

Inductive Proximity Sensor

E2F

Threaded Plastic Housing

- For applications where a metal housing cannot be used.
- Saves space.
- Short-circuit protection is built into all DC models.
- Watertight construction conforms to IP68.



Ordering Information

DC 3-wire Models

Shield	Short-circuit protection	Size	Sensing distance	Output configuration	Part Number	
					NPN	PNP
Shielded	Yes	M8	1.5 mm	NO	E2F-X1R5E1	E2F-X1R5F1
				NC	E2F-X1R5E2	E2F-X1R5F2
		M12	2 mm	NO	E2F-X2E1	E2F-X2F1
				NC	E2F-X2E2	E2F-X2F2
		M18	5 mm	NO	E2F-X5E1	E2F-X5F1
				NC	E2F-X5E2	E2F-X5F2
		M30	10 mm	NO	E2F-X10E1	E2F-X10F1
				NC	E2F-X10E2	E2F-X10F2

AC 2-wire Models

Shield	Short-circuit protection	Size	Sensing distance	Output configuration	Part Number		
Shielded	No	M8	1.5 mm	NO	E2F-X1R5Y1		
				NC	E2F-X1R5Y2		
		M12	2 mm	NO	E2F-X2Y1		
				NC	E2F-X2Y2		
		M18	5 mm	NO	E2F-X5Y1*		
				NC	E2F-X5Y2*		
		M30	10 mm	NO	E2F-X10Y1*		
				NC	E2F-X10Y2*		
		Yes		M8	1.5 mm	NO	---
						NC	---
				M12	2 mm	NO	---
						NC	---
	M18			5 mm	NO	E2F-X5Y1-53*	
					NC	E2F-X5Y2-53*	
	M30	10 mm	NO	E2F-X10Y1-53*			
			NC	E2F-X10Y2-53*			

Note: *When ordering AC 2-wire models conforming to UL and CSA standards, marked with "*" in the table above, add the suffix code "-US."

Specifications

Item	E2F-X1R5Ej E2F-X1R5Fj E2F-X1R5Yj	E2F-X2Ej E2F-X2Fj E2F-X2Yj	E2F-X5Ej E2F-X5Fj E2F-X5Yj	E2F-X10Ej E2F-X10Fj E2F-X10Yj	E2F-X5Yj -53	E2F-X10Yj -53
Size	M8	M12	M18	M30	M18	M30
Sensing distance	1.5 mm ±10%	2 mm ±10%	5 mm ±10%	10 mm ±10%	5 mm ±10%	10 mm ±10%
Supply voltage (operating voltage range)	E, F models: 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max. -Y models: 24 to 240 VAC (20 to 264 VAC)				90 to 140 VAC, 50/60 Hz	
Current consumption	E, F models: 17 mA max.				---	
Leakage current	Y models: 1.7 mA at 200 VAC				1.5 mA at 140 VAC	
Sensing object	Ferrous metal (Refer to <i>Engineering Data</i> for non-ferrous metal.)					
Sensing distance (with standard sensing object)	0 to 1.2 mm (iron: 8 x 8 x 1 mm)	0 to 1.6 mm (iron: 12 x 12 x 1 mm)	0 to 4.0 mm (iron: 18 x 18 x 1 mm)	0 to 8.0 mm (iron: 30 x 30 x 1 mm)	0 to 4.0 mm (iron: 18 x 18 x 1 mm)	0 to 8.0 mm (iron: 30 x 30 x 1 mm)
Differential travel	10% max. of sensing distance					
Response frequency (see note 1)	E, F models: 2 kHz Y models: 25 Hz	E, F models: 1.5 kHz Y models: 25 Hz	E, F models: 600 Hz Y models: 25 Hz	E, F models: 400 Hz Y models: 25 Hz	25 Hz	
Operation (with sensing object approaching)	E1 models: Output signal L is ON and load operates. E2 models: Output signal H is ON and load is reset. Y1 model: Load operates. Y2 model: Load is reset.					
Control output (switching capacity)	Y models: 5 to 100 mA E, F models: 200 mA max.		Y models: 5 to 300 mA		5 to 300 mA ---	
Circuit protection	E models: Reverse connection protection, load short-circuit protection, surge absorber Y models: Surge absorber				Load short-circuit protection Surge absorber	
Indicators	E, F models: Detection, Y models: Operating					
Ambient temperature	Operating: -25° to 70°C (with no icing)					
Ambient humidity	Operating: 35% to 95%					
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% of sensing distance in rated voltage when operated within ±15% of the rated power supply voltage Y model: ±1% of sensing distance in rated voltage when operated within ±10% of the rated power supply voltage					
Residual voltage	E models: 2.0 V max. (under load current of 200 mA and cord length of 2 m) Y models: Refer to <i>Engineering Data</i> of the E2E/E2E2 datasheet.					
Insulation resistance	50 MΩ (at 500 VDC) between current carry parts and case					
Dielectric strength	DC models: 1,000 VAC (50/60 Hz) for 1 min between current carry parts and case AC models (M8 models): 2,000 VAC (50/60 Hz) for 1 min between current carry parts and case AC models (other than M8 models): 4,000 VAC (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 hrs each in X, Y, and Z directions					
Shock resistance	Destruction: 1,000 m/s ² (approx. 100G) for 10 times each in X, Y, and Z directions					
Degree of protection	IEC IP68 (see note 2)					
Weight (with 2-m cord)	Approx. 40 g	Approx. 50 g	Approx. 130 g	Approx. 170 g	Approx. 130 g	Approx. 170 g
Material	Case	Polyallylate resin (see note 3)				
	Sensing surface	Polyallylate resin				

