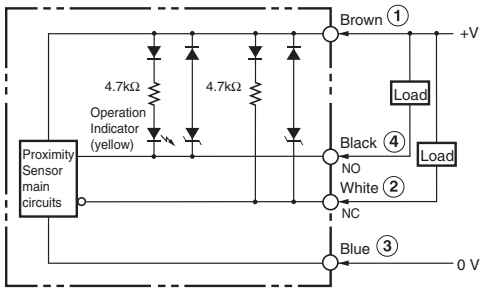
Sensing distance	Connection	Active face		Output	
				NO	NO + NC
20 mm shielded	Plug-in connector	Changable	NPN	E2Q4-N20E1-M1	E2Q4-N20E3-M1
			PNP	E2Q4-N20F1-M1	E2Q4-N20F3-M1
30 mm non-shielded			NPN	E2Q4-N30ME1-M1	E2Q4-N30ME3-M1
			PNP	E2Q4-N30MF1-M1	E2Q4-N30MF3-M1
40 mm non-shielded			NPN		E2Q4-N40ME3-M1
			PNP		E2Q4-N40MF3-M1

Rating/performance

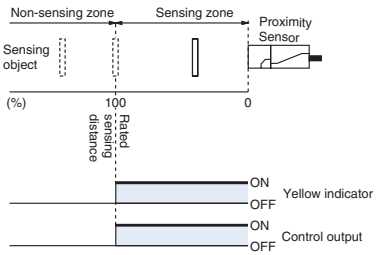
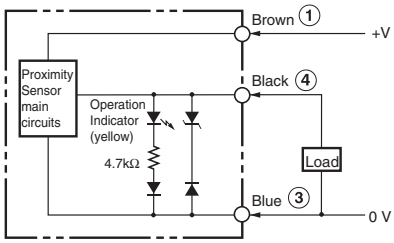
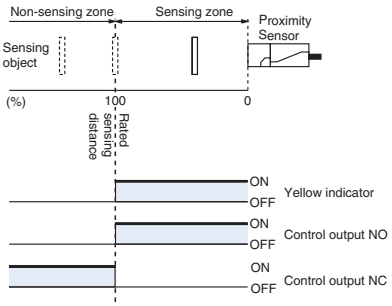
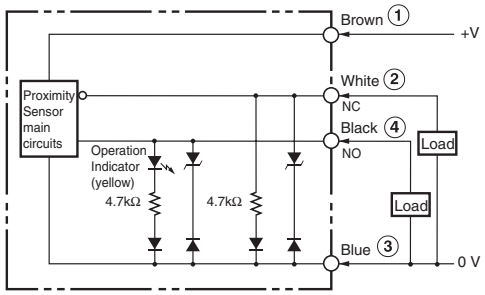
Item	Model	shielded	non-shielded	
		E2Q4-N20□□-M1	E2Q4-N30M□□-M1	E2Q4-N40M□3-M1
Sensing distance Sn		20 mm ± 10%	30 mm ± 10%	40 mm ± 10%
Standard target size, L x W x H, Fe 37		60 x 60 x 1 mm	90 x 90 x 1 mm	120 x 120 x 1 mm
Setting distance		0 to 16,2 mm	0 to 24,3 mm	0 to 32,4 mm
Switching frequency		150 Hz		
Sensing object		Ferrous metals		
Differential travel		15% max. of sensing distance Sn		
Operating voltage		10 to 30 VDC		
Current consumption		20 mA max.		
Control output	Type	E2Q4-N□□□E1-□□: NPN - NO E2Q4-N□□□E3-□□: NPN - NO + NC E2Q4-N□□□F1-□□: PNP - NO E2Q4-N□□□F3-□□: PNP - NO + NC		
	Load	200 mA max.		
	On-stage voltage drop	3 VDC max. (at 200 mA load current)		
Circuit protection		Reverse polarity, output short circuit		
Indicator		Operating indicator (yellow LED), operating voltage (green LED)		
Ambient temperature		Operating: -25° to 70°C		
Ambient humidity		35 to 95% RH		
Influence of temperature		± 10% max. of Sn at 23° in temperature range of -25° to 70°C		
Dielectric strength		1.500 VAC, 50/60 Hz for 1 min. between current carry parts and case		
Electromagnetic compatibility EMC		EN 60947-5-2		
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6		
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27		
Protection degree		IEC 60529 IP 67		
Connection	Connector	M12 plug, 4 pins		
Material	Case	PBT		
	Sensing face	PBT		
Approvals		CSA CERTIFIED UL LISTED		

Output Circuit Diagramm

NPN output

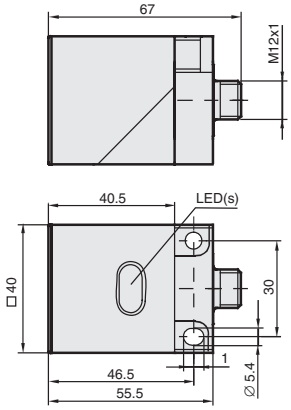
Model	Operation mode	Timing chart	Output circuit
E2Q4-N20E1-M1 E2Q4-N30ME1-M1	NO		 Connector Pin Arrangement  Note: Terminal 2 is not used
E2Q4-N20E3-M1 E2Q4-N30ME3-M1 E2Q4-N40ME3-M1	NO + NC		 Connector Pin Arrangement 

PNP output

Model	Operation mode	Timing chart	Output circuit
E2Q4-N20F1-M1 E2Q4-N30MF1-M1	NO		 Connector Pin Arrangement  Note: Terminal 2 is not used
E2Q4-N20F3-M1 E2Q4-N30MF3-M1 E2Q4-N40MF3-M1	NO + NC		 Connector Pin Arrangement 

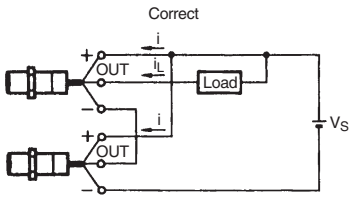
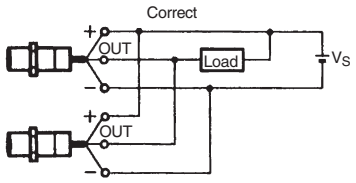
Dimensions (Unit:mm)

E2Q4-...-M1 type



Connection

DC type

Connection type	Method	Description
AND (serial connection)		The Sensors connected together must satisfy the following conditions: $i_L + (N-1) \times i \leq$ Upper-limit of control output of each Sensor $V_S - N \times V_R \geq$ Load operating voltage N = No. of Sensors V_R = Residual voltage of each Sensor V_S = Supply voltage i = Current consumption of the Sensor i_L = Load current If the MY Relay, which operate at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to the load.
OR (parallel connection)		A minimum of three Sensors with current outputs can be connected in parallel. The number of Sensors connected in parallel varies with the Proximity Sensor model.

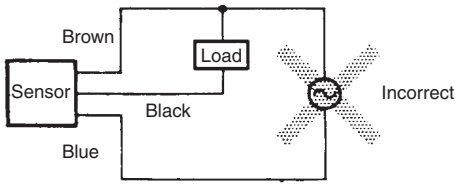
Precautions

⚠ Caution

Power supply

Do not impose an exessive voltage on the E2Q2, otherwise it may explode or burn.

Do not connect an AC power supply to any DC model. If AC power (100 VAC or more) is supplied to the sensor, it may explode or burn.



Be sure to abide by the following precautions for the safe operation of the Sensor.

Wiring

Power Supply Voltage and Output Load Power Supply Voltage

Make sure that the power supply to the Sensor is within the rated voltage range. If a voltage exceeding the rated voltage range is supplied to the Sensor, it may explode or burn.

Load Short-circuiting

Do not short-circuit the load, otherwise the Sensor may be damaged.

Connection without Load

Do not connect the power supply to the Sensor with no load connected, otherwise the internal elements may explode or burn.

Operating Environment

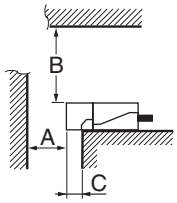
Do not use the Sensor in locations with explosive or flammable gas.

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

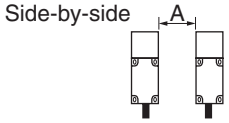


Effects of Surrounding Metal (Unit: mm)

Model Length	A	B	C
E2Q4-N20□□-M1	45	0	0
E2Q4-N30M□□-M1	90	250	30
E2Q4-N40M□□-M1	120	300	40

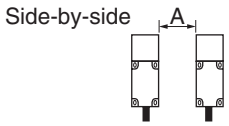
Mutual Interference

If more than one Sensor is located in parallel, ensure to maintain enough space between adjacent Sensors to suppress mutual interference as provided in the following diagram.



Mutual Interference (Unit: mm)

Model Length	A
E2Q4-N20□□-M1	40
E2Q4-N30M□□-M1	120



Mutual Interference (Unit: mm)

Model Length	A
E2Q4-N40M□□-M1	150

Power Reset Time

The Sensor is ready to operate within 300 ms after the Sensor is turned ON. If the load and Sensor are connected to independent power supplies respectively, be sure to turn ON the Sensor before supplying power to the load.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Sensing Object

The sensing distance of the Proximity Sensor vary with the metal coating on sensing objects.

Wiring

High-tension cables

Wiring through Metal Conduit:

If there is power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunction.

Mounting

Mounting the Sensor

The Proximity Sensor must be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Maintenance and Inspection

Periodically perform the following checks to ensure stable operation of the Proximity Sensor over a long period of time.

- Check for mounting position, dislocation, looseness or distortion of the Proximity Sensor and sensing objects.
- Check for loose wiring and connections, improper contacts and line breakage.
- Check for attachment or accumulation of metal powder or dust.
- Check for abnormal temperature conditions and other environmental conditions.

Never disassemble or repair the Sensor.

Environment

Water Resistivity

Do not use the Proximity Sensor underwater, outdoors or in the rain.

Operating Environment

Be sure to use the Proximity Sensor within its operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistive, a cover to protect the Proximity Sensor from water or water-soluble machining oil is recommended so that its reliability and life expectancy can be maintained.

Do not use the Proximity Sensor in an environment with chemical gas (e.g., strong alkaline or acid gasses including nitric, chromic and concentrated sulfuric acid gases).

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Snesor, in this case connect the load to the Proximity Sensor through a Relay

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D02E-EN-01A In the interest of product improvement, specifications are subject to change without notice.

High Precision Positioning Inductive Proximity Sensor

E2C-EDA

- 1 µm resolution
- Precision distance teaching

Ordering Information

Sensors

Sensor Heads

Type	Appearance		Sensing distance	Repeat accuracy	Model
Shielded	Cylindrical 	3 dia. × 18 mm	0.6 mm	1 µm	E2C-EDR6-F (See note 2.)
		5.4 dia. × 18 mm	1 mm	1 µm	E2C-ED01-□ (See notes 1, 2, and 3.)
		8 dia. × 22 mm	2 mm	2 µm	E2C-ED02-□ (See notes 1, 2, and 3.)
	Screw 	M10 × 22 mm	2 mm	2 µm	E2C-EM02-□ (See notes 1, 2, and 3.)
	Flat 	30 × 14 × 4.8 mm	5 mm	2 µm	E2C-EV05-□ (See notes 1, 2, and 3.)
Unshielded	Screw 	M18 × 46.3 mm	7 mm	5 µm	E2C-EM07M-□ (See notes 1, 2, and 3.)
Heat-resistant	Screw 	M12 × 22 mm	2 mm	2 µm	E2C-EM02H (See note 2.)

Note 1. A Protective Spiral Tube is provided with models ending in the suffix -S. (example: E2C-ED01-S).

2. Two cable lengths are available. (3-dia.: free-cut type, Heat-resistant type: standard-length only).
Overall length of the standard-length type: 2.5 m, Length from the Sensor Head to the Preamplifier: 2.0 m (Example: E2C-ED01)
Overall length of the free-cut type: 3.5 m, Length from the Sensor Head to the Preamplifier: 0.5 m for models ending in the suffix -F (example: E2C-ED01F).

3. Models ending in the suffix -S that come with Protective Spiral Tubes and free-cut models ending in the suffix -F are made-to-order products.

Amplifier Units

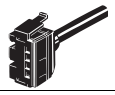
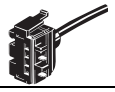
Amplifier Units with Cables

Item		Appearance	Functions	Model	
				NPN output	PNP output
Advanced models	Twin-output models		Area output, open circuit detection, differential operation	E2C-EDA11	E2C-EDA41
	External-input models		Remote setting, differential operation	E2C-EDA21	E2C-EDA51

Amplifier Units with Connectors

Item		Appearance	Functions	Model	
				NPN output	PNP output
Advanced models	Twin-output models		Area output, open circuit detection, differential operation	E2C-EDA6	E2C-EDA8
	External-input models		Remote setting, differential operation	E2C-EDA7	E2C-EDA9

Amplifier Unit Connectors (Order Separately)

Item	Appearance	Cable length	No. of conductors	Model
Master Connector		2 m	4	E3X-CN21
Slave Connector			2	E3X-CN22

Connector Ordering Precaution

Amplifier Units and Connectors are sold separately.

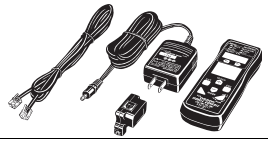
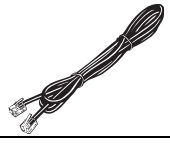
Refer to the following tables when placing an order.

Amplifier Unit				Applicable Connector (Order Separately)	
Model	NPN output	PNP output		Master Connector	Slave Connector
Advanced models	E2C-EDA6	E2C-EDA8	+	E3X-CN21	E3X-CN22
	E2C-EDA7	E2C-EDA9			

When Using 5 Amplifier Units

Amplifier Units (5 Units)		1 Master Connector	4 Slave Connectors
	+		

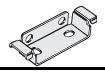
Mobile Console (Order Separately)

Appearance	Model	Remarks
	E3X-MC11-SV2 (model number of set)	Mobile Console with Head, Cable, and AC adapter provided as accessories
	E3X-MC11-C1-SV2	Mobile Console
	E3X-MC11-H1	Head
	E39-Z12-1	Cable (1.5 m)

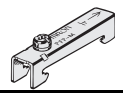
Note: Use the E3X-MC11-SV2 Mobile Console with E2C-EDA-series Amplifier Units. If you use a Mobile Console like the E3X-MC11-S, some functions may not operate.

Accessories (Order Separately)

Mounting Bracket

Appearance	Model	Quantity
	E39-L143	1

End Plate

Appearance	Model	Quantity
	PFP-M	1

Specifications

Sensor Heads

Item \ Model			E2C-EDR6-F	E2C-ED01(-□)	E2C-ED02(-□)	E2C-EM02-□)	E2C-EM07(-□)	E2C-EV05(-□)	E2C-EM02H
			3 dia. × 18 mm	5.4 dia. × 18 mm	8 dia. × 22 mm	M10 × 22 mm	M18 × 46.3 mm	30 × 14 × 4.8 mm	M12 × 22 mm
Sensing distance			0.6 mm	1 mm	2 mm		7 mm	5 mm	2 mm
Sensing object			Magnetic metal (The sensing distance will decrease when sensing non-magnetic metal. Refer to *Engineering Data* on 87.)						
Standard sensing object			5 × 5 × 3 mm		10 × 10 × 3 mm		22 × 22 × 3 mm	15 × 15 × 3 mm	20 × 20 × 3 mm
			Material: iron (S50C)						
Repeat accuracy (See note 1.)			1 µm		2 µm		5 µm	2 µm	
Hysteresis distance			Variable						
Temperature characteristic (See note 1.)	Sensor Head		0.3%/°C	0.08%/°C				0.04%/°C	0.2%/°C
	Preamplifier and Amplifier		0.08%/°C						
Ambient temperature (See note 2.)	Operating		–10°C to 60°C (with no icing or condensation)						–10°C to 200°C (See note 3.)
	Storage		–10°C to 60°C (with no icing or condensation)	–20°C to 70°C (with no icing or condensation)					
Ambient humidity			Operating/storage: 35% to 85% (with no condensation)						
Insulation resistance			50 MΩ min. (at 500 VDC)						
Dielectric strength			1,000 VAC at 50/60 Hz for 1 min between current carry 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: 500 m/s² for 3 times each in X, Y, and Z directions						
Degree of protection			IEC60529 IP67						IEC60529 IP60 (See note 4.)
Connection method			Connector (standard cable length: 2.5 m (2 m between Head and Preamplifier) “-F” model cable length: 3.5 m (0.5 m between Head and Preamplifier)						
Weight (packed state)			Approx. 120 g (Models with protective spiral tube (“-S” models) are approx. 90 g heavier.)						
Material	Sensor Head	Case	Brass	Stainless steel	Brass			Zinc	Brass
		Sensing surface	Heat-resistant ABS						PEEK
		Clamping nut	---			Nickel-plated brass		---	Nickel-plated brass
		Toothed washer	---			Zinc-plated iron		---	Zinc-plated iron
	Preamplifier		PES						
Accessories			Preamplifer Mounting Brackets, Instruction Manual						

Note 1. The repeat accuracy and temperature characteristic are for a standard sensing object positioned midway through the rated sensing distance.

2. A sudden temperature rise even within the rated temperature range may degrade characteristics.

3. For the Sensor Head only without the preamplifier (10 to 60°C). With no icing or condensation.

4. Do not operate in areas exposed to water vapor because the enclosure is not waterproof.

Amplifier Units

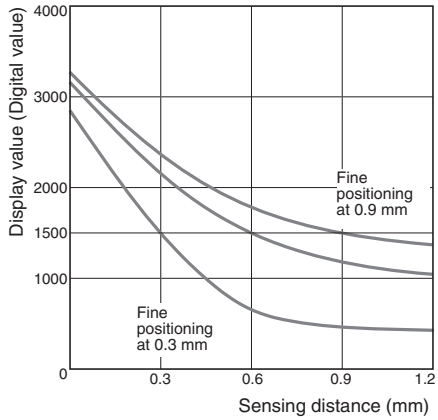
Item \ Model	Type	Advanced Models with Twin Outputs		Advanced Models with External Inputs	
	NPN output	E2C-EDA11	E2C-EDA6	E2C-EDA21	E2C-EDA7
	PNP output	E2C-EDA41	E2C-EDA8	E2C-EDA51	E2C-EDA9
Supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.			
Power consumption		1,080 mW max. (current consumption: 45 mA at power supply voltage of 24 VDC)			
Control output		Load power supply voltage: 26.4 VDC max.; NPN/PNP open collector output; load current: 50 mA max. (residual voltage: 1 V max.)			
Response time	Super-high-speed mode	150 μs for operation and reset respectively			
	High-speed mode	300 μs for operation and reset respectively			
	Standard mode	1 ms for operation and reset respectively			
	High-resolution mode	4 ms for operation and reset respectively			
Functions	Differential detection	Switchable between single edge and double edge detection mode Single edge: Can be set to 300 μs, 500 μs, 1 ms, 10 ms, or 100 ms Double edge: Can be set to 500 μs, 1 ms, 2 ms, 20 ms, or 200 ms.			
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)			
	Zero-reset	Negative values can be displayed. (Threshold is not shifted.)			
	Initial reset	Settings can be returned to defaults as required.			
	Mutual interference prevention	Possible for up to 5 Units. (See note.) Intermittent oscillation method (Response time = (number of Units connected + 1) × 15 ms)			
	Hysteresis settings	Setting range: 10 to 4,000			
	I/O settings	Output setting (Select from channel 2 output, area output, self-diagnosis, or open circuit detection.)		Input setting (Select from teaching, fine positioning, zero-reset, synchronous detection.)	
Digital display		Select from the following: Incident level + threshold, incident level percentage +threshold, incident light peak level + incident light bottom level (updated with output), long bar display, incident level + peak hold, incident level + channel			
Display orientation		Switching between normal/reversed display is possible.			
Ambient temperature		Operating: When connecting 1 to 2 Units: –10°C to 55°C When connecting 3 to 5 Units: –10°C to 50°C When connecting 6 to 16 Units: –10°C to 45°C When used in combination with an EDR6-F When connecting 3 to 4 Units: –10°C to 50°C When connecting 5 to 8 Units: –10°C to 45°C When connecting 9 to 16 Units: –10°C to 40°C Storage: –20°C to 70°C (with no icing)			
Ambient humidity		Operating/storage: 35% to 85% (with no condensation)			
Insulation resistance		20 MΩ min. (at 500 VDC)			
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min			
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: 500 m/s² for 3 times each in X, Y, and Z directions			
Degree of protection		IEC60529 IP50			
Connection method		Prewired	Connector	Prewired	Connector
Weight (packed state)		Approx. 100 g	Approx. 55 g	Approx. 100 g	Approx. 55 g
Material	Case	PBT (polybutylene terephthalate)			
	Cover	Polycarbonate			

Note: Communications are disabled if the detection mode is selected during super-high-speed sensing mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.

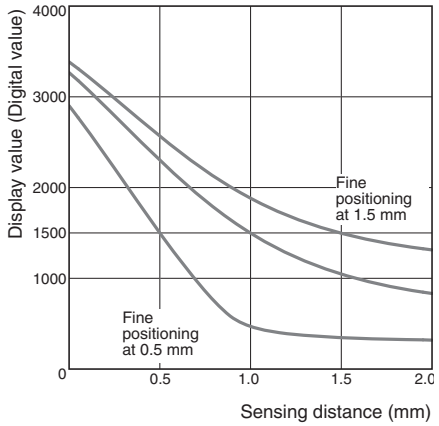
Engineering Data

Sensing Distance vs. Display Values

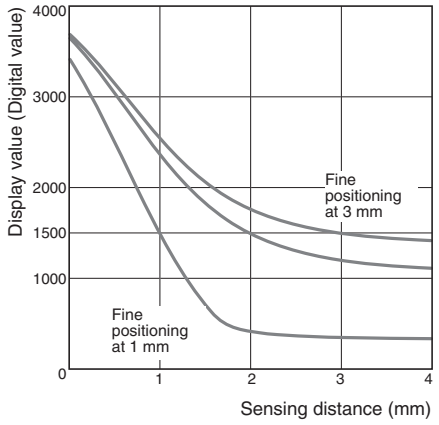
E2C-EDR6-F



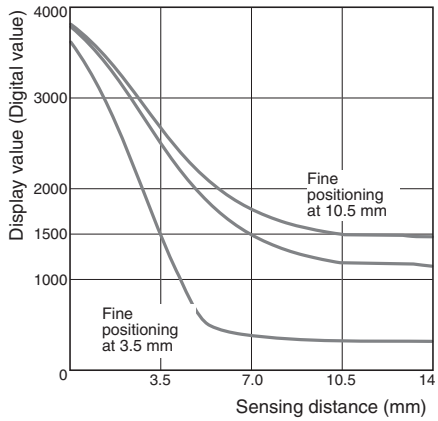
E2C-ED01(-□)



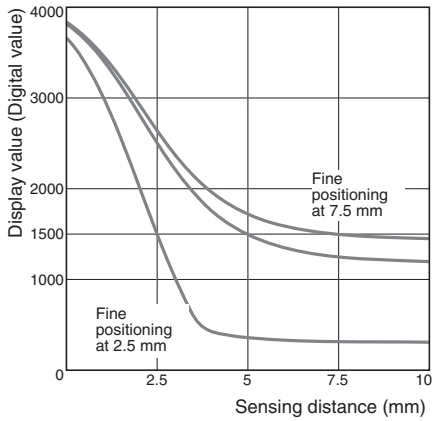
E2C-ED02(-□)/EM02(-□)



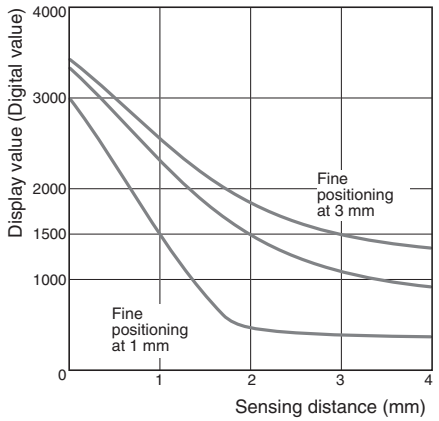
E2C-EM07(-□)



E2C-EV05(-□)

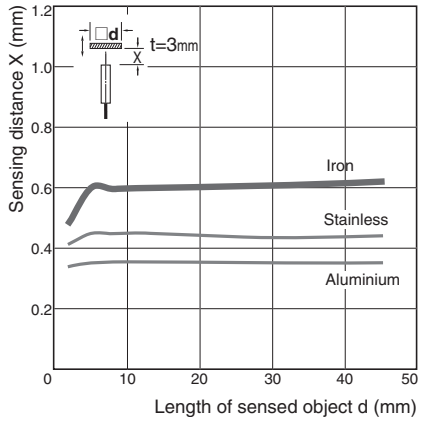


E2C-EM02H

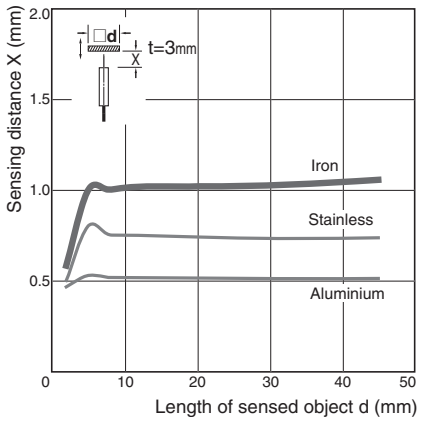


Influence of Sensing Object Size and Material

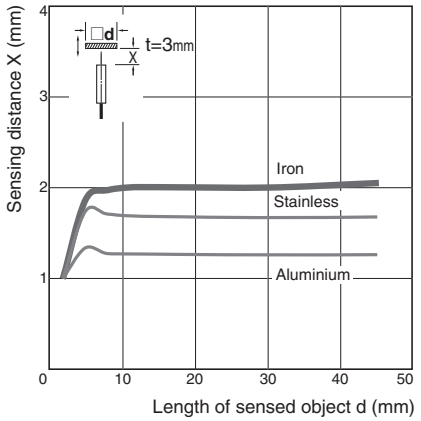
E2C-EDR6-F



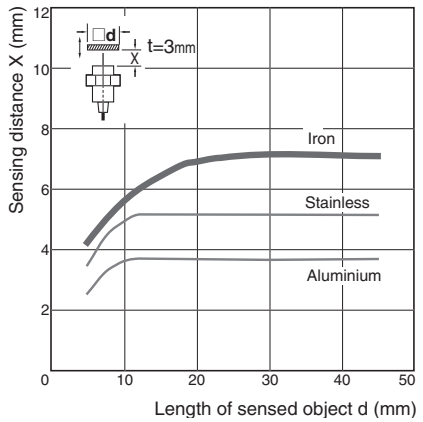
E2C-ED01(-□)



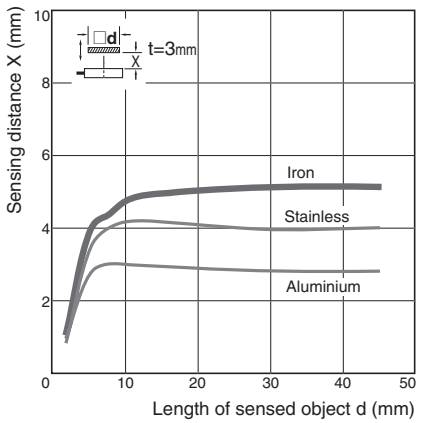
E2C-ED02(-□)/EM02(-□)



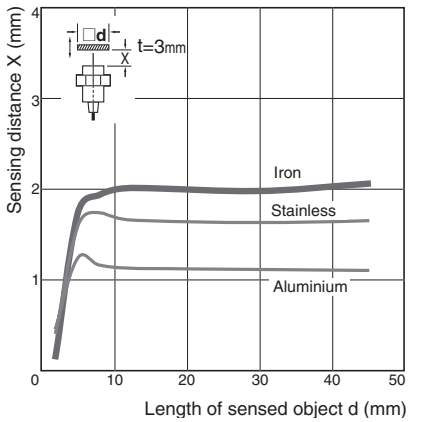
E2C-EM07(-□)



E2C-EV05(-□)

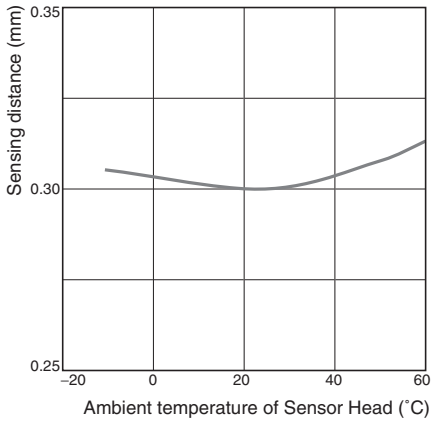


E2C-EM02H

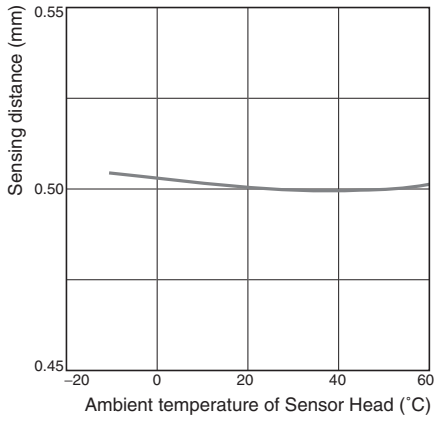


Influence of Sensor Head Temperature

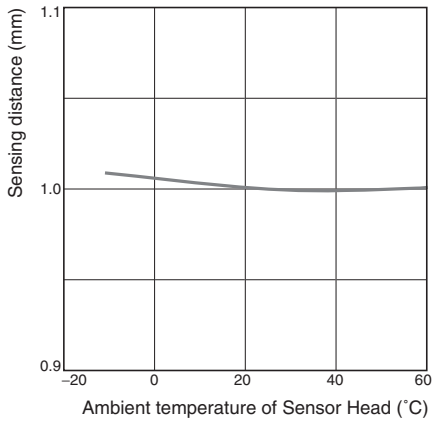
E2C-EDR6-F



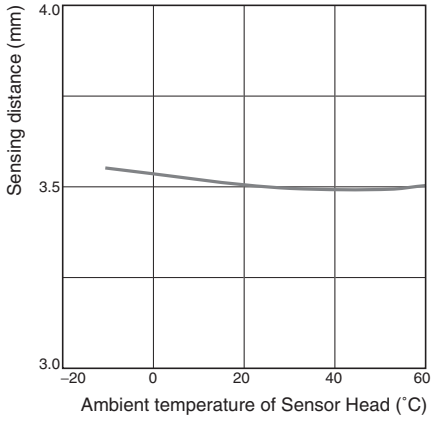
E2C-ED01(-□)



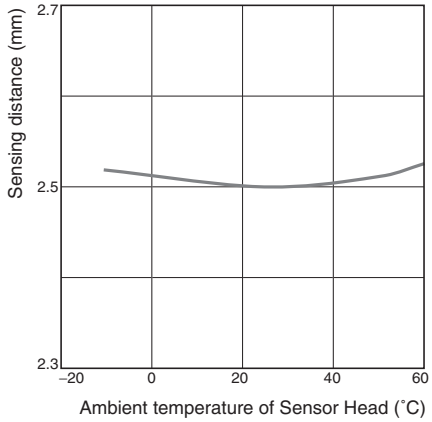
E2C-ED02(-□)/EM02(-□)



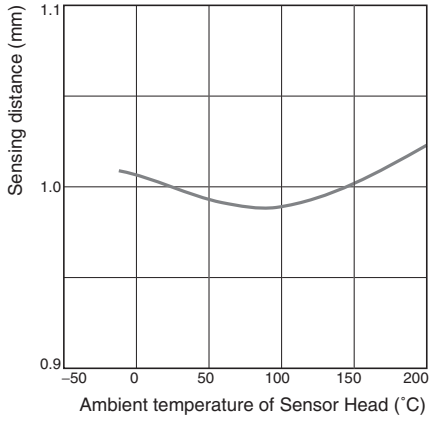
E2C-EM07(-□)



E2C-EV05(-□)

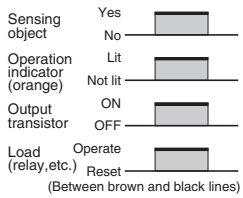
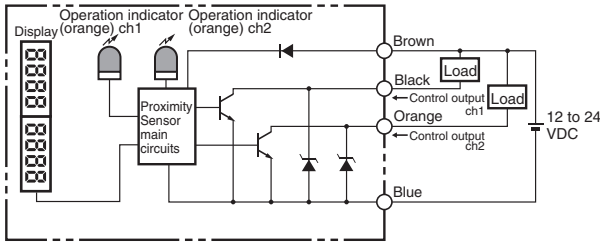
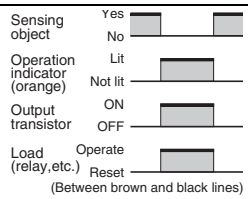
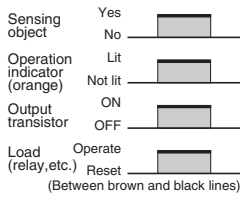
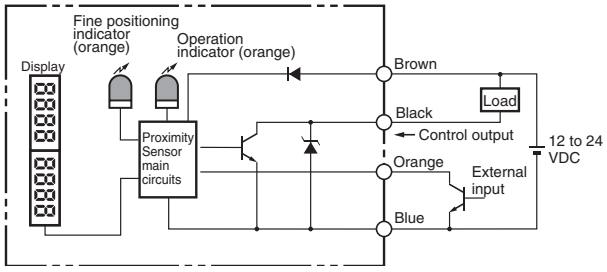
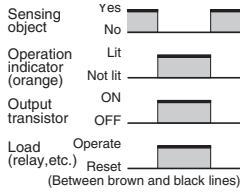


E2C-EM02H



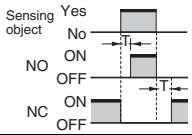
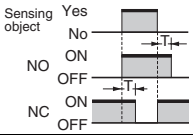
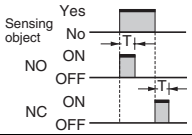
Operation

NPN Output

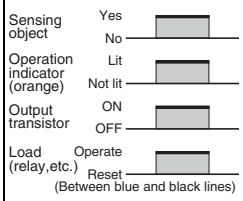
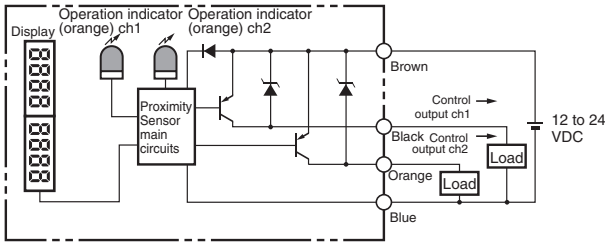
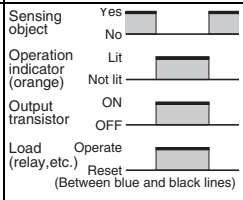
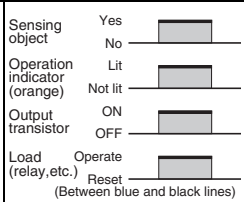
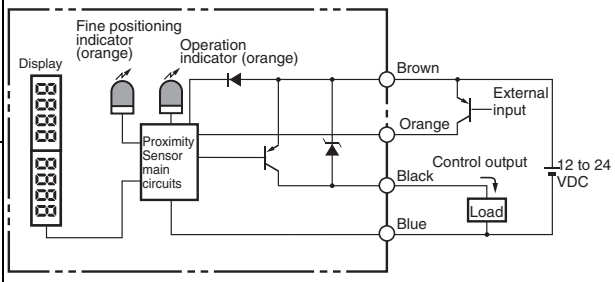
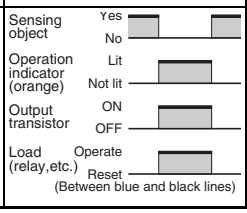
Model	Operation mode	Timing chart	Mode selector	Output circuit
E2C-EDA11 E2C-EDA6	NO (Normally open)		NO	
	NC (Normally closed)		NC	
E2C-EDA21 E2C-EDA7	NO (Normally open)		NO	
	NC (Normally closed)		NC	

Note 1. Setting Areas for Twin-output Models
Normally open: ON between the thresholds for Channel 1 and Channel 2
Normally closed: OFF between the thresholds for Channel 1 and Channel 2

2. Timing Charts for Timer Settings (T: Set Time)

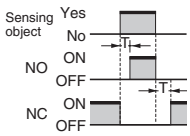
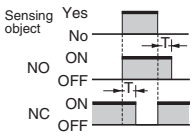
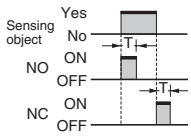
ON delay	OFF delay	One shot
		

PNP Output

Model	Operation mode	Timing chart	Mode selector	Output circuit
E2C-EDA41 E2C-EDA8	NO (Normally open)		NO	
	NC (Normally closed)		NC	
E2C-EDA51 E2C-EDA9	NO (Normally open)		NO	
	NC (Normally closed)		NC	

Note 1. Setting Areas for Twin-output Models
Normally open: ON between the thresholds for Channel 1 and Channel 2
Normally closed: OFF between the thresholds for Channel 1 and Channel 2

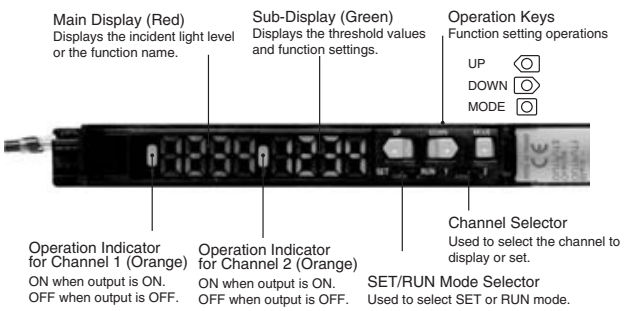
2. Timing Charts for Timer Settings (T: Set Time)

ON delay	OFF delay	One shot
		

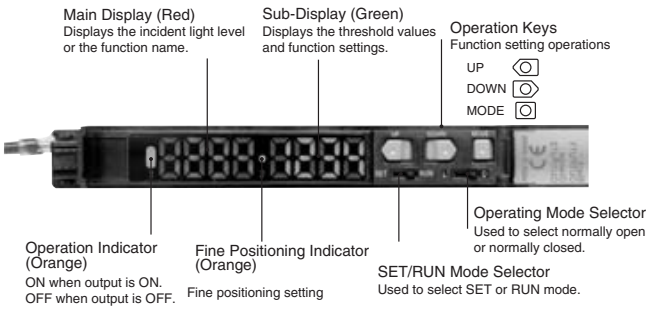
Nomenclature

Amplifier Units

Twin-output Models
(E2C-EDA11/EDA41/EDA6/EDA8)



External-input Models
(E2C-EDA21/EDA51/EDA7/EDA9)



Precautions

Do not use this product in any safety device used for the protection of human lives.

Precautions for Correct Use

Do not use this product in operating atmospheres or environments outside the specified ratings.

Amplifier Units

Design

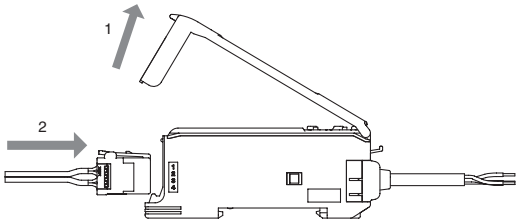
Power ON

The Sensor is ready to sense an object within 200 ms after turning the power ON. If the load and Sensor are connected to different power supplies, always turn ON the Sensor power first.

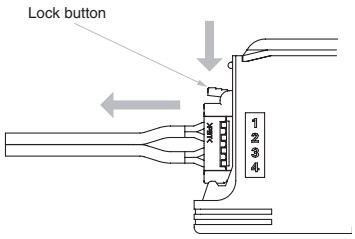
Connecting Sensor Heads

Connecting and Disconnecting Sensor Heads

1. Open the protective cover.
2. Making sure that the lock button is up, insert the fibers all the way to the back of the Connector insertion opening.

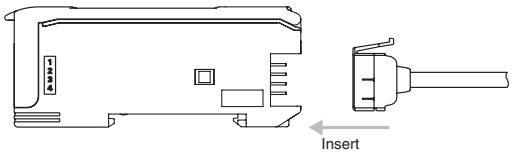


To disconnect the Sensor Head, pull out the fibers while pressing on the lock button.

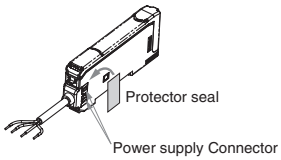


Connecting and Disconnecting Connectors
Connecting Connectors

1. Insert the Master or Slave Connector into the Amplifier Unit until it clicks into place.



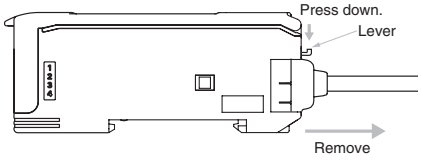
2. Apply the supplied seal to the non-connection surface of the Master/Slave Connector.



Note: Apply the seal to the grooved side.

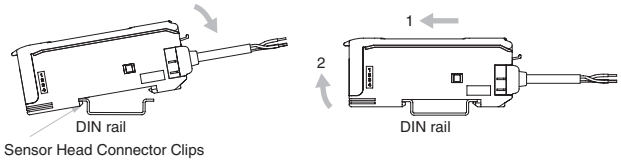
Disconnecting Connectors

1. Slide the Slave Amplifier Unit.
2. After the Amplifier Unit has been separated, press down on the lever on the Connector and remove it. (Do not attempt to remove Connectors without separating them from other Amplifier Units first.)

