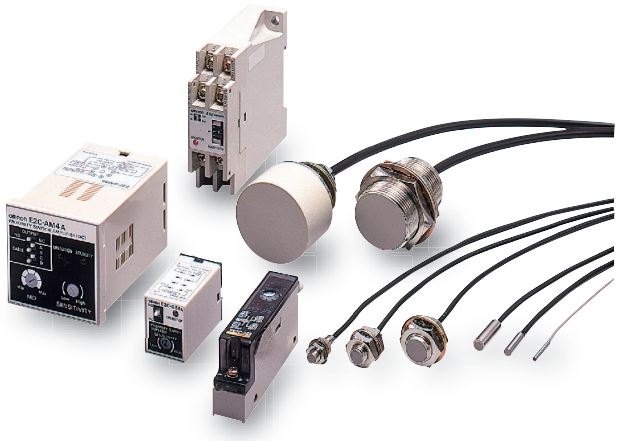
Separate Amplifier Proximity Sensor with Adjustment Potentiometer

E2C/E2C-H

CSM_E2C_E2C-H_DS_E_3_1

Separate Amplifier Sensor with Sensitivity Adjustment

- Compact design with smaller Sensor Head.
- Heat-resistance model available for application between −10 and 200°C.



⚠ Be sure to read *Safety Precautions* on page 15.

Ordering Information

Sensors [Refer to *Dimensions* on page 18.]

Standard Models

Sensor				Combination	Amplifier Units			
Appearance		Stable sensing area *	Model		Model	Power supply/ Output	Timer function	Self-diagnostic output
Shielded	3.5 dia.	0.8 (1.8) mm	E2C-CR8A 3M	→	E2C-GE4A	DC/ (NPN)	---	---
	3.8 dia.	0.8 (1.8) mm	E2C-CR8B 3M		E2C-GF4A	DC/ (PNP)	---	---
	M5	1 (2) mm	E2C-X1A 3M		E2C-WH4A	DC/ (NPN PNP)	---	---
	5.4 dia.	1 (2) mm	E2C-C1A 3M		E2C-JC4AP 2M *	DC/ (NPN)	Yes	Yes
	M8	1.5 (3) mm	E2C-X1R5A 3M		E2C-JC4A 2M	DC/ (NPN)	Yes	---
	M12	2 (5) mm	E2C-X2A 3M		E2C-AM4A	DC/ (NPN PNP)	---	---
	M18	5 (10) mm	E2C-X5A 3M		E2C-AK4A	AC	---	---
	M30	10 (18) mm	E2C-X10A 3M					
Unshielded	40 dia.	20 (50) mm	E2C-C20MA 3M					

*1. Values in parentheses are for the maximum sensing distances at 23°C.

* Self-diagnostic output, timer, and DIN Track mounting.

Heat-resistant Model

Sensor				Combination	Amplifier Unit
Appearance		Stable sensing area	Model		Model
Shielded	M8	1.5 mm	E2C-X1R5AH	→	E2C-JC4CH
	M12	2 mm	E2C-X2AH	→	E2C-JC4DH
	M18	5 mm	E2C-X5AH	→	E2C-JC4EH

Note: Characteristics will change if the cable length changes. Do not cut or extend the cable.

Accessories (Order Separately)

Mounting Brackets [Refer to Dimension on page 21.]

Name	Model	Applicable Sensors	Remarks
Mounting Brackets	**Y92E-F3R5**	E2C-CR8A, for 3.5 dia.	---
	Y92E-F5R4	E2C-C1A, for 5.4 dia.	

Connection Sockets [Refer to Dimension on page 21.]

Name	Model	Applicable Amplifier Unit	Remarks
Front Connection Sockets	**PYF08A**	E2C-GE4A E2C-GF4A	Hold-down Clips (Order Separately) PYC-A1 Sold as a set.
	P2CF-08	E2C-AM4A	---
	P2CF-11	E2C-AK4A	
Back Connection Sockets	**P3G-08**	E2C-AM4A	
	P3GA-11	E2C-AK4A	

Adapters [Refer to Dimension on page 21.]