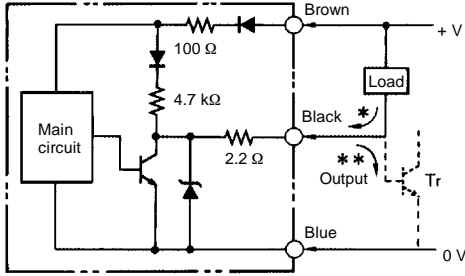
- Note:**
- Response frequencies are mean values measured with standard sensing objects, each separated from one another with a distance that is double the size of the sensing object and located at a distance that is half the sensing distance.
 - The E2E is recommended in locations where machining oil spray is present because the additives in the machining oil may damage the E2F.
 - The tightening nuts are made of polyacetal resin.

Operation

Output Circuits

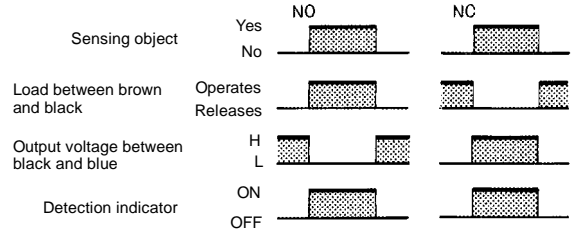
DC 3-wire Models

NPN
E2F-Xj E

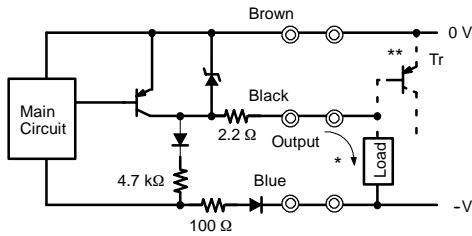


* 200 mA max. (load current)