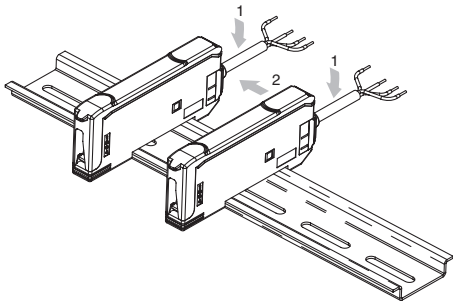


Installing and Removing Amplifier Units
Installing Amplifier Units

1. Install the Units one by one to the DIN rail.



2. Slide one Unit toward the other, match the clips at the front ends, and then bring them together until they “click.”



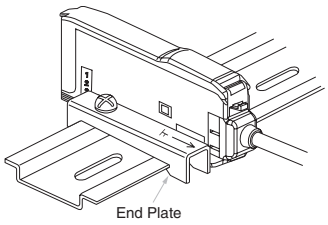
Removing Amplifier Units

Slide one Unit away from the other and remove them one by one. (Do not remove the connected Units together from the DIN rail.)

Note 1. When the Amplifier Units are connected to each other, the operable ambient temperature changes depending on the number of connected Amplifier Units. Check Specifications.
2. Before connecting or disconnecting the Units, always switch power OFF.

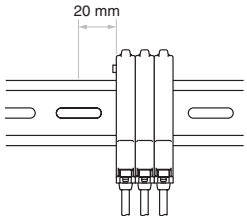
End Plate Mounting (PFP-M)

Mount End Plates on Amplifier Units to avoid movement due to vibration. When a Mobile Console is installed, mount the End Plate facing as shown in the following diagram.



Mounting a Communications Head for the Mobile Console

Leave a space of at least 20 mm on the left side of the Units for a Mobile Console Communications Head.



EEPROM Write Error

If the data is not written to the EEPROM correctly due to a power failure or static-electric noise, initialize the settings using the keys on the Amplifier Unit.

Optical Communications

When using more than one Amplifier Unit, mount the Units side-by-side. Do not slide or remove Units while they are in use.

Miscellaneous

Protective Cover

Be sure to put on the Protective Cover before use.

Mobile Console

Use the E3X-MC11-SV2 Mobile Console for E2C-EDA-series Amplifier Units. Other Mobile Consoles, such as the E3X-MC11, cannot be used.

Sensor Head and Amplifier Unit Connection

Be sure to use only specified Sensor Head and Amplifier Unit combinations. The E3C-LDA-series Photoelectric Sensor with Separate Digital Amplifier is not compatible, and the E2C-EDA must not be used with products from that series.

Warm-up

The digital display will slowly change until the circuits stabilize after the power is turned ON. It takes about 30 minutes after the power is turned ON before the E2C-EDA is ready to sense.

Maintenance Inspection

- Be sure to turn OFF the power before adjusting, connecting, or disconnecting the Sensor Head.
- Do not use thinner, benzene, acetone, or kerosene to clean the Sensor Head or Amplifier Unit.

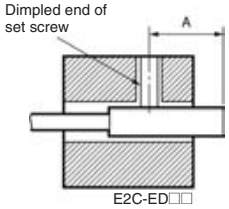
Sensor Heads

Mounting

Mounting Sensor Heads

- Use the dimensions from the following table to mount unthreaded cylindrical models (E2C-ED-□□). Do not tighten screws with torque exceeding 0.2 N·m when mounting Sensor Heads.

Model	Tightening range A
E2C-EDR6-F	9 to 18 mm
E2C-ED01□□	9 to 18 mm
E2C-ED02□□	11 to 12 mm



- Use the torque given in the following table to tighten threaded cylindrical models (E2C-EM□□).

Model	Tightening torque
E2C-EM02□□	15 N·m max.
E2C-EM07M□□	15 N·m max.
E2C-EM02H□□	5.9 N·m max.

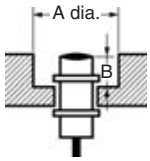
- Do not use torque exceeding 0.5 N·m to tighten screws when mounting flat models (E2C-EV□□).
- Use a bending radius of at least 8 mm for the Sensor Head cable.
- Use only the special extension cable to extend the cable between the Sensor Head and the Amplifier Unit. Consult your OMRON representative for details.

Effects of Surrounding Metal

- Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

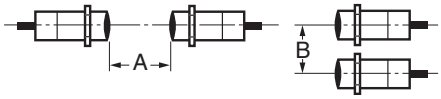
Effects of Surrounding Metal (Units: mm)

Model	Counterbore A	Protrusion B
E2C-EDR6-F	3.1	0
E2C-ED01□□	5.4	0
E2C-ED02□□	8	0
E2C-EM02□□	10	0
E2C-EM07M□□	35	20
E2C-EV05□□	14 × 30	4.8
E2C-EM02H□□	12	0



Mutual Interference

- If more than one Sensor Head is installed face to face or in parallel, make sure that the distances between two Units adjacent to each other are the same as or larger than the corresponding values shown in the following table.
- The distance between Sensor Heads may be narrower than specified with these Sensors because the Mutual Interference Prevention Function is used for optical communications between the Amplifier Units.



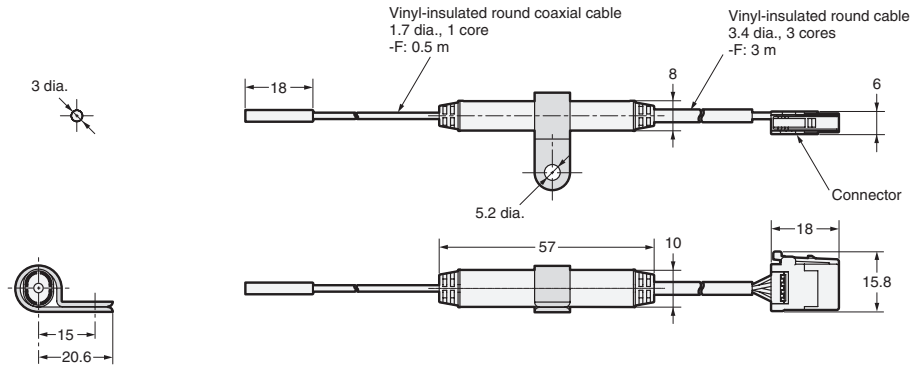
Mutual Interference (Units: mm)

Model	Face-to-face arrangement A	Parallel arrangement B	Face-to-face arrangement using the Mutual Interference Prevention Function A'	Parallel arrangement using the Mutual Interference Prevention Function B'
E2C-EDR6-F	14	10	3.5	3.1
E2C-ED01□□	45	20	9	5.4
E2C-ED02□□	35	30	21	8
E2C-EM02□□	36	30	21	10
E2C-EM07M□□	140	120	35	18
E2C-EV05□□	65	30	21	14
E2C-EM02H□□	45	30	21	12

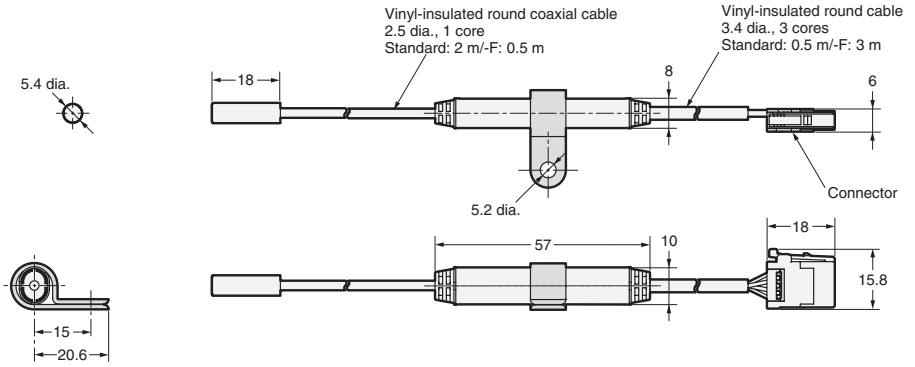
Dimensions

Sensors

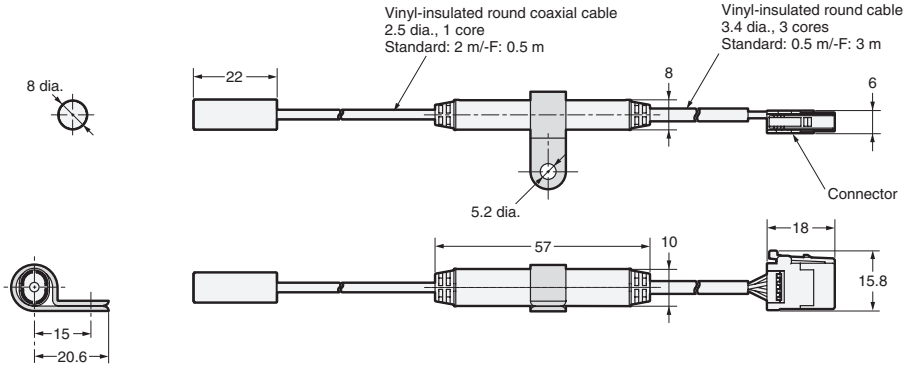
E2C-EDR6-F



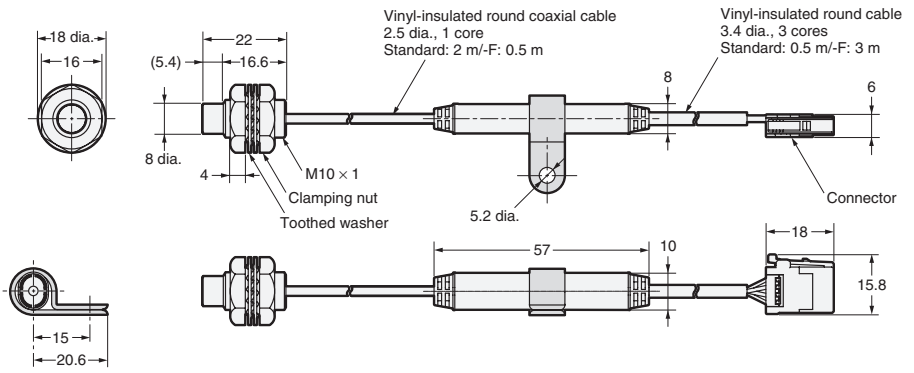
E2C-ED01(-F)



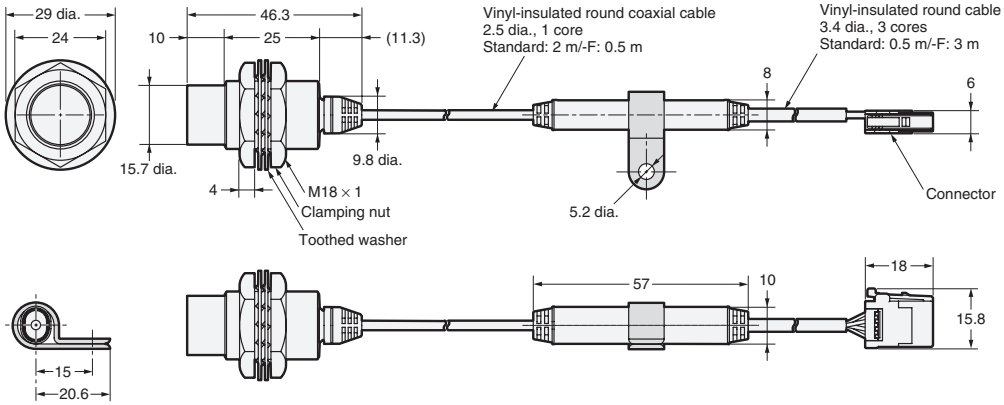
E2C-ED02(-F)



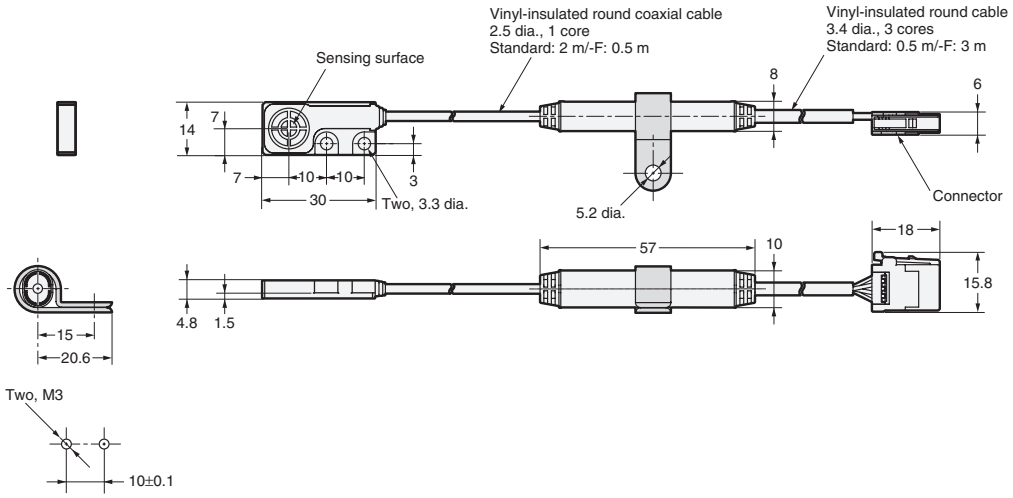
E2C-EM02(-F)



E2C-EM07M(-F)

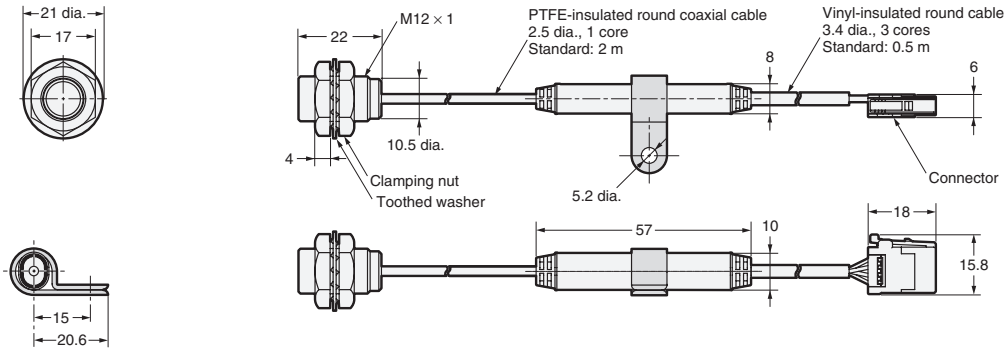


E2C-EV05(-F)



Mounting Holes

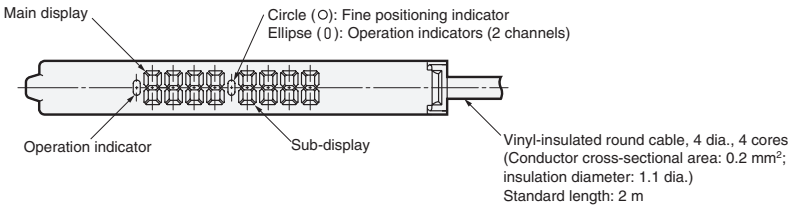
E2C-EM02H

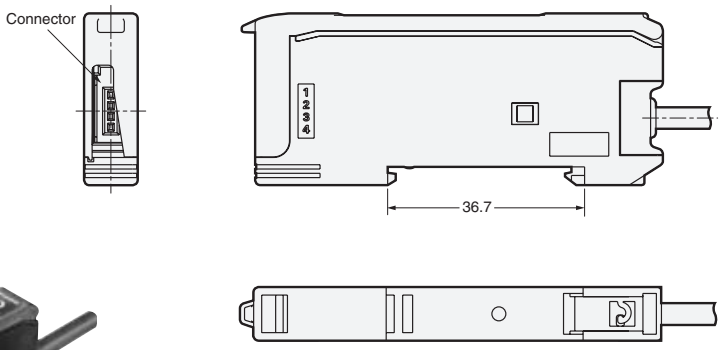


Amplifier Units

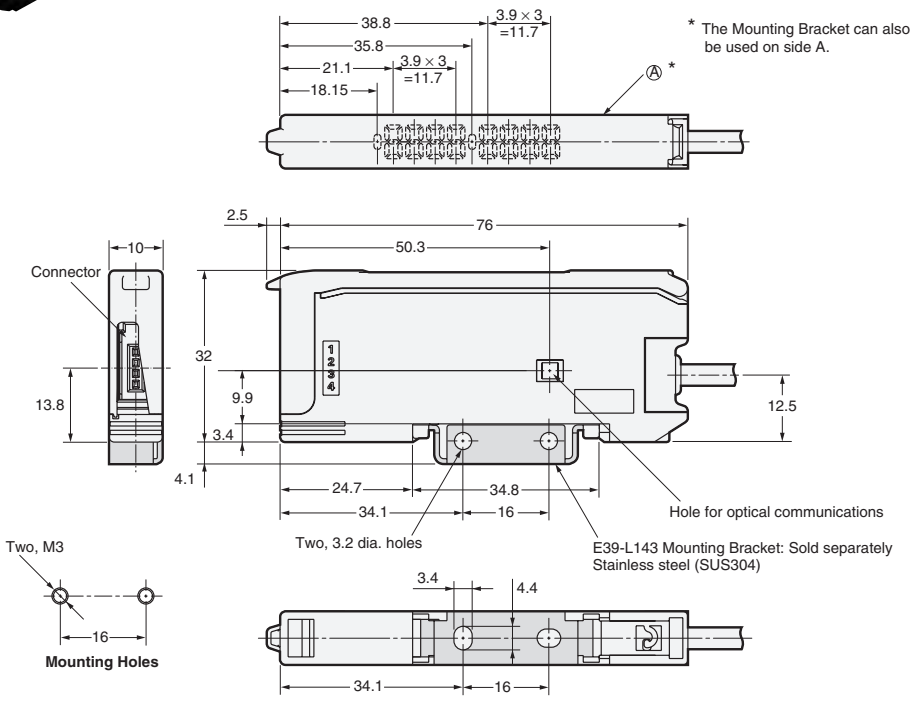
Amplifier Units with Cables

E2C-EDA11
E2C-EDA21
E2C-EDA41
E2C-EDA51



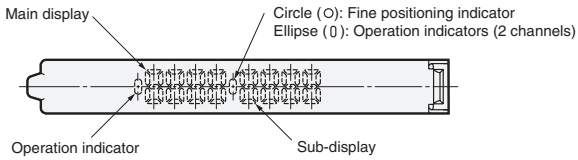


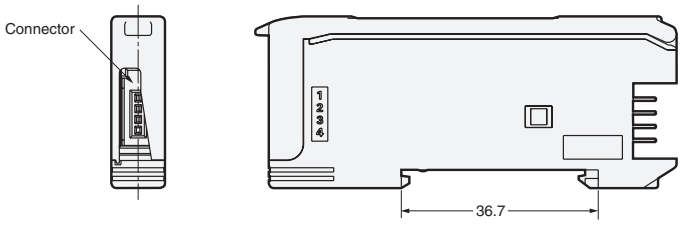
With Mounting Bracket Attached



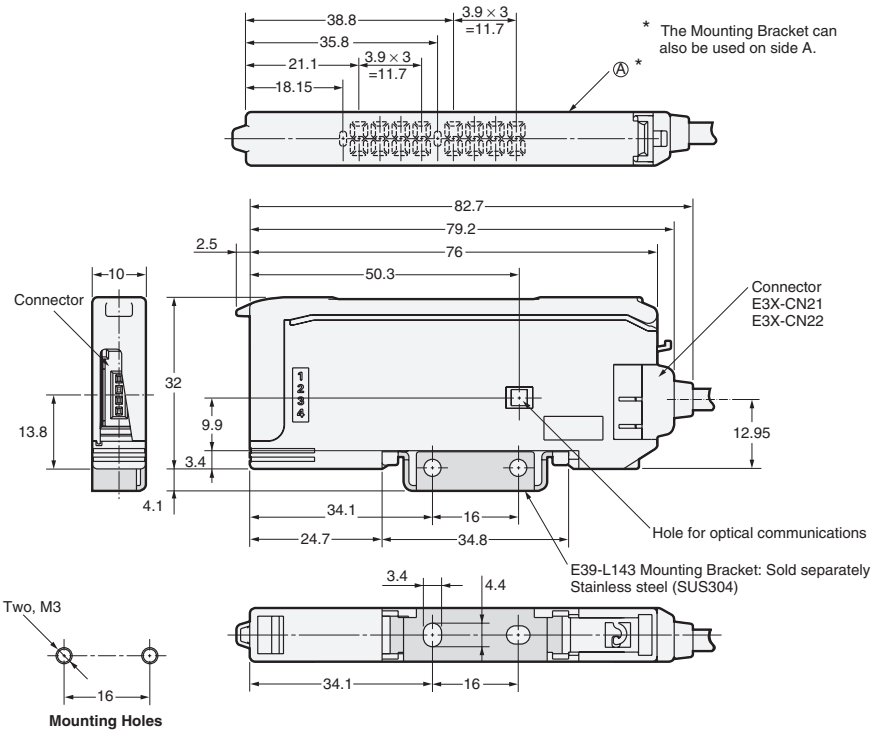
Amplifier Units with Connectors

E2C-EDA6
E2C-EDA7
E2C-EDA8
E2C-EDA9





With Mounting Bracket Attached



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D101-E2-01A-X In the interest of product improvement, specifications are subject to change without notice.

High Frequency Inductive Proximity Sensor

E2EL

Increased response frequency for high speed applications

- Max 5 kHz, switching frequency
- M8 or dia
- 6.5 mm housing
- Brass or stainless steel housing

CE

Ordering Information

Cable types

Brass housing

Diameter	Length	Mounting	Sensing Distance	Output			
				NPN / NO	NPN / NC	PNP / NO	PNP / NC
Ø 6,5	30 mm	Shielded	1,5 mm	E2EL-C1R5E1 2M	E2EL-C1R5E2 2M	E2EL-C1R5F1 2M	E2EL-C1R5F2 2M
	32 mm	Non-shielded	2,0 mm	E2EL-C2ME1 2M	E2EL-C2ME2 2M	E2EL-C2MF1 2M	E2EL-C2MF2 2M
	45 mm	Shielded	1,5 mm	E2EL-C1R5E1-L 2M	E2EL-C1R5E2-L 2M	E2EL-C1R5F1-L 2M	E2EL-C1R5F2-L 2M
	47 mm	Non-shielded	2,0 mm	E2EL-C2ME1-L 2M	E2EL-C2ME2-L 2M	E2EL-C2MF1-L 2M	E2EL-C2MF2-L 2M
M8	30 mm	Shielded	1,5 mm	E2EL-X1R5E1 2M	E2EL-X1R5E2 2M	E2EL-X1R5F1 2M	E2EL-X1R5F2 2M
	32 mm	Non-shielded	2,0 mm	E2EL-X2ME1 2M	E2EL-X2ME2 2M	E2EL-X2MF1 2M	E2EL-X2MF2 2M
	45 mm	Shielded	1,5 mm	E2EL-X1R5E1-L 2M	E2EL-X1R5E2-L 2M	E2EL-X1R5F1-L 2M	E2EL-X1R5F2-L 2M
	47 mm	Non-shielded	2,0 mm	E2EL-X2ME1-L 2M	E2EL-X2ME2-L 2M	E2EL-X2MF1-L 2M	E2EL-X2MF2-L 2M

Stainless steel housing

Diameter	Length	Mounting	Sensing Distance	Output			
				NPN / NO	NPN / NC	PNP / NO	PNP / NC
Ø 6,5	30 mm	Shielded	2,0 mm	E2EL-C2E1-DS 2M	E2EL-C2E2-DS 2M	E2EL-C2F1-DS 2M	E2EL-C2F2-DS 2M
	45 mm	Shielded	2,0 mm	E2EL-C2E1-DSL 2M	E2EL-C2E2-DSL 2M	E2EL-C2F1-DSL 2M	E2EL-C2F2-DSL 2M
M8	30 mm	Shielded	2,0 mm	E2EL-X2E1-DS 2M	E2EL-X2E2-DS 2M	E2EL-X2F1-DS 2M	E2EL-X2F2-DS 2M
	45 mm	Shielded	2,0 mm	E2EL-X2E1-DSL 2M	E2EL-X2E2-DSL 2M	E2EL-X2F1-DSL 2M	E2EL-X2F2-DSL 2M

Plug types

Brass housing

Diameter	Length	Mounting	Sensing Distance	Output			
				NPN / NO	NPN / NC	PNP / NO	PNP / NC
Ø 6,5 / Plug M8	45 mm	Shielded	1,5 mm	E2EL-C1R5E1-M3	E2EL-C1R5E2-M3	E2EL-C1R5F1-M3	E2EL-C1R5F2-M3
	47 mm	Non-shielded	2,0 mm	E2EL-C2ME1-M3	E2EL-C2ME2-M3	E2EL-C2MF1-M3	E2EL-C2MF2-M3
	54 mm	Shielded	1,5 mm	E2EL-C1R5E1-M3L	E2EL-C1R5E2-M3L	E2EL-C1R5F1-M3L	E2EL-C1R5F2-M3L
	56 mm	Non-shielded	2,0 mm	E2EL-C2ME1-M3L	E2EL-C2ME2-M3L	E2EL-C2MF1-M3L	E2EL-C2MF2-M3L
M8 / Plug M8	45 mm	Shielded	1,5 mm	E2EL-X1R5E1-M3	E2EL-X1R5E2-M3	E2EL-X1R5F1-M3	E2EL-X1R5F2-M3
	47 mm	Non-shielded	2,0 mm	E2EL-X2ME1-M3	E2EL-X2ME2-M3	E2EL-X2MF1-M3	E2EL-X2MF2-M3
	54 mm	Shielded	1,5 mm	E2EL-X1R5E1-M3L	E2EL-X1R5E2-M3L	E2EL-X1R5F1-M3L	E2EL-X1R5F2-M3L
	56 mm	Non-shielded	2,0 mm	E2EL-X2ME1-M3L	E2EL-X2ME2-M3L	E2EL-X2MF1-M3L	E2EL-X2MF2-M3L
M8 / Plug M12	44 mm	Shielded	1,5 mm	E2EL-X1R5E1-M1	E2EL-X1R5E2-M1	E2EL-X1R5F1-M1	E2EL-X1R5F2-M1
	46 mm	Non-shielded	2,0 mm	E2EL-X2ME1-M1	E2EL-X2ME2-M1	E2EL-X2MF1-M1	E2EL-X2MF2-M1
	60 mm	Shielded	1,5 mm	E2EL-X1R5E1-M1L	E2EL-X1R5E2-M1L	E2EL-X1R5F1-M1L	E2EL-X1R5F2-M1L
	62 mm	Non-shielded	2,0 mm	E2EL-X2ME1-M1L	E2EL-X2ME2-M1L	E2EL-X2MF1-M1L	E2EL-X2MF2-M1L

Specifications

Brass type

Type			Ø 6,5		M8	
Operating voltage			10 to 35 VDC			
Rated supply voltage			24 VDC			
Current consumption			max. 15 mA at 24 VDC			
Sensing object			Ferrous metals			
Mounting ((s)hielded, (n)on-shielded) *1			s	n	s	n
Operating distance in mm			1,5	2,0	1,5	2,0
Tolerance of operating distance			±10%			
Standard target size in mm (L x W x H in mm, FE 37)			6,5x6,5x1		8x8x1	
Differential travel			1 % ... 15 % of operating distance			
Max. response frequency in kHz			5,0			
Control output		Type	E2EL-...	E1 type: NPN-NO		
				E2 type: NPN-NC		
				F1 type: PNP-NO		
				F2 type: PNP-NC		
		Max-Load	200 mA			
		Max-on-state Voltage drop	2,5 VDC (at 200mA load current and with 2 m cable)			
Circuit protection			Reverse polarity, output short-circuit			
Indicator			Operating indicator (yellow LED)			
Ambient temperature			Operating: -25° to 70°C			
Humidity			35 to 95 % RH			
Influence of temperature			± 10 % max. of Sn at 23°C in temperature range of -25° to 70°C			
Dielectric strength			1.500 VAC, 50/60 Hz for 1 min. between current carry parts and case			
Electromagnetic compatibility EMC			EN 60947-5-2			
Vibration resistance			Destruction: 10 to 70 Hz, 1,5 mm double amplitude for 1 hour each in X, Y and Z directions			
Shock resistance			Destruction: 300 m/s² (approx. 30 G) for 6 times each in X, Y and Z directions			
Enclosure rating			IP 67 (EN 60947-1)			
Connection *2		Pre-wired	2 m PVC-cable, 3 x 0,14 mm²			
		Connector	M8 plug			
Weight in g	Pre-wired	long	45		50	
		short	43		48	
	Connector	long	10		15	
		short	8		13	
Material		Case	Brass			
		Sensing face	PBTP			

*1. For detailed mounting instruction please refer to page D-105
*2. PUR cable and different length on request.

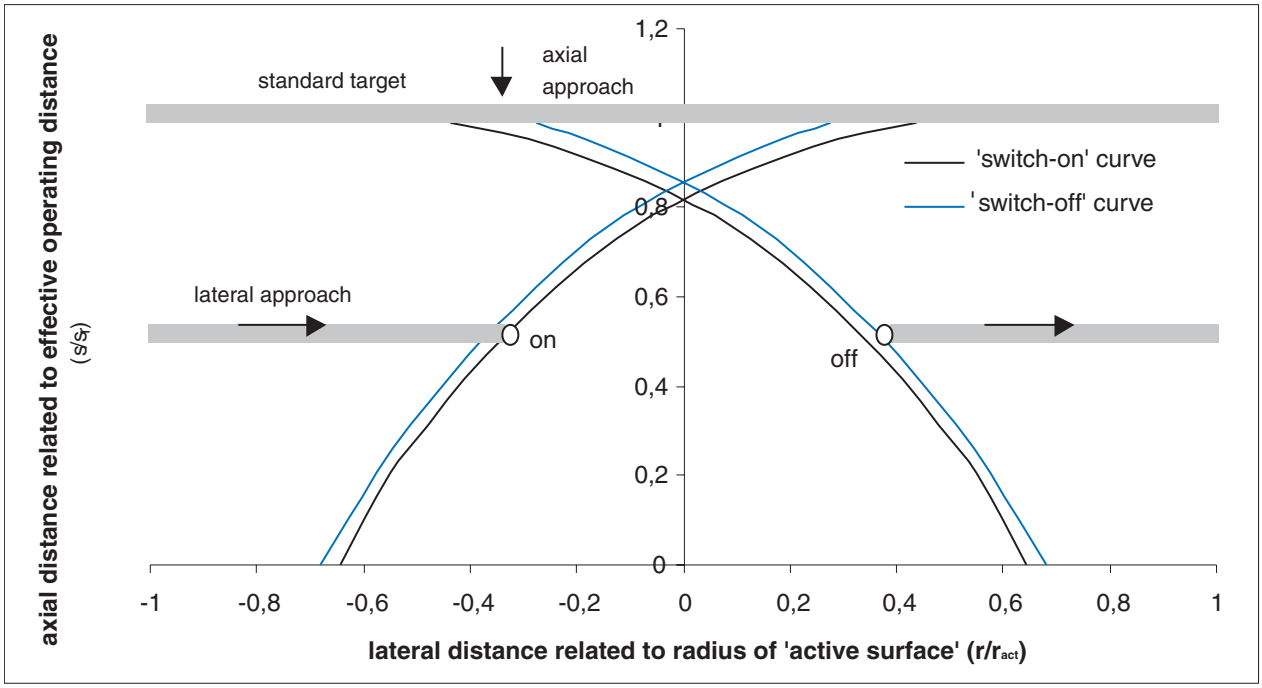
Stainless steel type

Type			Ø 6,5	M8
Operating voltage			10 to 35 VDC	
Rated supply voltage			24 VDC	
Current consumption			max. 15 mA at 24 VDC	
Sensing object			Ferrous metals	
Mounting *1			shielded	
Operating distance in mm			2,0	
Tolerance of operating distance			±10%	
Standard target size in mm (L x W x H in mm, FE 37)			6,5x6,5x1	8x8x1
Differential travel			1 % ... 15 % of operating distance	
Max. response frequency in kHz			4,0	
Control output		Type	E2EL-... E1 type: NPN-NO E2 type: NPN-NC F1 type: PNP-NO F2 type: PNP-NC	
		Max-Load	200 mA	
		Max-on-state Voltage drop	2,5 VDC (at 200mA load current and with 2 m cable)	
Circuit protection			Reverse polarity, output short-circuit	
Indicator			Operating indicator (yellow LED)	
Ambient temperature			Operating: -25° to 70°C	
Humidity			35 to 95 % RH	
Influence of temperature			± 10 % max. of Sn at 23°C in temperature range of -25° to 70°C	
Dielectric strength			1.500 VAC, 50/60 Hz for 1 min. between current carry parts and case	
Electromagnetic compatibility EMC			EN 60947-5-2	
Vibration resistance			Destruction: 10 to 70 Hz, 1,5 mm double amplitude for 1 hour each in X, Y and Z directions	
Shock resistance			Destruction: 300 m/s² (approx. 30 G) for 6 times each in X, Y and Z directions	
Enclosure rating			IP 67 (EN 60947-1)	
Connection *2		Pre-wired	2 m PVC-cable, 3 x 0,14 mm²	
		Connector	-	M8 plug
Weight in g	Pre-wired	long	45	50
		short	43	48
	Connector	long	-	10
		short	-	-
Material		Case	stainless steel 1.4305 / AISI 303	
		Sensing face	PBTP	

*1. For detailed mounting instruction please refer to page D-105
*2. PUR cable and different length on request.

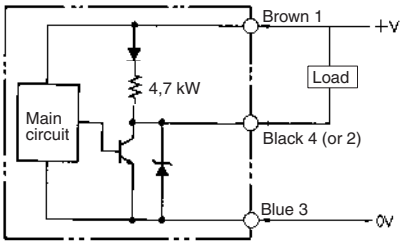
Engineering data

Standardized characteristic for lateral approach

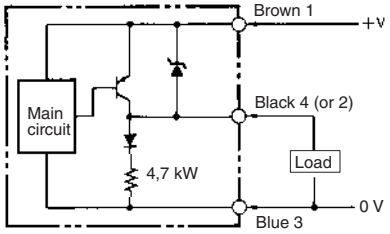


Output Circuit Diagram and Timing Chart

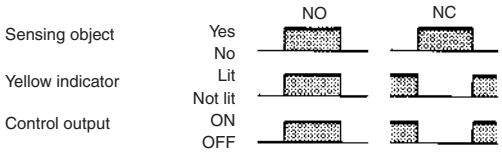
E2EL-□E□
NPN Output



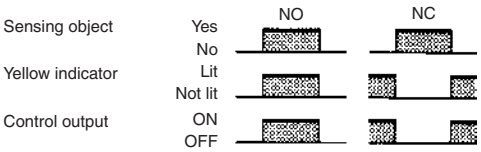
E2EL-□F□
PNP Output



E2EL-□E□
NPN Output

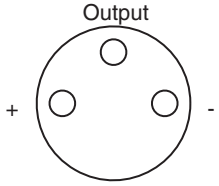


E2EL-□F□
PNP Output



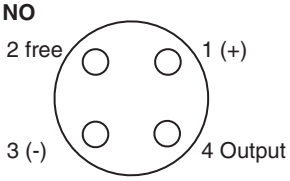
Pin Arrangement at Connector Types

1. Connector M8 (viewed to plug pins)

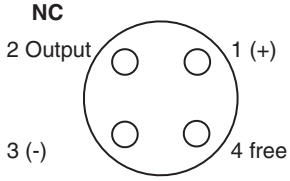


2. Connector M12 (viewed to plug pins)

NO



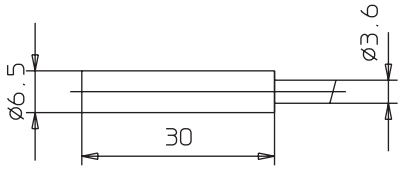
NC



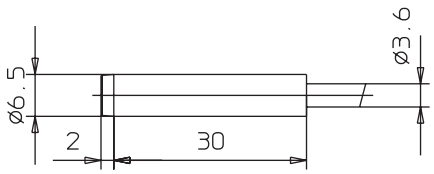
Dimensions

Cable types

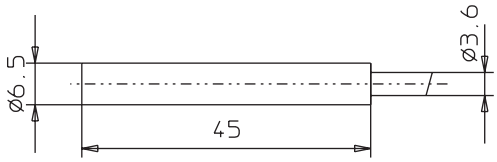
E2EL-C1□R5 2M, E2EL-C2□-DS 2M



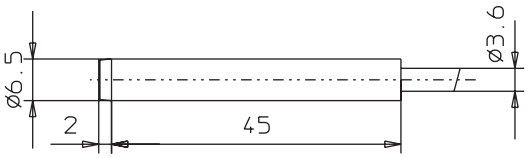
E2EL-C2M□ 2M



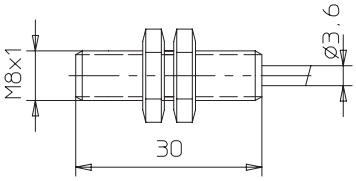
E2EL-C1R5□-L 2M, E2EL-C2□-DSL 2M



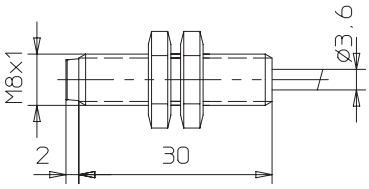
E2EL-C2M□-L 2M



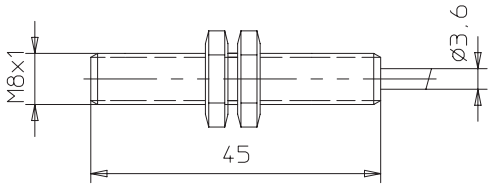
E2EL–X1R5□ 2M, E2EL–X2□–DS 2M



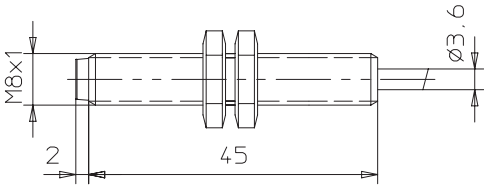
E2EL–X2M □2M



E2EL–X1R5□–L 2M, E2EL–X2 □-DSL 2M

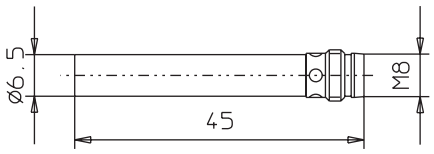


E2EL–X2M□–L 2M

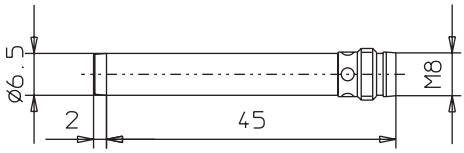


Plug types

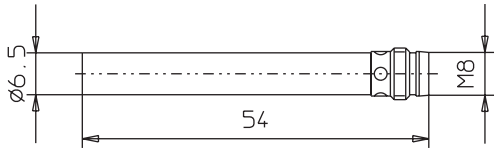
E2EL-C1R5□-M3



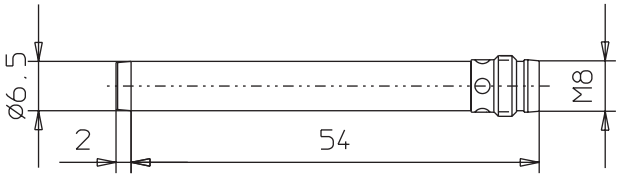
E2EL-C2M□-M3



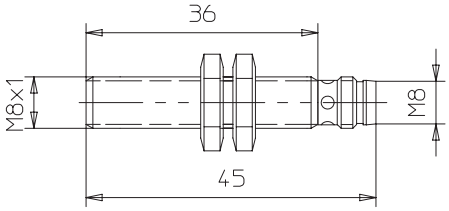
E2EL-C1R5□-M3L



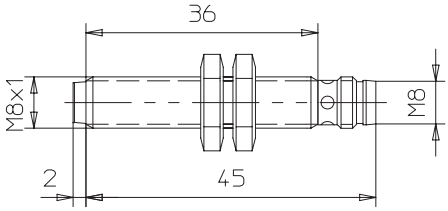
E2EL-C2M□-M3L



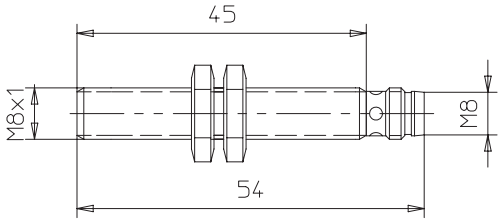
E2EL–X1R5□–M3



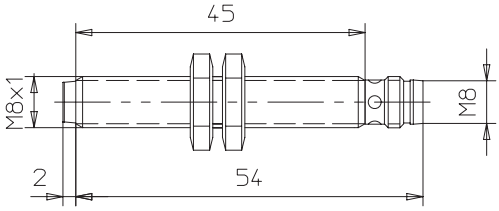
E2EL–X2M□–M3



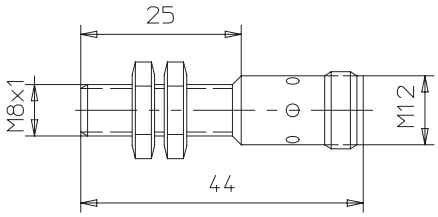
E2EL–X1R5□–M3L, E2EL–X2 □DM3S



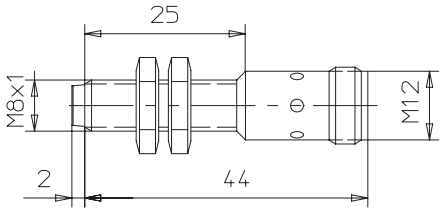
E2EL–X2M □–M3L



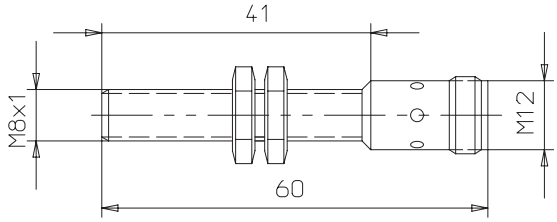
E2EL–X1R5□–M1



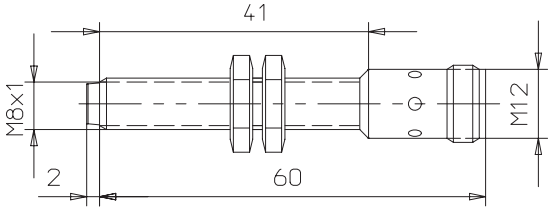
E2EL–X2M□–M1



E2EL–X1R5□–M1L

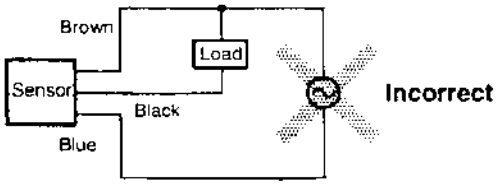
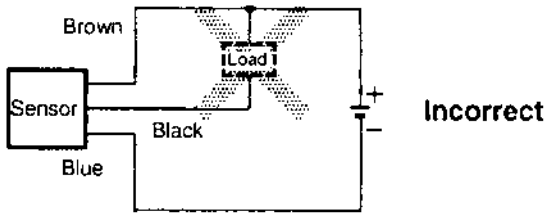
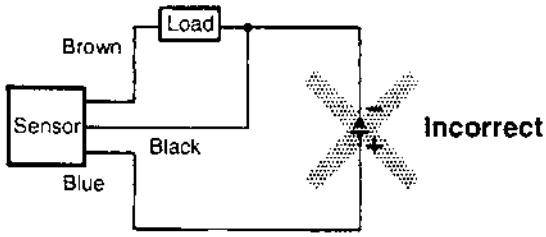


E2EL–X2M□–M1L



Installation

Caution

Item	Examples
Power Supply Do not impose an excessive voltage on the E2EL, otherwise it may explode or burn. Do not impose 24 VAC on any E2EL model, otherwise it may explode or burn.	
Load short-circuit Do not short-circuit the load, or the E2EL may explode or burn. The E2EL's short-circuit protection function is valid, if the polarity of the supply voltage imposed is incorrect and within the rated voltage range.	
Wiring Be sure to wire the E2EL and load correctly, otherwise it may explode or burn.	