Name	Model	Applicable Amplifier Unit	Remarks
Embedded Adapters	**Y92F-30**	E2C-AM4A/-AK4A	---
	Y92F-70		
	Y92F-71		

For details on *Mounting Brackets, Protective Covers, and Sputter Protective Covers*, refer to *Accessories* on *Y92□*.

Ratings and Specifications

Standard Models

Sensors

Item \ Model		E2C-CR8A/ -CR8B	E2C-X1A/ -C1A	E2C-X1R5A	E2C-X2A	E2C-X5A	E2C-X10A	E2C-C20MA
Sensing distance (at 23°C)		1.8 mm	2 mm	3 mm	5 mm	10 mm	18 mm	50 mm
Stable sensing area	Ambient temperature	0 to 0.8 mm	0 to 1 mm	0 to 1.5 mm	0 to 2 mm	0 to 5 mm	0 to 10 mm	0 to 20 mm
	At 0 to 40°C	0 to 1.2 mm	0 to 1.5 mm	0 to 2 mm	0 to 2.5 mm	0 to 7 mm	0 to 15 mm	0 to 28 mm
Differential travel		Refer to *Ratings and Specifications* on page 4 for Amplifier Unit specifications.						
Detectable object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 7.)						
Standard sensing object		Iron, 5 × 5 × 1 mm		Iron, 8 × 8 × 1 mm	Iron, 12 × 12 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 50 × 50 × 1 mm
Response frequency *1		1 kHz		800 Hz		350 Hz	100 Hz	50 Hz
Ambient temperature range		Operating/Storage: –25 to 70°C (with no icing or condensation)						
Ambient humidity range		Operating/Storage: 35% to 95% (with no condensation)						
Temperature influence		15% max. of sensing distance at 23°C in the temperature range of –25 to 70°C						
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X and Y directions						
Shock resistance		Destruction: 500 m/s^2 3 times each in X and Y directions						
Degree of protection		IEC 60529 IP67, in-house standards: oil-resistant						
Connection method *2		Pre-wired Models						
		High-frequency coaxial cable (Standard cable length: 3 m)						
Weight (packed state)		Approx. 40 g	Approx. 45 g	Approx. 50 g	Approx. 60 g	Approx. 140 g	Approx. 270 g	Approx. 300 g
Materials	Case	Stainless steel	Brass					
	Sensing surface	ABS resin						
	Cable	Polyethylene						
	Clamping nut	---	Brass, nickel-plated (except E2C-C1A)					
	Toothed washer	---	Brass, zinc-plated (except E2C-C1A)					
Accessories		---						

*1. The minimum value when using the solid-state control output on the Amplifier Unit.
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. Refer to 6 for cable lengths when combining Amplifier Units and Sensors.
The characteristic impedance of the high-frequency coaxial cable is 50 Ω.