** When connecting to the Tr circuit

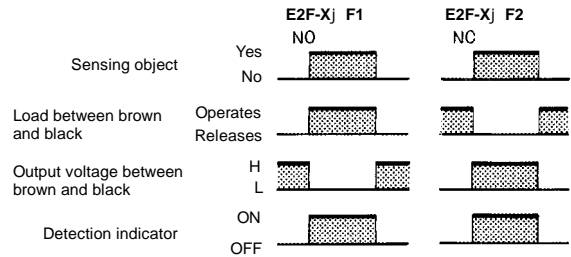
Timing Charts



PNP

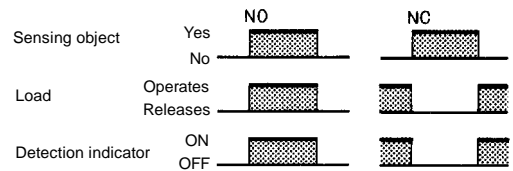
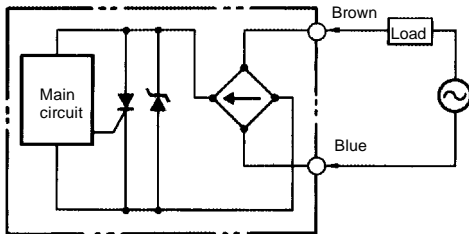


* 200 mA max. (source current), 2 V max. (residual voltage)
** Dotted line denotes the circuit when the load is a transistor.



AC 2-wire Models

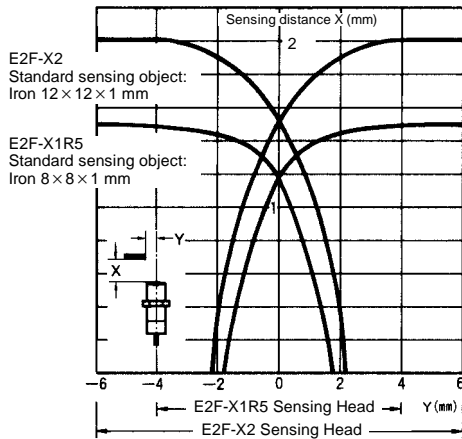
E2F-Xj Y



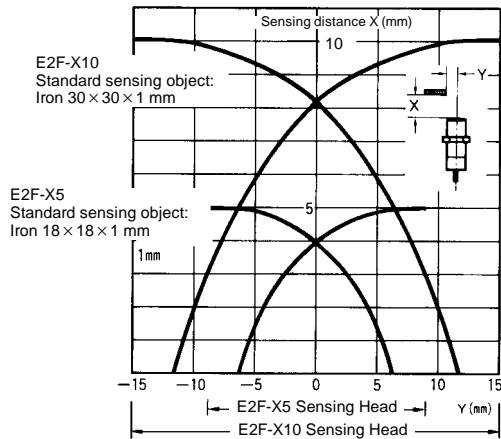
Engineering Data

Operating Range (Typical)

E2F-X1R5j j , E2F-X2j j

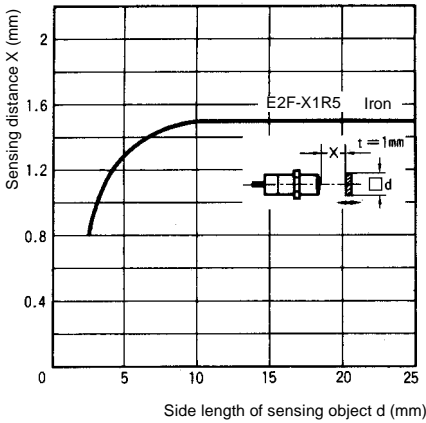


E2F-X5j j , E2F-X10j j

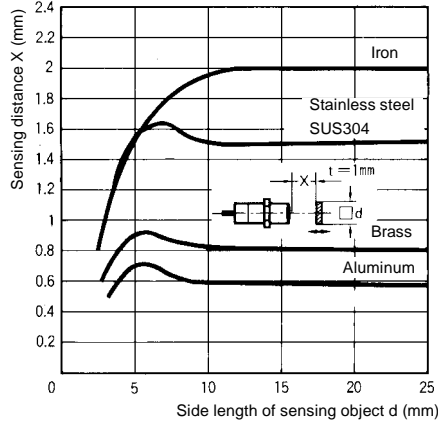


Sensing Distance vs. Sensing Object (Typical)