Correct Use

Installation

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If power supplies are connected to the Proximity Sensor and load respectively, be sure to supply power to the Proximity Sensor before supplying power to the load.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned off. Therefore, it is recommended to turn off the load before turning off the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Sensing Object

Metal Coating:
The sensing distance of the Proximity Sensor vary with the metal coating on sensing objects.

Wiring

High-tension Lines

Wiring through Metal Conduit
If there is a power or high-tension line near the cord of the Proximity Sensor, wire the cord through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Core Tractive Force

Do not pull cords with the tractive force exceeding the following: pull force (N) = 20 x cable diameter (mm)

Mounting

The Proximity Sensor must not be subjected to excessive shock with a ha mmer when it is installed, otherwise the Proximity Sensor may be damaged or lose the water-resistivity.

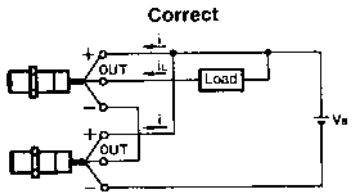
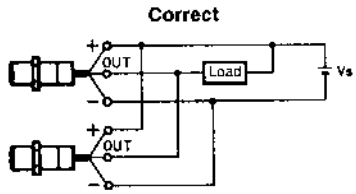
Environment

Water-Resistivity

Do not use the Proximity Sensor underwater, outdoors or in the rain.

Operating Environment

Be sure to use the Proximity Sensor within operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistive, a cover to protect the Proximity Sensor from water or soluble machining oil is reco mmended so that its reliability and life expectancy can be maintained. Do not use the Proximity Sensor in an environment with chemical gas (e. G., strong alkaline or acid gases including nitric, chromic, and concentrated sulfuric acid gases).

Item	Examples	Item
AND (serial connection)		The Sensors connected together must satisfy the following conditions: iL + (N-1) x i = Upper-limit of control output of each Sensor VS - N x VR = Load operating voltage N = No. of Sensors VR = Residual voltage of each Sensor VS = Supply voltage i = Current consumption of the Sensor iL = Load current If the MY Relay, which operate at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to the load.
OR (parallel connection)		The number of Sensors connected in parallel varies with the Proximity Sensor model.

Effects of Surrounding Metal

Shielded types:

Shielded types allow direct installation on metal plates in an embedded manner without performance change. A minimum distance of 3sn is required between the active surface and a metallic surface in front of the device. (Fig. 1).
For SUS shielded types the following minimum distances are required to avoid performance change (see Fig.2 and table below):

Shielded SUS Types	Free zone
E2EL-2□-DS	0,5 mm

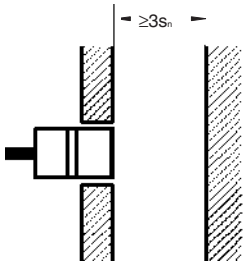


Fig.1: Shielded type (except SUS)

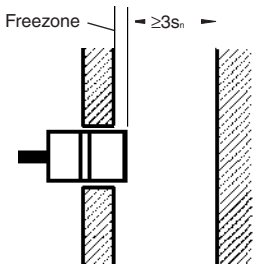


Fig.2: Shielded SUS type

Non-shielded types:

Installation of non-shielded types in metal require the minimum distances according to Fig. 3.

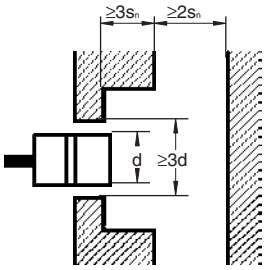


Fig.3: Non-shielded type

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D06E-EN-01

In the interest of product improvement, specifications are subject to change without notice.

Ultra Small Inductive Proximity Sensor

E2EC

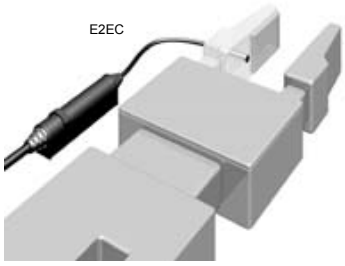
Subminiature Sensor for demanding mounting conditions

- 3 mm dia sensing head for most demanding mounting conditions
- 18 mm long ultra short M12 size housing

Applications

Check of a robot hand chucking

The proximity sensor which can be attached to a moving part like a chucking robot.



Ordering Information

Sensors

DC 2-wire

Shape		Sensing distance	Model	
			Operating status	
			NO	NC
Shield 	3-mm dia. *	0.8mm	**E2EC-CR8D1**	**E2EC-CR8D2**
	5.4-mm dia. *	1.5mm	**E2EC-C1R5D1**	**E2EC-C1R5D2**
	8-mm dia. *	3mm	**E2EC-C3D1**	**E2EC-C3D2**
	M12*	4mm	**E2EC-X4D1**	**E2EC-X4D2**

Note: A different frequency type is available. (E2EC-□□5; e.g.E2EC-CR8D15)

Accessories (Order Separately)

Mounting Brackets

Shape	Model	Applicable models
	**Y92E-F5R4**	E2EC-C1R5D□

Rating/performance

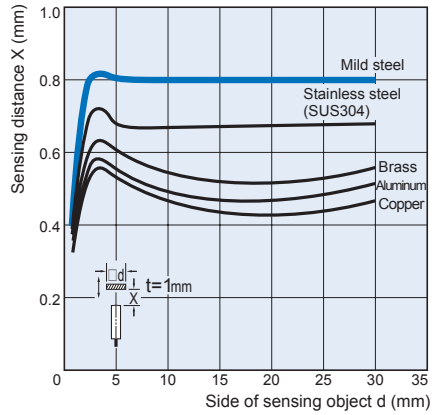
Item \ Type / Model		DC 2-wire			
		E2EC-CR8D□	E2EC-C1R5D□	E2EC-C3D□	E2EC-X4D□
Sensing distance		0.8 mm ±15%	1.5 mm ±10%	3 mm ±10%	4 mm ±10%
Setting distance		0 to 0.56 mm	0 to 1.05 mm	0 to 2.1 mm	0 to 2.8 mm
Differential distance		10% max.			
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)			
Standard sensing object		Iron, 5 × 5 × 1 mm		Iron, 8 × 8 × 1 mm	Iron, 12 × 12 × 1 mm
Response frequency		1.5 kHz		1 kHz	
Power supply (Operating voltage range)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.			
Current consumption		---			
Leakage current		0.8 mA max.			
Control output	Switching capacity	5 to 100 mA			
	Residual voltage	3.0 V max. (under load current of 100 mA with cable length of 2 m)			
Indicator lamp		D1 type: Operation indicator (red LED), Operation set indicator (green LED) D2 type: Operation indicator (red LED)			
Operating status (with sensing object approaching)		D1 models: NO D2 models: NC			
Protective circuits		Surge absorber, short-circuit protection			
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)			
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)			
Temperature influence		±20%max. of sensing distance at 23° in temperature range of -25° to 70°			
Voltage influence		±2.5% max. of sensing distance within a range of ±15% of rated power supply voltage			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		1,000 VAC for 1 min between current carry parts and case			
Vibration resistance		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/s^2 for 10 times each in X, Y, and Z directions			
Protective structure		IEC60529 IP67			
Connection method		Pre-wired models (standard length: 2 m)			
Weight (Packed state)		Approx. 45 g			
Material	Case	Brass			
	Sensing surface	ABS			
Accessories		Mounting bracket, instruction manual			

* The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

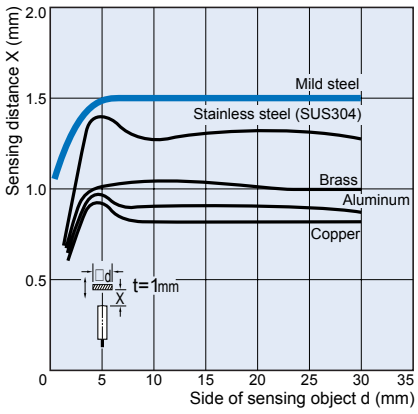
Characteristic data (typical)

Sensing Distance vs. Sensing Object

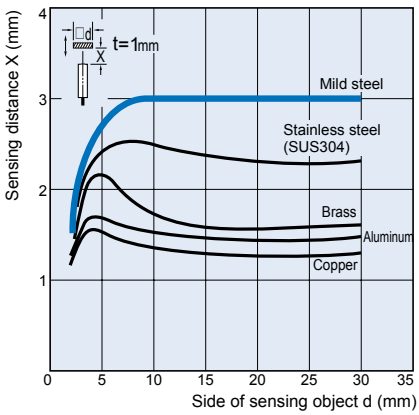
E2EC-CR8D1



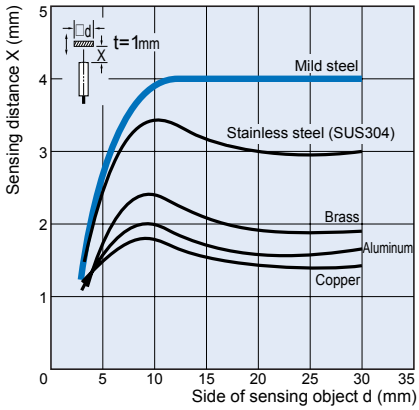
E2EC-C1R5D1



E2EC-C3D1

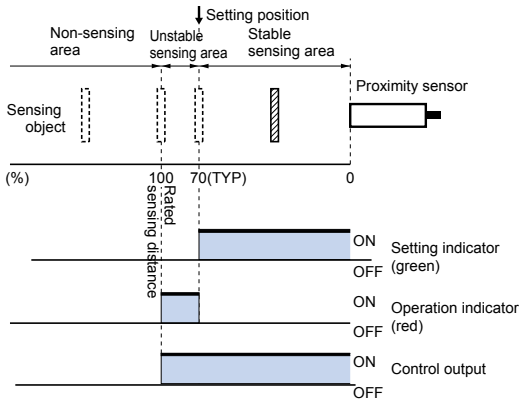
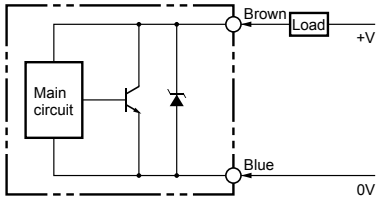
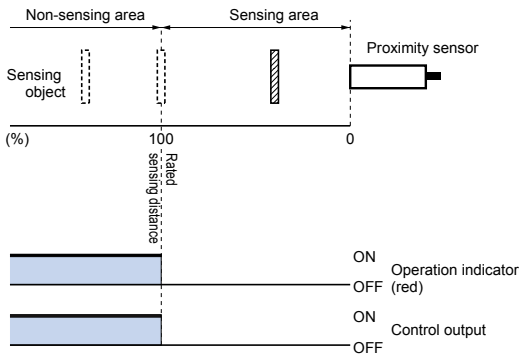


E2EC-X4D1



Output Circuit Diagram

DC 2-wire Models

Operating status	Model	Timing chart	Output circuit
NO	**E2EC-CR8D1** **E2EC-C1R5D1** **E2EC-C3D1** **E2EC-X4D1**		 Note: The load can be connected to either the +V or 0-V side.
NC	**E2EC-CR8D2** **E2EC-C1R5D2** **E2EC-C3D2** **E2EC-X4D2**		

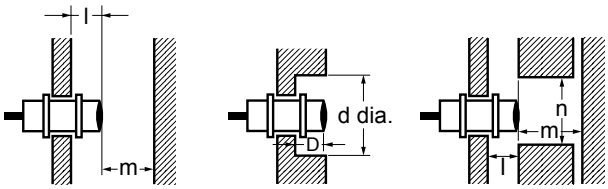
Precautions

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance as shown in the table below between the Sensor and the surrounding metal.

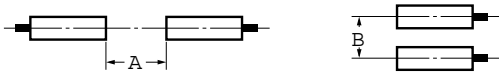


Effects of Surrounding Metal(Unit: mm)

Model / Item	l	d	D	m	n
E2EC-CR8D□	0	3	0	2.4	6
E2EC-C1R5D□		5.4		4.5	10.8
E2EC-C3D□		8		9	16
E2EC-X4D□		12		12	24

Mutual Interference

If more than one Sensor is located face-to-face or in parallel, be sure to maintain enough space, as provided in the following diagram, between adjacent Sensors to suppress mutual interference.



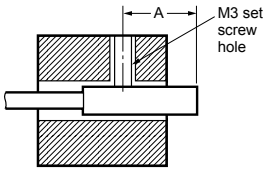
Mutual Interference(Unit: mm)

Model / Item	A	B
E2EC-CR8D□	18 (4)	6 (3)
E2EC-C1R5D□	15 (8)	10.8 (5.4)
E2EC-C3D□	30 (15)	16 (8)
E2EC-X4D□	40 (20)	24 (12)

Note: The above values in parentheses are applicable when using two sensors with different frequencies.

Mounting

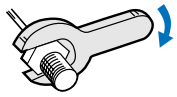
- Refer to the following table for the torque and tightening ranges applied to mount unthreaded E2EC-C models.



Permissible Tightening Torque

Model	Tightening range	Set-screw tightening torque
E2EC-CR8D□	6 to 10 mm	0.49 N•m
E2EC-C1R5D□	8 to 16 mm	
E2EC-C3D□		0.98 N•m

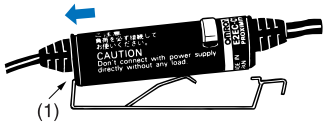
- The tightening torque applied to the E2EC-X4D (I.e., models with column screws) must be 120 kgf•cm (12 N•m) max.



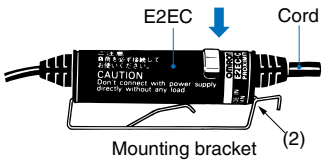
Mounting Bracket for DC 2-wire Models

Mounting

1. Insert the amplifier into the trapezoidal end (I.e., the fixing side) of the mounting bracket.

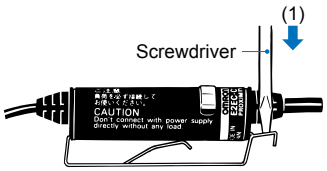


2. Press the other end of the amplifier onto the bracket.

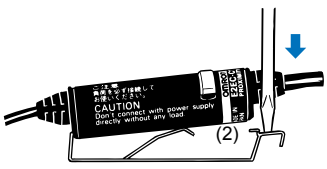


Removal

1. Lightly press the hook of the mounting bracket with a flat-blade screwdriver.



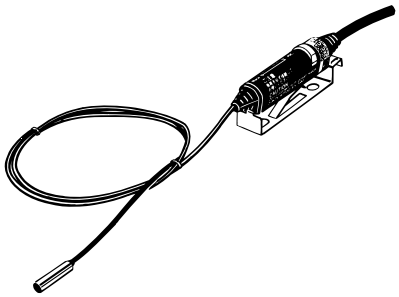
2. The amplifier will automatically spring loose from the mounting bracket.



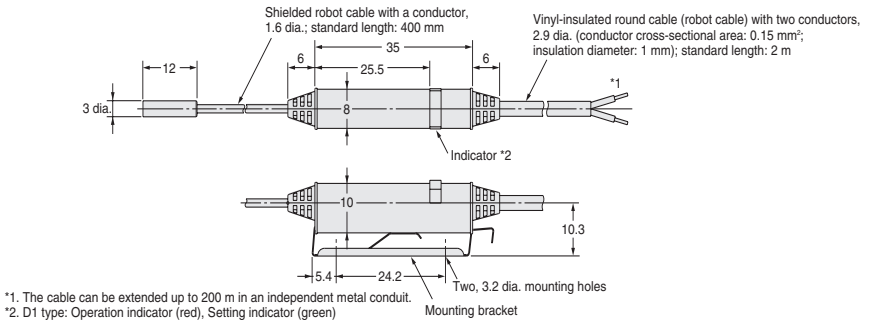
Dimensions (Unit: mm)

Sensors

E2EC-CR8D□

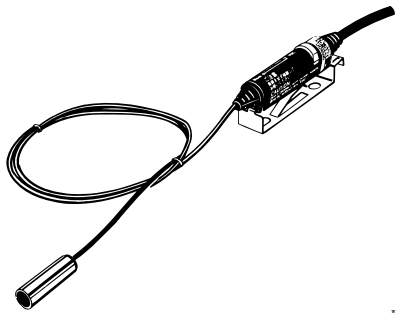


With Mounting Blanket Attached

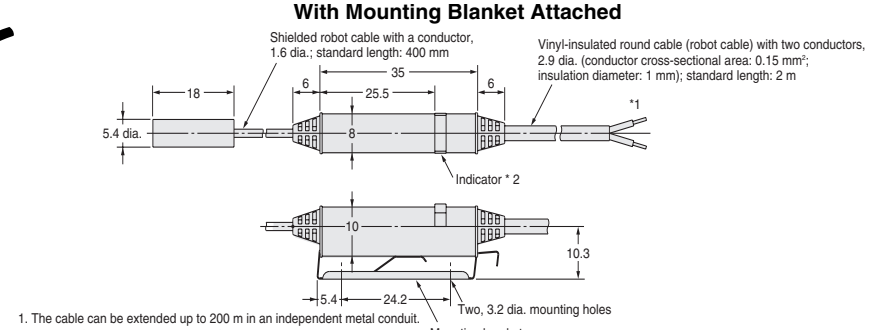


*1. The cable can be extended up to 200 m in an independent metal conduit.
*2. D1 type: Operation indicator (red), Setting indicator (green)

E2EC-C1R5D□

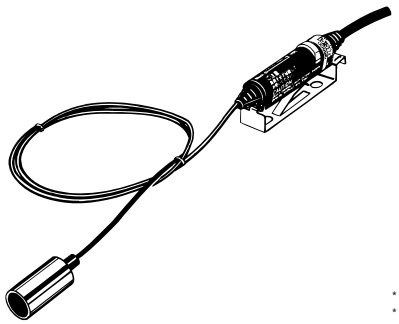


With Mounting Blanket Attached

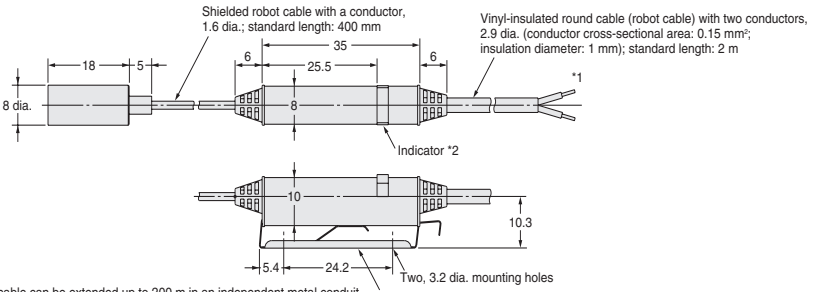


1. The cable can be extended up to 200 m in an independent metal conduit.
* 2. D1 type: Operation indicator (red), Setting indicator (green)

E2EC-C3D□

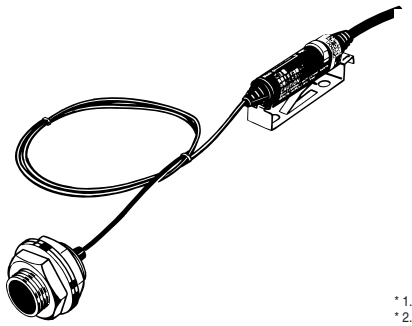


With Mounting Blanket Attached

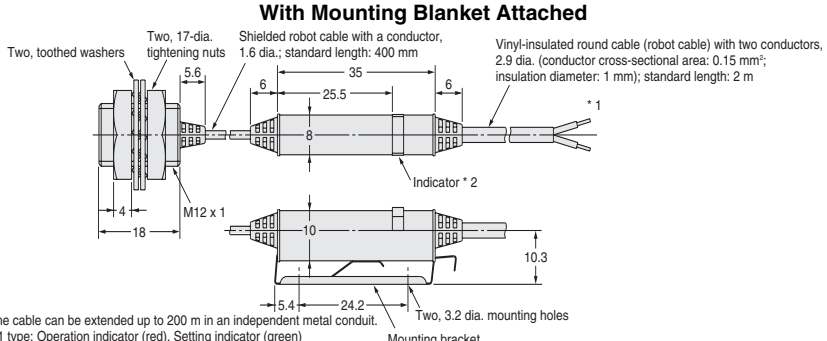


* 1. The cable can be extended up to 200 m in an independent metal conduit.
* 2. D1 type: Operation indicator (red), Setting indicator (green)
D2 type: Operation indicator (red)

E2EC-X4D□

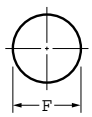


With Mounting Blanket Attached



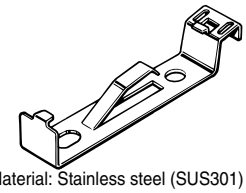
* 1. The cable can be extended up to 200 m in an independent metal conduit.
* 2. D1 type: Operation indicator (red), Setting indicator (green)
D2 type: Operation indicator (red)

Mounting Holes

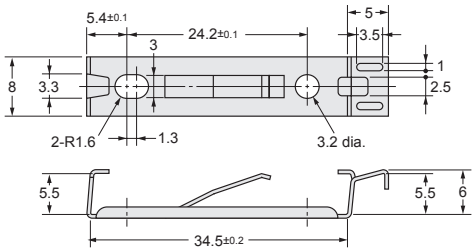


Model	F (mm)
E2EC-CR8D□	3.3-mm dia. $^{+0.}$
E2EC-C1R5D□	5.7-mm dia. $^{+0.}$
E2EC-C3D□	8.5-mm dia. $^{+0.}$
E2EC-X4D□	12.5-mm dia.$^{+0.}$

Mounting Brackets



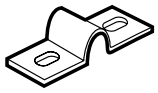
Material: Stainless steel (SUS301)
Note: It is attached to the DC 2-wire sensors.



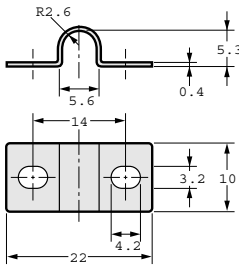
Accessories (Order Separately)

Mounting Brackets

Y92E-F5R4



Material: Stainless steel (SUS304)
Note: E2EC-C1R5D applicable to head of □



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D09E-EN-01

In the interest of product improvement, specifications are subject to change without notice.

Smooth Barrel Proximity Sensors

TL

Cylindrical dia 8 mm all-metal housing with M8 plug connection or pre-wired

CE

Ordering information

Short barrel type

Versions			Sn (mm)	Output			
				NPN		PNP	
Size	Type			NO	NC	NO	NC
8 mm	Shielded	Connector	1.5	TL-C1R5E1-M3-E1	TL-C1R5E2-M3-E1	TL-C1R5F1-M3-E1	TL-C1R5F2-M3-E1
		Pre-wired		TL-C1R5E1-E1	TL-C1R5E2-E1	TL-C1R5F1-E1	TL-C1R5F2-E1
	Non-shielded	Connector	2	TL-C2ME1-M3-E1	TL-C2ME2-M3-E1	TL-C2MF1-M3-E1	TL-C2MF2-M3-E1
		Pre-wired		TL-C2ME1-E1	TL-C2ME2-E1	TL-C2MF1-E1	TL-C2MF2-E1

Long barrel type

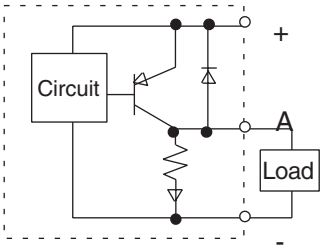
Versions			Sn (mm)	Output			
				NPN		PNP	
Size	Type			NO	NC	NO	NC
8 mm	Shielded	Connector	1.5	TL-C1R5E1-M3-E2	TL-C1R5E2-M3-E2	TL-C1R5F1-M3-E2	TL-C1R5F2-M3-E2
		Pre-wired		TL-C1R5E1-E2	TL-C1R5E2-E2	TL-C1R5F1-E2	TL-C1R5F2-E2
	Non-shielded	Connector	2	TL-C2ME1-M3-E2	TL-C2ME2-M3-E2	TL-C2MF1-M3-E2	TL-C2MF2-M3-E2
		Pre-wired		TL-C2ME1-E2	TL-C2ME2-E2	TL-C2MF1-E2	TL-C2MF2-E2

Specifications

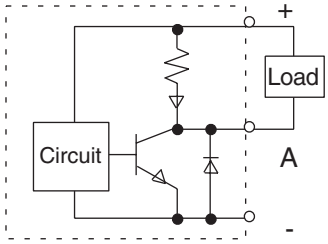
Type	8 mm Ø	
	TL-C1R5□□-E1 TL-C1R5□□-E2	TL-C2M□□-E1 TL-C2M□□-E2
Sensing distance (Sn)	1.5 mm ± 10%	2 mm ± 10%
Power supply	10 to 35 V DC	
Power consumption	15 mA max.	
Object St 37	8 x 8 x 1 mm	
Switching hysteresis	1 to 15 %	
Switching frequency	5 kHz	
Temperature dependency	10% max.	
Ambient temperature	-25° to 70° C	
Switching output	300 mA max.	
Residual voltage	2.5 V max.	
Function display	1 LED	
Degree of protection	IP 65	
Housing material	Nickel-plated brass	

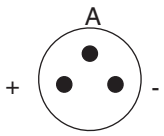
Output circuits

PNP output



NPN output



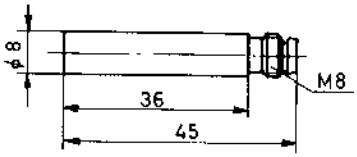


Reduction factors (typical values)

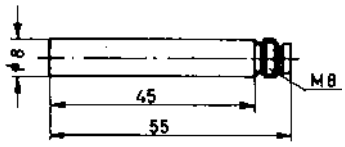
Chrome-nickel	Sn x 0.9
Brass	Sn x 0.5
Aluminium	Sn x 0.45
Copper	Sn x 0.4

Dimensions (mm)

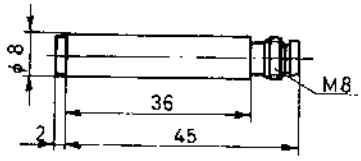
TL-C1R5□□-E1



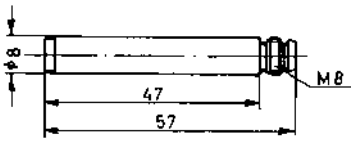
TL-C1R5□□-E2



TL-C2M□□-E1

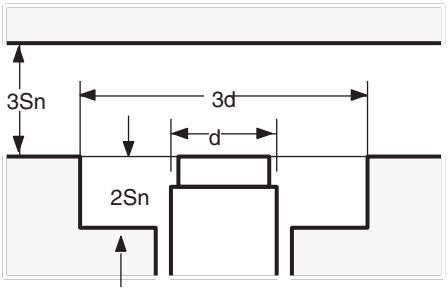


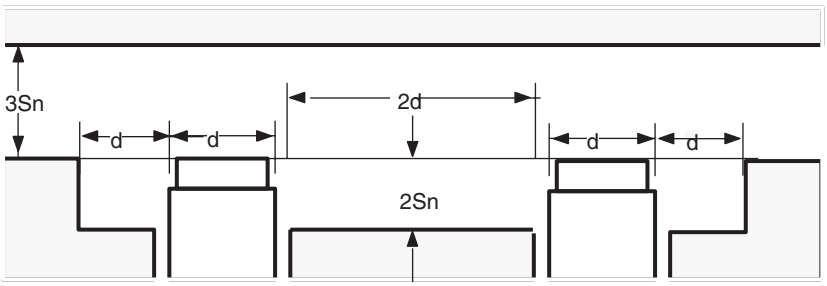
TL-C2M□□-E2



Installation

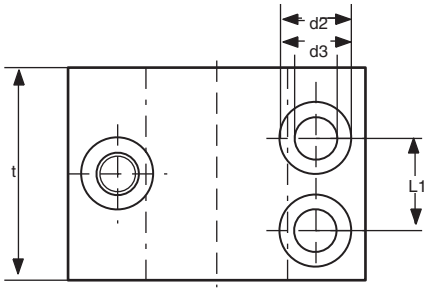
The minimum clearances indicated below must always be maintained in the case of non-shielded mounted types.

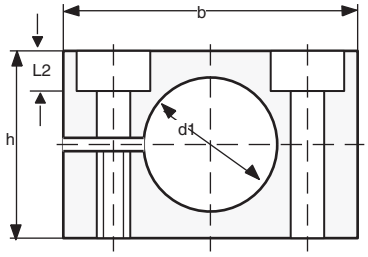




Installation accessories

Type	d1	d2	d3	L1	L2	w	h	d	Material
Y92E-B8-E1	8.0	6.0	3.2	7.5	3.3	20	12	16	Brass
Y92E-B8-E2	8.0	6.0	3.2	7.5	3.3	20	14	16	Plastic





ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D05E-EN-01

In the interest of product improvement, specifications are subject to change without notice.

Oil resistant Cylindrical Proximity Sensor (Automotive)

E2E

Designed and tested for Automotive assembly lines

- tested oil resistance on commonly used lubricants in Automotive industry

Ordering Information

E2E

DC 2-wire/Pre-wired Models

Self-diagnostic output function	Size		Sensing distance	Model	
				NO	NC
Yes	Shielded 	M12	3 mm	E2E-X3D1S (See note 1.)	---
		M18	7 mm	E2E-X7D1S (See note 1.)	---
		M30	10 mm	E2E-X10D1S (See note 1.)	---
	Unshielded 	M12	8 mm	E2E-X8MD1S (See note 1.)	---
		M18	14 mm	E2E-X14MD1S (See note 1.)	---
		M30	20 mm	E2E-X20MD1S (See note 1.)	---
No	Shielded 	M8	2 mm	E2E-X2D1-N (See notes 2 and 3.)	E2E-X2D2-N (See note 3.)
		M12	3 mm	E2E-X3D1-N (See notes 1, 2 and 3.)	E2E-X3D2-N (See note 3.)
		M18	7 mm	E2E-X7D1-N (See notes 1, 2 and 3.)	E2E-X7D2-N (See note 3.)
		M30	10 mm	E2E-X10D1-N (See notes 1, 2 and 3.)	E2E-X10D2-N
	Unshielded 	M8	4 mm	E2E-X4MD1 (See notes 2 and 3.)	E2E-X4MD2
		M12	8 mm	E2E-X8MD1 (See notes 1, 2 and 3.)	E2E-X8MD2
		M18	14 mm	E2E-X14MD1 (See notes 1, 2 and 3.)	E2E-X14MD2
		M30	20 mm	E2E-X20MD1 (See notes 1, 2 and 3.	E2E-X20MD2

*1. In addition to the above models, E2E-X□□15 models (e.g., E2E-X3D15-N), which are different in frequency from the above models, are available.
*2. E2E models with a robotics cable are available as well. The model number of a model with a robotics cable has the suffix "-R" (e.g., E2E-X3D1-R).
*3. Cables with a length of 5 m are also available. Specify the cable length at the end of the model number (e.g., E2E-X3D1-N 5M).

DC 2-wire/Connector Models

Connector	Self-diagnostic output function	Size		Sensing distance	Model	
					NO	NC
M12	Yes	Shielded 	M12	3 mm	E2E-X3D1S-M1	---
			M18	7 mm	E2E-X7D1S-M1	---
			M30	10 mm	E2E-X10D1S-M1	---
		Unshielded 	M12	8 mm	E2E-X8MD1S-M1	---
			M18	14 mm	E2E-X14MD1S-M1	---
			M30	20 mm	E2E-X20MD1S-M1	---
	No	Shielded 	M8	2 mm	E2E-X2D1-M1G	E2E-X2D2-M1G
			M12	3 mm	E2E-X3D1-M1G (See note.)	E2E-X3D2-M1G
			M18	7 mm	E2E-X7D1-M1G (See note.)	E2E-X7D2-M1G
			M30	10 mm	E2E-X10D1-M1G (See note.)	E2E-X10D2-M1G
		Unshielded 	M8	4 mm	E2E-X4MD1-M1G	E2E-X4MD2-M1G
			M12	8 mm	E2E-X8MD1-M1G (See note.)	E2E-X8MD2-M1G
			M18	14 mm	E2E-X14MD1-M1G (See note.)	E2E-X14MD2-M1G
			M30	20 mm	E2E-X20MD1-M1G (See note.)	E2E-X20MD2-M1G
M8		Shielded 	M8	2 mm	E2E-X2D1-M3G	E2E-X2D2-M3G
		Unshielded 		4 mm	E2E-X4MD1-M3G	E2E-X4MD2-M3G

Note: In addition to the above models, E2E-X□D15-M1G models (e.g., E2E-X3D15-M1G), which are different in frequency from the above models, are available.

DC 2-wire/Pre-wired Connector Models

Size		Sensing distance	Operation mode	Polarity	Model
Shielded 	M12	3 mm	NO	Yes	E2E-X3D1-M1GJ
				No	E2E-X3D1-M1J-T
	M18	7 mm		Yes	E2E-X7D1-M1GJ
				No	E2E-X7D1-M1J-T
	M30	10 mm		Yes	E2E-X10D1-M1GJ
				No	E2E-X10D1-M1J-T
Unshielded 	M12	8 mm		Yes	E2E-X8MD1-M1GJ
	M18	14 mm			E2E-X14MD1-M1GJ
	M30	20 mm			E2E-X20MD1-M1GJ

*1. A model with no polarity has a residual voltage of 5 V, which must be taken into consideration together with the interface condition (the PLC's ON voltage, for example) when connecting the Proximity Sensor to a load.
*2. The standard cable length is 300 mm. Models are also available with 500 mm and 1 m cables.

Connector Pin Assignments of DC 2-wire Model

The connector pin assignments of each new E2E DC 2-wire conforms to IEC947-5-2 Table III.
The following E2E models with conventional connector pin assignments are available as well.

Size		Operation mode	Model	Size		Operation mode	Model
Shielded 	M8	NO	E2E-X2D1-M1	Unshielded 	M8	NO	E2E-X4MD1-M1
		NC	E2E-X2D2-M1			NC	E2E-X4MD2-M1
	M12	NO	E2E-X3D1-M1		M12	NO	E2E-X8MD1-M1
		NC	E2E-X3D2-M1			NC	E2E-X8MD2-M1
	M18	NO	E2E-X7D1-M1		M18	NO	E2E-X14MD1-M1
		NC	E2E-X7D2-M1			NC	E2E-X14MD2-M1
	M30	NO	E2E-X10D1-M1		M30	NO	E2E-X20MD1-M1
		NC	E2E-X10D2-M1			NC	E2E-X20MD2-M1

DC 3-wire/Pre-wired Models

Size		Sensing distance	Output configuration	Model
Shielded 	M8	1.5 mm	NPN NO	E2E-X1R5E1 (See notes 1 and 2.)
			NPN NC	E2E-X1R5E2
			PNP NO	E2E-X1R5F1
			PNP NC	E2E-X1R5F2
	M12	2 mm	NPN NO	E2E-X2E1 (See notes 1, 2, 3, and 4.)
			NPN NC	E2E-X2E2 (See notes 3 and 4.)
			PNP NO	E2E-X2F1
			PNP NC	E2E-X2F2
	M18	5 mm	NPN NO	E2E-X5E1 (See notes 1, 2, 3, and 4.)
			NPN NC	E2E-X5E2 (See notes 3 and 4.)
			PNP NO	E2E-X5F1
			PNP NC	E2E-X5F2
	M30	10 mm	NPN NO	E2E-X10E1 (See notes 1, 2, 3, and 4.)
			NPN NC	E2E-X10E2 (See notes 3 and 4.)
			PNP NO	E2E-X10F1
			PNP NC	E2E-X10F2
Unshielded 	M8	2 mm	NPN NO	E2E-X2ME1 (See note 2.)
			NPN NC	E2E-X2ME2
			PNP NO	E2E-X2MF1
			PNP NC	E2E-X2MF2
	M12	5 mm	NPN NO	E2E-X5ME1 (See notes 1, 2, 3, and 4.)
			NPN NC	E2E-X5ME2 (See notes 3 and 4.)
			PNP NO	E2E-X5MF1
			PNP NC	E2E-X5MF2
	M18	10 mm	NPN NO	E2E-X10ME1 (See notes 1, 2, 3, and 4.)
			NPN NC	E2E-X10ME2 (see notes 3 and 4.)
			PNP NO	E2E-X10MF1
			PNP NC	E2E-X10MF2
	M30	18 mm	NPN NO	E2E-X18ME1 (See notes 1, 2, 3, and 4.)
			NPN NC	E2E-X18ME2 (See notes 3 and 4.)
			PNP NO	E2E-X18MF1
			PNP NC	E2E-X18MF2

Note: 1. Cables with a length of 5 m are also available. Specify the cable length at the end of the model number (e.g., E2E-X2E1 5M).
2. Models with a robotics cable are also available. These models are E2E-X□E1-R (e.g., E2E-X5E1-R).
3. Models with a different frequency are also available. These models are E2E-X□E□5 (e.g., E2E-X5E15).
4. These models have e-CON connectors (0.3 m cable length), which is indicated by the suffix "-ECON" (e.g., E2E-X2E1-ECON).

AC 2-wire/Pre-wired Models

Size		Sensing distance	Operation mode	Model
Shielded 	M8	1.5 mm	NO	E2E-X1R5Y1
			NC	E2E-X1R5Y2
	M12	2 mm	NO	E2E-X2Y1 (See notes 1 and 2.)
			NC	E2E-X2Y2
	M18	5 mm	NO	E2E-X5Y1 (See notes 1 and 2.)
			NC	E2E-X5Y2
	M30	10 mm	NO	E2E-X10Y1 (See notes 1 and 2.)
			NC	E2E-X10Y2
Unshielded 	M8	2 mm	NO	E2E-X2MY1
			NC	E2E-X2MY2
	M12	5 mm	NO	E2E-X5MY1 (See notes 1 and 2.)
			NC	E2E-X5MY2
	M18	10 mm	NO	E2E-X10MY1 (See note 1.)
			NC	E2E-X10MY2
	M30	18 mm	NO	E2E-X18MY1 (See note 1.)
			NC	E2E-X18MY2

Note: 1. Models with a different frequency are also available. These models are E2E-X□Y□5 (e.g., E2E-X5Y15).
2. Cables with a length of 5 m are also available. Specify the cable length at the end of the model number (e.g., E2E-X2Y1 5M).

DC 3-wire/Connector Models

Connector	Size		Sensing distance	Output configuration	Model
M12	Shielded 	M8	1.5 mm	NPN NO	E2E-X1R5E1-M1
				NPN NC	E2E-X1R5E2-M1
				PNP NO	E2E-X1R5F1-M1
				PNP NC	E2E-X1R5F2-M1
		M12	2 mm	NPN NO	E2E-X2E1-M1
				NPN NC	E2E-X2E2-M1
				PNP NO	E2E-X2F1-M1
				PNP NC	E2E-X2F2-M1
		M18	5 mm	NPN NO	E2E-X5E1-M1
				NPN NC	E2E-X5E2-M1
				PNP NO	E2E-X5F1-M1
				PNP NC	E2E-X5F2-M1
		M30	10 mm	NPN NO	E2E-X10E1-M1
				NPN NC	E2E-X10E2-M1
				PNP NO	E2E-X10F1-M1
				PNP NC	E2E-X10F2-M1
	Unshielded 	M8	2 mm	NPN NO	E2E-X2ME1-M1
				NPN NC	E2E-X2ME2-M1
				PNP NO	E2E-X2MF1-M1
				PNP NC	E2E-X2MF2-M1
		M12	5 mm	NPN NO	E2E-X5ME1-M1
				NPN NC	E2E-X5ME2-M1
				PNP NO	E2E-X5MF1-M1
				PNP NC	E2E-X5MF2-M1
		M18	10 mm	NPN NO	E2E-X10ME1-M1
				NPN NC	E2E-X10ME2-M1
				PNP NO	E2E-X10MF1-M1
				PNP NC	E2E-X10MF2-M1
		M30	18 mm	NPN NO	E2E-X18ME1-M1
				NPN NC	E2E-X18ME2-M1
				PNP NO	E2E-X18MF1-M1
				PNP NC	E2E-X18MF2-M1
M8	Shielded 	M8	1.5 mm	NPN NO	E2E-X1R5E1-M3
				NPN NC	E2E-X1R5E2-M3
				PNP NO	E2E-X1R5F1-M3
				PNP NC	E2E-X1R5F2-M3
	Unshielded 	M8	2 mm	NPN NO	E2E-X2ME1-M3
				NPN NC	E2E-X2ME2-M3
				PNP NO	E2E-X2MF1-M3
				PNP NC	E2E-X2MF2-M3

AC 2-wire/Connector Models

Size		Sensing distance	Operation mode	Model
Shielded 	M12	2 mm	NO	E2E-X2Y1-M1
			NC	E2E-X2Y2-M1
	M18	5 mm	NO	E2E-X5Y1-M1
			NC	E2E-X5Y2-M1
	M30	10 mm	NO	E2E-X10Y1-M1
			NC	E2E-X10Y2-M1
Unshielded 	M12	5 mm	NO	E2E-X5MY1-M1
			NC	E2E-X5MY2-M1
	M18	10 mm	NO	E2E-X10MY1-M1
			NC	E2E-X10MY2-M1
	M30	18 mm	NO	E2E-X18MY1-M1
			NC	E2E-X18MY2-M1

AC/DC 2-wire/Pre-wired Models

Size		Sensing distance	Operation mode	Model
Shielded 	M12	3 mm	NO	E2E-X3T1
	M18	7 mm		E2E-X7T1 (See note 2.)
	M30	10 mm		E2E-X10T1

*1. These models do not conform to CE standards.
*2. Cables with a length of 5 m are also available as standard models. Specify the cable length at the end of the model number (e.g., E2E-X7T1 5M).