Amplifier Units

Item \ Model		E2C-GE4A	E2C-GF4A	E2C-JC4A E2C-JC4AP	E2C-WH4A	E2C-AM4A	E2C-AK4A
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max. *1					100 to 240 VAC (90 to 264 VAC) 50/60 Hz
Current consumption		25 mA max.		45 mA max.	25 mA max.	50 mA max.	55 mA max.
Sensing distance adjustment range *2		20% min. of rated sensing distance with 4-turn potentiometer		20% to 100% of rated sensing distance with 4-turn potentiometer			
Differential travel adjustment range		Differential travel fixed (10% max. of sensing distance)				1% to 5% of rated sensing distance	
Response time	Solid-state	(Refer to the response frequency of the Proximity Sensor.)					
	Relay	---					20 ms max.
Control outputs	Solid-state	NPN Load resistance: 4.7 kΩ, 100 mA max. (40 VDC max.) (Residual voltage: 1.5 V max.)	PNP Load resistance: 4.7 kΩ, 100 mA max. (40 VDC max.) (Residual voltage: 1.5 V max.)	NPN Open-collector output 100 mA max. (40 VDC max.) (Residual voltage: 0.7 V max.) (E2C-JC4AP: 1 V max.)	NPN/PNP output Open-collector output 200 mA max. (40 VDC max.) (Residual voltage: 1.5 V max.)		Transistor/photocoupler 50 mA max. (40 VDC max.) (Residual voltage: 2 V max.)
	Relay	---					Relay output, SPDT 2 A at 250 VAC, cosϕ = 1 (resistive load) *3
Indicators		Detection indicator (red) (OPERATION)		Detection indicator (red) (OPERATION) Stability indicator (green) (STABILITY)	Detection indicator (red) (OPERATION)	Detection indicator (red) (OPERATION) Stability indicator (green) (STABILITY)	
Operation mode		Changed with NO/NC switch.					
Self-diagnostic output		---		(E2C-JC4AP only) Output transistor turns ON when Sensor open circuit or unstable sensing is detected; solid-state NPN open-collector 50 mA max. (40 VDC max.) (Residual voltage: 1 V max.)	---		
Timer function		---		OFF-delay: 40 ±10 ms	---		
Cable length compensation between Sensor and Amplifier Unit		---		(E2C-JC4AP only) 3 m/5 m, terminals Short-plate switching Shorted: 1 to 3 m Open: 3 to 5 m	Switched between 3 and 5 m.	Mode switched with 4-position switch.	
Ambient temperature range		Operating/storage: −10 to 55°C (with no icing or condensation)					
Ambient humidity range		Operating/Storage: 35% to 85% (E2C-JC4AP: 35% to 95%) (with no condensation)					
Temperature influence		10% max. of sensing distance at 23°C in the temperature range of −10 to 55°C					
Voltage influence		DC Models: ±1% max. of sensing distance at rated voltage in the rated voltage ±20% range AC Models: ±1% max. of sensing distance at rated voltage in the rated voltage ±10% range					
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case					
Dielectric strength		DC Models: 1,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case AC Models: 1,500 VAC, 50/60 Hz for 1 min between current-carrying parts and case					
Vibration resistance		Destruction: 10 to 25 Hz, 2-mm double amplitude for 2 hours each in X, Y, and Z directions		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions	Destruction: 10 to 25 Hz, 2-mm double amplitude for 2 hours each in X, Y, and Z directions		

Item \ Model	E2C-GE4A	E2C-GF4A	E2C-JC4A E2C-JC4AP	E2C-WH4A	E2C-AM4A	E2C-AK4A
Shock resistance	Destruction: 100 m/s² 3 times each in X, Y, and Z directions					
Life expectancy	---					Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min.
Connection method	Terminal block		Pre-wired Models (Standard cable length: 2 m)	Terminal block		
Weight (packed state) *4	Approx. 20 g		E2C-JC4A: Approx. 50 g E2C-JC4AP: Approx 80 g	Approx. 80 g	Approx. 140 g	Approx. 250 g
Accessories	Instruction manual		Caution labels, Mounting Bracket, instruction manual	Instruction manual		

*1. A full-wave rectification power supply of 24 VDC ±10% (average value) can be used (except for the E2C-GE4□).
*2. The sensing distance range required to maintain performed is given for using the Amplifier Unit in combination with the Sensor.
*3. Internal relay: G2R-14 DC 12V
*4. The weight of the Connection Socket is not included.

Heat-resistant Models

Sensors

Item \ Model		E2C-X1R5AH	E2C-X2AH	E2C-X5AH
Detectable object		Ferrous metal (The sensing distance decreases with non-ferrous metal, refer to *Engineering Data* on page 7.)		
Standard sensing object		Iron, 8 × 8 × 1 mm	Iron, 12 × 12 × 1 mm	Iron, 18 × 18 × 1 mm
Stable sensing area		0 to 1.5 mm	0 to 2 mm	0 to 5 mm
Differential travel		0.04 mm max.		0.1 mm max.
Response frequency *1		300 Hz		
Ambient temperature range		Operating/Storage: –10 to 200°C (with no icing or condensation)		
Ambient humidity range		Operating/Storage: 35% to 95% (with no condensation)		
Temperature influence		±0.2%/°C		
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 3 times each in X, Y, and Z directions		
Degree of protection		IEC 60529 IP60 *2		
Connection method		Pre-wired Models (Cable length: 3 m) Heat-resistant, high-frequency coaxial cable		
Weight (packed state)		Approx. 50 g	Approx. 60 g	Approx. 140 g
Materials	**Case**	Brass		
	Sensing surface	PEEK (polyether ether ketone)		
	Cable	Fluorine resin		
	Clamping nut	Brass, nickel-plated		
	Toothed washer	Iron, zinc-plated		

Note: Ratings and characteristic are given for 50% of the stable sensing area.
*1. 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. Do not operate the Sensor in areas exposed to water vapor because the enclosure is not waterproof.