E2F-X1R5j j

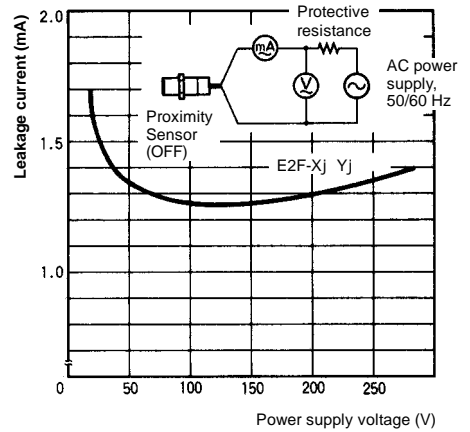


E2F-X2j j

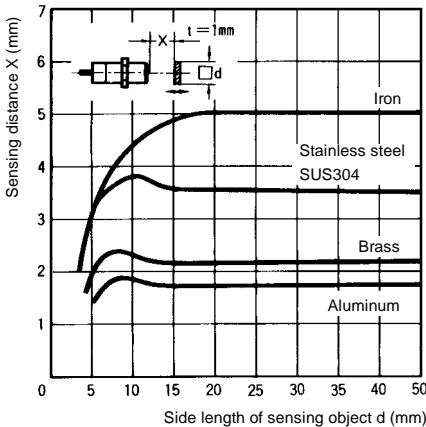


Leakage Current (Typical)

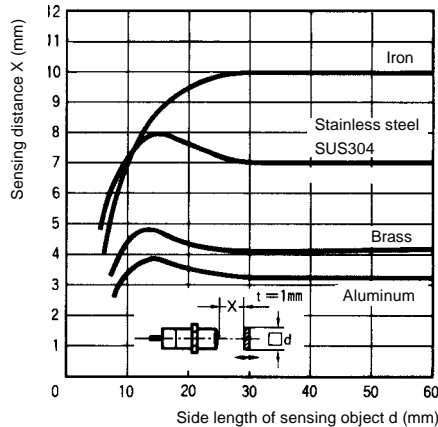
E2F-Xj Yj



E2F-X5j j



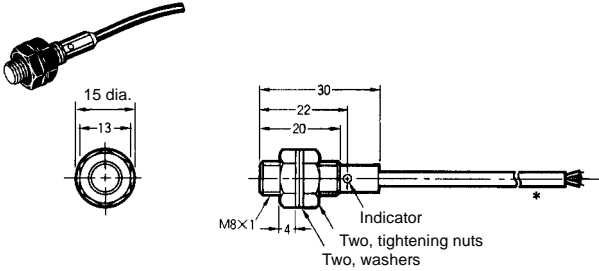
E2F-X10j j



Dimensions

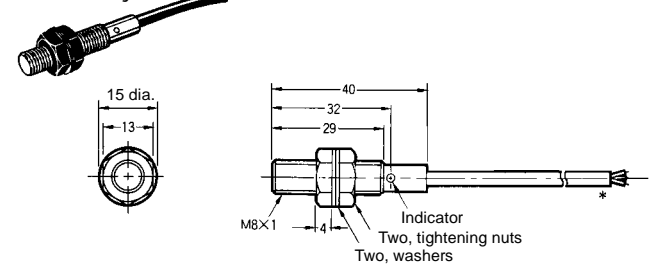
Note: All units are in millimeters unless otherwise indicated.