Specifications

Ratings/Characteristics

E2E

E2E-X□D□ DC 2-wire Models

Size		M8		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Item		E2E-X2D□	E2E-X4MD□	E2E-X3D□	E2E-X8MD□	E2E-X7D□	E2E-X14MD□	E2E-X10D□	E2E-X20MD□
Sensing distance		2 mm ±10%	4 mm ±10%	3 mm ±10%	8 mm ±10%	7 mm ±10%	14 mm ±10%	10 mm ±10%	20 mm ±10%
Set distance (See note 1.)		0 to 1.6 mm	0 to 3.2 mm	0 to 2.4 mm	0 to 6.4 mm	0 to 5.6 mm	0 to 11.2 mm	0 to 8.0 mm	0 to 16.0 mm
Differential travel		15% max. of sensing distance		10% max. of sensing distance					
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to *Engineering Data*.)							
Standard sensing object		Iron, 8 x 8 x 1 mm	Iron, 20 x 20 x 1 mm	Iron,12 x 12 x 1 mm	Iron,30 x 30 x 1 mm	Iron, 18 x 18 x 1 mm	Iron, 30 x 30 x 1 mm	Iron,30 x 30 x 1 mm	Iron, 54 x 54 x 1 mm
Response speed (See note 2.)		1.5 kHz	1.0 kHz	1.0 kHz	0.8 kHz	0.5 kHz	0.4 kHz	0.4 kHz	0.1 kHz
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Leakage current		0.8 mA max.							
Control output	Load current	3 to 100 mA Diagnostic output: 50 mA for -D1(5)S models							
	Residual voltage (See note 3.)	3 V max. (Load current: 100 mA, Cable length: 2 m. M1J-T models only: 5 V max.)							
Indicator		D1 Models: Operation indicator (red LED), setting indicator (green LED) D2 Models: Operation indicator (red LED)							
Operation mode (with sensing object approaching)		D1 Models: NO D2 Models: NC For details, refer to *Timing Charts*.							
Diagnostic output delay		0.3 to 1 s							
Protection circuits		Surge suppressor, output load short-circuit protection (for control and diagnostic output)							
Ambient temperature		Operating: –25°C to 70°C, Storage: –40°C to 85°C (with no icing or condensation)							
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)							
Temperature influence		±15% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C		±10% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C					
Voltage influence		±1% max. of sensing distance in the rated voltage range ±15%							
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case							
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current-carrying parts and case							
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		500 m/s^2 10 times each in X, Y, and Z directions		1,000 m/s^2 10 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67 (Pre-wired models, pre-wired connector models: JEM standard IP67g (waterproof and oil-proof))							
Connection method		Pre-wired models (standard length: 2 m), connector models, pre-wired connector models (standard length: 0.3 m)							
Weight (packed state)	Pre-wired models	Approx. 60 g		Approx. 70 g		Approx. 130 g		Approx. 175 g	
	Pre-wired connector models	---		Approx. 40 g		Approx. 70 g		Approx. 110 g	
	Connector models	Approx. 15 g		Approx. 25 g		Approx. 40 g		Approx. 90 g	
Material	Case	Stainless steel (SUS303)		Brass-nickel plated					
	Sensing surface	PBT (polybutylene terephthalate)							
	Clamping nuts	Brass-nickel plated							
	Toothed washer	Iron-zinc plated							
Accessories		Instruction manual							

Note: 1. Use the E2E within the range in which the setting indicator (green LED) is ON (except D2 models).
2. The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.
3. The residual voltage of each E2E model with the model number suffix "-M1J-T" is 5 V. When connecting an E2E model with the suffix "-M1J-T" to a device, make sure that the device can withstand the residual voltage.

E2E-X□E□/F□ DC 3-wire Models

Size		M8		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Item		E2E-X1R5E□/F□	E2E-X2ME□/F□	E2E-X2E□/F□	E2E-X5ME□/F□	E2E-X5E□/F□	E2E-X10ME□/F□	E2E-X10E□/F□	E2E-X18ME□/F□
Sensing distance		1.5 mm ±10%	2 mm ±10%	2 mm ±10%	5 mm ±10%	5 mm ±10%	10 mm ±10%	10 mm ±10%	18 mm ±10%
Set distance		0 to 1.2 mm	0 to 1.6 mm	0 to 1.6 mm	0 to 4.0 mm	0 to 4.0 mm	0 to 8.0 mm	0 to 8.0 mm	0 to 14.0 mm
Differential travel		10% max. of sensing distance							
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to *Engineering Data*.)							
Standard sensing object		Iron, 8 x 8 x 1 mm	Iron, 12 x 12 x 1 mm	Iron, 12 x 12 x 1 mm	Iron, 15 x 15 x 1 mm	Iron, 18 x 18 x 1 mm	Iron, 30 x 30 x 1 mm	Iron, 30 x 30 x 1 mm	Iron, 54 x 54 x 1 mm
Response speed (See note 1.)		2.0 kHz	0.8 kHz	1.5 kHz	0.4 kHz	0.6 kHz	0.2 kHz	0.4 kHz	0.1 kHz
Power supply voltage (operating voltage range) (See note 2.)		12 to 24 VDC (10 to 40 VDC), ripple (p-p): 10% max.							
Current consumption		13 mA max.							
Control output	Load current (See note 2.)	200 mA max.							
	Residual voltage	2 V max. (Load current : 200 mA, Cable length: 2 m)							
Indicator		Operation indicator (red LED)							
Operation mode (with sensing object approaching)		E1 F1 Models: NO E2 F2 Models: NC For details, refer to *Timing Charts*.							
Protection circuits		Power supply reverse polarity protection, surge suppressor, output load short-circuit protection							
Ambient temperature (See note 2)		Operating/Storage: –40°C to 85°C (with no icing or condensation)							
Ambient humidity		Operating/Storage: 35% to 95% (with no icing)							
Temperature influence		±15% max. of sensing distance at 23°C in the temperature range of –40°C to 85°C ±10% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C							
Voltage influence		±1% max. of sensing distance in the rated voltage range ±15%							
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case							
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current-carrying parts and case							
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		500 m/s² 10 times each in X, Y, and Z directions		1,000 m/s² 10 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67 (Pre-wired models: JEM standard IP67g (waterproof and oil-proof))							
Connection method		Pre-wired models (standard length 2 m), connector models							
Weight (packed state)	Pre-wired models	Approx. 65 g		Approx. 75 g		Approx. 150 g		Approx. 195 g	
	Connector models	Approx. 15 g		Approx. 25 g		Approx. 40 g		Approx. 90 g	
Material	Case	Stainless steel (SUS303)		Brass-nickel plated					
	Sensing surface	PBT (polybutylene terephthalate)							
	Clamping nuts	Brass-nickel plated							
	Toothed washer	Iron-zinc plated							
Accessories		Instruction manual							

Note: 1. The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.
2. When using an E2E with an M8 connector at an ambient temperature range between 70°C and 85°C, supply 10 to 30 VDC to the E2E and make sure that the E2E has a control output of 100 mA maximum.

E2E-X□Y□ AC 2-wire Models

Size		M8		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Item		E2E-X1R5Y□	E2E-X2MY□	E2E-X2Y□	E2E-X5MY□	E2E-X5Y□	E2E-X10MY□	E2E-X10Y□	E2E-X18MY□
Sensing distance		1.5 mm ±10%	2 mm ±10%	2 mm ±10%	5 mm ±10%	5 mm ±10%	10 mm ±10%	10 mm ±10%	18 mm ±10%
Set distance		0 to 1.2 mm	0 to 1.6 mm	0 to 1.6 mm	0 to 4.0 mm	0 to 4.0 mm	0 to 8.0 mm	0 to 8.0 mm	0 to 14.0 mm
Differential travel		10% max. of sensing distance							
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to *Engineering Data*.)							
Standard sensing object		Iron, 8 x 8 x 1 mm	Iron,12 x 12 x 1 mm	Iron, 12 x 12 x 1 mm	Iron, 15 x 15 x 1 mm	Iron, 18 x 18 x 1 mm	Iron, 30 x 30 x 1 mm	Iron, 30 x 30 x 1 mm	Iron, 54 x 54 x 1 mm
Response speed		25 Hz							
Power supply voltage (operating voltage range) (See note 1.)		24 to 240 VAC, 50/60 Hz (20 to 264 VAC)							
Leakage current		1.7 mA max.							
Control output	Load current (See note 2.)	5 to 100 mA		5 to 200 mA		5 to 300 mA			
	Residual voltage	Refer to *Engineering Data*.							
Indicator		Operation indicator (red LED)							
Operation mode (with sensing object approaching)		Y1 Models: NO Y2 Models: NC For details, refer to *Timing Charts*.							
Protection circuit		Surge suppressor							
Ambient temperature (See notes 1 and 2.)		Operating/Storage: –25°C to 70°C (with no icing or condensation)		Operating/Storage: –40°C to 85°C (with no icing or condensation)					
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)							
Temperature influence		±10% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C		±15% max. of sensing distance at 23°C in the temperature range of –40°C to 85°C ±10% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C					
Voltage influence		±1% max. of sensing distance in the rated voltage range ±15%							
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case							
Dielectric strength		4,000 VAC at 50/60 Hz for 1 min between current-carrying parts and case (2,000 VAC for M8 Models)							
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		500 m/s^2 10 times each in X, Y, and Z directions		1,000 m/s^2 10 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67 (Pre-wired models: JEM standard IP67g (waterproof, oil-proof))							
Connection method		Pre-wired models (standard length 2 m), connector models							
Weight (packed state)	Pre-wired models	Approx. 60 g		Approx. 70 g		Approx. 130 g		Approx. 175 g	
	Connector models	Approx. 15 g		Approx. 25 g		Approx. 40 g		Approx. 90 g	
Material	Case	Stainless steel (SUS303)		Brass-nickel plated					
	Sensing surface	PBT (polybutylene terephthalate)							
	Clamping nuts	Brass-nickel plated							
	Toothed washer	Iron-zinc plated							
Accessories		Instruction manual							

Note: 1. When supplying 24 VAC to any of the above models, make sure that the operating ambient temperature range is over –25°C.
2. When using an M18-or M30-sized E2E within an ambient temperature of 70°C to 85°C, make sure that the E2E has a control output of 5 to 200 mA max.

AC/DC 2-wire Models

Size		M12	M18	M30
Type		Shielded		
Item		E2E-X3T1	E2E-X7T1	E2E-X10T1
Sensing distance		3 mm ±10%	7 mm ±10%	10 mm ±10%
Set distance		0 to 2.4 mm	0 to 5.6 mm	0 to 8.0 mm
Differential travel		10% max. of sensing distance		
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to *Engineering Data*.)		
Standard sensing object		Iron, 12 x 12 x 1 mm	Iron, 18 x 18 x 1 mm	Iron, 30 x 30 x 1 mm
Response speed (See note 1.)	DC	1.0 kHz	0.5 kHz	0.4 kHz
	AC	25 Hz		
Power supply voltage (operating voltage range) (See note 2.)		24 to 240 VDC (20 to 264 VDC)/48 to 240 VAC (40 to 264 VAC)		
Leakage current		1 mA DC max., 2 mA AC max.		
Control output	Load current	5 to 100 mA		
	Residual voltage	6.0 VDC max. (Load current: 100 mA, Cable length: 2 m) 10 VAC max. (Load current: 5 mA , Cable length: 2 m)		
Indicator		Operation indicator (red LED), setting indicator (green LED)		
Operation mode (with sensing object approaching)		NO For details, refer to *Timing Charts*.		
Protection circuits		Output load short-circuit protection (at 20 to 40 VDC), Surge suppressor		
Ambient temperature		Operating: –25°C to 70°C, Storage: –40°C to 85°C (with no icing or condensation)		
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)		
Temperature influence		±10% max. of sensing distance at 23°C in the temperature range of –25°C to 70°C		
Voltage influence		±1% max. of sensing distance in the rated voltage range ±15%		
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case		
Dielectric strength		4,000 VAC at 50/60 Hz for 1 min between current-carrying parts and case		
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance		1,000 m/s^2 10 times each in X, Y, and Z directions		
Degree of protection		IEC 60529 IP67 (JEM standard IP67g (waterproof, oil-proof))		
Connection method		Pre-wired Models (standard length 2 m)		
Weight (packed state)		Approx. 80 g	Approx. 140 g	Approx. 190 g
Material	Case	Brass-nickel plated		
	Sensing surface	PBT (polybutylene terephthalate)		
	Clamping nuts	Brass-nickel plated		
	Toothed washer	Iron-zinc plated		
Accessories		Instruction manual		

Note: 1. The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.
2. Power supply voltage waveform: Use a sine wave for the power supply. Using a rectangular AC power supply may result in faulty reset.

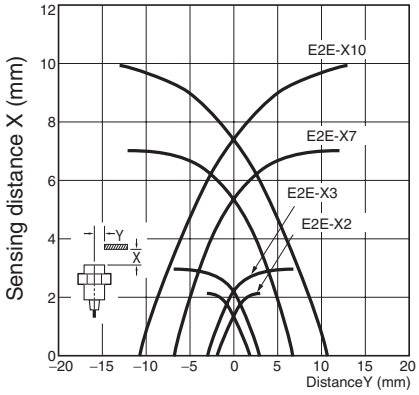
Engineering Data

E2E

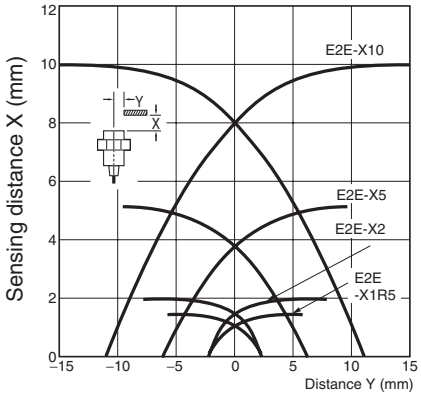
Operating Range (Typical)

Shielded Models

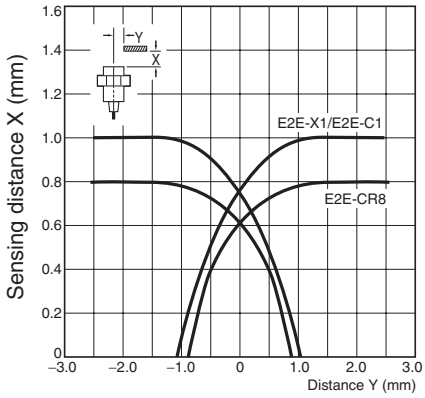
E2E-X□D□
E2E-X□T1



E2E-X□E□/F□
E2E-X□Y□

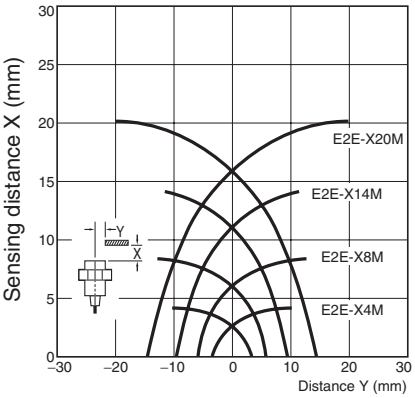


E2E-C□C□/B□
E2E-X□C□/B□

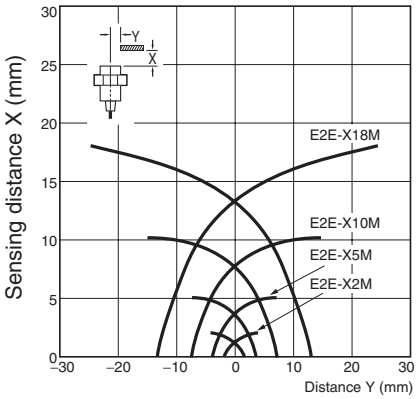


Unshielded Models

E2E-X□MD□

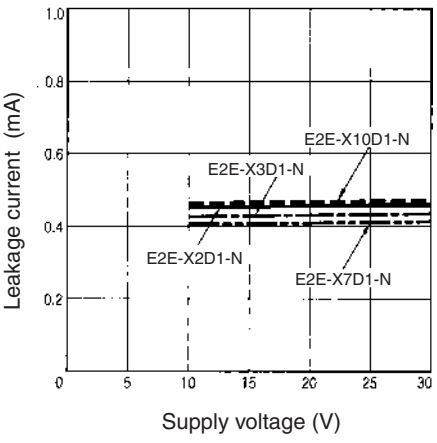


E2E-X□ME□/F□
E2E-X□MY□

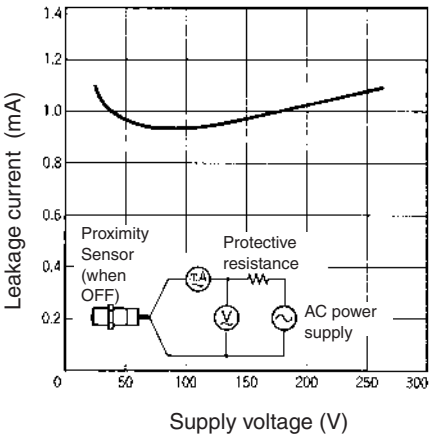


Leakage Current (Typical)

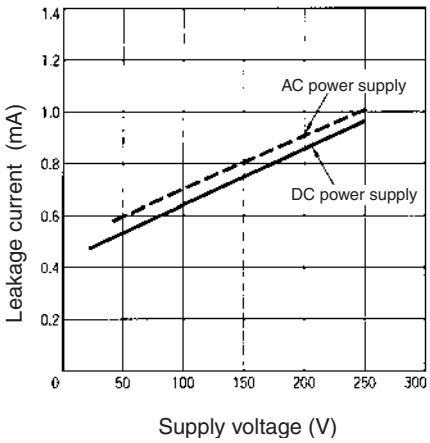
E2E-X□D□



E2E-X□Y□

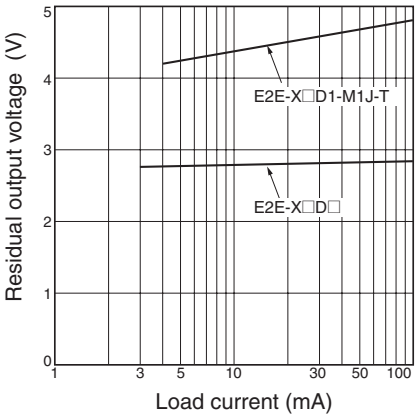


E2E-X□T1
DC/AC

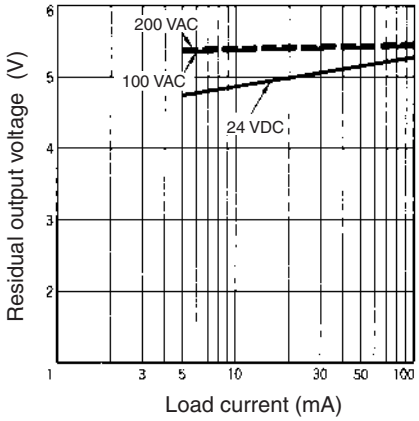


Residual Output Voltage (Typical)

E2E-X□D□

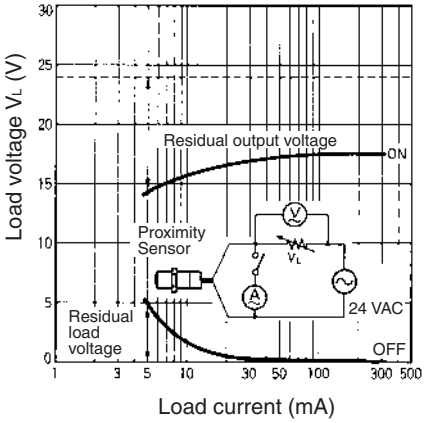


E2E-X□T1

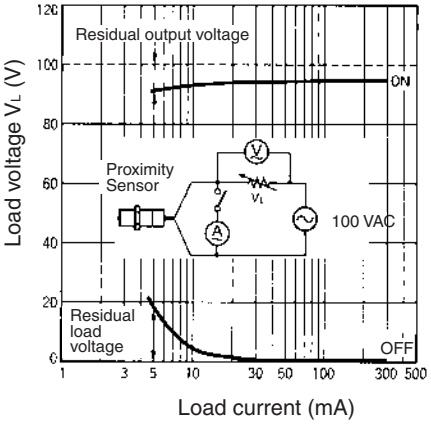


E2E-X□Y□

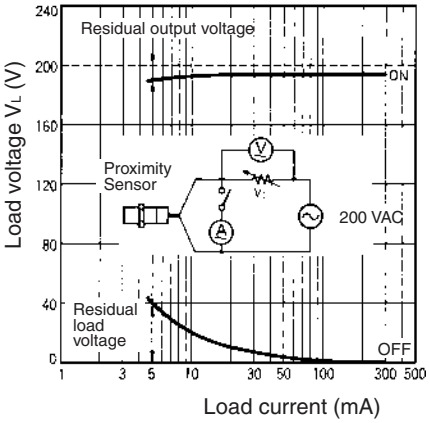
24 VAC



100 VAC

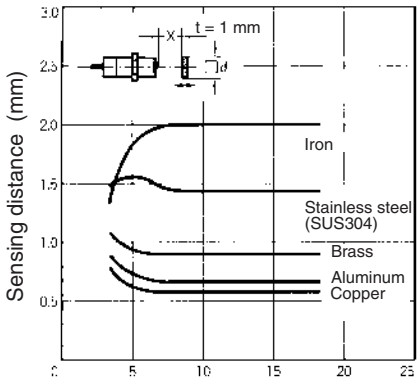


200 VAC

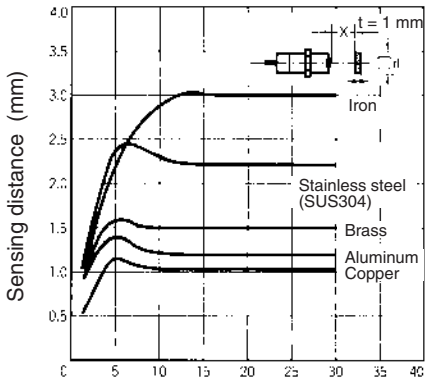


Sensing Distance vs. Sensing Object (Typical)

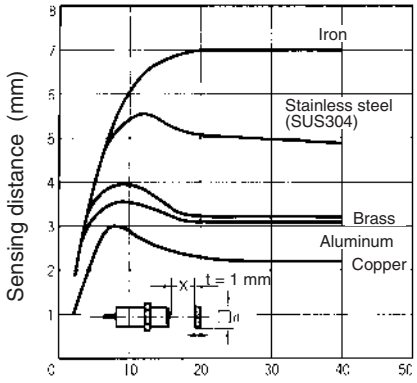
E2E-X2D□



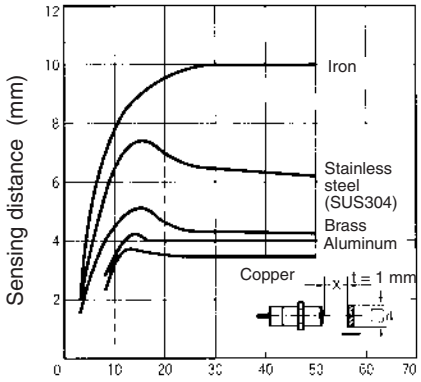
E2E-X3D□
E2E-X3T1



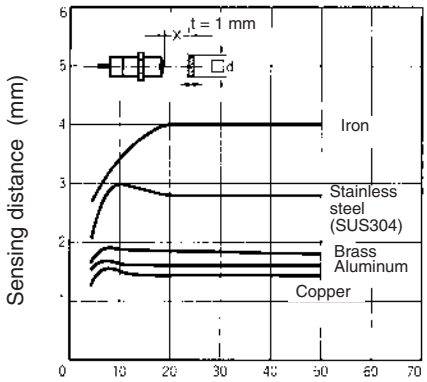
E2E-X7D□
E2E-X7T1



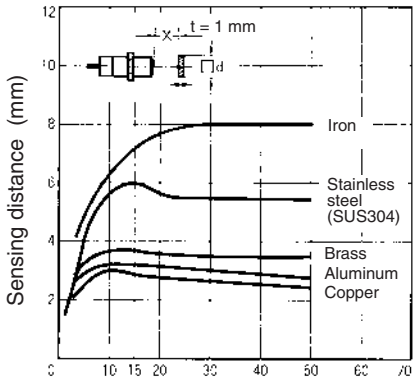
E2E-X10D□
E2E-X10T1



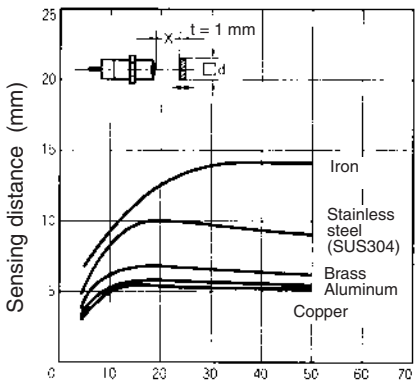
E2E-X4MD□



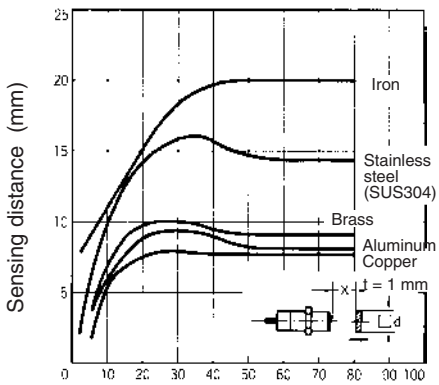
E2E-X8MD□



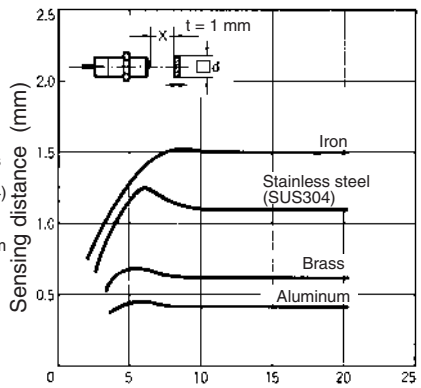
E2E-X14MD□



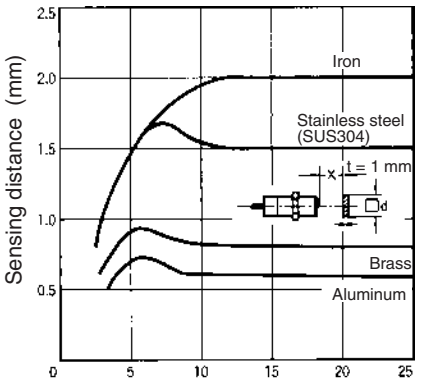
E2E-X20MD□



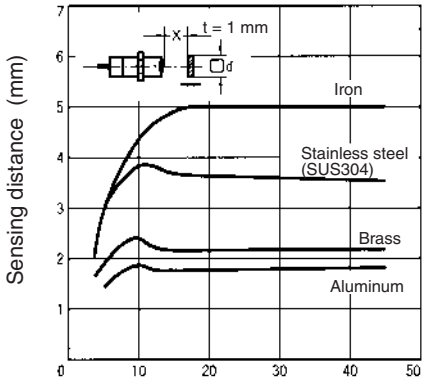
E2E-X1R5E□/F□
E2E-X1R5Y□



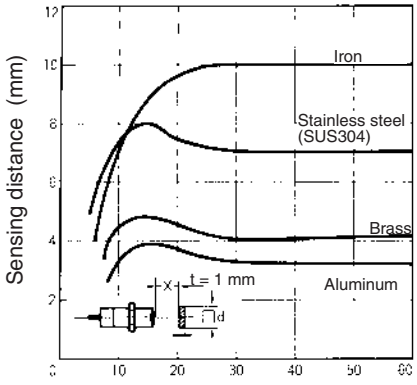
E2E-X2E□/F□
E2E-X2Y□



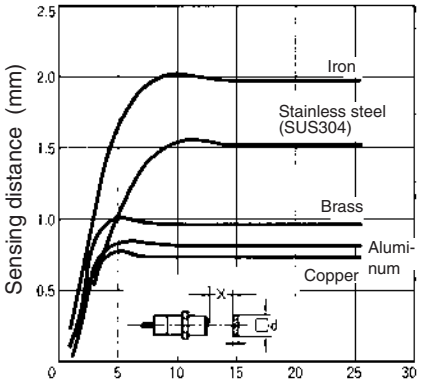
E2E-X5E□/F□
E2E-X5Y□



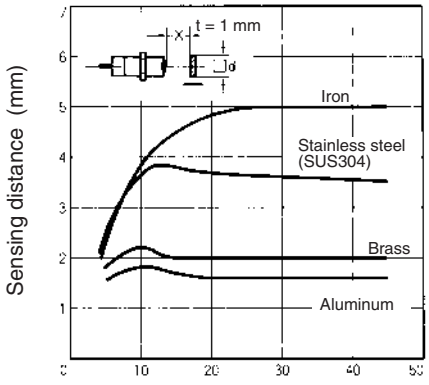
E2E-X10E□F□
E2E-X10Y□



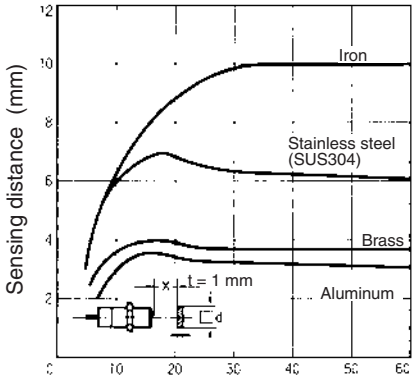
E2E-X2ME□/F□
E2E-X2MY□



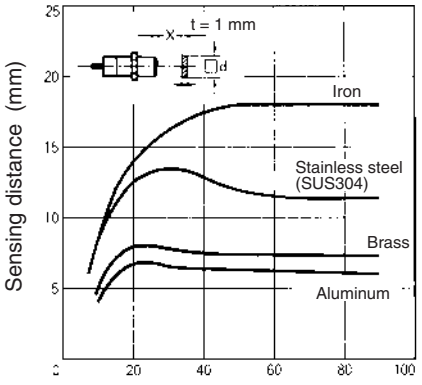
E2E-X5ME□/F□
E2E-X5MY□



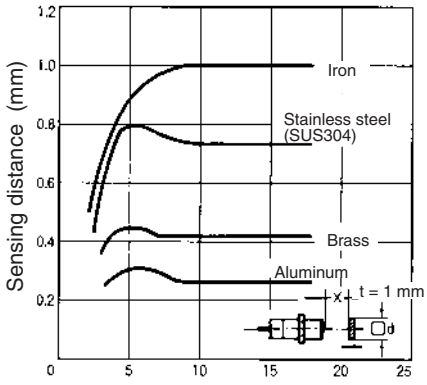
E2E-X10ME□/F□
E2E-X10MY



E2E-X18ME□/F□
E2E-X18MY□



E2E-X1□□



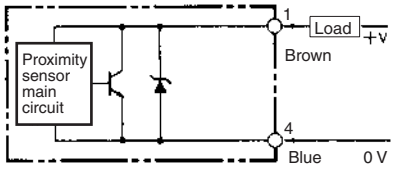
Output Circuits and Timing Charts

Output Circuits

E2E

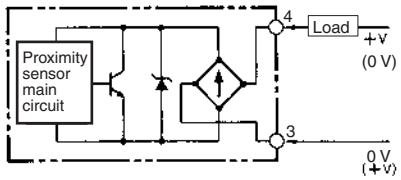
E2E-X□D□ DC 2-wire Models

E2E-X□D1
Without Diagnostic Output



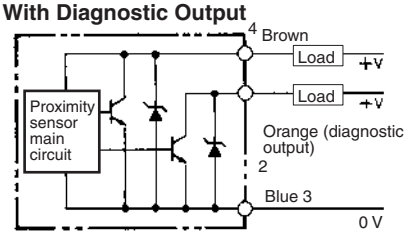
Note: 1. The load can be connected to either the +V or 0 V side.
2. The pin numbers in the above diagram are for the -M□G(J). For the -M1, pin 4 is +V and pin 3 is 0 V.

E2E-X□D1-M1J-T
No Polarity



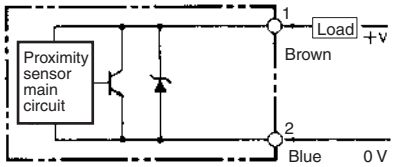
Note: 1. The load can be connected to either the +V or 0 V side.
2. The E2E-X□D1-M1J-T has no polarity. Therefore, terminals 3 and 4 have no polarity.

E2E-X□D1S
With Diagnostic Output



Note: Connect both the loads to the +V side of the control output and diagnostic output.

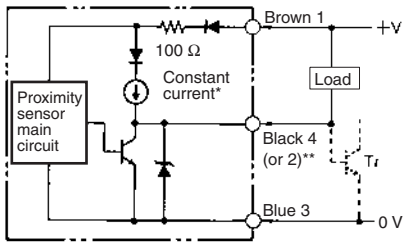
E2E-X□D2
Without Diagnostic Output



Note: 1. The load can be connected to either the +V or 0 V side.
2. The pin numbers in the above diagram are for the -M□G. For -M1 models, pin 2 is +V and pin 3 is 0 V.

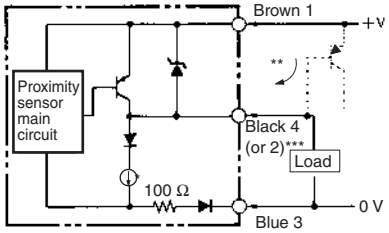
DC 3-wire Models

E2E-X□E□
NPN Output



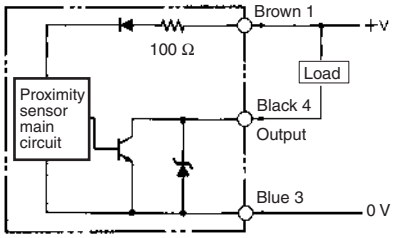
* Constant current output is 1.5 to 3 mA.
** Pin 4 is an NO contact, and pin 2 is an NC contact.

E2E-X□F□
PNP Output

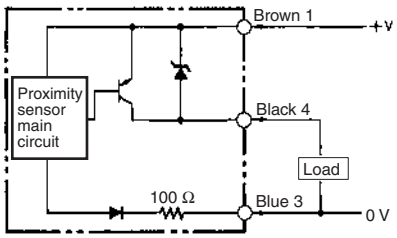


* Constant current output is 1.5 to 3 mA.
** When connecting to a Tr circuit.
*** Pin 4 is an NO contact, and pin 2 is an NC contact.

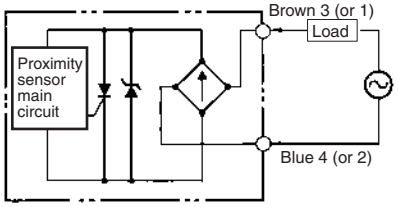
E2E-C/X□C□
NPN Open-collector Output



E2E-C/X□B□
PNP Open-collector Output

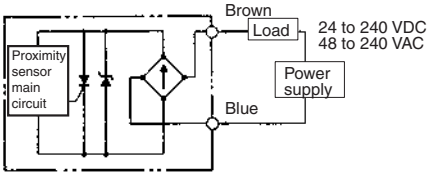


E2E-X□Y□ AC 2-wire Models



Note: For connector models, the connection between pins 3 and 4 uses an NO contact, and the connection between pins 1 and 2 uses an NC contact.

E2E-X□T1 AC/DC 2-wire Models



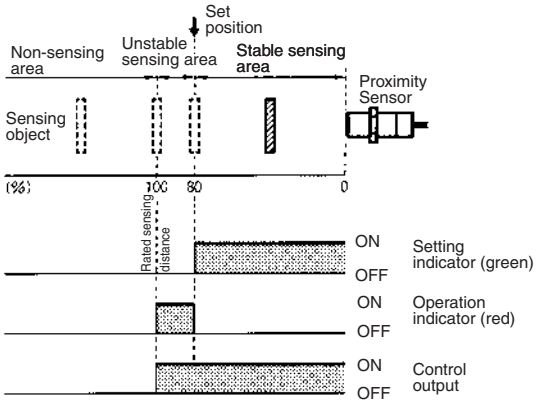
Note: The load can be connected to either the +V or 0 V side.
There is no need to be concerned about the polarity (Brown/Blue) of the Proximity Sensor.

Timing Charts

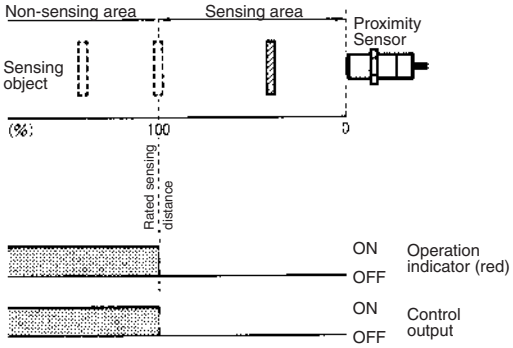
E2E

E2E-X□D□ DC 2-wire Models
E2E-X□T1 AC/DC 2-wire Models

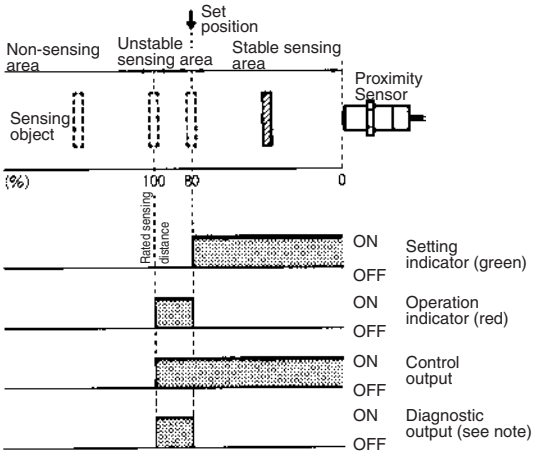
E2E-X□D1
E2E-X□T1
NO Models



E2E-X□D2
NC Models



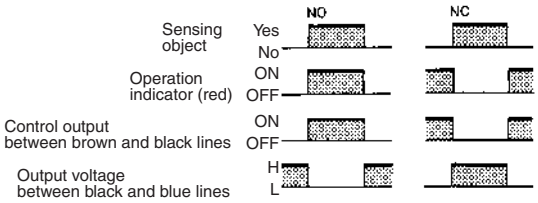
E2E-X□D1S



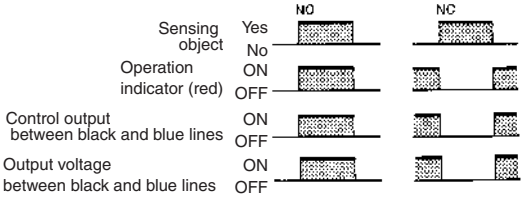
Note: The diagnostic output of the E2E-X□D1S is ON when there is a coil burnout or the sensing object is located in the unstable sensing range for 0.3 s or more.

DC 3-wire Models

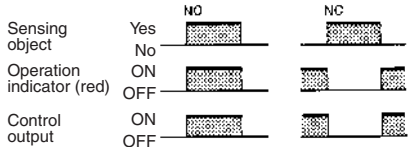
E2E-X□E□
NPN Output



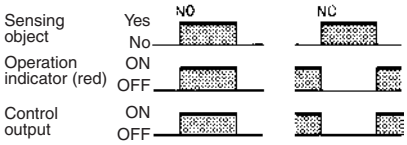
E2E-X□F□
PNP Output



E2E-C/X□C□/B□
NPN/PNP Open-collector Output



E2E-X□Y□ AC 2-wire Models



Installation

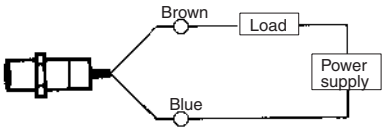
Connection

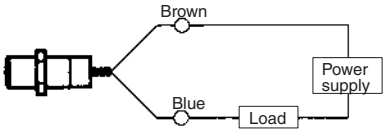
E2E

E2E-X□D□
DC 2-wire Models
(Without Diagnostic Output)

E2E-X□Y□
AC 2-wire Models

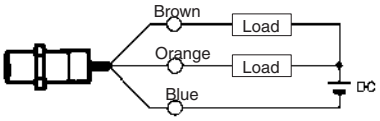
E2E-X□T1
AC/DC 2-wire Models





Note: The load can be connected as shown above.