Amplifier Units

Item \ Model		E2C-JC4CH	E2C-JC4DH	E2C-JC4EH
Power supply voltage *1 (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.		
Current consumption		45 mA max.		
Sensing distance adjustment range *2		20% to 100% of rated sensing distance 4-turn potentiometer		
Control outputs	**Load current**	NPN open collector, 100 mA max. (40 VDC max.)		
	Residual voltage	0.8 V max.		
Indicators		Detection indicator (red)		
Operation mode		Changed with NO/NC switch.		
Cable length compensation		Switched between 3 and 5 m.		
Ambient temperature range		Operating/storage: –10 to 55°C (with no icing or condensation)		
Ambient humidity range		Operating/storage: 35% to 85% (with no condensation)		
Temperature influence		±0.08%/°C		
Voltage influence		±2% max. of sensing distance at rated voltage in the rated voltage ±20% range		
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case		
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case		
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance		Destruction: 100 m/s² 3 times each in X, Y, and Z directions		
Degree of protection		IEC 60529 IP20		
Connection method		Pre-wired Models (Cable length: 2 m)		
Weight (packed state)		Approx. 80 g		
Accessories		Caution labels, Mounting Bracket, instruction manual		

*1. A full-wave rectification power supply of 24 VDC ±10% (average value) can be used.
*2. The sensing distance range required to maintain performed is given for using the Amplifier Unit in combination with the Sensor.

Cable Lengths for Sensor-Amplifier Unit Combinations

Standard Models

Sensor / Amplifier Units	E2C-CR8A	E2C-CR8B	E2C-X1A	E2C-C1A	E2C-X1R5A	E2C-X2A	E2C-X5A	E2C-X10A	E2C-C20MA
E2C-GE4A	Restricted to 3 m.					---	---	---	---
E2C-GF4A						---	---	---	---
E2C-WH4A	Restricted to 3 m or 5 m. Set cable length switch to desired position. *					---	---	---	---
E2C-JC4AP	1 to 3 m: Short cable length terminals * 3 to 5 m: Open cable length terminals *						---	---	---
E2C-JC4A	Restricted to 3 m.						---	---	---
E2C-AM4A	0 to 5 m Set cable length switch to desired position. *					0 to 10 m Set cable length switch to desired position. *			
E2C-AK4A									

Note: The standard cable length is 3 m. Models with 5-m or 10-m are manufactured upon order.
* Refer to page 14 for the operation of cable length switching.

Heat-resistant Models

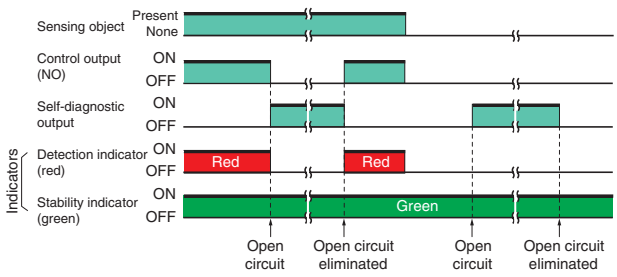
Sensor / Amplifier Units	E2C-X1R5AH	E2C-X2AH	E2C-X5AH
E2C-JC4CH	Set 3 m/5 m cable length switch to desired position.		
E2C-JC4DH			
E2C-JC4EH			

Note: The standard cable length is 3 m. Models with 5-m are manufactured upon order.