E2F-X1R5Ej



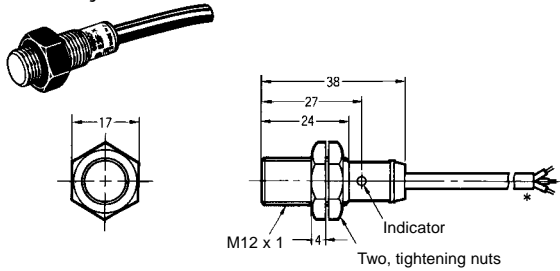
Note: Vinyl-insulated round cord, 3.5 dia., 3 cores (0.12 dia. x 13); Standard length: 2 m

E2F-X1R5Yj



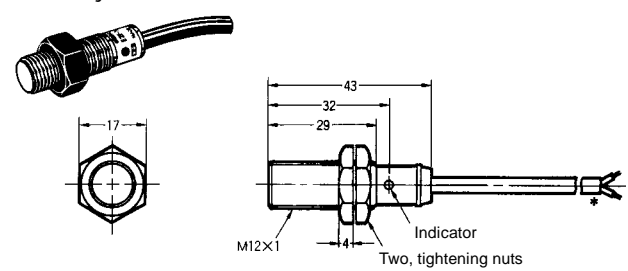
Note: Vinyl-insulated round cord, 3.5 dia., 2 cores (0.12 dia. x 13); Standard length: 2 m

E2F-X2Ej



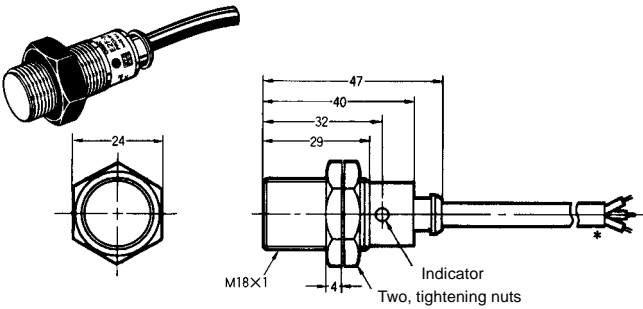
Note: Oil-and vibration-resistant, vinyl-insulated round cord, 6 dia., 0.5 dia. x 3 cores; Standard length: 2 m
The cord can be extended up to 200 m in an independent metal conduit.

E2F-X2Yj



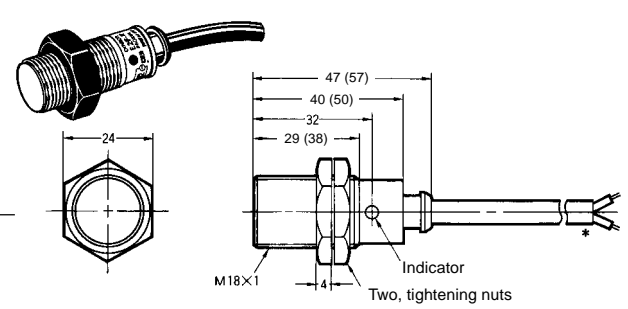
Note: Oil-and vibration-resistant, vinyl-insulated round cord, 6 dia., 0.5 dia. x 2 cores; Standard length: 2 m
The cord can be extended up to 200 m in an independent metal conduit.

E2F-X5Ej



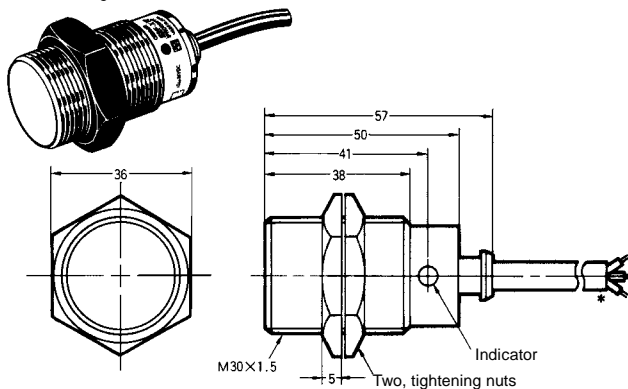
Note: Oil-and vibration-resistant, vinyl-insulated round cord, 6 dia., 0.5 dia. x 3 cores; Standard length: 2 m
The cord can be extended up to 200 m in an independent metal conduit.