E2E-X□D1S
DC 3-wire Models
(With Diagnostic Output)

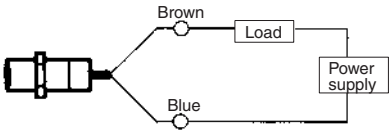


Note: The control output and diagnostic output share the negative common terminal. Therefore, the loads must be connected to the positive sides of the control output and diagnostic output.

E2E-X□D1-M1J-T
DC 2-wire Models
(No Polarity)

E2E-X□Y□
AC 2-wire Models

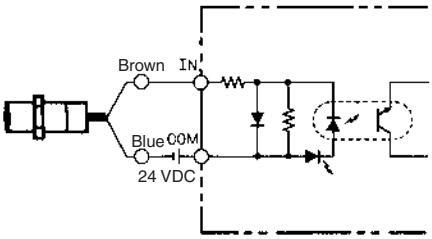
E2E-X□T1
AC/DC 2-wire Models



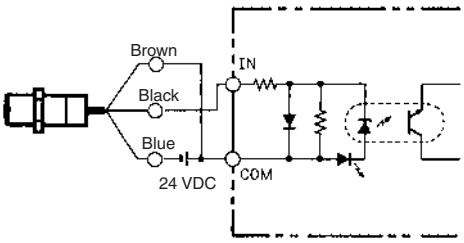
Note: There is no need to be concerned about the polarity (Brown/Blue) of the Proximity Sensor.

Connected to PC

E2E-X□D□
DC 2-wire Models

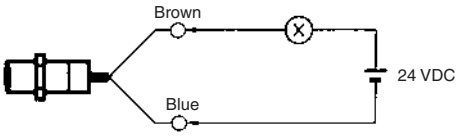


E2E-X□E□
DC 3-wire Models

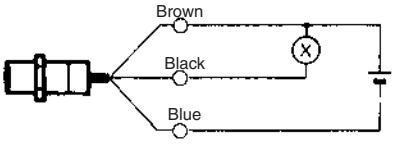


Connected to Relay Load

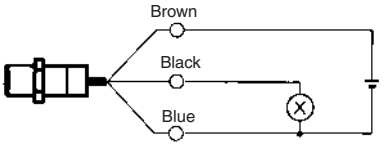
E2E-X□D□
DC 2-wire Models



E2E-X□E□
DC 3-wire Models

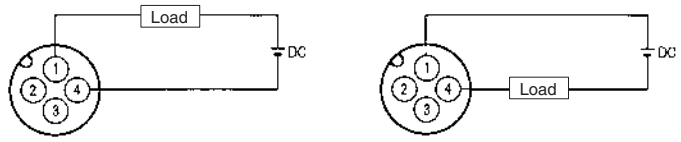
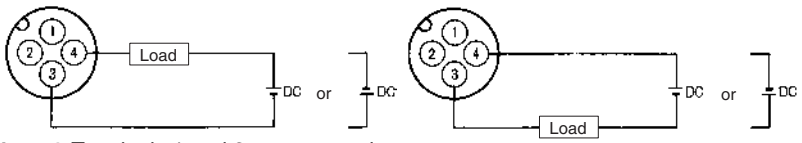
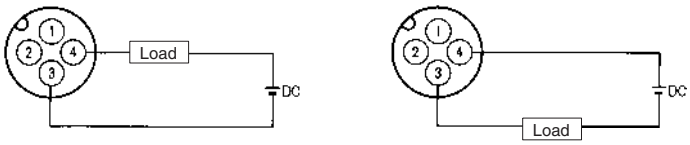
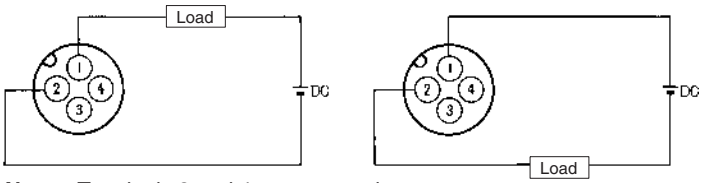
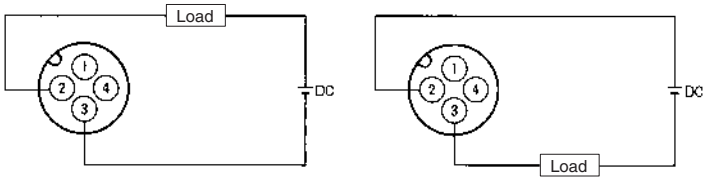
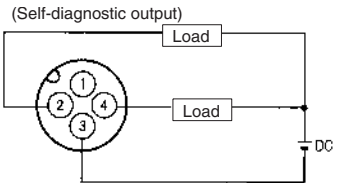
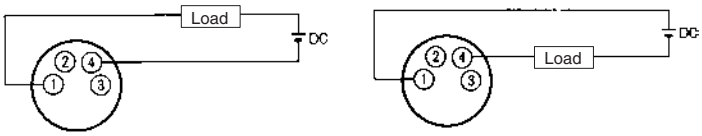
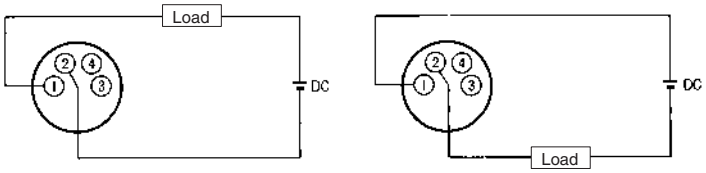


E2E-X□F□
DC 3-wire Models



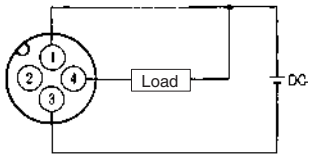
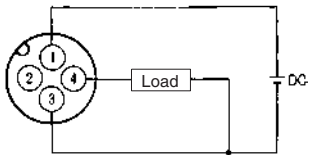
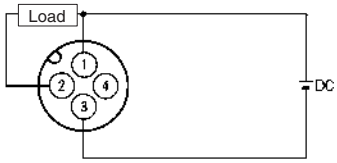
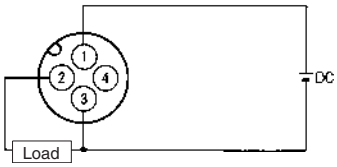
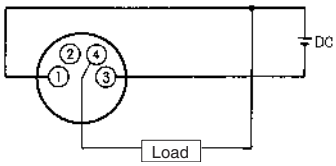
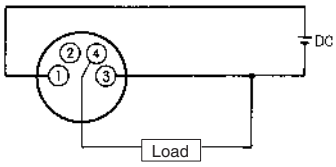
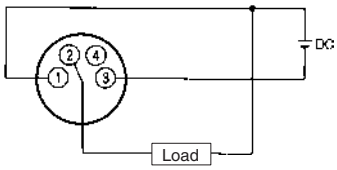
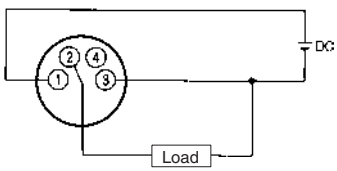
Pin Arrangement

E2E-X□D□-M□ DC 2-wire Models

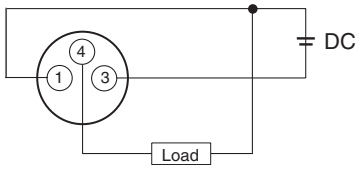
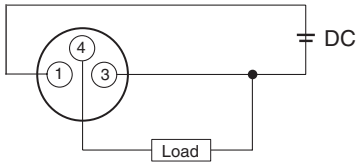
Connector	Self-diagnostic output	Operation mode	Applicable models	Pin arrangement
M12	No	NO	E2E-X□D1-M1G□ (See note.)	 **Note:** Terminals 2 and 3 are not used.
			E2E-X□D1-M1J-T	 **Note: 1.** Terminals 1 and 2 are not used. **2.** Terminals 3 and 4 has no polarity.
			E2E-X□D1-M1	 **Note:** Terminals 1 and 2 are not used.
		NC	E2E-X□D2-M1G (See note.)	 **Note:** Terminals 3 and 4 are not used.
			E2E-X□D2-M1	 **Note:** Terminal 1 is not used.
	Yes	NO	E2E-X□D1S-M1	 **Note:** Terminals 1 is not used.
M8	No	NO	E2E-X□D1-M3G	 **Note:** Terminals 2 and 3 are not used.
		NC	E2E-X□D2-M3G	 **Note:** Terminals 3 and 4 are not used.

Note: The above pin arrangements conform to IEC standards.

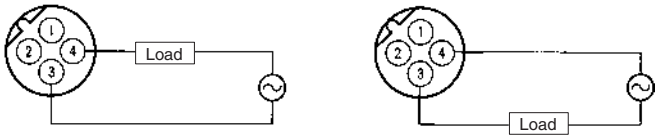
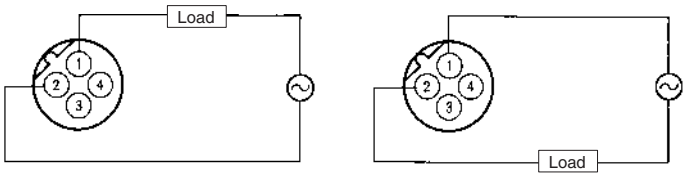
E2E-X□E/F□-M□ DC 3-wire Models

Connector	Operation mode	Applicable models	Pin arrangement
M12	NO	E2E-X□E1-M1	 **Note:** Terminal 2 is not used.
		E2E-X□F1-M1	 **Note:** Terminal 2 is not used.
	NC	E2E-X□E2-M1	 **Note:** Terminal 4 is not used.
		E2E-X□F2-M1	 **Note:** Terminal 4 is not used.
M8	NO	E2E-X□E1-M3	 **Note:** Terminal 2 is not used.
		E2E-X□F1-M3	 **Note:** Terminal 2 is not used.
	NC	E2E-X□E2-M3	 **Note:** Terminal 4 is not used.
		E2E-X□F2-M3	 **Note:** Terminal 4 is not used.

E2E-CR8C□/CR8B□/X1C□/X1B□-M5 DC 3-wire Models

Connector	Operation mode	Applicable models	Pin arrangement
M8-3pin	NO/NC	E2E-X1C□-M5	
	NO/NC	E2E-X1B□-M5	

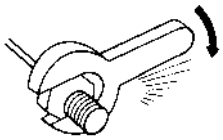
E2E-X□Y□-M1 AC 2-wire Models

Operation mode	Applicable models	Pin arrangement
NO	E2E-X□Y1-M1	 **Note:** Terminals 1 and 2 are not used.
NC	E2E-X□Y2-M1	 **Note:** Terminals 3 and 4 are not used.

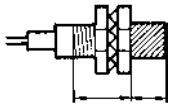
Precautions

Mounting

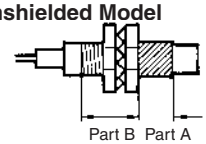
Do not tighten the nut with excessive force. A washer must be used with the nut.



Shielded Model



Unshielded Model

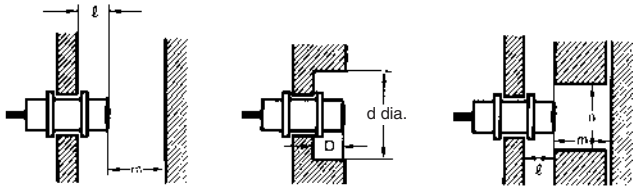


Note: The table below shows the tightening torques for part A and part B nuts. In the previous examples, the nut is on the sensor head side (part B) and hence the tightening torque for part B applies. If this nut is in part A, the tightening torque for part A applies instead.

Model		Part A		Part B
		Length	Torque	Torque
M8	Shielded	9 mm	9 N·m	12 N·m
	Unshielded	3 mm		
M12		30 N·m		
M18		70 N·m		
M30		180 N·m		

Influence of Surrounding Metal

When mounting the E2E within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the sensor.



Model		Item	M8	M12	M18	M30
E2E-X□D□ DC 2-wire E2E-X□T1 AC/DC 2-wire	Shielded	l	0 mm	0 mm	0 mm	0 mm
		d	8 mm	12 mm	18 mm	30 mm
		D	0 mm	0 mm	0 mm	0 mm
		m	4.5 mm	8 mm	20 mm	40 mm
		n	12 mm	18 mm	27 mm	45 mm
	Unshielded	l	12 mm	15 mm	22 mm	30 mm
		d	24 mm	40 mm	70 mm	90 mm
		D	12 mm	15 mm	22 mm	30 mm
		m	8 mm	20 mm	40 mm	70 mm
		n	24 mm	40 mm	70 mm	90 mm
E2E-X□E□ E2E-X□F□ DC 3-wire E2E-X□Y□ AC 2-wire DC 3-wire E2E2-X□Y□ AC 2-wire	Shielded	l	0 mm	0 mm	0 mm	0 mm
		d	8 mm	12 mm	18 mm	30 mm
		D	0 mm	0 mm	0 mm	0 mm
		m	4.5 mm	8 mm	20 mm	40 mm
		n	12 mm	18 mm	27 mm	45 mm
	Unshielded	l	6 mm	15 mm	22 mm	30 mm
		d	24 mm	40 mm	55 mm	90 mm
		D	6 mm	15 mm	22 mm	30 mm
		m	8 mm	20 mm	40 mm	70 mm
		n	24 mm	36 mm	54 mm	90 mm

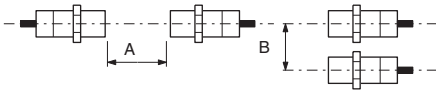
Relationship between Sizes and Models

E2E

Model		Model No.
M8	Shielded	E2E-X2D□ E2E-X1R5E□/F□ E2E-X1R5Y□
	Unshielded	E2E-X4MD□ E2E-X2ME□/F□ E2E-X2MY□
M12	Shielded	E2E-X3D□ E2E-X2E□/F□ E2E-X2Y□ E2E-X3T1
	Unshielded	E2E-X8MD□ E2E-X5ME□/F□ E2E-X5MY□
M18	Shielded	E2E-X7D□ E2E-X5E□/F□ E2E-X5Y□ E2E-X7T1
	Unshielded	E2E-X14MD□ E2E-X10ME□/F□ E2E-X10MY□
M30	Shielded	E2E-X10D□ E2E-X10E□/F□ E2E-X10Y□ E2E-X10T1
	Unshielded	E2E-X20MD□ E2E-X18ME□/F□ E2E-X18MY□

Mutual Interference

When installing two or more Sensors face to face or side by side, ensure that the minimum distances given in the following table are maintained.



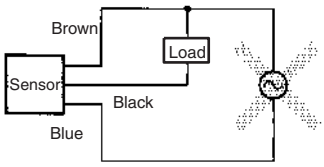
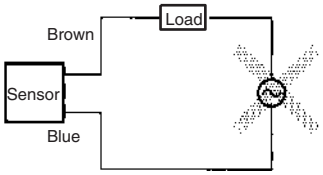
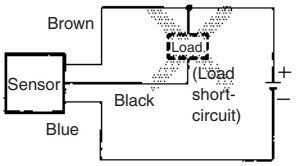
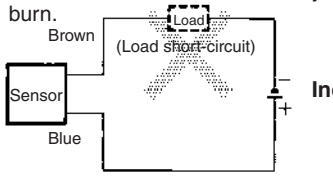
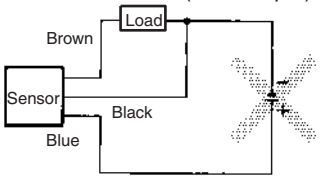
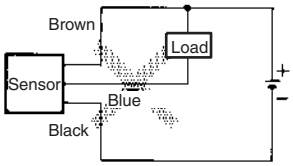
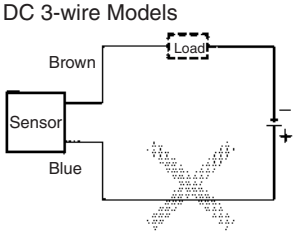
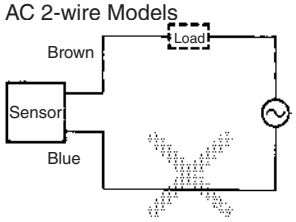
Model		Item	M8	M12	M18	M30
E2E-X□D□ DC 2-wire	Shielded	A	20 mm	30 (20) mm	50 (30) mm	100 (50) mm
		B	15 mm	20 (12) mm	35 (18) mm	70 (35) mm
E2E-X□T1 AC/DC 2-wire	Unshielded	A	80 mm	120 (60) mm	200 (100) mm	300 (100) mm
		B	60 mm	100 (50) mm	110 (60) mm	200 (100) mm
E2E-X□E□ E2E-X□F□ DC 3-wire	Shielded	A	20 mm	30 (20) mm	50 (30) mm	100 (50) mm
		B	15 mm	20 (12) mm	35 (18) mm	70 (35) mm
E2E-X□Y□ AC 2-wire	Unshielded	A	80 mm	120 (60) mm	200 (100) mm	300 (100) mm
		B	60 mm	100 (50) mm	110 (60) mm	200 (100) mm

⚠ WARNING

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

Precautions for Safe Use

The colors in parentheses are previous wire colors.

Item	Examples	
Power supply Do not impose an excessive voltage on the E2E, otherwise it may explode or burn. Do not impose 100 VAC on any E2E DC Model, otherwise it may explode or burn.	DC 3-wire Models  Incorrect	DC 2-wire Models  Incorrect
Load short-circuit Do not short-circuit the load, or the E2E may explode or burn. The E2E short-circuit protection function is valid if the polarity of the supply voltage imposed is correct and within the rated voltage range.	DC 3-wire Models (NPN output)  Incorrect	DC 2-wire Models The following diagram shows that the load is short-circuited while the polarity of the supply voltage imposed on the E2E/E2E2 is wrong, in which case the E2E/E2E2 may explode or burn.  Incorrect
Wiring Be sure to wire the E2E and load correctly, otherwise it may explode or burn.	DC 3-wire Models (NPN output)  Incorrect  Incorrect	
Connection with no load Make sure to connect a proper load to the E2E in operation, otherwise it may explode or burn.	DC 3-wire Models  Incorrect	AC 2-wire Models  Incorrect

Precautions for Correct Use

Installation

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If power supplies are connected to the Proximity Sensor and load respectively, be sure to supply power to the Proximity Sensor before supplying power to the load.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended to turn OFF the load before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Sensing Object

Metal Coating:
The sensing distances of the Proximity Sensor vary with the metal coating on sensing objects.

Wiring

High-tension Lines

Wiring through Metal Conduit

If there is a power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Connecting Load to AC/DC 2-wire Sensor

Refer to the following before using AC or DC 2-wire Proximity Sensors.

Surge Protection

Although the Proximity Sensor has a surge absorption circuit, if there is any machine that has a large surge current (e.g., a motor or welding machine) near the Proximity Sensor, connect a surge absorber to the machine.

Leakage Current

When the Proximity Sensor is OFF, the Proximity Sensor has leakage current. Refer to page 127 Leakage Current Characteristics. In this case, the load is imposed with a small voltage and the load may not be reset. Before using the Proximity Sensor, make sure that this voltage is less than the load reset voltage. The AC 2-wire Proximity Sensor cannot be connected to any card-lift-off relay (e.g., the G2A) because contact vibration of the relay will be caused by the leakage current and the life of the relay will be shortened.

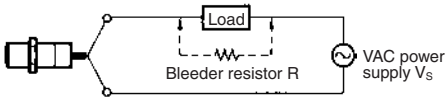
Loads with Large Inrush Currents (E2E-X□T□)

Connecting a load that has a large inrush current (e.g., a lamp or motor) may result in a malfunction due to the inrush current causing a load short-circuit.

Countermeasures Against Leakage Current

AC 2-wire Models

Connect a bleeder resistor as the bypass for the leakage current so that the current flowing into the load will be less than the load reset current.
As shown in the following diagram, connect the bleeder resistor so that the current flowing into the Proximity Sensor will be 10 mA minimum and the residual voltage imposed on the load will be less than the load reset voltage.



Refer to the following to calculate the bleeder resistance and the allowable power of the bleeder resistor.

$R \leq Vs/(10 - I)$ (kΩ)

$P > Vs^2/R$ (mW)

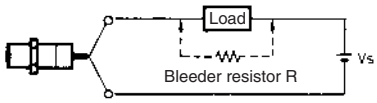
P: The allowable power of the bleeder resistor. (The actual power capacity of the bleeder resistor must be at least a few times as large as the allowable power of the bleeder resistor.)

I: Load current (mA)

The following resistors are recommended.
100 VAC (supply voltage): A resistor with a resistance of 10 kΩ maximum and an allowable power of 3 W minimum
200 VAC (supply voltage): A resistor with a resistance of 20 kΩ maximum and an allowable power of 10 W minimum
If these resistors generate excessive heat, use a resistor with a resistance of 10 kΩ maximum and an allowable power of 5 W minimum at 100 VAC and a resistor with a resistance of 20 kΩ maximum and an allowable power of 10 W minimum at 200 VAC instead.

DC 2-wire Models

Connect a bleeder resistor as the bypass for the leakage current so that the current flowing into the load will be less than the load reset current.



Refer to the following to calculate the bleeder resistance and the allowable power of the bleeder resistor.

$R \leq Vs/(iR - ioff)$ (kΩ)

$P > Vs^2/R$ (mW)

P: The allowable power of the bleeder resistor. (The actual power capacity of the bleeder resistor must be at least a few times as large as the allowable power of the bleeder resistor.)

iR: Leakage current of Sensors (mA)

ioff: Release current of load (mA)

The following resistors are recommended.
12 VDC (supply voltage): A resistor with a resistance of 15 kΩ maximum and an allowable power of 450 mW minimum
24 VDC (supply voltage): A resistor with a resistance of 30 kΩ maximum and an allowable power of 0.1 W minimum

Cable Tractive Force

Do not pull on cables with tractive forces exceeding the following.

Diameter	Tractive force
4 dia. max.	30 N max.
4 dia. min.	50 N max.

Mounting

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Environment

Water Resistivity

The Proximity Sensors are tested intensively on water resistance, but in order to ensure maximum performance and life expectancy avoid immersion in water and provide protection from rain or snow.

Operating Enviroment

Ensure the usage of the Proximity Sensor within its operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistive, a cover to protect the Proximity Sensor from water or water soluble machining oil is recommended so that its reliability and life expectancy can be maintained.
Do not use the Proximity Sensor in an environment with chemical gas (e.g., strong alkaline or acid gasses including nitric, chromic, and concentrated sulfuric acid gases).

Connection to a PLC

Required Conditions

Connection to a PLC is possible if the specifications of the PLC and the Proximity Sensor satisfy the following conditions. (The meanings of the symbols are given below.)

1. The ON voltage of the PLC and the residual voltage of the Proximity Sensor must satisfy the following.
   $V_{ON} \leq V_{CC} - V_R$
2. The OFF current of the PLC and the leakage current of the Proximity Sensor must satisfy the following.
   $I_{OFF} \geq I_{leak}$
   (If the OFF current is not listed in the specifications, take it to be 1.3 mA.)
3. The ON current of the PLC and the control output (I_{OUT}) of the Proximity Sensor must satisfy the following.
   $I_{OUT(min)} \leq I_{ON} \leq I_{OUT(max)}$
   The ON current of the PLC will vary, however, with the power supply voltage and the input impedance used as shown in the following equation.
   $I_{ON} = (V_{CC} - V_R - V_{PC})/R_{IN}$

Example

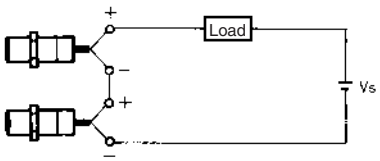
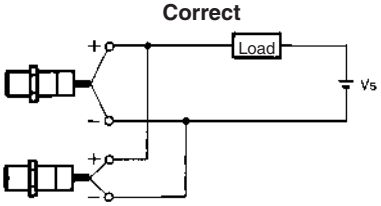
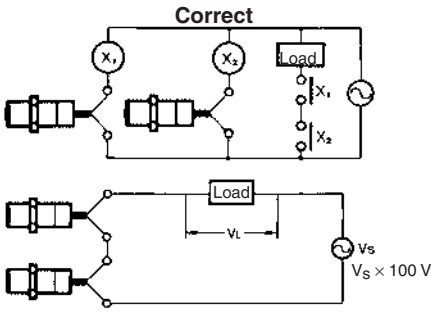
In this example, the above conditions are checked for when the PLC model is the C200H-ID212, the Proximity Sensor model is the E2E-X7D1-N, and the power supply voltage is 24 V.

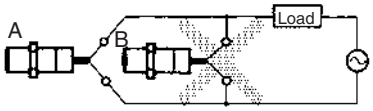
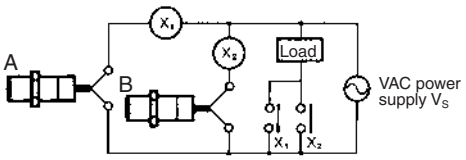
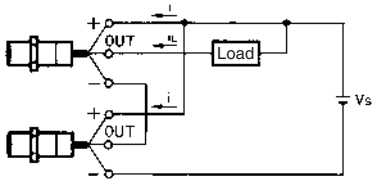
1. V_{ON} (14.4 V) $\leq V_{CC}$ (20.4 V) – V_R (3 V) = 17.4 V: OK
2. I_{OFF} (1.3 mA) ≥ I_{leak} (0.8 mA): OK
3. $I_{ON} = [V_{CC}$ (20.4 V) – V_R (3 V) – V_{PC} (4 V)]/R_{IN} (3 kΩ)
   ≈ 4.5 mA
   Therefore,
   $I_{OUT(min)}$ (3 mA) $\leq I_{ON}$ (4.5 mA): OK

V_{ON}: ON voltage of PLC (14.4 V)
I_{ON}: ON current of PLC (typ. 7 mA)
I_{OFF}: OFF current of PLC (1.3 mA)
R_{IN}: Input impedance of PLC (3 kΩ)
V_{PC}: Internal residual voltage of PLC (4 V)
V_R: Output residual voltage of Proximity Sensor (3 V)
I_{leak}: Leakage current of Proximity Sensor (0.8 mA)
I_{OUT}: Control output of Proximity Sensor (3 to 100 mA)
V_{CC}: Power supply voltage (PLC: 20.4 to 26.4 V)
Values in parentheses are for the following PLC model and Proximity Sensor model.
PLC: C200H-ID212
Proximity Sensor: E2E-X7D1-N

Precautions for AC/DC 2-wire Proximity Sensors in Operation

Connection

Model	Connection type	Method	Description
DC 2-wire	AND (serial connection)	Correct 	The Sensors connected together must satisfy the following conditions. $V_S - N \times V_R \geq$ Load operating voltage N: No. of Sensors V_R: Residual voltage of each Sensor V_S: Supply voltage If each Proximity Sensor is not supplied with the rated voltage and current, the indicator will not be lit properly or unnecessary pulses may be output for approximately 1 ms.
	OR (parallel connection)	Correct 	The Sensors connected together must satisfy the following conditions. N x i ≤Load reset current N: No. of Sensors i: Leakage current of each Sensor If the MY Relay, which operates at 24 VDC, is used as a load for example, a maximum of four Proximity Sensors can be connected to the load.
AC 2-wire	AND (serial connection)	Incorrect  Correct 	If 100 or 200 VAC is imposed on the Proximity Sensors, V_L (i.e., the voltage imposed on the load) will be obtained from the following. $V_L = V_S$ – (residual voltage x No. of Proximity Sensors) (V) Therefore, if V_L is lower than the load operating voltage, the load will not operate. A maximum of three Proximity Sensors can be connected in series provided that the supply voltage is 100 V minimum.

Model	Connection type	Method	Description
AC 2-wire	OR (parallel connection)	**Incorrect**  **Correct**  	In principle, more than two Proximity Sensors cannot be connected in parallel. Provided that Proximity Sensor A does not operate with Proximity Sensor B simultaneously and there is no need to keep the load operating continuously, the Proximity Sensors can be connected in parallel. In this case, however, due to the total leakage current of the Proximity Sensors, the load may not reset properly. It is not possible to keep the load operating continuously with Proximity Sensors A and B in simultaneous operation to sense sensing objects due to the following reason. When Proximity Sensor A is ON, the voltage imposed on Proximity Sensor A will drop to approximately 10 V and the load current flows into Proximity Sensor A, and when one of the sensing objects is close to Proximity Sensor B, Proximity Sensor B will not operate because the voltage imposed on Proximity Sensor B is 10 V, which is too low. When Proximity Sensor A is OFF, the voltage imposed on Proximity Sensor B will reach the supply voltage and Proximity Sensor B will be ON. Then, Proximity Sensor A as well as Proximity Sensor B will be OFF for approximately 10 ms, which resets the load for an instant. To prevent the instantaneous resetting of the load, use a relay as shown on the left.
DC 3-wire	AND (serial connection)	**Correct**  	The Sensors connected together must satisfy the following conditions. $i_L + (N - 1) \times i \leq$ Upper-limit of control output of each Sensor $V_S - N \times V_R \geq$ Load operating voltage N: No. of Sensors V_R: Residual voltage of each Sensor V_S: Supply voltage i: Current consumption of the Sensor i_L: Load current If the MY Relay, which operates at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to the load.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

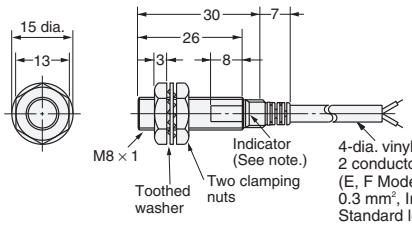
E2E

Model			DC 2-wire		DC 3-wire		AC 2-wire		AC/DC 2-wire	
			Model No.	Figure No.	Model No.	Figure No.	Model No.	Figure No.	Model No.	Figure No.
Pre-wired	**Shielded**	**M8**	E2E-X2D□-N	4	E2E-X1R5E□/F□	4	E2E-X1R5Y□	6		
		M12	E2E-X3D□-N	8	E2E-X2E□/F□	8	E2E-X2Y□	10	E2E-X3T1	12
		M18	E2E-X7D□-N	13	E2E-X5E□/F□	13	E2E-X5Y□	13	E2E-X7T1	13
		M30	E2E-X10D□-N	15	E2E-X10E□/F□	15	E2E-X10Y□	15	E2E-X10T1	15
	Unshielded	**M8**	E2E-X4MD□	5	E2E-X2ME□/F□	5	E2E-X2MY□	7	---	---
		M12	E2E-X8MD□	9	E2E-X5ME□/F□	9	E2E-X5MY□	11		
		M18	E2E-X14MD□	14	E2E-X10ME□/F□	14	E2E-X10MY□	14		
		M30	E2E-X20MD□	16	E2E-X18ME□/F□	16	E2E-X18MY□	16		
Connector (M12)	**Shielded**	**M8**	E2E-X2D□-M1(G)	17	E2E-X1R5E□-M1/F□-M1	17	---	---	---	---
		M12	E2E-X3D□-M1(G)	19	E2E-X2E□-M1/F□-M1	19	E2E-X2Y□-M1	21		
		M18	E2E-X7D□-M1(G)	23	E2E-X5E□-M1/F□-M1	23	E2E-X5Y□-M1	23		
		M30	E2E-X10D□-M1(G)	25	E2E-X10E□-M1/F□-M1	25	E2E-X10Y□-M1	25		
	Unshielded	**M8**	E2E-X4MD□-M1(G)	18	E2E-X2ME□-M1/F□-M1	18	---	---	---	---
		M12	E2E-X8MD□-M1(G)	20	E2E-X5ME□-M1/F□-M1	20	E2E-X5MY□-M1	22		
		M18	E2E-X14MD□-M1(G)	24	E2E-X10ME□-M1/F□-M1	24	E2E-X10MY□-M1	24		
		M30	E2E-X20MD□-M1(G)	26	E2E-X18ME□-M1/F□-M1	26	E2E-X18MY□-M1	26		
Connector (M8)	**Shielded**	**M8**	E2E-X2D□-M3G	27	E2E-X1R5E□-M3/F□-M3	27	---	---	---	---
	Unshielded		E2E-X4MD□-M3G	28	E2E-X2ME□-M3/F□-M3	28				
Pre-wired connector	**Shielded**	**M12**	E2E-X3D1-M1GJ	29	---	---	---	---	---	---
		M18	E2E-X7D1-M1GJ	31						
		M30	E2E-X10D1-M1GJ	33						
	Unshielded	**M12**	E2E-X8MD1-M1GJ	30	---	---	---	---	---	---
		M18	E2E-X14MD1-M1GJ	32						
		M30	E2E-X20MD1-M1GJ	34						
Pre-wired connector (no polarity)	**Shielded**	**M12**	E2E-X3D1-M1J-T	29	---	---	---	---	---	---
		M18	E2E-X7D1-M1J-T	31						
		M30	E2E-X10D1-M1J-T	33						

Note: 1. Two clamping nuts and one toothed washer are provided with M8 to M30 Models.
2. The model numbers of Pre-wired M8 to M30 Models are laser-marked on the milled section and cable section.

Pre-wired Models (Shielded)

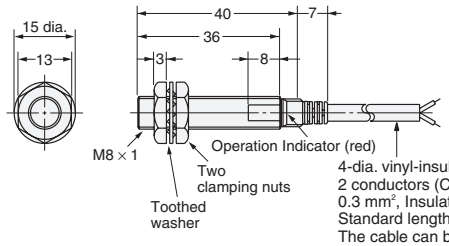
Fig. 4 : E2E-X2D□-N
E2E-X1R5E□/F□



Note: D Models: Operation indicator (red), setting indicator (green);
E, F Models: Operation indicator (red)

4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E, F Models)(Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
Robotics cable Models: 4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E Models)(Conductor cross section: 0.3 mm², Insulator diameter: 1.27 mm), Standard length: 2 m
The cable can be exteded up to 200 m (separate metal conduit).

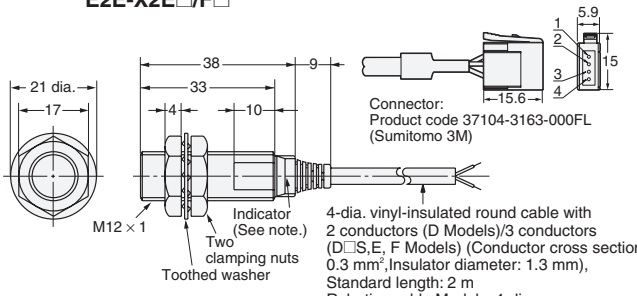
Fig. 6 : E2E-X1R5Y□



4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
The cable can be exteded up to 200 m (separate metal conduit).

Fig. 8 : E2E-X3D□-N
E2E-X2E□/F□

Pre-wired e-CON connector Model

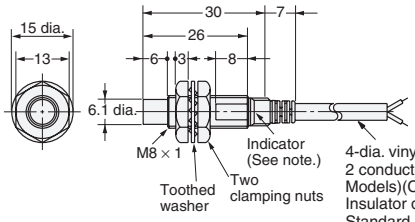


Note: D Models:
Operation indicator (red), setting indicator (green);
E, F Models:
Operation indicator (red)

4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (D□S,E, F Models) (Conductor cross section: 0.3 mm²,Insulator diameter: 1.3 mm), Standard length: 2 m
Robotics cable Models: 4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E Models) (Conductor cross section: 0.3 mm², Insulator diameter: 1.27 mm), Standard length: 2 m
The cable can be extended (separate metal conduit) up to 200 m (control output) or up to 100 m (diagnostic output).

Pre-wired Models (Unshielded)

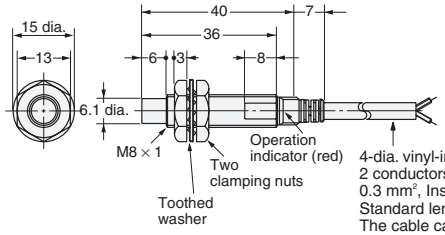
Fig. 5 : E2E-X4MD□
E2E-X2ME□/F□



Note: D Models: Operation indicator (red), setting indicator (green);
E, F Models: Operation indicator (red)

4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E, F Models)(Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
Robotics cable models: 4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E Models)(Conductor cross section: 0.3 mm², Insulator diameter: 1.27 mm), Standard length: 2 m
The cable can be exteded up to 200 m (separate metal conduit).

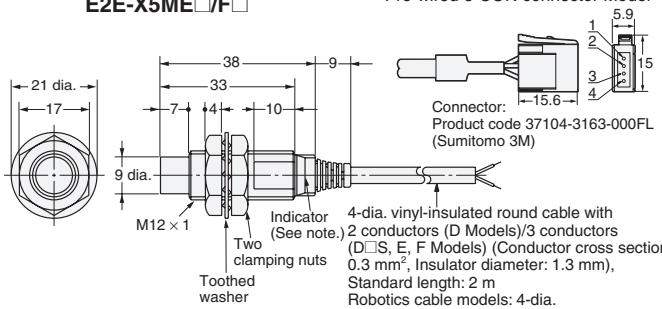
Fig. 7 : E2E-X2MY□



4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
The cable can be exteded up to 200 m (separate metal conduit).

Fig. 9 : E2E-X8MD□
E2E-X5ME□/F□

Pre-wired e-CON connector Model

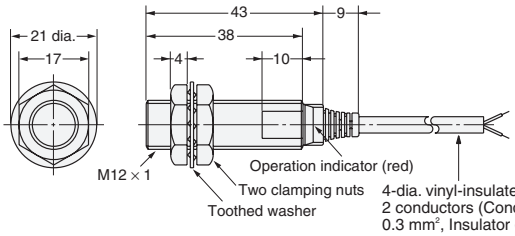


Note: D Models:
Operation indicator (red), setting indicator (green);
E, F Models:
Operation indicator (red)

4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (D□S, E, F Models) (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
Robotics cable models: 4-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E Models) (Conductor cross section: 0.3 mm², Insulator diameter: 1.27 mm), Standard length: 2 m
The cable can be extended (separate metal conduit) up to 200 m (control output) or up to 100 m (diagnostic output).

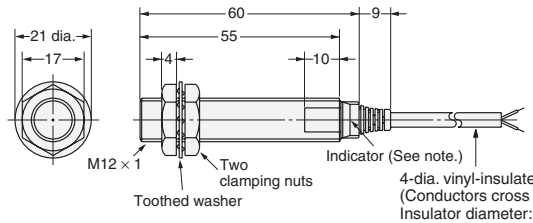
Pre-wired Models (Shielded)

Fig. 10 : E2E-X2Y□



4-dia. vinyl-insulated round cable with 2 conductors (Conductors cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
The cable can be extended up to 200 m (separate metal conduit).

Fig. 12 : E2E-X3T1

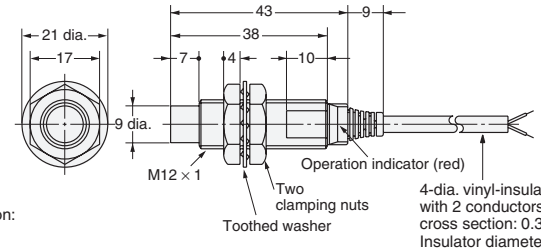


4-dia. vinyl-insulated round cable with 2 conductors (Conductors cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
The cable can be extended up to 200 m (separate metal conduit).

Note: Operation indicator (red), setting indicator (green)

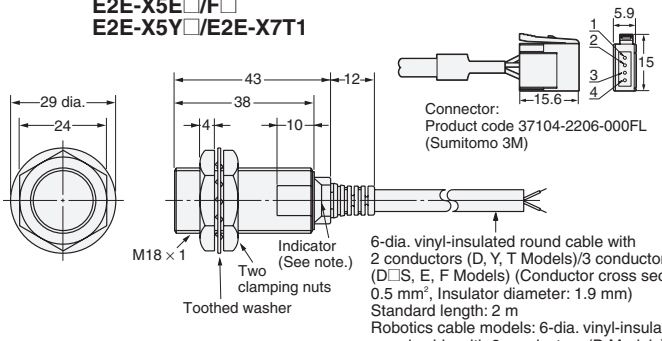
Pre-wired Models (Unshielded)

Fig. 11 : E2E-X5MY□



4-dia. vinyl-insulated round cable with 2 conductors (Conductors cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
The cable can be extended up to 200 m (separate metal conduit).

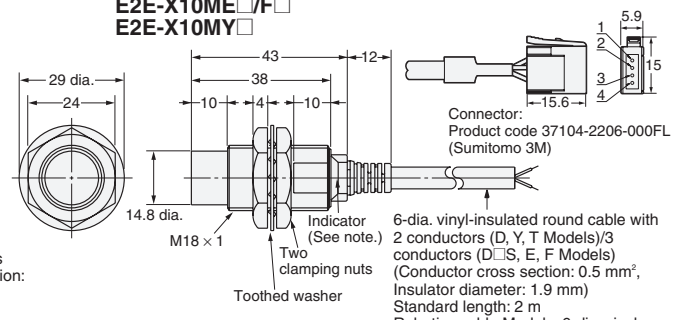
Fig. 13 : E2E-X7D□-N/ E2E-X5E□/F□ E2E-X5Y□/E2E-X7T1



6-dia. vinyl-insulated round cable with 2 conductors (D, Y, T Models)/3 conductors (D□S, E, F Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm)
Standard length: 2 m
Robotics cable models: 6-dia. vinyl-insulated round cable with 2 conductors (D Models)/ 3 conductors (E Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.74 mm)
Standard length: 2 m
The cable can be extended (separate metal conduit) up to 200 m (control output) or up to 100 m (diagnostic output).

Note: D, T Models: Operation indicator (red), setting indicator (green);
E, F, Y Models: Operation indicator (red)

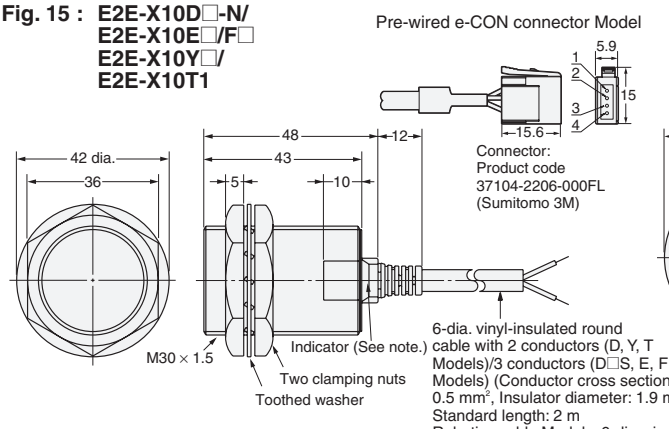
Fig. 14 : E2E-X14MD□/ E2E-X10ME□/F□ E2E-X10MY□



6-dia. vinyl-insulated round cable with 2 conductors (D, Y, T Models)/3 conductors (D□S, E, F Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm)
Standard length: 2 m
Robotics cable Models: 6-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.74 mm)
Standard length: 2 m
The cable can be extended (separate metal conduit) up to 200 m (control output) or up to 100 m (diagnostic output).

Note: D Models: Operation indicator (red), setting indicator (green);
E, F, Y Models: Operation indicator (red)

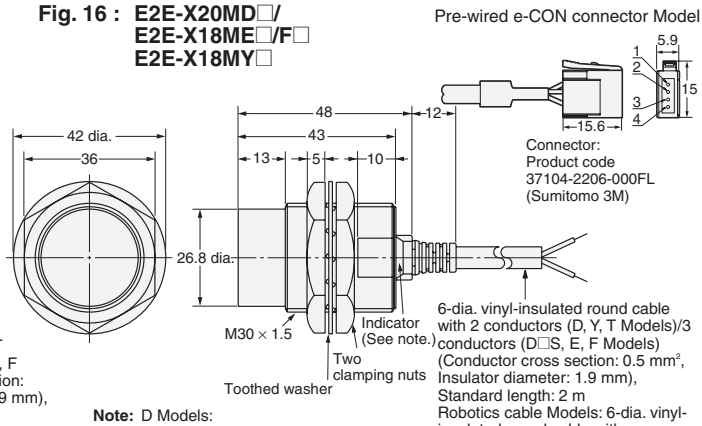
Fig. 15 : E2E-X10D□-N/ E2E-X10E□/F□ E2E-X10Y□/ E2E-X10T1



6-dia. vinyl-insulated round cable with 2 conductors (D, Y, T Models)/3 conductors (D□S, E, F Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
Robotics cable Models: 6-dia. vinyl-insulated round cable with 2 conductors (D Models)/3 conductors (E Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.74 mm), Standard length: 2 m
The cable can be extended (separate metal conduit) up to 200 m (control output) or up to 100 m (diagnostic output).

Note: D, T Models: Operation indicator (red), setting indicator (green);
E,F,Y Models: Operation indicator (red)

Fig. 16 : E2E-X20MD□/ E2E-X18ME□/F□ E2E-X18MY□

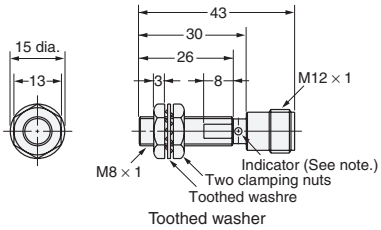


6-dia. vinyl-insulated round cable with 2 conductors (D, Y, T Models)/3 conductors (D□S, E, F Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
Robotics cable Models: 6-dia. vinyl-insulated round cable with 2 conductors (D Models)/ 3 conductors (E Models) (Conductor cross section: 0.5 mm², Insulator diameter: 1.74 mm), Standard length: 2 m
The cable can be extended (separate metal conduit) up to 200 m (control output) or up to 100 m (diagnostic output).

Note: D Models: Operation indicator (red), setting indicator (green);
E, F, Y Models: Operation indicator (red)

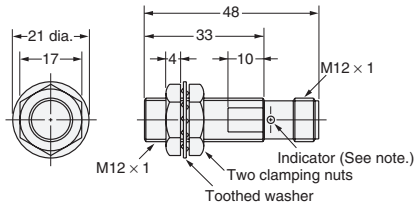
M12 Connector Models (Shielded)

**Fig. 17 : E2E-X2D□-M1(G)
E2E-X1R5E□-M1/F□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F Model: Operation indicator (red)

**Fig. 19 : E2E-X3D□-M1(G)
E2E-X2E□-M1/F□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F Model: Operation indicator (red)

Fig. 21 : E2E-X2Y□-M1

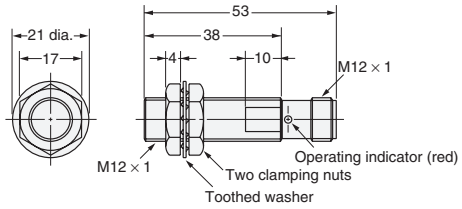
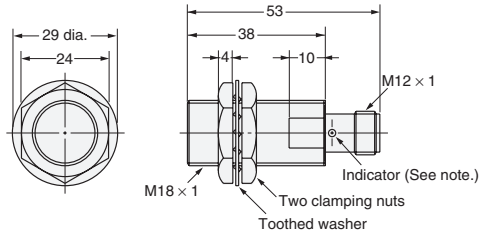
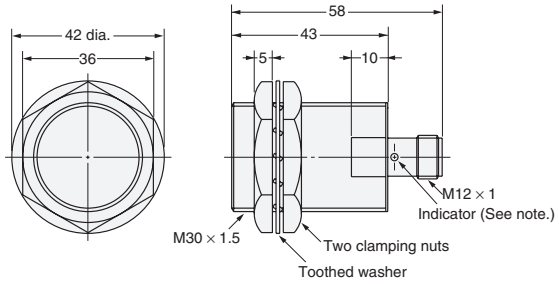


**Fig. 23 : E2E-X7D□-M1(G)/E2E-X5E□-M1/F□-M1
E2E-X5Y□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F, Y Model: Operation indicator (red)

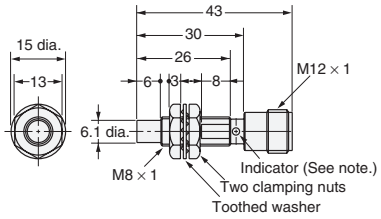
**Fig. 25 : E2E-X10D□-M1(G)/E2E-X10E□-M1/F□-M1
E2E-X10Y□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F, Y Model: Operation indicator (red)

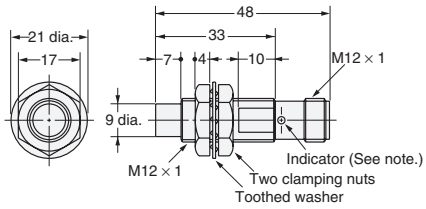
M12 Connector Models (Unshielded)

**Fig. 18 : E2E-X4MD□-M1(G)
E2E-X2ME□-M1/F□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F Model: Operation indicator (red)

**Fig. 20 : E2E-X8MD□-M1(G)
E2E-X5ME□-M1/F□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F Model: Operation indicator (red)

Fig. 22 : E2E-X5MY□-M1

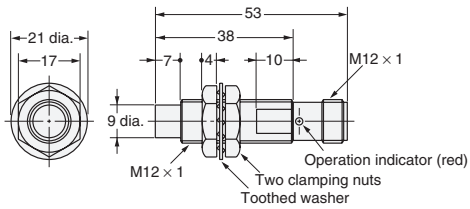
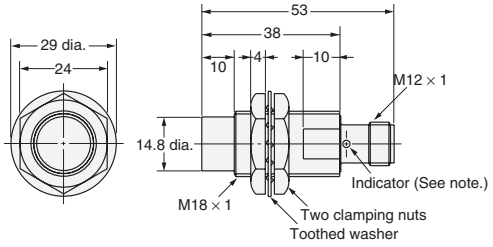
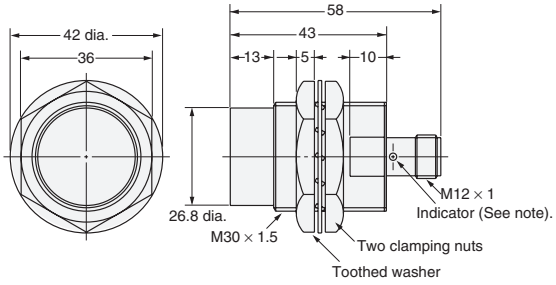


**Fig. 24 : E2E-X14MD□-M1(G)/E2E-X10ME□-M1/F□-M1
E2E-X10MY□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F, Y Model: Operation indicator (red)

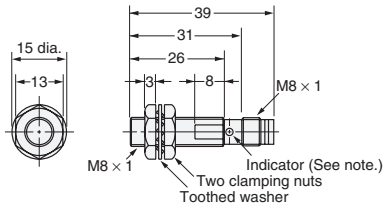
**Fig. 26 : E2E-X20MD□-M1(G)/E2E-X18ME□-M1/F□-M1
E2E-X18MY□-M1**



Note: D Models: Operation indicator (red), setting indicator (green)
E, F, Y Model: Operation indicator (red)

M8 Connector Models (Shielded)

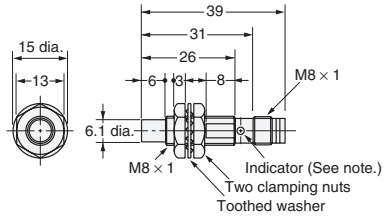
Fig. 27 : E2E-X2D□-M3G/E2E-X1R5E□-M3/F□-M3



Note: D models: Operation indicator (red), setting indicator (green)
E, F model: Operation indicator (red)

M8 Connector Models (Unshielded)

Fig. 28 : E2E-X4MD□-M3G/E2E-X2ME□-M3/F□-M3



Note: D models: Operation indicator (red), setting indicator (green)
E, F model: Operation indicator (red)

Pre-wired M12 Connector Models

Fig. 29 : E2E-X3D1-M1GJ
E2E-X3D1-M1J-T

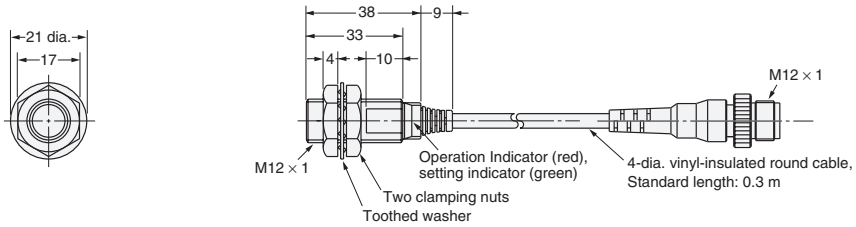


Fig. 30 : E2E-X8MD1-M1GJ

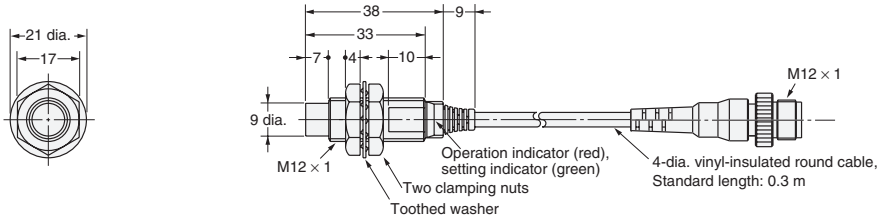
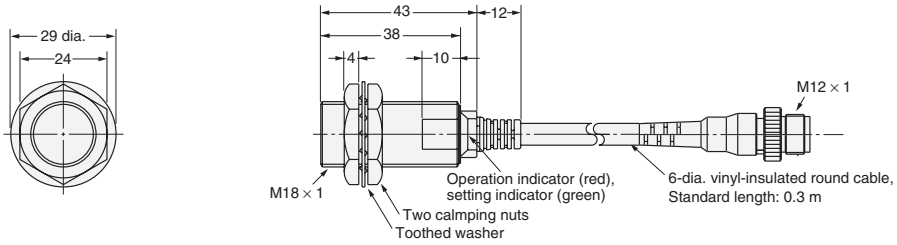


Fig. 31 : E2E-X7D1-M1GJ
E2E-X7D1-M1J-T



Pre-wired M12 Connector Models

Fig. 32 : E2E-X14MD1-M1GJ

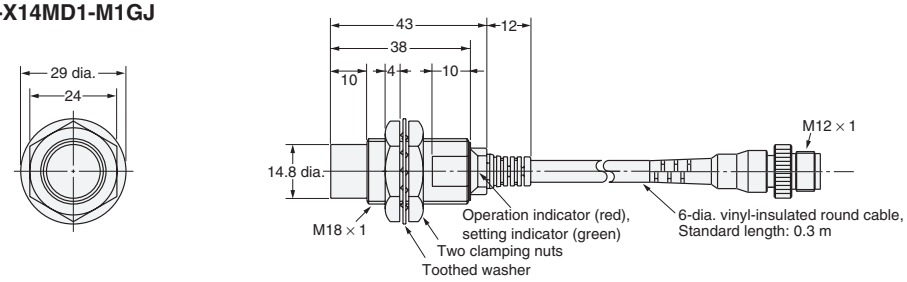


Fig. 33 : E2E-X10D1-M1GJ
E2E-X10D1-M1J-T

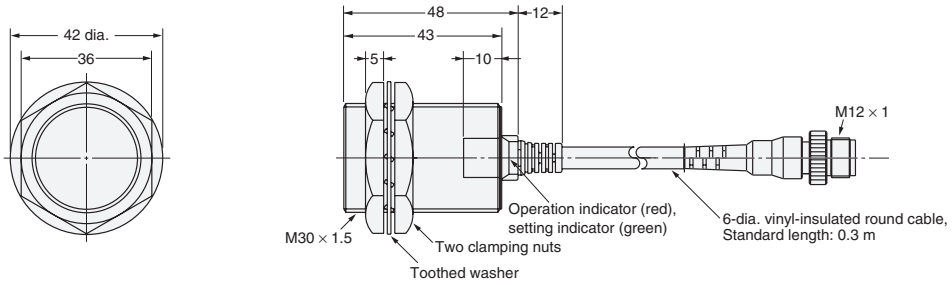
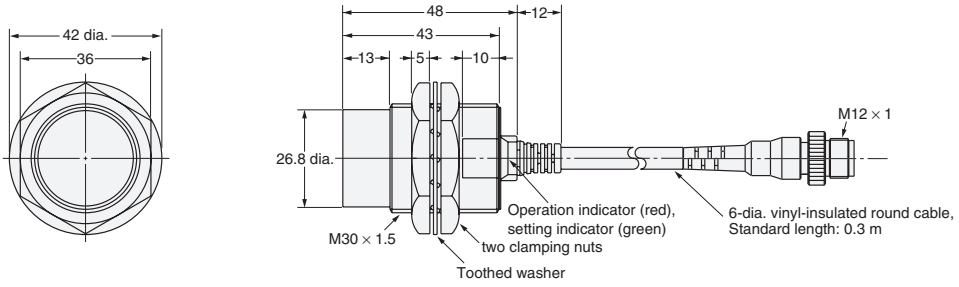
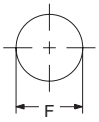


Fig. 34 : E2E-X20MD1-M1GJ



Mounting Holes



Dimensions	M8	M12	M18	M30
F (mm)	$8.5^{+0.5}/_{0}$ dia.	$12.5^{+0.5}/_{0}$ dia.	$18.5^{+0.5}/_{0}$ dia.	$30.5^{+0.5}/_{0}$ dia.

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Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D058-E2-02-X In the interest of product improvement, specifications are subject to change without notice.

Cylindrical Proximity Sensor for Mobile Usage

E2AU

Designed and tested to keep your machines moving

IP69k tested and certified for highest water resistance

e1 type approval (according to automotive directive 95/54/EC)

EMC noise tested up to 100 V/m (ISO 11452-2)

Ordering Information

DC 3-wire models

Size		Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode NO
M12	Shielded	4.0 mm	Pre-wired	Brass	34 (50)	PNP	E2AU-M12KS04-WP-B1 2M
					56 (72)	PNP	E2AU-M12LS04-WP-B1 2M
			M12 connector	Brass	34 (48)	PNP	E2AU-M12KS04-M1-B1
					56 (70)	PNP	E2AU-M12LS04-M1-B1
M18	Shielded	8.0 mm	Pre-wired	Brass	39 (59)	PNP	E2AU-M18KS08-WP-B1 2M
					61 (81)	PNP	E2AU-M18LS08-WP-B1 2M
			M12 connector	Brass	39 (53)	PNP	E2AU-M18KS08-M1-B1
					61 (75)	PNP	E2AU-M18LS08-M1-B1
M30	Shielded	15.0 mm	Pre-wired	Brass	44 (64)	PNP	E2AU-M30KS15-WP-B1 2M
					66 (86)	PNP	E2AU-M30LS15-WP-B1 2M
			M12 connector	Brass	44 (58)	PNP	E2AU-M30KS15-M1-B1
					66 (80)	PNP	E2AU-M30LS15-M1-B1

Model Number Legend

E2A□-□□□□□-□-□□-□□

1 2 3 4 5 6 7 8 9 10 11 12

Example: E2A-M12LS04-M1-B1 Standard, M12, long barrel, shielded, Sn=4 mm, M12 connector, PNP-NO
E2A-S08KN04-WP-B1 5M Standard, M8 stainless steel, short barrel, non-shielded, Sn=4 mm, pre-wired PVC cable, PNP-NO, cable length=5 m

1. Basic name

E2A

2. Sensing technology

Blank: Standard double distance
3: Triple distance
U: Mobile Usage
X: Explosion hazarduous environments

3. Housing shape and material

M: Cylindrical, metric threaded, brass
S: Cylindrical, metric threaded, stainless steel

4. Housing size

08: 8 mm
12: 12 mm
18: 18 mm
30: 30 mm

5. Barrel length

K: Standard length
L: Long body

6. Shield

S: Shielded
N: Non-shielded

7. Sensing distance

Numeral: Sensing distance: e.g. 02=2 mm, 16=16 mm

8. Kind of connection

WP: pre-wired, PVC, dia 4mm (standard)
WS: pre-wired, PVC, dia 6mm
WR: pre-wired, PVC, robotic cable, dia 4mm
WA: pre-wired, PUR/PVC (PUR jacket), dia 4mm
WB: pre-wired, PUR/PVC (PUR jacket), dia 6mm

M1: M12 connector (4 pin) *
M3: M8 connector (4 pin)
M5: M8 connector (3 pin)

M1J pre-wired with M12 cable end connector (4 pin)
M3J pre-wired with M8 cable end connector (4 pin)
M5J pre-wired with M8 cable end connector (3 pin)

9. Power source and output

B: DC, 3-wire, PNP open collector
C: DC, 3-wire, NPN open collector
D: DC, 2-wire
E: DC, 3-wire, NPN voltage output
F: DC, 3-wire, PNP voltage output

10. Operation mode

1: Normally open (NO)
2: Normally closed (NC)
3: Antivalent (NO+NC)

11. Specials (e.g., cable material, oscillating frequency)

12. Cable length

Blank: Connector type
Numeral: Cable length

Note: *In case of DC 2-wire models the M12 connector identifier is '-M1G'

Specifications

DC 3-wire Models

Size		M12
Type		Shielded
Item		E2A-M12□S04-□□-B1
Sensing distance		4 mm ± 10%
Setting distance		0 to 3.2 mm
Differential travel		10% max. of sensing distance
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)
Standard target (mild steel ST37)		12× 12× 1 mm
Response frequency (See note 1.)		1,000 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)
Current consumption (DC 3-wire)		10 mA max.
Output type		PNP open collector
Control output	Load current (See note 2.)	200 mA max. (32 VDC max.)
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)
Indicator		Operation indicator (Yellow LED)
Operation mode (with sensing object approaching)		-B1
Protection circuit		Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection
Ambient air temperature		Operating: -40° C to 70° C, Storage: -40° C to 85° C (with no icing or condensation)
Temperature influence (See note 2.)		±10% max. of sensing distance at 23° C within temperature range of -25° C to 70° C ±15% max. of sensing distance at 23° C within temperature range of -40° C to 70° C
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions
Shock resistance		1,000 m/s², 10 times each in X, Y and Z directions
Standard and listings		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (See note 3.) EMC after 95/54/EC EMC after ISO11452-2
Connection method		Pre-wired models (dia 4mm PVC cable with length = 2m). M12 connector models
Weight (packaged)	Pre-wired model	Approx. 85 g
	Connector model	Approx. 35 g
Material	Case	Brass-nickel plated
	Sensing surface	PBT
	Cable	Standard cable is PVC dia 4mm.
	Clamping nut	Brass-nickel plated

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 100 mA max.,

3. UL (CSA) [E196555]: Use class 2 circuit only.

DC 3-wire Models / DC 4-wire

Size		M18	M30
Type		Shielded	Shielded
Item		E2A-M18□S08-□□-B1	E2A-M30□S15-□□-B1
Sensing distance		8 mm±10%	15 mm±10%
Setting distance		0 to 6.4 mm	0 to 12 mm
Differential travel		10% max. of sensing distance	
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)	
Standard target (mild steel ST37)		24×24×1 mm	45×45×1 mm
Response frequency (See note 1.)		500 Hz	250 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)	
Current consumption (DC 3-wire)		10 mA max.	
Output type		PNP open collector	
Control output	Load current (See note 2.)	200 mA max. (32 VDC max.)	
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)	
Indicator		Operation indicator (Yellow LED)	
Operation mode (with sensing object approaching)		-B1	
Protection circuit		Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection	
Ambient air temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)	
Temperature influence (See note 2.)		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°C	
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%	
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%	
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case	
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry parts and case	
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions	
Shock resistance		1,000 m/s², 10 times each in X, Y and Z directions	
Standard and listings		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 (See note 3.) EMC after 95/94/EC EMC after ISO11452-2	
Connection method		Pre-wired models (dia 4mm PVC cable with length = 2m). M12 connector models.	
Weight (pakka-ged)	Pre-wired model	Approx. 160 g	Approx. 280 g
	Connector model	Approx. 70 g	Approx. 200 g
Material	Case	Brass-nickel plated	
	Sensing surface	PBT	
	Cable	Standard cable is PVC dia 4mm.	
	Clamping nut	brass-nickel plated for brass models stainless steel for steel models	

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

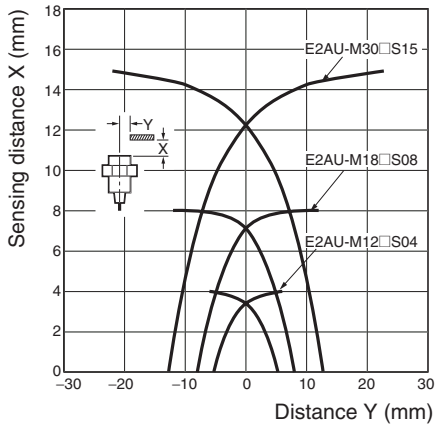
2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 100 mA max.

3. UL (CSA) [E196555]: Use class 2 circuit only.

Engineering Data

Operating Range (Typical)

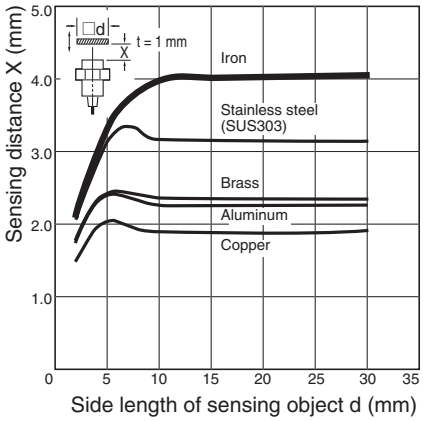
Shielded Models



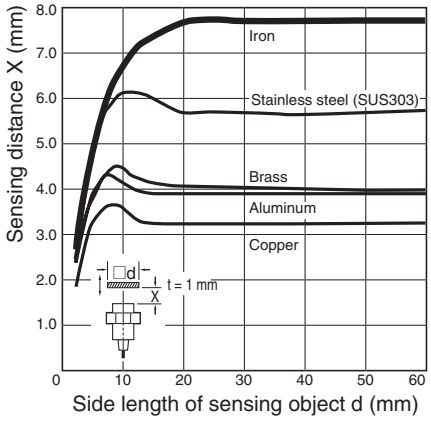
Influence of Sensing Object Size and Materials

Shielded Models

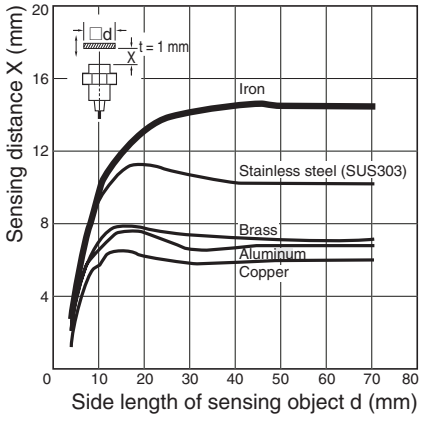
E2AU-M12□S04/ E2A-S12□S04



E2AU-M18□S08/E2A-S18□S08



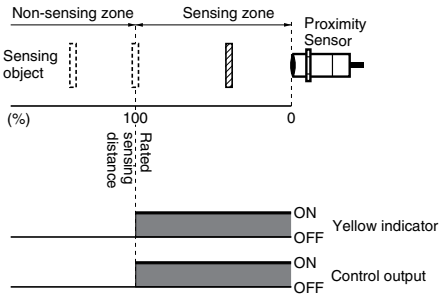
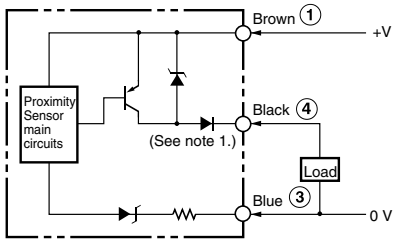
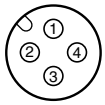
E2AU-M30□S15/ E2A-S30□S15



Operation

DC 3-wire models

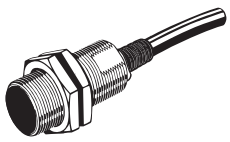
PNP Output

Operation mode	Model	Timing chart	Output circuit
NO	E2AU-□-□-B1		 **Note 1:** With M8 connector models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  **Note 2:** Terminal 2 of the M12 connector is not used.

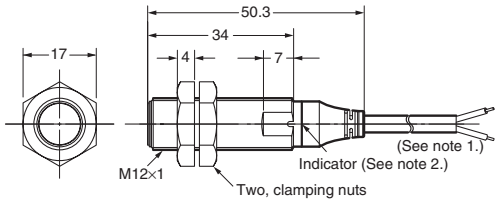
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Pre-wired Models (Shielded)

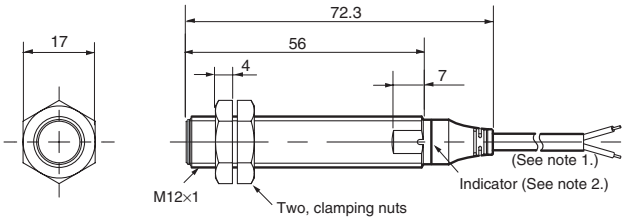


E2AU-M12KS04-WP-□□



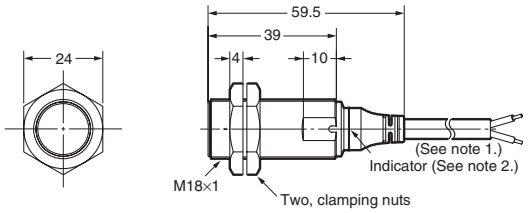
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2A-M12LS04-WP-□□



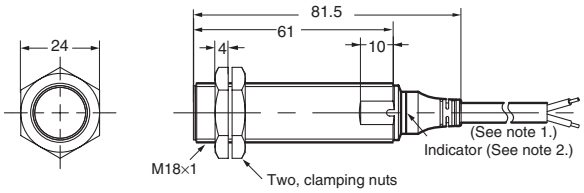
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2AU-M18KS08-WP-□□



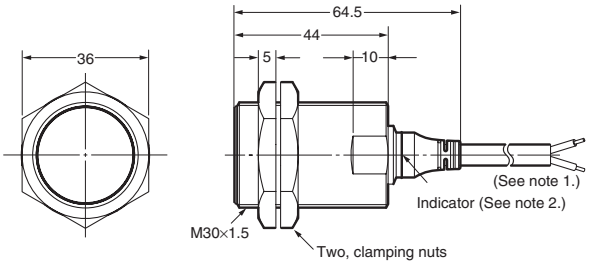
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2AU-M18LS08-WP-□□



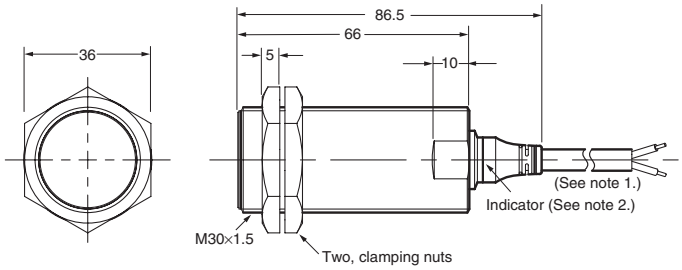
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2AU-M30KS15-WP-□□



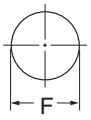
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

E2AU-M30LS15-WP-□□



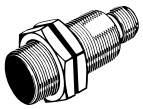
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
2. Operation indicator (yellow)

Mounting Hole Cutout Dimensions

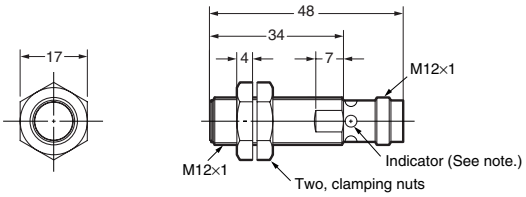


External diameter of Proximity Sensor	Dimension F (mm)
M12	12.5 dia.$^{+0.5}_{0}$
M18	18.5 dia.$^{+0.5}_{0}$
M30	30.5 dia.$^{+0.5}_{0}$

M12 Connector Models (Shielded)

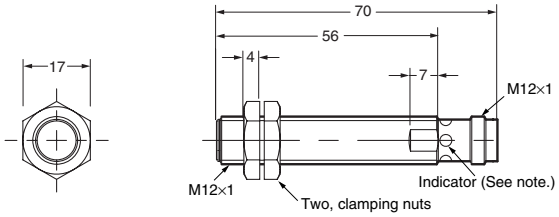


E2AU-M12KS04-M1-□□



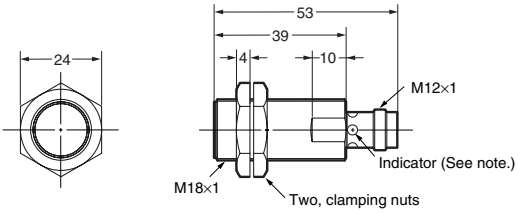
Note 1: Operation indicator (yellow LED, 4×90°)

E2AU-M12LS04-M1-□□



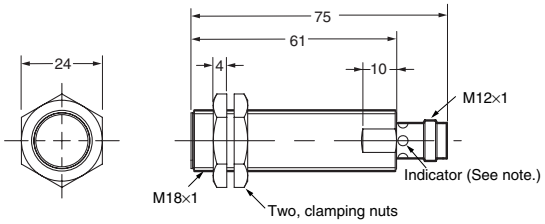
Note: Operation indicator (yellow LED, 4×90°)

E2AU-M18KS08-M1-□□



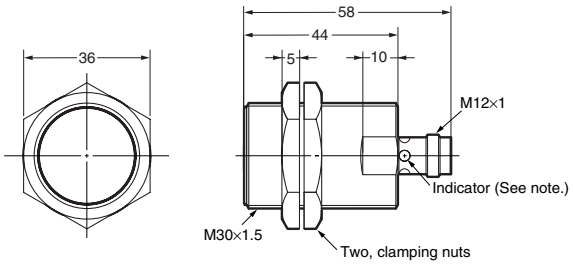
Note: Operation indicator (yellow LED, 4×90°)

E2AU-M18LS08-M1-□□



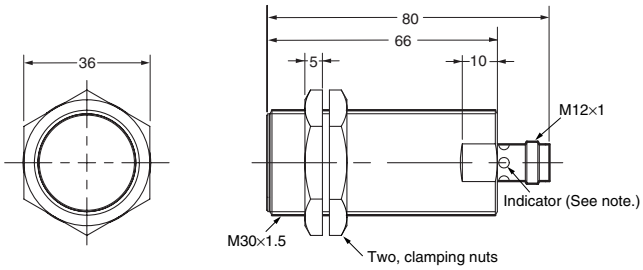
Note: Operation indicator (yellow LED, 4×90°)

E2AU-M30KS15-M1-□□



Note: Operation indicator (yellow LED, 4×90°)

E2AU-M30LS15-M1-□□



Note: Operation indicator (yellow LED, 4×90°)

Precautions

Safety Precautions

Power Supply

Do not impose an excessive voltage on the E2AU, otherwise it may be damaged. Do not impose AC current (100 to 240 VAC) on any DC model, otherwise it may be damaged.

Load Short-circuit

Do not short-circuit the load, or the E2AU may be damaged.

The E2AU's short-circuit protection function will be valid if the polarity of the supply voltage imposed is correct and within the rated voltage range.

Wiring

Be sure to wire the E2AU and load correctly, otherwise it may be damaged.

Connection with No Load

Be sure to insert loads when wiring. Make sure to connect a proper load to the E2AU in operation, otherwise it may damage internal elements.

Do not expose the product to flammable or explosive gases.

Do not disassemble, repair, or modify the product.

Correct Use

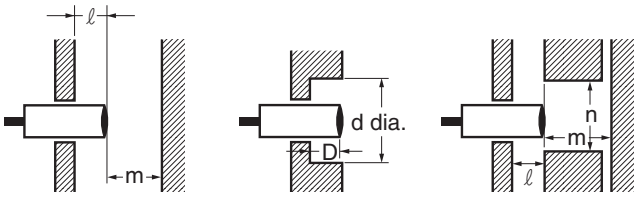
Designing

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If power supplies are connected to the Proximity Sensor and load respectively, be sure to supply power to the Proximity Sensor before supplying power to the load.

Effects of Surrounding Metal

When mounting the E2AU within a metal panel, ensure that the clearances given in the following table are maintained.



(Unit: mm)

Type	Dimension	M12	M18	M30	
				Short barrel	Long barrel
Shielded	l	0	0 (See note 1.)	0 (See note 2.)	
	m	12	24	45	
	d	---	27	45	
	D	0	1.5	4	
	n	18	27	45	
Non-shielded	l	15	22	30	40
	m	20	48	70	90
	d	40	70	90	120
	D	15	22	30	40
	n	40	70	90	120

Note 1. In the case of using the supplied nuts.
If true flash mounting is necessary, apply a free zone of 1.5 mm.

2. In the case of using the supplied nuts.
If true flush mounting is necessary, apply a free zone of 4 mm.

Power OFF

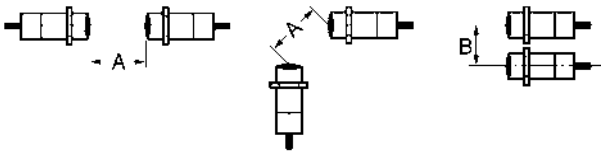
The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Mutual Interference

When installing two or more Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



(Unit: mm)

Type	Dimension	M12	M18	M30	
				Short barrel	Long barrel
Shielded	A	30	60	110	
	B	20	35	70	
Non-shielded	A	120	200	300	300
	B	100	120	200	300

Wiring

High-tension Lines

Wiring through Metal Conduit**:**
If there is a power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Cable Extension

Standard cable length is less than 200 m.

The tractive force is 50 N.

Mounting

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Do not tighten the nut with excessive force. A washer must be used with the nut.

Type	Torque
M12	30 Nm
M18	70 Nm
M30	180 Nm

Maintenance and Inspection

Periodically perform the following checks to ensure stable operation of the Proximity Sensor over a long period of time.

1. Check for mounting position, dislocation, looseness, or distortion of the Proximity Sensor and sensing objects.
2. Check for loose wiring and connections, improper contacts, and line breakage.
3. Check for attachment or accumulation of metal powder or dust.
4. Check for abnormal temperature conditions and other environmental conditions.
5. Check for proper lighting of indicators (for models with a set indicator.)

Never disassemble or repair the Sensor.

Environment

Water Resistivity

The Proximity Sensors are tested intensively on water resistance, but in order to ensure maximum performance and life expectancy avoid immersion in water and provide protection from rain or snow.

Operating Environment

Ensure storage and operation of the Proximity Sensor within the given specifications.

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor, in which case connect the load to the Proximity Sensor through a relay.

<SUITABILITY FOR USE>

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

<CHANGE IN SPECIFICATIONS>

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D10E-EN-01

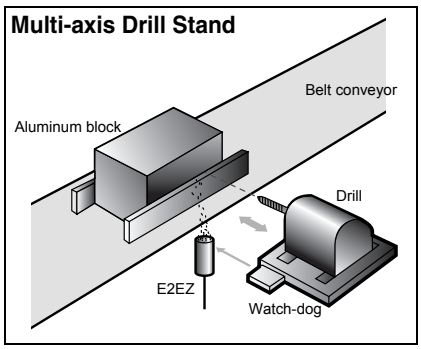
In the interest of product improvement, specifications are subject to change without notice.