E2F-X5Yj



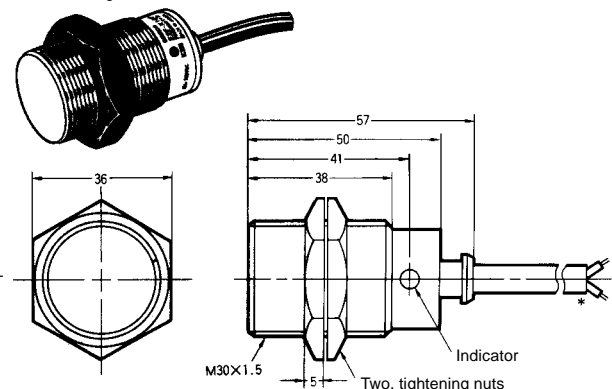
Note: Oil-and vibration-resistant, vinyl-insulated round cord, 6 dia., 0.5 dia. x 2 cores; Standard length: 2 m
The cord can be extended up to 200 m in an independent metal conduit.
The figures in parentheses are values for the E2F-X5Yj -53.

E2F-X10Ej



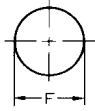
Note: Oil-and vibration-resistant, vinyl-insulated round cord, 6 dia., 0.5 dia. x 3 cores; Standard length: 2 m
The cord can be extended up to 200 m in an independent metal conduit.

E2F-X10Yj



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

Mounting Hole Dimension

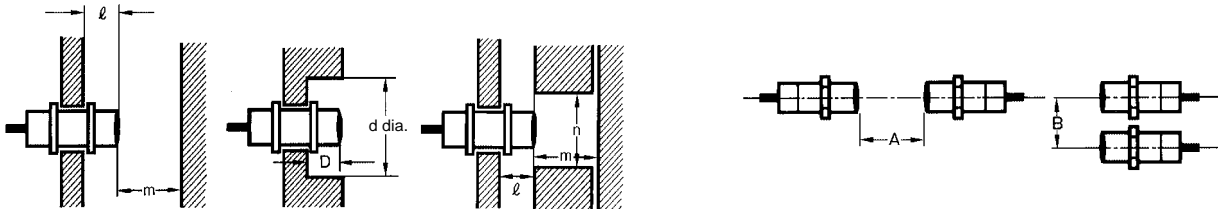


Model	F (mm)
E2F-X1R5j	8.5 ^{+0.5} / ₀ dia
E2F-X2j	12.5 ^{+0.5} / ₀ dia
E2F-X5j	18.5 ^{+0.5} / ₀ dia
E2F-X10j	30.5 ^{+0.5} / ₀ dia

Precautions

Effects of Surrounding Metals and Mutual Interference

When mounting the Proximity Sensor flush within a metal panel or when mounting two or more identical Sensors face to face or side by side, ensure that the clearances given in the following table are maintained. Sufficient clearances prevent the Sensors from being affected by metallic objects other than the sensing object and prevent mutual interference between the two Sensors.



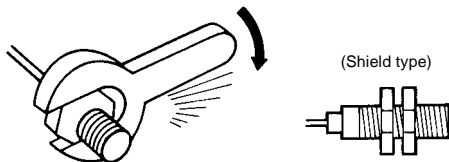
(Unit: mm)

Item	E2F-X1R5j j	E2F-X2j j	E2F-X5j j	E2F-X10j j
ℓ	0	0	0	0
d	8	12	18	30
D	0	0	0	0
m	4.5	8	20	40
n	12	18	27	45
A	20	30 (20)	50 (30)	100 (50)
B	15	20 (12)	35 (18)	70 (35)

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

Mounting

Do not apply excessive torque when tightening any nuts.



Model	Tightening torque
E2F-X1R5	8 kgf S cm {0.78 N S m}
E2F-X2	8 kgf S cm {0.78 N S m}
E2F-X5	20 kgf S cm {2.0 N S m}
E2F-X10	20 kgf S cm {2.0 N S m}

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. D83-E1-1 **In the interest of product improvement, specifications are subject to change without notice.**

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