Anti-Aluminum Cut Chips Models

E2EZ

Specialized sensing method for immunity against small sized metal objects (e.g. aluminium chips)

Applications



Ordering Information

Sensors

Pre-wired Models

Shape		Sensing distance	Output specifications	Model	
				Operating status	
				NO	NC
Shielded	M18	4mm	DC 3-wire NPN	**E2EZ-X4C1**	---
			DC 2-wire	**E2EZ-X4D1-N**	**E2EZ-X4D2-N**
			AC 2-wire Models	**E2EZ-X4Y1**	---
	M30	8mm	DC 3-wire NPN	**E2EZ-X8C1**	---
			DC 2-wire	**E2EZ-X8D1-N**	**E2EZ-X8D2-N**
			AC 2-wire Models	**E2EZ-X8Y1**	

Connector Models

Shape		Sensing distance	Output specifications	Model	
				Operating status	
				NO	NC
Shielded	M18	4mm	DC 2-wire models (3) and (4) pin arrangement	**E2EZ-X4D1-M1J** NEW	---
			DC 2-wire models (1) and (4) pin arrangement	**E2EZ-X4D1-M1GJ** NEW	---
	M30	8mm	DC 2-wire models (3) and (4) pin arrangement	**E2EZ-X8D1-M1J** NEW	---
			DC 2-wire models (1) and (4) pin arrangement	**E2EZ-X8D1-M1GJ** NEW	---

Accessories (Order Separately)

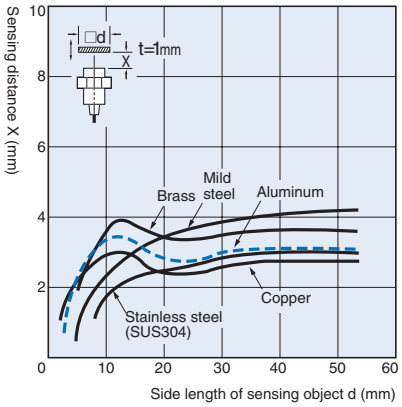
Sensor I/O Connectors

Shape	Cable length	Sensor I/O Connectors	Applicable proximity sensor models
Straight type	2 m	**XS2F-D421-DD0**	E2EZ-X4D□-M1J
	5 m	**XS2F-D421-GD0**	
L type	2 m	**XS2F-D422-DD0**	E2EZ-X8D□-M1J
	5 m	**XS2F-D422-GD0**	
Straight type	2 m	**XS2F-D421-DA0-A**	E2EZ-X4D□-M1GJ
	5 m	**XS2F-D421-GA0-A**	
L type	2 m	**XS2F-D422-DA0-A**	E2EZ-X8D□-M1GJ
	5 m	**XS2F-D422-GD0-A**	

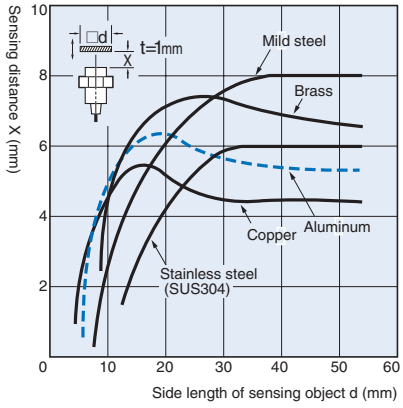
Characteristic data (typical)

Sensing Distance vs. Sensing Object

E2EZ-X4□



E2EZ-X8□



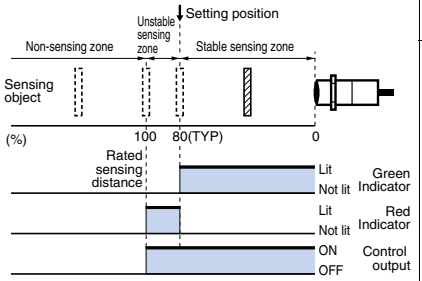
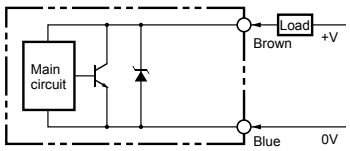
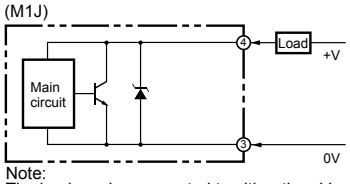
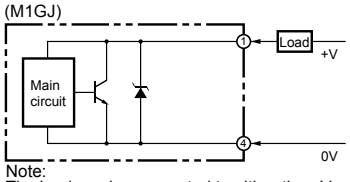
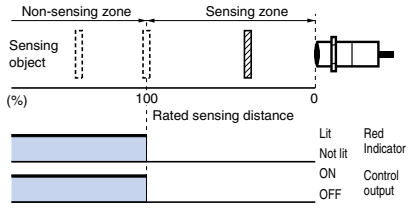
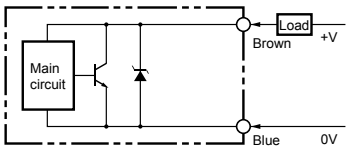
Rating/performance

Item \ Model	E2EZ-X4C1 E2EZ-X4Y1	E2EZ-X8C1 E2EZ-X8Y1	E2EZ-X4D□-N E2EZ-X4D□-M1J E2EZ-X4D□-M1GJ	E2EZ-X8D□-N E2EZ-X8D□-M1J E2EZ-X8D□-M1GJ
Sensing distance	4 mm ±10%	8 mm ±10%	4 mm ±10%	8 mm ±10%
Setting distance*1	0 to 3.2 mm	0 to 6.4 mm	0 to 3.2 mm	0 to 6.4 mm
Differential distance	20% max. of sensing distance			
Sensing object	Ferrous metal (Sensitivity lowers with non-ferrous metals)			
Standard sensing object	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm
Response frequency*2	C models: 12 Hz Y models: 5 Hz	C models: 8 Hz Y models: 5 Hz	100 Hz	30 Hz
Rated supply voltage (operating voltage)	C models: 12 to 24 VDC, ripple (p-p) : 10% max., (10 to 30 VDC)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.	
Current consumption	C models: 15 mA max.		---	
Leakage current	Y models: 2 mA max. (at 100 VAC), 3 mA max. (at 200 VAC)		0.8 mA max.	
Control output: Switching capacity	C models: NPN open collector output 12 VDC 100 mA max. (30 VDC max.) Y models: 10 to 200 mA		3 to 100 mA	
Control output: Residual voltage	C models: 2 V max. (load current: 200 mA with cable length: 2 m) Y models: Refer to the Specifications		3.0 V max. (under load current of 100 mA with cable length of 2 m)	
Indicator lamp	C models: Detection indicator (red LED) Y models: Operation indicator (red LED)		D1 models: Operation indicator (red LED), Operation set indicator (green LED) D2 models: Operation indicator (red LED)	
Operating status (with sensing object approaching)	NO		D1 models: NO D2 models: NC NO	
Protective circuits	C models: Reverse connection protection, load short-circuit protection, surge absorber Y models: None		Surge absorber, short-circuit protection	
Ambient temperature	Operating/Storage: 0°C to 50°C (with no icing or condensation)			
Ambient humidity	Operating/Storage: 35% to 95%RH (with no condensation)			
Temperature influence	±20% max. of sensing distance within a temperature range of 0°C to 50°C based on the sensing distance at a temperature of 23°C.			
Voltage influence	E models: ±2.5% max. of sensing distance within a range of ±10% of rated power supply voltage Y models: ±1% max. of sensing distance within a range of ±10% of rated power supply voltage		±2.5% max. of sensing distance within a range of ±10% of rated power supply voltage	
Insulation resistance	50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength	C type: 1,000 VAC, 50/60 Hz for 1 min.)		1000 VAC 50/60 Hz for 1 min between current carrying part and case	
Vibration resistance	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 for 10 times each in X, Y, and Z directions			
Protective structure	IEC60529 IP67			
Connection method	Pre-wired (standard length: 2 m) Connector Extension Models			
Weight (Packed state)	Approx. 170 g	Approx. 270 g	E2EZ-X4D□-N Approx. 160 g E2EZ-X4D□-M1J Approx. 90 g E2EZ-X4D□-M1GJ Approx. 90 g	E2EZ-X8D□-N Approx. 220 g E2EZ-X8D□-M1J Approx. 160 g E2EZ-X8D□-M1G Approx. 160 g
Material	Case: Brass, Sensing face: Heat-resistant ABS resin Screw: Brass, Mounting nut: Steel			
Accessories	Instruction manual			

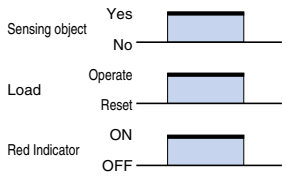
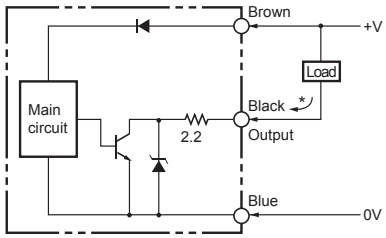
*1. Use within a range where the green indicator is lit.
*2. The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

Output Circuit Diagram

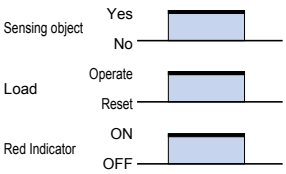
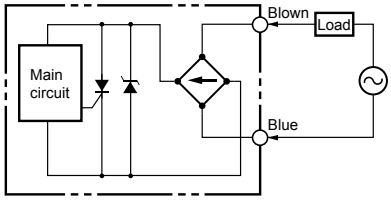
DC 2-wire Models

Operating status	Model	Timing chart	Output circuit
NO	E2EZ-X4D1-N E2EZ-X8D1-N		 Note: The load can be connected to either the +V or the 0-V line.
	E2EZ-X4D1-M1J E2EZ-X4D1-M1GJ E2EZ-X8D1-M1J E2EZ-X8D1-M1GJ		(M1J)  Pin arrangement  Note: Terminals ① and ② are not used. Note: The load can be connected to either the +V or the 0-V line. (M1GJ)  Pin arrangement  Note: Terminals ② and ③ are not used. Note: The load can be connected to either the +V or the 0-V line.
NC	E2EZ-X4D2-N E2EZ-X8D2-N		 Note: The load can be connected to either the +V or the 0-V line.

DC 3-wire Models

Operating status	Model	Timing chart	Output circuit
NO	E2EZ-X4C1 E2EZ-X8C1		 * Load current: 100mA max. at 12 V and 200 mA max. at 24 V

AC 2-wire Models

Operating status	Model	Timing chart	Output circuit
NO	E2EZ-X4Y1 E2EZ-X8Y1		

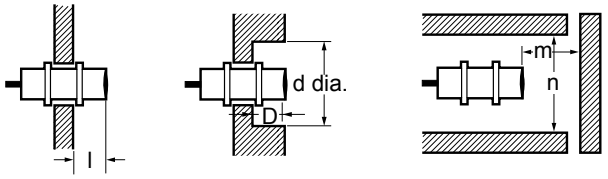
Precautions

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance as shown in the table below between the Sensor and the surrounding metal.



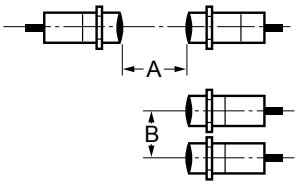
Effects of Surrounding Metal (Unit: mm)

Model	Item / Surround-	l	d	D	m	n
E2EZ-X4□	Steel	0	18	0	16	27
	Aluminum	5	40	5		54
E2EZ-X8□	Steel	0	30	0	32	45
	Aluminum	10	70	10		90

Mutual Interference

When installing two or more E2EZ face to face or side by side, ensure that the minimum distances given in the following table maintained.

Mutual Interference (Unit: mm)



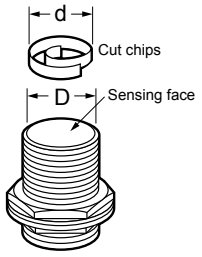
Model / Item	A	B
E2EZ-X4□	40	50
E2EZ-X8□	60	100

Aluminum and Cast Iron Cut Chips

A detection signal will not be output if aluminum or cast iron cut chips are stuck to the sensing face. Under the following conditions, however, the proximity sensor may output detection signals, in which case remove the cut chips from the sensing face.

(1) About the external diameter (d) of a cut chip and the diameter (D) of the sensing surface

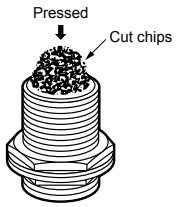
If the external diameter (d) of a cut chip is two-thirds the diameter (D) of the sensing face as shown in the illustration.



(Unit: mm)

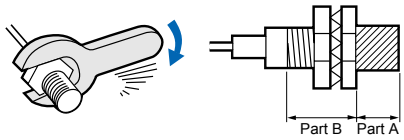
Model / Length	D
E2EZ-X4□	16
E2EZ-X8□	28

(2) If cut chips are pressed onto the sending face as shown in the illustration.



Mounting

Do not tighten the nut with excessive force. A washer must be used with the nut.

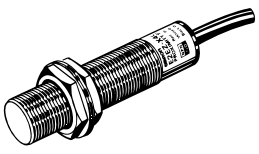


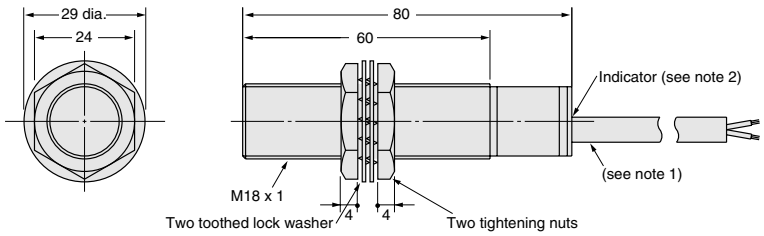
Note: 1. The table below shows the tightening torques for part A and part B nuts. In the previous examples, the nut is on the sensor head side (part B) and hence the tightening torque for part B applies. If this nut is in part A, the tightening torque for part A applies instead.
2. The table below shows the value of tightening torques when using toothed washers.

Tightening torgues / Model	Part A Length (mm)	Part A Tensile strength (torque)	Part B Tensile strength (torque)
E2EZ-X4C1 E2EZ-X4Y1	20	15 N•m	29 N•m
E2EZ-X8C1 E2EZ-X8Y1	22	29 N•m	39 N•m
E2EZ-X4D□-□	29	15 N•m	---
E2EZ-X8D□-□	26	39 N•m	78 N•m

Dimensions (Unit: mm)

E2EZ-X4C1
E2EZ-X4Y1



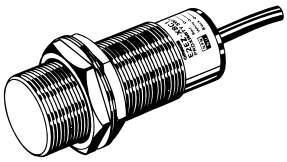


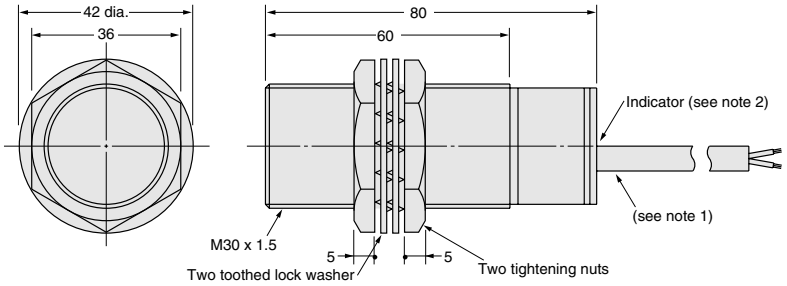
Note:
1. E2EZ-X4B1 and E2EZ-X4CI:
A 6 dia., 3-conductor, vinyl-insulated round cable (conductor cross-sectional area: 0.5 mm²; insulation diameter: 1.9 mm) is used.
Standard length: 2 m

E2EZ-X4Y1
A 6 dia., 2-conductor, vinyl-insulated round cable (conductor cross-sectional area: 0.5 mm²; insulation diameter: 1.9 mm) is used.
Standard length: 2 m

2. B, C Type: Detection indicator (red)
Y Type: Operation indicator (red)

E2EZ-X8C1
E2EZ-X8Y1



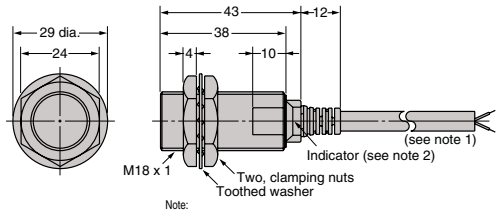


Note:
1. E2EZ-X8B1 and E2EZ-X8CI:
A 6 dia., 3-conductor, vinyl-insulated round cable (conductor cross-sectional area: 0.5 mm²; insulation diameter: 1.9 mm) is used.
Standard length: 2 m

E2EZ-X8Y1
A 6 dia., 2-conductor, vinyl-insulated round cable (conductor cross-sectional area: 0.5 mm²; insulation diameter: 1.9 mm) is used.
Standard length: 2 m

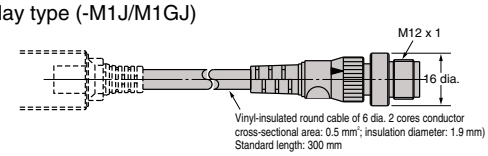
2. B, C Type: Detection indicator (red)
Y Type: Operation indicator (red)

E2EZ-X4D□-N

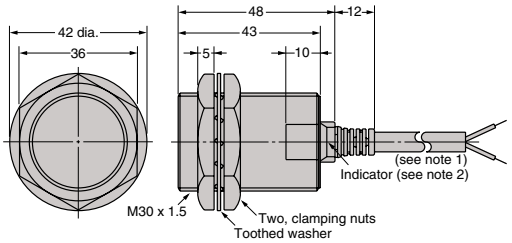


Note:
A 6 dia., 2-conductor, vinyl-insulated round cable (conductor cross-sectional area: 0.5 mm²; insulation diameter: 1.9 mm) is used.
Standard length: 2m
Cable extension (through a single metal conduit): 200 m max.
2. D1 type: Operation indicator (red);
Operation set indicator (green)
D2 type: Operation indicator (red)

Connector relay type (-M1J/M1GJ)

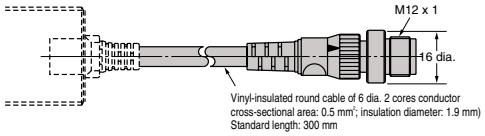


E2EZ-X8D□-N

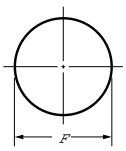


Note:
A 6 dia., 2-conductor, vinyl-insulated round cable (conductor cross-sectional area: 0.5 mm²; insulation diameter: 1.9 mm) is used.
Standard length: 2m
Cable extension (through a single metal conduit): 200 m max.
2. D1 type: Operation indicator (red);
Operation set indicator (green)
D2 type: Operation indicator (red)

Connector relay type(-M1J/M1GJ)



Mounting Holes



Model	F (mm)
E2EZ-X4□	18.5-mm dia. +0
E2EZ-X8□	30.5-mm dia. +0

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D028-E2-04-X In the interest of product improvement, specifications are subject to change without notice.

Chemical Resistant Inductive Proximity Sensor

E2FQ

PTFE housing for increased chemical and detergent resistance*

Note:1.

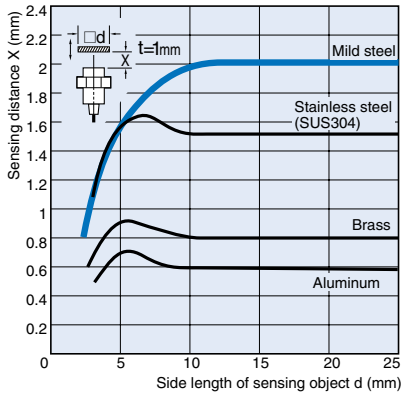
Ordering Information

Shape		Sensing distance	DC 3-wire models			DC 2-wire models		AC 2-wire models	
			PNP (NO)	NPN (NO)	Response frequency	NO	Response frequency	NO	Response frequency
Shielded	M12	2mm	E2FQ-X2F1	E2FQ-X2E1	1.5 kHZ	E2FQ-X2D1	800 Hz	---	---
	M18	5mm	E2FQ-X5F1	E2FQ-X5E1	600 Hz	E2FQ-X5D1	500 Hz	E2FQ-X5Y1	25 HZ
	M30	10mm	E2FQ-X10F1	E2FQ-X10E1	400 Hz	E2FQ-X10D1	300 Hz	E2FQX10Y1	

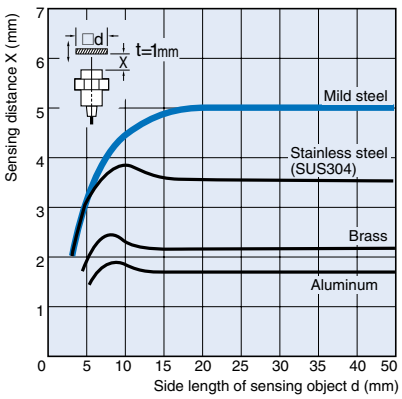
Characteristic data (typical)

Sensing Distance vs. Sensing Object

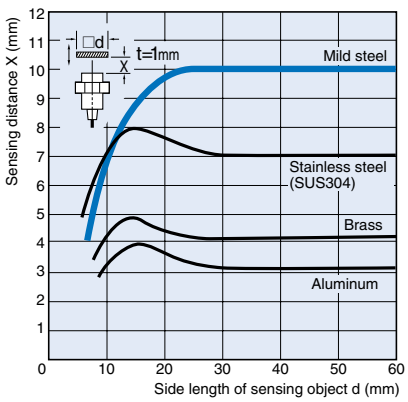
E2FQ-X2□



E2FQ-X5□



E2FQ-X10□



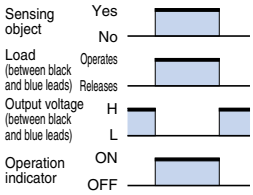
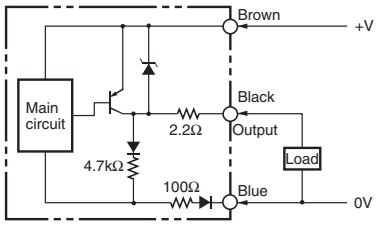
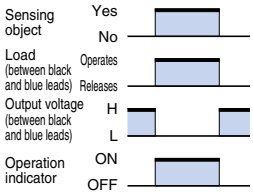
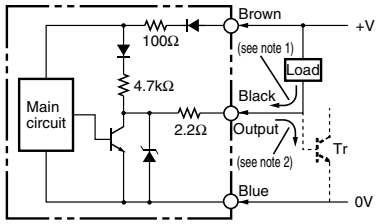
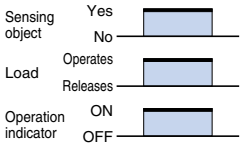
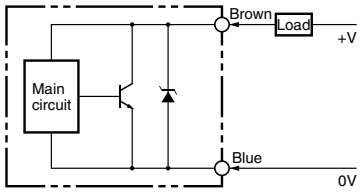
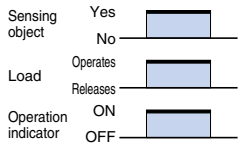
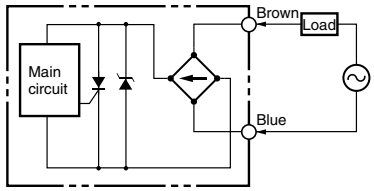
Note: 1 . CE mark certification in progress at time of catalog printing. Please contact your OMRON representative for the current status.

Rating/Performance

Item / Model		E2FQ-X2□	E2FQ-X5□	E2FQ-X10□
Sensing distance		2 mm ±10%	5 mm ±10%	10 mm ±10%
Setting distance		0 to 1.6 mm	0 to 4 mm	0 to 8 mm
Differential distance		E1, F1, Y1 models: 10% max. of sensing distance		
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)		
Standard sensing object (mild steel)		12 x 12 x 1 mm	18 x 18 x 1 mm	30 x 30 x 1 mm
Response frequency*1		E1, F1 models: 1.5 kHz D1 models: 800 Hz	E1, F1 models: 600 Hz, D1 models: 500 Hz	E1, F1 models: 400 Hz, D1 models: 300 Hz
			Y1 models: 25 Hz	
Power supply (Operating voltage range)		E1, F1 models: 12 to 24 VDC, ripple (p-p) : 10% max., (10 to 30 VDC) D1 models: 12 to 24 VDC, ripple (p-p) : 20% max., (10 to 36 VDC)		
Current consumption		E1, F1 models: 17 mA max.		
Leakage current		D1 models: 0.8 mA max., Y models: 5 to 300 mA		
Control output	Switching capacity	E1, F1 models: 200 mA max., D1 models: 5 to 100 mA DC, Y models: 5 to 300 mA		
	Residual voltage	E1, F1 models: 2 V max. (load current: 200 mA with cable length: 2 m) Y models: Refer to the Specifications. D1 models: 4.0 V max. (under load current of 100 mA with cable length of 2 m)		
Indicator lamp		E,D models: detection indicator (red), Y models: operation indicator (red)		
Operating status (with sensing object approaching)		E1, F1 models, D1 models and Y1 models: NO		
Protective circuits		E1, F1 models: Protection for reverse polarity, load short circuit, surge voltage		
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)		
Temperature influence		10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C		
Voltage influence		E1, F1 models: ±2.5% max. of sensing distance within rated voltage range ±15%		
Insulation resistance		50 M min. (at 500 VDC) between energized parts and case		
Dielectric strength		E1, F1, D1 models: 1,000 VAC 50/60 Hz for 1 min between energized 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: 500 m/s^2 for 10 times each in X, Y, and Z directions	Destruction: 1,000 m/s^2 for 10 times each in X, Y, and Z directions	
Protective structure		IEC60529 IP67		
Connection method		Pre-wired models (standard length: 2 m)		
Weight (Packed state)		Approx. 70 g	Approx. 130 g	Approx. 170 g
Material	Case	PTFE		
	Sensing surface			
Accessories		Instruction manual		

*1. The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

Output Circuit Diagram

Operating status	Output specifications	Model	Timing chart	Output circuit
NO	PNP	**E2FQ-X□F1**		
	NPN	**E2FQ-X□E1**		 Note: 1. 200 mA max.(load current) 2. When a transistor is connected
	DC 2-wire	**E2FQ-X□D1**		 Note: The load can be connected to either the +V or the 0-V line.
	AC 2-wire Models	**E2FQ-X□Y1**		

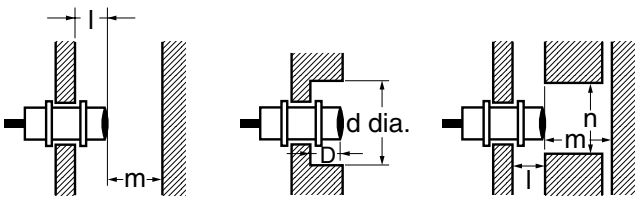
Precautions

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.



Effects of Surrounding Metal (Unit: mm)

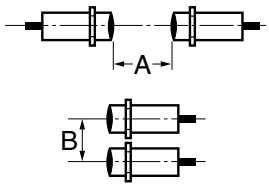
Model \ Item	l	d	D	m	n
E2FQ-X2□	0	12	0	8	18
E2FQ-X5□		18		20	27
E2FQ-X10□		30		40	45

Mutual Interference

If more than one Proximity Sensor is installed face to face or in parallel, ensure that the distances between two Units adjacent to each other are the same as or larger than the corresponding values shown in the following table.

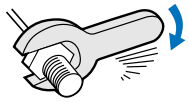
Mutual Interference (Unit: mm)

Model \ Item	A	B
E2FQ-X2□	30	20
E2FQ-X5□	50	35
E2FQ-X10□	100	70



Installation

Do not tighten the nut with excessive force. A washer must be used with the nut.



Note: The table below shows the value of tightening torques when using toothed washers.

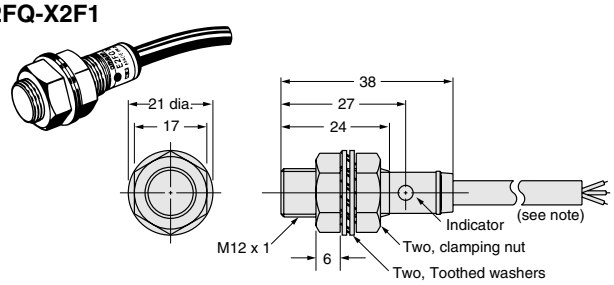
Model \ Torque	Tensile strength (torque)
E2FQ-X2□	0.98 Nm
E2FQ-X5□	2 Nm
E2FQ-X10□	

Others

Chemical resistance

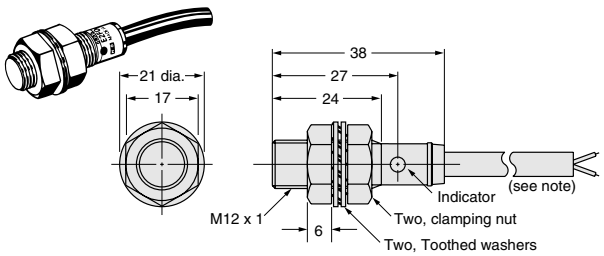
Dimensions (Unit: mm)

E2FQ-X2E1
E2FQ-X2F1



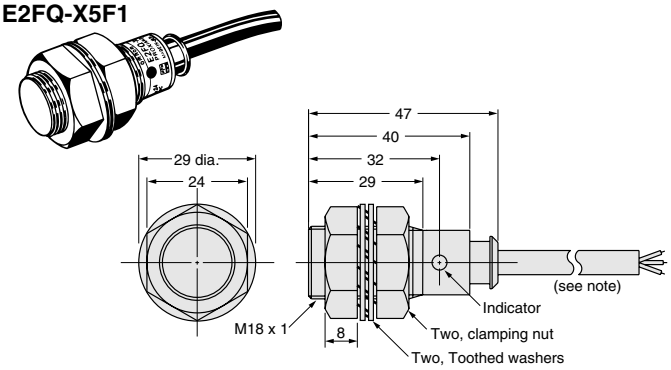
Note:
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X2D1



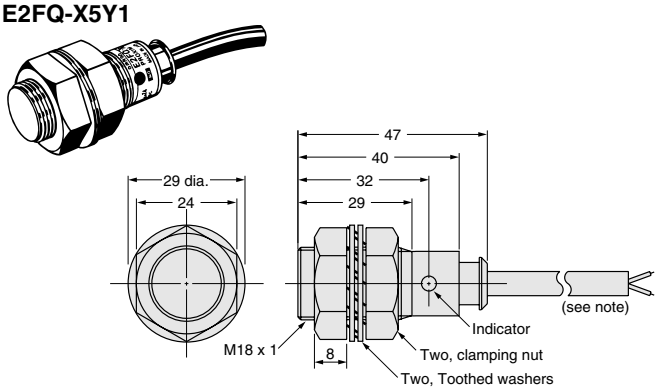
Note:
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X5E1
E2FQ-X5F1



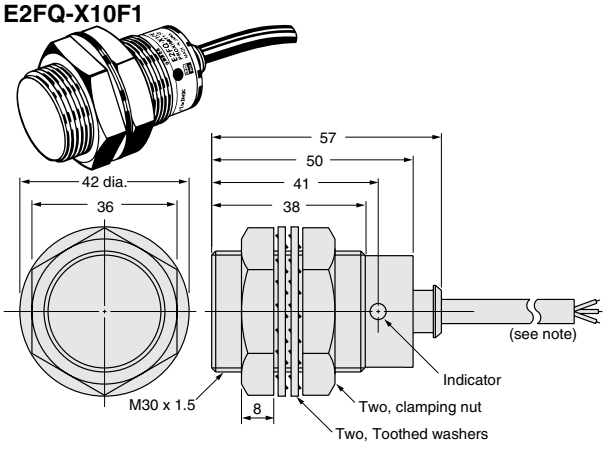
Note:
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X5D1
E2FQ-X5Y1



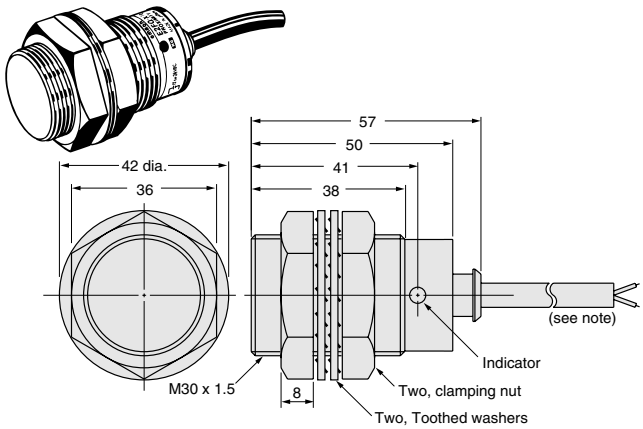
Note:
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X10E1
E2FQ-X10F1



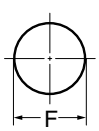
Note:
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X10D1
E2FQ-X10Y1



Note:
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m
The cord can be extended in an independent conduit for 200 m maximum.

Mounting Holes



Model	F (mm)
E2FQ-X2□	12.5 mm dia. $^{+0.5}_{0}$
E2FQ-X5□	18.5 mm dia. $^{+0.5}_{0}$
E2FQ-X10□	30.5 mm dia. $^{+0.5}_{0}$

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

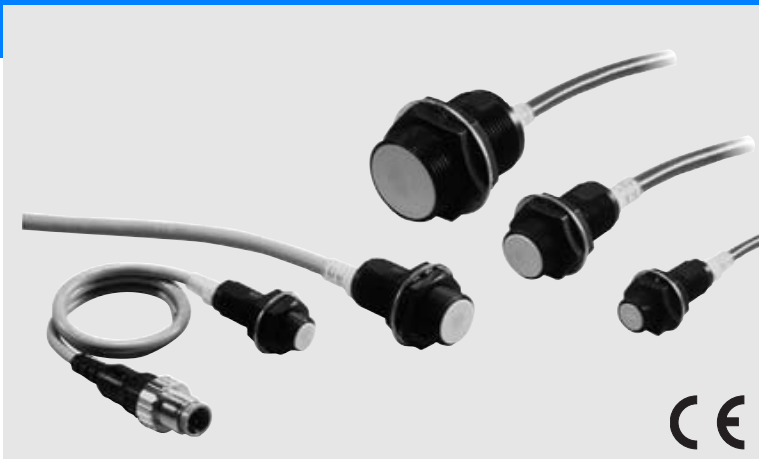
Cat. No. D029-E2-04-X

In the interest of product improvement, specifications are subject to change without notice.

Spatter Immune Proximity Sensors

E2EQ

A Series of Spatter-resistant Proximity Sensors with a PTFE-coated Metal Housing



Ordering Information

Sensors

● Pre-wired Models

Extended-distance type

Shape		Sensing distance	Output specifications	Operating status	Model
Shielded	M12	4mm	DC 2-wire	NO	**E2EQ-X4X1**
	M18	8mm			**E2EQ-X8X1**
	M30	15mm			**E2EQ-X15X1**

Standard

Shape		Sensing distance	Output specifications	Operating status	Model
Shielded	M12	3mm	DC 2-wire	NO	**E2EQ-X3D1**
	M18	7mm			**E2EQ-X7D1**
	M30	10mm			**E2EQ-X10D1**

● Plug-in Models

Extended-distance type

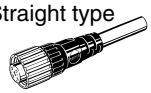
Shape		Sensing distance	Output specifications	Operating status	Model
Shielded	M12	4mm	DC 2-wire models (3) and (4) Pin arrangement	NO	**E2EQ-X4X1-M1J**
	M18	8mm			**E2EQ-X8X1-M1J**
	M30	15mm			**E2EQ-X15X1-M1J**

Standard

Standard		Sensing distance	Output specifications	Operating status	Model
Shielded	M12	3mm	DC 2-wire models (1) and (4) Pin arrangement	NO	**E2EQ-X3D1-M1GJ**
	M18	7mm			**E2EQ-X7D1-M1GJ**
	M30	10mm			**E2EQ-X10D1-M1GJ**

Accessories (Order Separately)

Sensor I/O Connectors

Shape	Cable length	Sensor I/O Connectors	Applicable proximity sensor models
Straight type 	2 m	**XS2F-D421-DCO-A**	E2EQ-X□X1-M1J
	5 m	**XS2F-D421-GCO-A**	
L type 	2 m	**XS2F-D422-DCO-A**	
	5 m	**XS2F-D422-GCO-A**	
Straight type 	2 m	**XS2F-D421-DA0-A**	E2EQ-X□D1-M1GJ
	5 m	**XS2F-D421-GA0-A**	
L type 	2 m	**XS2F-D422-DA0-A**	
	5 m	**XS2F-D422-GA0-A**	

Rating/Performance

Long-distance type

Item \ Model	E2EQ-X4X1 E2EQ-X4X1-M1J	E2EQ-X8X1 E2EQ-X8X1-M1J	E2EQ-X15X1 E2EQ-X15X1-M1J
Sensing distance	4 mm ±10%	8 mm ±10%	15 mm ±10%
Setting distance*1	0 to 3.2 mm	0 to 6.4 mm	0 to 12 mm
Differential distance	15% max. of sensing distance		
Standard sensing object (mild steel)	12 x 12 x 1 mm	18 ± 18 ± 1 mm	30 ± 30 ± 1 mm
Response frequency*2	1 kHz	0.5 kHz	0.25 kHz
Control output: Switching capacity	3 to 100 mA		
Control output: Residual voltage*3	5.0 V max. (under load current of 100 mA with cable length of 2 m)		
Operating status (with sensing object approaching)	C1 models: NO		
Protective circuits	Surge absorber, load short-circuit protection		
Ambient temperature	Operating: -25°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)		
Temperature influence	±15% max. of sensing distance at 23°C within temperature range of -40°C to 85°C ±10% max. of sensing distance at 23°C within temperature range of -25°C to70°C		±15% max. of sensing distance at 23°C within temperature range of -25°C to 70°C
Voltage influence	±1% max. of Sensing distance in rated voltage range ±15%.		
Shock resistance	Destruction: 1,000 m/s^2 for 10 times each in X, Y, and Z directions		
Connection method	Pre-wired (standard length: 2 m) Connector Extension Models		
Weight (Packed state): Pre-wired	65 g	Approx. 140 g	Approx. 190 g
Weight (Packed state): Junction connector	Approx. 20 g	Approx. 40g	Approx. 90 g

*1. Use within a range where the green indicator is lit.
*2. The response frequencies for DC switching are average values.
*3. Since residual voltage is 5 V, use it after checking interface requirements with the connection devices.

Standard

Item \ Model		E2EQ-X3D1 E2EQ-X3D1-M1GJ	E2EQ-X7D1 E2EQ-X7D1-M1GJ	E2EQ-X10D1 E2EQ-X10D1-M1GJ
Sensing distance		3 mm ±10%	7 mm ±10%	10 mm ±10%
Setting distance		0 to 2.4 mm	0 to 5.6 mm	0 to 8 mm
Differential distance		10% max.		
Standard sensing object (mild steel)		12 x 12 x 1 mm	18 x 18 x 1 mm	30 x 30 x 1 mm
Response frequency		1 kHz	500 Hz	400 Hz
Control output	Switching capacity	3 to 100 mA		
	Residual voltage	3.0 V max. (under load current of 100 mA with cable length of 2 m)		
Operating status (with sensing object approaching)		NO		
Protective circuits		Surge absorber, short-circuit protection		
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)		
Temperature influence		±10% max. of sensing distance at 23°C within temperature range of -25°C and 70°C		
Voltage influence		±2.5% max. of Sensing distance within rated voltage range ±15%.		
Shock resistance		Destruction: 1,000 m/s^2 for 10 times each in X, Y, and Z directions		
Connection method		E2EQ-X□D1: Pre-wired models (Standard length: 2 m) E2EQ-X□D1-M1GJ type: Connector relay models (Standard length: 300 mm)		
Weight (Packed state)	Pre-wired	Approx. 120 g	Approx. 160 g	Approx. 220 g
	Junction connector	Approx. 80 g	Approx. 110 g	Approx. 190 g

* The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

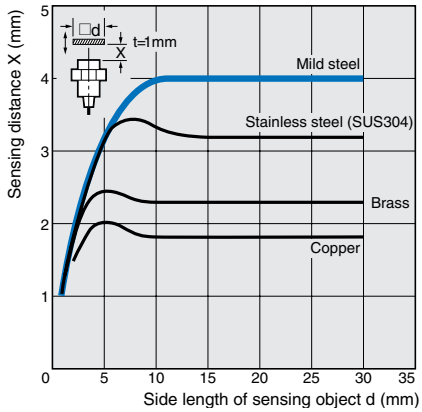
General

Item \ Model		E2EQ-X4X1 E2EQ-X4X1-M1J E2EQ-X3D1 E2EQ-X3D1-M1GJ	E2EQ-X8X1 E2EQ-X8X1-M1J E2EQ-X7D1 E2EQ-X7D1-M1GJ	E2EQ-X15X1 E2EQ-X15X1-M1J E2EQ-X10D1 E2EQ-X10D1-M1GJ
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)		
Rated supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.		
Leakage current		0.8 mA max.		
Indicator lamp		Operation indicator (red), operation setting indicator (green)		
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)		
Insulation resistance		50 M min. (at 500 VDC) between energized parts and case		
Dielectric strength		1,000 VAC for 1 min between energized parts and case		
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Protective structure		IEC60529 IP67		
Material	Case	PTFE resin coating (base: brass)		
	Sensing surface	PTFE resin		
Accessories		Instruction manual		

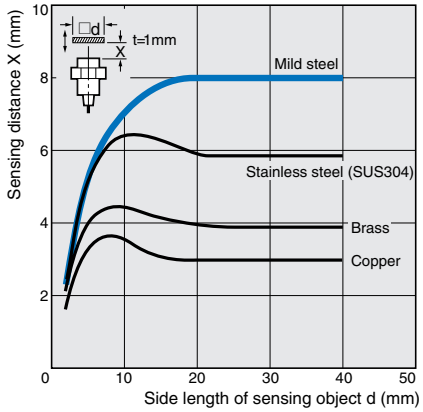
Characteristic data (typical)

Sensing Distance vs. Sensing Object

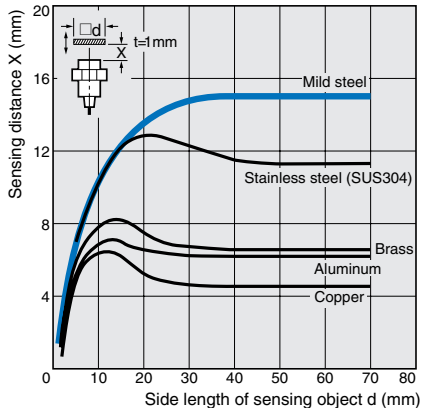
E2EQ-X4X1(-M1J)



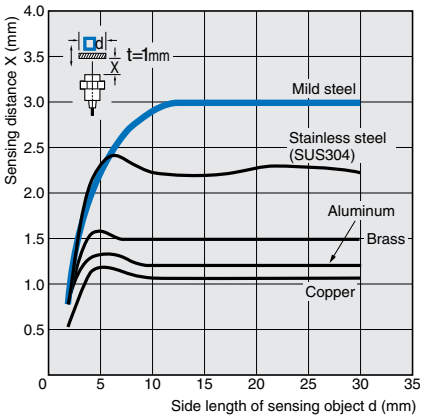
E2EQ-X8X1(-M1J)



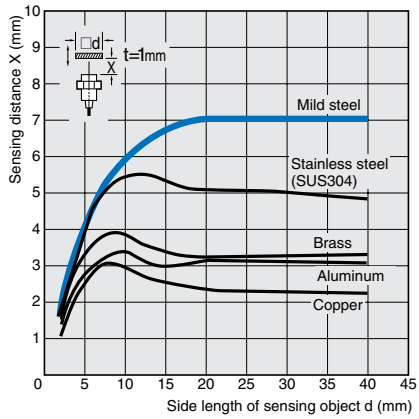
E2EQ-X15X1(-M1J)



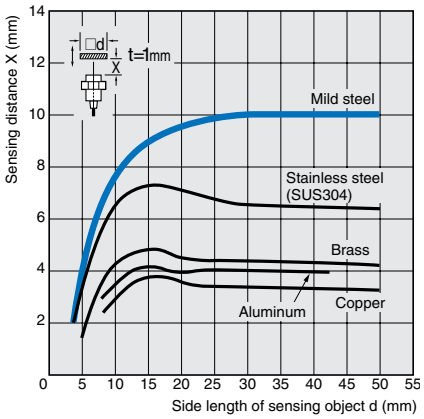
E2EQ-X3D1(-M1GJ)



E2EQ-X7D1(-M1GJ)

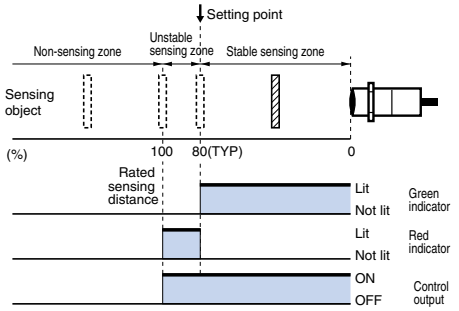
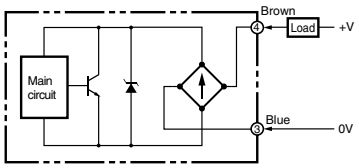
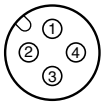


E2EQ-X10D1(-M1GJ)

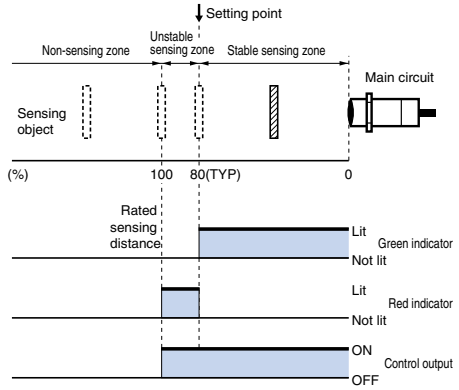
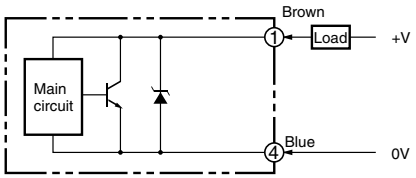
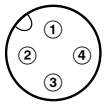


Output Circuit Diagram

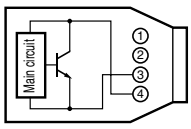
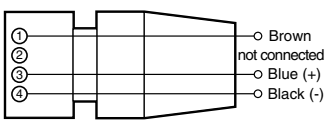
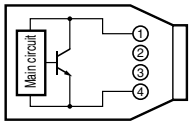
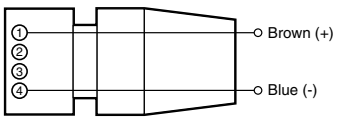
Extended-distance type

Model	Operating status	Timing chart	Output circuit
E2EQ-X4X1 **E2EQ-X8X1** **E2EQ-X15X1** **E2EQ-X4X1-M1J** **E2EQ-X8X1-M1J** **E2EQ-X15X1-M1J**	**NO**		 Note: 1. The load can be connected to either the +V or the 0-V line. 2. Since there is no polarity, there is no need to pay attention to the brown or blue polarity. Wiring  Note: Terminals ② and ③ are not used.

Standard

Model	Operating status	Timing chart	Output circuit
E2EQ-X3D1 **E2EQ-X7D1** **E2EQ-X10D1** **E2EQ-X3D1-M1GJ** **E2EQ-X7D1-M1GJ** **E2EQ-X10D1-M1GJ**	**NO**		 Note: The Load can be connected to either the +V or the 0-V line. Wiring  Note: Terminals ② and ③ are not used.

Connecting Plug-in models

Model	E2EQ-X□X1-M1J	E2EQ-X□D1-M1GJ
Connection	Connector relay type E2EQ-X□X1-M1J  Sensor I/O Connectors XS2F-D42□-□C0-A 	Connector relay type E2EQ-X□D1-M1GJ  Sensor I/O Connectors XS2F-D42□-□A0-A 

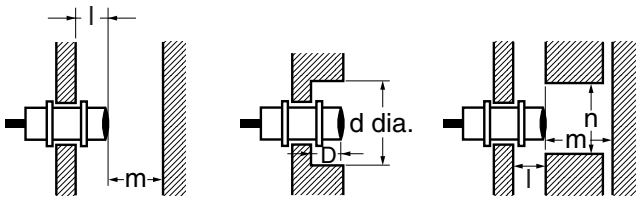
Precautions

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

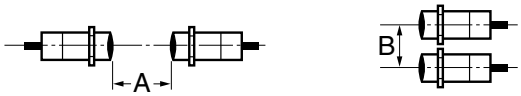


Effects of Surrounding Metal (Unit: mm)

Model / Item	l	d	D	m	n
E2EQ-X4X1(-M1J)	2.4	18	2.4	12	18
E2EQ-X8X1(-M1J)	3.6	27	3.6	24	27
E2EQ-X15X1(-M1J)	6	45	6	45	45
E2EQ-X3D11(-M1GJ)	0	12	0	8	18
E2EQ-X7D1(-M1GJ)		18		20	27
E2EQ-X10D1(-M1GJ)		30		40	45

Mutual Interference

If more than one Proximity Sensor is installed face to face or in parallel, make sure that the distances between two Units adjacent to each other are the same as or larger than the corresponding values shown in the following table.

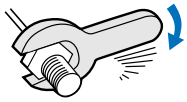


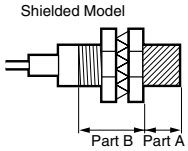
Mutual Interference(Unit: mm)

Model / Item	A	B
E2EQ-X4X1(-M1J)	30	20
E2EQ-X8X1(-M1J)	60	35
E2EQ-X15X1(-M1J)	110	90
E2EQ-X3D1(-M1GJ)	30	20
E2EQ-X7D1(-M1GJ)	50	35
E2EQ-X10D1(-M1GJ)	100	70

Mounting

Do not tighten the nut with excessive force. A washer must be used with the nut.





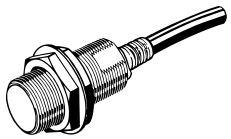
Note: 1. The table below shows the tightening torques for part A and part B nuts. In the previous examples, the nut is on the sensor head side (part B) and hence the tightening torque for part B applies. If this nut is in part A, the tightening torque for part A applies instead.
2. The table below shows the value of tightening torques when using toothed washers.

Torque / Model	Part A		Part B
	Length (mm)	Torque	Torque
E2EQ-X4X1(-M1J)	---	30 Nm	
E2EQ-X8X1(-M1J)		70 Nm	
E2EQ-X15A(-M1J)		180 Nm	
E2EQ-X3D1(-M1GJ)	24	15 Nm	---
E2EQ-X7D1(-M1GJ)	29		
E2EQ-X10D1(-M1GJ)	26	39 Nm	78 Nm

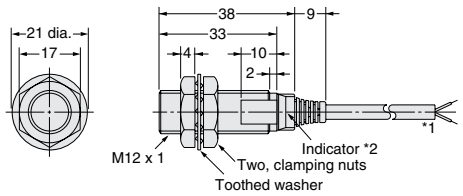
Dimensions (Unit: mm)

● Pre-wired Models

Extended-distance type

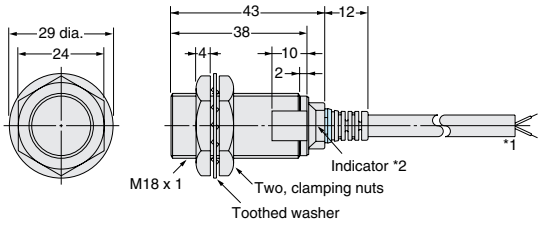


E2EQ-X4X1



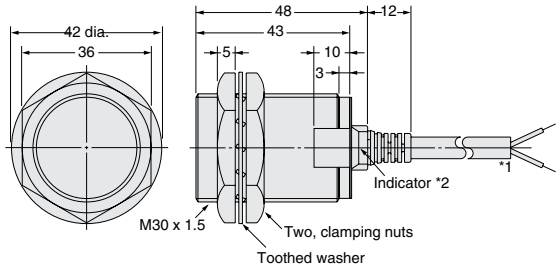
*1: Vinyl-insulated round cable (flame-resistant), 4 dia.
2/3 conductors (conducting cross-sectional area: 0.3 mm²/insulator diameter: 1.3 mm
Standard length: 2m
Cable extension (through a single metal conduit): 200m max.
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X8X1



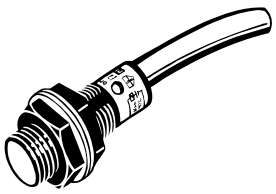
*1: Vinyl-insulated round cable (flame-resistant), 6 dia.
2/3 conductors (conducting cross-sectional area: 0.5 mm²/insulator diameter: 1.9 mm
Standard length: 2m
Cable extension (through a single metal conduit): 200m max.
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X15X1

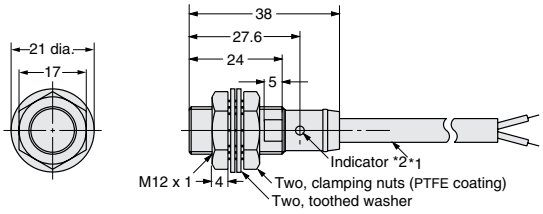


*1: Vinyl-insulated round cable (flame-resistant), 6 dia.
2/3 conductors (conducting cross-sectional area: 0.5 mm²/insulator diameter: 1.9 mm
Standard length: 2m
Cable extension (through a single metal conduit): 200m max.
*2: Operation indicator (red) and setting indicator (green).

Standard

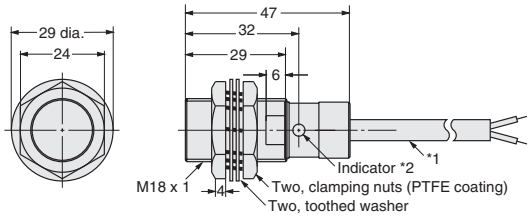


E2EQ-X3D1



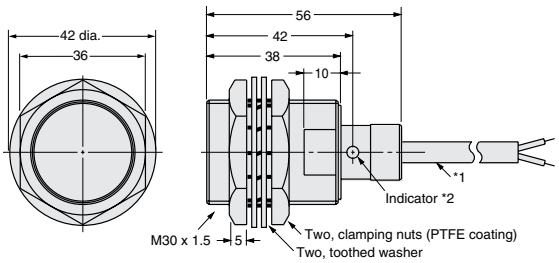
*1: Vinyl-insulated round cable (flame-resistant), 6 dia., 2 conductors (conducting cross-sectional area: 0.5 mm²/insulator diameter: 1.9 mm
Standard length: 2m
Cable extension (through a single metal conduit): 200m max.
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X7D1



*1: Vinyl-insulated round cable (flame-resistant), 6 dia., 2 conductors (conducting cross-sectional area: 0.5 mm²/insulator diameter: 1.9 mm
Standard length: 2m
Cable extension (through a single metal conduit): 200m max.
*2: Operation indicator (red) and setting indicator (green).

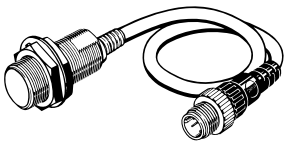
E2EQ-X10D1



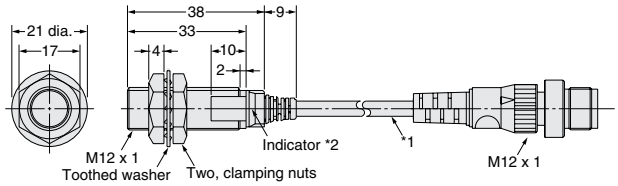
*1: Vinyl-insulated round cable (flame-resistant), 6 dia., 2 conductors (conducting cross-sectional area: 0.5 mm²/insulator diameter: 1.9 mm
Standard length: 2m
Cable extension (through a single metal conduit): 200m max.
*2: Operation indicator (red) and setting indicator (green).

● Plug-in Models

Extended-distance type

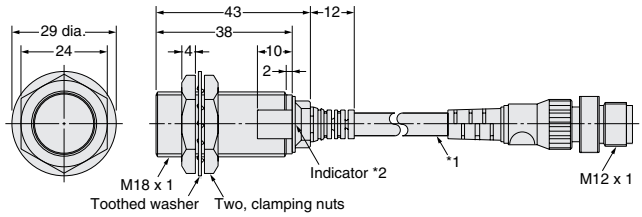


E2EQ-X4X1-M1J



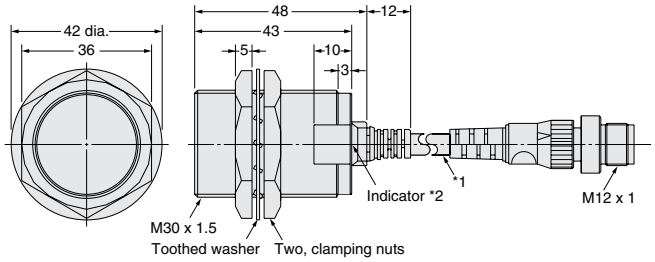
*1: Vinyl-insulated round cable (flame-resistant), 4 dia.
(Conducting cross-sectional area: 0.3 mm²; insulator diameter: 1.3 mm)
Standard length: 300 mm
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X8X1-M1J



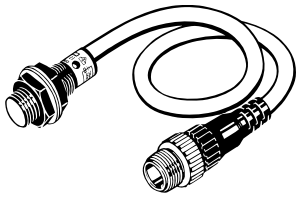
*1: Vinyl-insulated round cable (flame-resistant), 5 dia.
(Conducting cross-sectional area: 0.5 mm²; insulator diameter: 1.9 mm)
Standard length: 300 mm
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X15X1-M1J

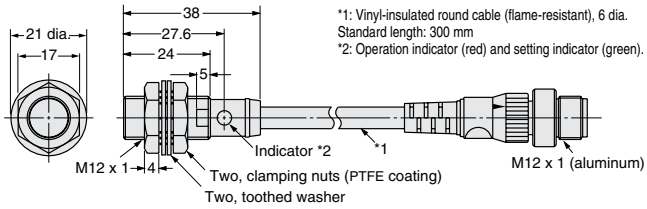


*1: Vinyl-insulated round cable (flame-resistant), 5 dia.
(Conducting cross-sectional area: 0.5 mm²; insulator diameter: 1.9 mm)
Standard length: 300 mm
*2: Operation indicator (red) and setting indicator (green).

Standard

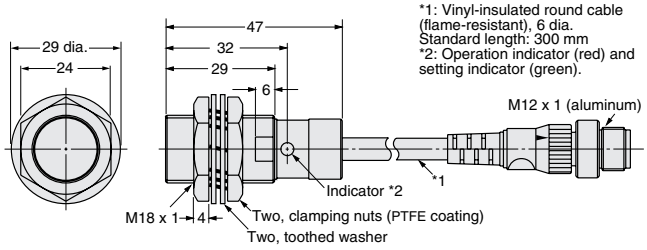


E2EQ-X3D1-M1GJ



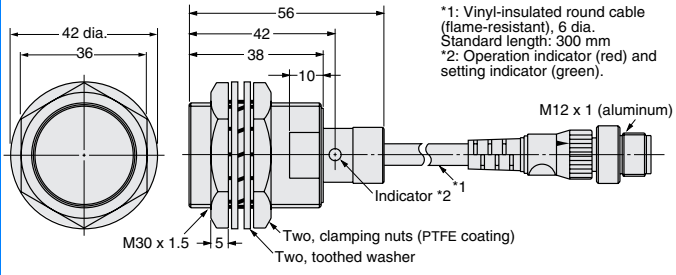
*1: Vinyl-insulated round cable (flame-resistant), 6 dia.
Standard length: 300 mm
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X7D1-M1GJ



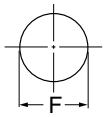
*1: Vinyl-insulated round cable (flame-resistant), 6 dia.
Standard length: 300 mm
*2: Operation indicator (red) and setting indicator (green).

E2EQ-X10D1-M1GJ



*1: Vinyl-insulated round cable (flame-resistant), 6 dia.
Standard length: 300 mm
*2: Operation indicator (red) and setting indicator (green).

Mounting Holes



Outer diameter	M12	M18	M30
F (mm)	12.5 dia.$^{+0.5}$	18.5 dia.$^{+0.5}$	30.5 dia.$^{+0.5}$

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D055-E2-03-X

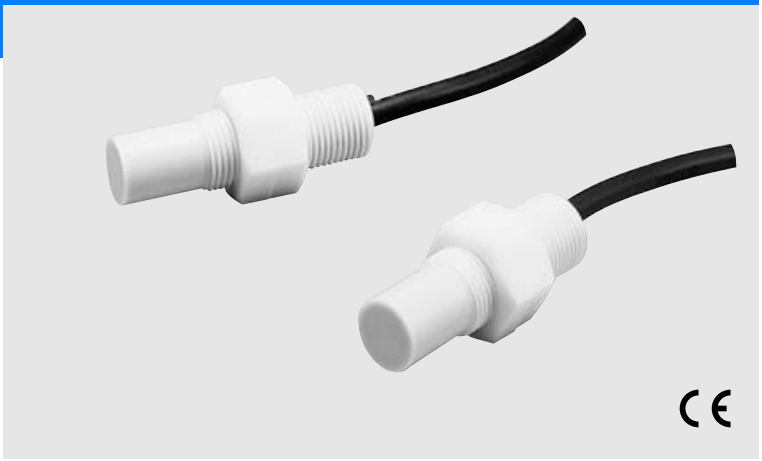
In the interest of product improvement, specifications are subject to change without notice.

Inductive Proximity Sensor

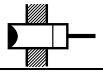
E2KQ-X

Proximity Sensor with Easy Sensing Distance Adjustment and PTFE Coating Effective Oil and Chemical Resistance

- Oil and chemical-resistant PTFE case.
- Sensitivity adjuster ensures easy sensing distance adjustment according to the sensing object.
- Incorporates a cord connector with an indicator providing high visibility.



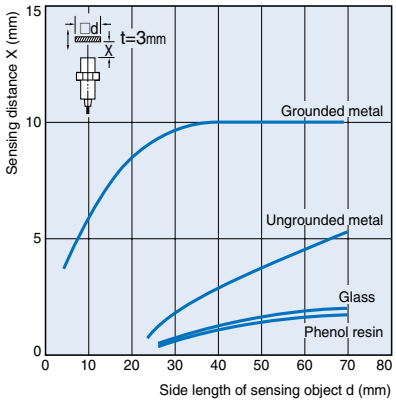
Ordering Information

Shape		Sensing distance	Output	Operating status	Model
Unshielded 	M18	6 to 10 mm	DC 3-wire NPN	**NO ***	**E2KQ-X10ME1**

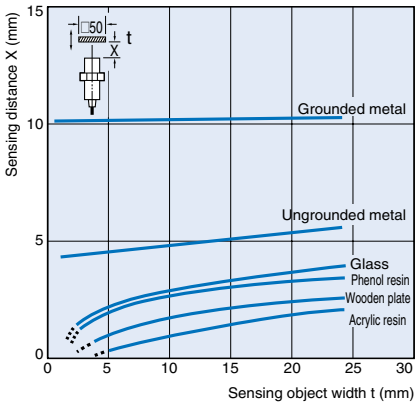
* NC models available (E2KQ-X10ME2)

Characteristic data (typical)

Sensing Distance vs. Sensing Object

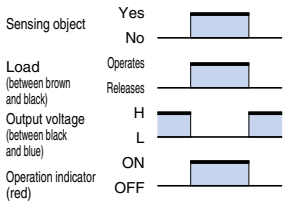
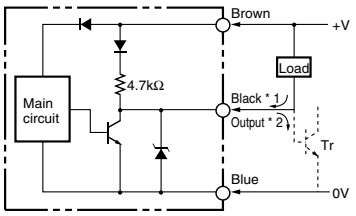


Sensing Object Thickness and Material vs. Sensing Distance



Output Circuit Diagram

DC 3-wire Models

Operating status	Model	Timing chart	Output circuit
NO	**E2KQ-X10ME1**		 * 1. 100 mA max. (load current) * 2. When a transistor is connected

Rating/Performance

Item	Model	E2KQ-X
Sensing distance *		10 mm
Sensing distance adjustable range		6 to 10 mm
Differential distance		4% to 20% of sensing distance
Sensing object		Conductors and dielectrics
Standard sensing object		with grounded metal: 50 x 50 x 1t mm
Response frequency		35 Hz
Rated supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.
Current consumption		15 mA max.
Control output	Switching capacity	100 mA
	Residual voltage	1.5 V max. (under load current of 100 mA with cable length of 2 m)
Indicator lamp		Detection indicator (red LED)
Operating status (with sensing object approaching)		Refer to previous pages for details of operating chart of output circuits.
Protective circuits		Reverse connection protection, surge absorber
Ambient temperature		Operating: -10°C to 55°C, Storage: -25°C to 55°C (with no icing or condensation)
Ambient humidity		Operating/Storage: 35% to 85%RH (with no condensation)
Temperature influence		±15% max. of sensing distance at 23°C in the temperature range of -10°C and 55°C
Voltage influence		2% max. sensing distance within a range of 80% to 120% of the rated supply voltage.
Insulation resistance		50 M min. (at 500 VDC) between energized parts and case
Dielectric strength		500 VAC 50/60 Hz for 1 min between energized part and case
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance		Destruction: 500 m/s^2 for 3 times each in X, Y, and Z directions
Protective structure		IEC IP66
Connection method		Pre-wired models (standard length: 2 m)
Weight (Packed state)		Approx. 150 g
Material	Case, Sensing surface	Fluororesin
	Clamping nut	
Accessories		Instruction sheet and screwdriver for adjustment

* This sensing distance is possible with a standard sensing object. Refer to Engineering Data for sensing distances of other materials.

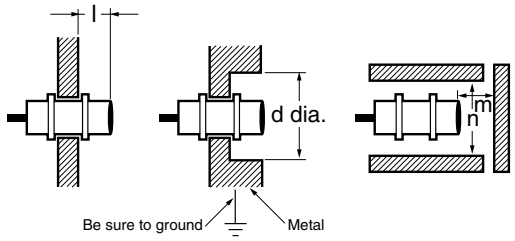
Precautions

Correct Use

Design

Effects of Surrounding Metals

If E2K-X is embedded in metal, maintain at least the following distances between E2K-X and the metal.



* Ensure to ground the metal object, otherwise E2KQ-X will not be in stable operation.

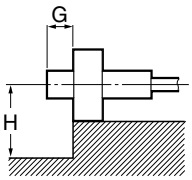
Effects of Surrounding Metal **(Unit: mm)**

Model / Length	l	d	m	n
E2KQ-X10ME1	30	75	18	90

If a mounting bracket is used, be sure that at least the following distances are maintained.

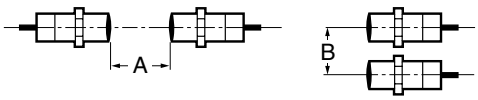
Effects of Surrounding Metal **(Unit: mm)**

Model / Length	G	H
E2KQ-X10ME1	30	35



Mutual Interference

If more than one Sensor is located face to face or in parallel, provide sufficient space between adjacent Sensors to suppress mutual interference as indicated in the following diagram.



Mutual Interference **(Unit: mm)**

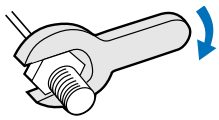
Model / Length	A	B
E2KQ-X10ME1	200	32

Effect of High-frequency Electro-magnetic Field

E2KQ-X may malfunction if there is an ultrasonic washer, high-frequency generator, transceiver, or inverter nearby. For a typical measure refer to the "Noise" with Common precautions of a photoelectric sensor in Rear B-page.

Installation

The tightening torque must not exceed the following value.



Model	Tensile strength (torque)
E2KQ-X10ME1	0.6 Nm

● Adjustment

Sensing object

The maximum sensing distance will decrease if the sensing object is a metal or dielectric object that is not grounded.

- Sensing Object Material E2K-C can detect almost any type of object. The sensing distance of E2K-C, however, will vary with the electrical characteristics of the object, such as the conductance and inductance of the object, and the water content and capacity of the object. The maximum sensing distance of E2K-C will be available if the object is made of grounded metal.
- Ensure a constant ambient operating temperature during the indirect detection of objects.

Miscellaneous

Ambient Conditions

Ensure that the E2K-X is free from sprayed water, oil, chemical, or condensation, otherwise E2K-X may malfunction by detecting them as sensing objects.

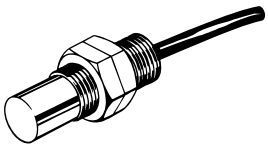
Environment

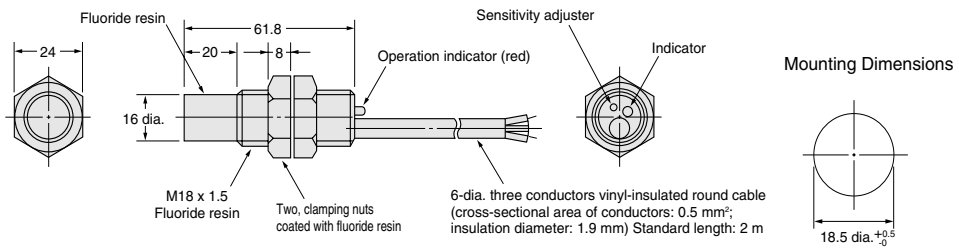
E2KQ-X has a water-resistant design. To increase the reliability of E2KQ-X in operation, however, it is recommended that E2KQ-X is free from sprayed water or machining oil.

The cord is not coated with PTFE, which must be taken into consideration when installing the E2KQ-X.

Dimensions (Unit: mm)

E2KQ-X10ME1





ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

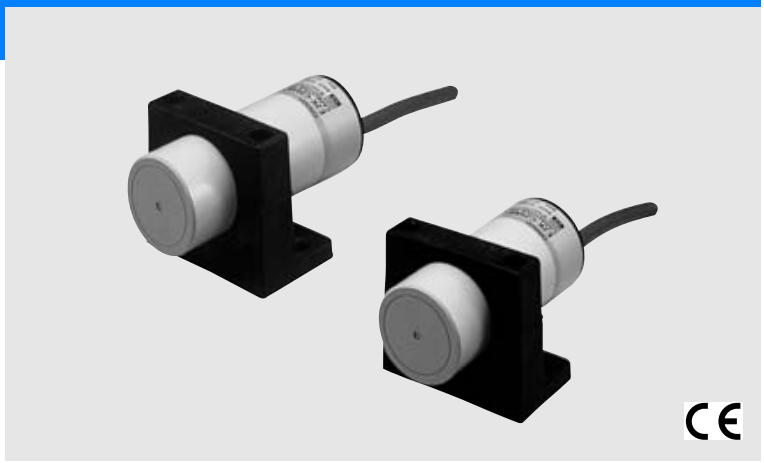
Cat. No. D078-E2-02-X In the interest of product improvement, specifications are subject to change without notice.

Long-distance Capacitive Proximity Sensor

E2K-C

Capacitive Proximity Sensor with Adjustable Sensitivity

- Detects both metallic and non-metallic objects (glass, lumber, water, oil, plastic, etc.) without direct contact.
- DC models acquire CE marking



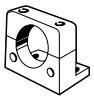
Ordering Information

Sensors

Shape	Sensing distance	Model		
		Output specifications	Operating status	
			NO	NC
Unshielded 34 dia.	3 to 25mm	DC 3-wire NPN DC 3-wire PNP	**E2K-C25ME1** **E2-KC25MF1**	**E2K-C25ME2** **E2K-C25MF2**

Accessories (Order Separately)

Mounting Brackets

Shape	Model	Quantity	Remarks
	**Y92E-A34**	1	Supplied with the product.

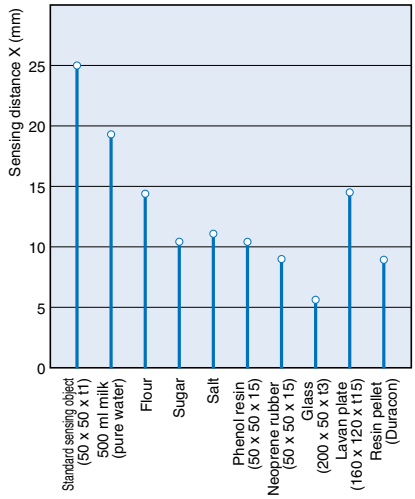
Rating/Performance

Item / Model		E2K-C25M□1	E2K-C25M□2
Sensing distance *		25 mm	
Sensing distance adjustable range		3 to 25 mm	
Sensing object		Conductors and dielectrics	
Standard sensing object		with grounded metal: 50 x 50 x 1t mm	
Differential distance		15% max. of sensing distance (when adjusted to 25 mm ±10% with standard object)	
Response frequency		70 Hz	
Power supply(Operating voltage range)		12 to 24 VDC, ripple (p-p): 10% max.,(10 to 40 VDC)	
Current consumption		E models: 10 mA max. at 12 VDC, 16 mA max. at 24 VDC	
Leakage current		Y models: 1 mA max. at 100 VAC (50/60 Hz) with output turned OFF., 2 mA max. at 200 VAC (50/60 Hz) with output turned OFF.	
Control output	Switching capacity	200 mA max.	
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)	
Indicator lamp		Detection indicator (red LED)	
Operating status (with sensing object approaching)		E1, Y1 models: NO E2, Y2 models: NC	
Protective circuits		Reverse connection protection, surge absorber	
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)	
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)	
Temperature influence		±15%max. of sensing distance at 23° within temperature range -10°C to 55°C	
Voltage influence		±2% max. of sensing distance at a voltage between 85% and 115% of the rated power supply voltage	
Insulation resistance		50 M min. (at 500 VDC) between current carry parts and case	
Dielectric strength		1000 VAC 50/60 Hz for 1 min between energized part and case	
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance		Destruction: 500 m/s^2 for 10 times each in X, Y, and Z directions	
Protective structure		IEC 60529 IP66	
Connection method		Pre-wired models (standard length: 2 m)	
Weight (Packed state)		Approx. 200 g	
Material	Case	Heat-resistant ABS resin	
	Sensing surface		
Accessories		Mounting bracket, instruction manual	

* The set distances are sensing distances applicable to standard sensing objects. Refer to Engineering Data for sensing distances applicable to other types of objects.

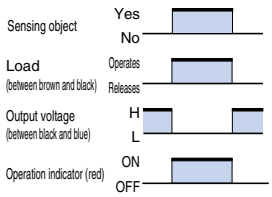
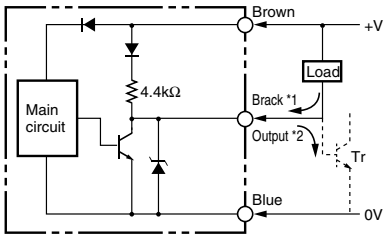
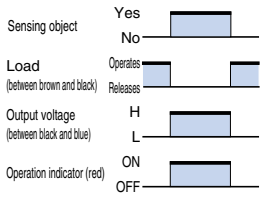
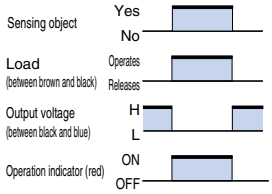
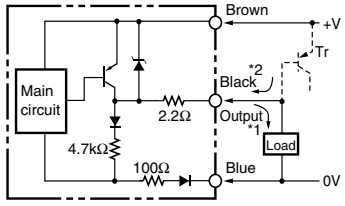
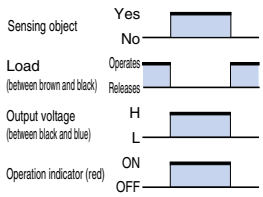
Characteristic data (typical)

Sensing Distance Change by Sensing Object (Typical)



Output Circuit Diagram

DC 3-wire Models

Operating status	Model	Timing chart	Output circuit
NO	E2K-C25ME1		
NC	E2K-C25ME2		
NO	E2K-C25MF1		
NC	E2K-C25MF2		

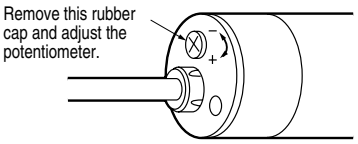
* 1. 200 mA max. (load current)
* 2. When a transistor is connected

* 1. Maximum load current: 200 mA
* 2. Current flows in this direction if the circuit incorporates the transistor.

Operation

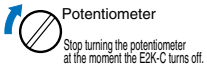
Sensitivity adjustment

Remove the rear rubber cap of the E2K-C and turn the potentiometer in the hole to adjust the sensitivity of the E2K-C.

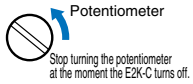


The sensing distance increases by turning the potentiometer clockwise and decreases by turning the potentiometer counterclockwise. The potentiometer can make 15±3 valid turns and then make slip turns because the potentiometer does not have a stopper. The slip turns will not, however, damage the potentiometer.

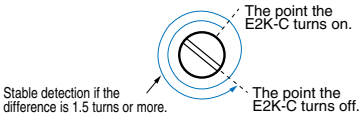
1. Slowly turn the potentiometer clockwise until the E2K-C turns on with no sensing object.



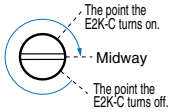
2. Turn the potentiometer counterclockwise until the E2K-C turns off with the sensing object located within the sensing distance.



3. The E2K-C will be in stable operation if there is a difference of 1.5 turns or more between the points the E2K-C is turned on and off, otherwise the E2K-C will not be in stable operation.



4. Set the potentiometer midway between the two points.



5. If the distance of each sensing object varies, take step 2 with the sensing object located at the farthest sensing distance to be applied.

Precautions

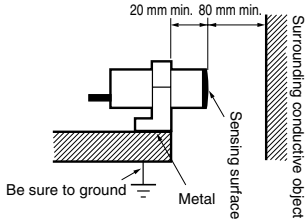
Correct Use

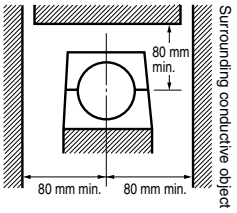
Design

Effects of Surrounding Metal

During Proximity Sensor installation provide a distance of 80 mm min. from the surrounding metal objects to prevent the Sensor from being affected by metal objects other than the sensing object.

If installing the Sensor with the L-shaped mounting bracket, provide a distance of 20 mm min. between the face of the sensing head and the mounting bracket.

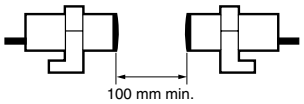




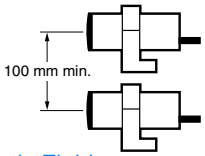
Mutual Interference

Space the two Sensors at a distance exceeding 100 mm to prevent mutual interference.

Face-to-dace Mounting



Parallel Mounting



Effect of High-frequency Electro-magnetic Field

The E2K-C may malfunction if there is an ultrasonic washer, high-frequency generator, transceiver, or inverter nearby.

Sensing Object

- Sensing Object Material. The E2K-C can detect almost any type of object. The sensing distance of the E2K-C, however, will vary with the electrical characteristics of the object, such as the conductance and inductance of the object, and the water content and capacity of the object. The maximum sensing distance of E2K-C will be available if the object is made of grounded metal.
- Indirect Detection. In the case of the detection of objects in metal containers, each metal container must have a non-metallic window.

Miscellaneous

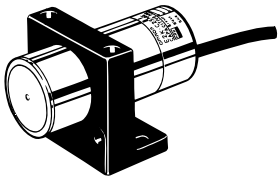
Organic Solvents

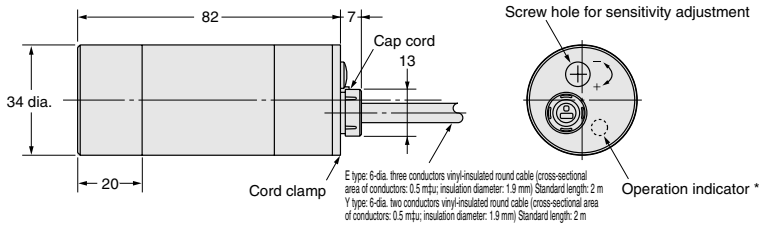
E2K-C has a case made of heat-resistant ABS resin. Be sure that the case is free from organic solvents or solutions containing organic solvents.

Dimensions (Unit: mm)

Sensors

E2K-C25M□□

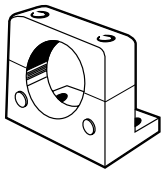


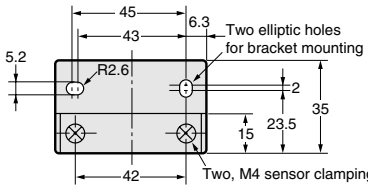


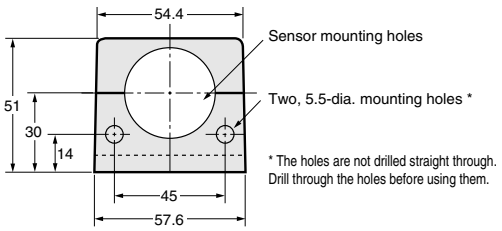
* E models: Detection indicator (red); Y models: Operation indicator (red)

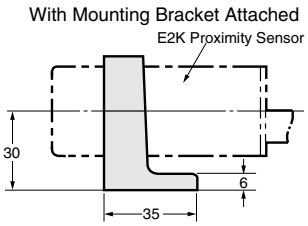
Accessories (Order Separately)*

L-shaped Mounting Bracket
Y92E-A34









* Attached to the product.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D016-E2-04-X

In the interest of product improvement, specifications are subject to change without notice.

Flat Type Capacitive Proximity Sensor

E2K-F

Low-profiled Capacitive Proximity Sensor providing Flexible Installation

Ordering Information

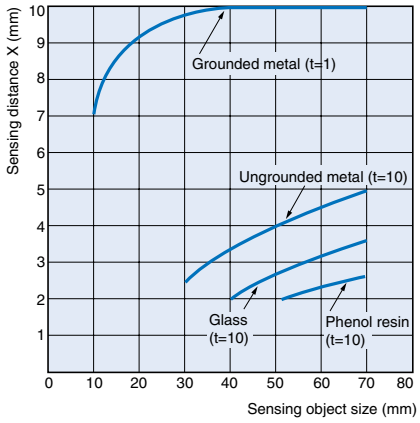
Shape	Sensing distance	Output specifications	Operating status	Model
Flat type Unshielded	10 mm	DC 3-wire NPN	NO	**E2K-F10MC1**
			NC	**E2K-F10MC2**
	4 to 10 mm		NO	**E2K-F10MC1-A**
			NC	**E2K-F10MC2-A**

Rating/Performance

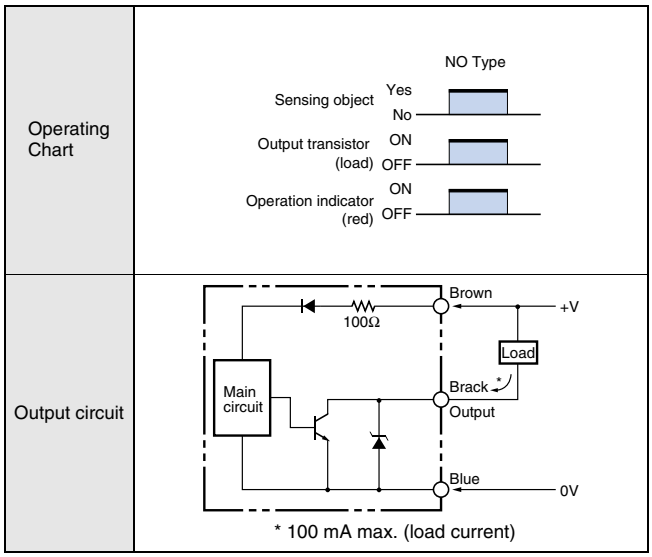
Item		E2K-F10MC1 E2K-F10MC2	E2K-F10MC1-A E2K-F10MC2-A
Sensing distance		10 mm ±10%	4 to 10 mm ±10%
Setting distance		0 to 7.5 mm	
Differential distance		15% max. sensing distance	
Sensing object		Conductors and dielectrics	
Standard sensing object		with grounded metal: 50 x 50 x 1 mm	
Response frequency		100 Hz	
Rated supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.	
Current consumption		10 mA max. (24VDC)	
Control output	Switching capacity	NPN open collector 100 mA max. (under 30 VDC)	
	Residual voltage	1.5 V max. (under load current of 100 mA with cable length of 2 m)	
Indicator lamp		Detection indicator (red LED)	
Operating status (with sensing object approaching)		NO	
Protective circuits		Reverse connection protection, surge absorber	
Ambient temperature		Operating/Storage: -10°C to 55°C (with no icing or condensation)	
Ambient humidity		Operating/Storage: 35% to 95%RH	
Temperature influence		±15% max. of sensing distance at 23°C within the temperature range of -10°C and 55°C	
Voltage influence		±2.5% max. of sensing distance within a range of ±10% of rated supply voltage	
Insulation resistance		50 M min. (at 500 VDC) between energized parts and case	
Dielectric strength		500 VAC 50/60 Hz for 1 min between energized part and case	
Vibration resistance		Malfunction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance		Destruction: 500 m/s^2 for 3 times each in X, Y, and Z directions	
Protective structure		IEC 60529 IP66	IEC 60529 IP64
Connection method		Pre-wired models (standard length: 2 m)	
Weight (Packed state)		Approx. 35 g	
Material	Case	Heat-resistant ABS resin	
	Sensing surface		
Accessories		Instruction manual	

Characteristic data (typical)

Sensing Distance vs. Sensing Object



Output Circuit Diagram



Precautions

Correct Use

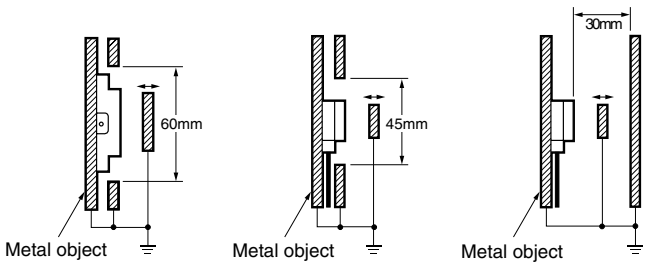
Design

Sensing Object Material

E2K-F can detect almost any type of object. The sensing distance of E2K-F, however, will vary with the electrical characteristics of the object, such as the conductance and inductance of the object, as well as the water content and capacity of the object. The maximum sensing distance of E2K-F will be available if the object is made of grounded metal. There are objects that cannot be detected indirectly. Therefore test E2K-F in a trial operation with the objects before using E2K-F in actual applications.

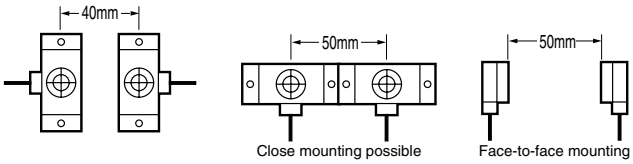
Effects of Surrounding Metal

Separate E2K-F from ambient metals as shown below.



Mutual Interference

If installing more than one E2K-F face to face or side by side, separate them as shown below.



Effect of High-frequency Electro-magnetic Field

E2K-F may malfunction if an ultrasonic washer, high-frequency generator, transceiver, or inverter are nearby.

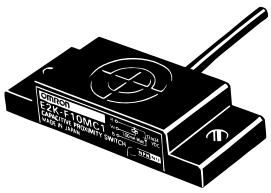
For a typical measure, refer to the "Noise" with Common precautions of a photoelectric sensor in Rear B-page.

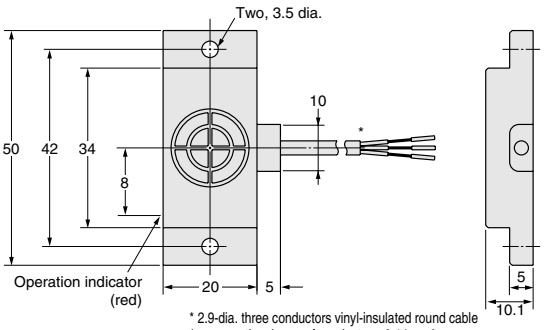
Wiring Considerations

The characteristics of E2K-F will not change if the cord is extended. Keep in mind that voltage drops may occur due to the cord extension, thus, ensure that the total cord length does not exceed 200 m.

Dimensions (Unit: mm)

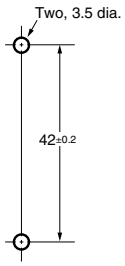
E2K-F





* 2.9-dia. three conductors vinyl-insulated round cable
(cross-sectional area of conductors: 0.14 mm²;
insulation diameter: 0.9 mm)
Standard length: 2 m

Mounting Holes



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Cat. No. D018-E2-02A-X In the interest of product improvement, specifications are subject to change without notice.