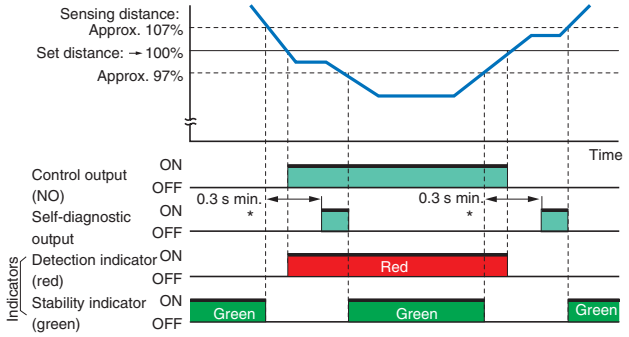
Self-diagnostic Function

The self-diagnostic output transistor will turn ON in the following cases. (The output will turn ON for any of these conditions individually.)
(1) Sensor open circuit: Transistor will turn ON the instance there is an open circuit for the Sensor (including the cable).

Sensor Open Circuit



Sensor Connected

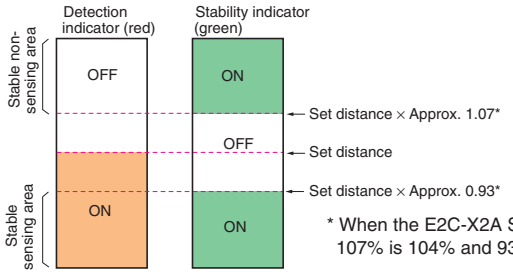


Note: When the E2C-X2A Sensor is used, 93% is 96% and 107% is 104%.
* The self-diagnostic output may turn ON if the sensing objects moves a low speed. In actual application, include an ON-delay timer circuit or other suitable measure.

(2) Detection: The output will turn ON if a sensing object is within 93% to 100% of the sensing distance continuously for 0.3 s or longer (e.g., for sensing object position offset).
(3) No detection: The output will turn ON if a sensing object is within 100% to 107% of the sensing distance continuously for 0.3 s or longer (e.g., when background is influencing detection).

Indicators

- The detection indicator lights when a sensing object approaches the sensing distance to indicate that a sensing object has been detected.
- The stability indicator lights when the sensing object approaches within 93% of the sensing distance or moves away from 107% of the sensing distance to indicate a stable sensing or non-sensing condition.

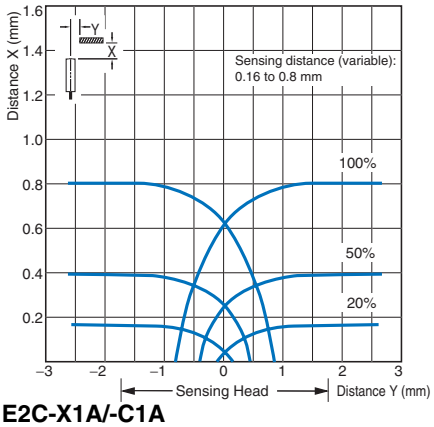


* When the E2C-X2A Sensor is used, 107% is 104% and 93% is 96%.

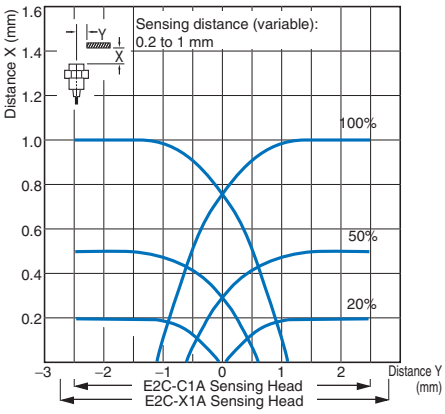
Engineering Data (Typical)

Sensing Area

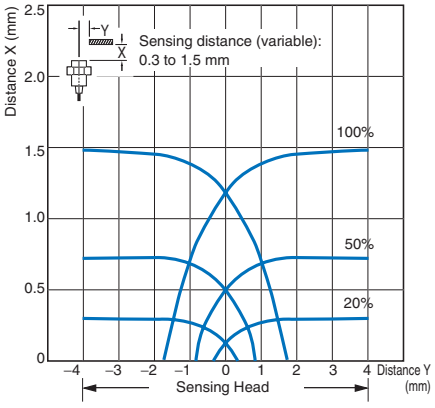
E2C-CR8□



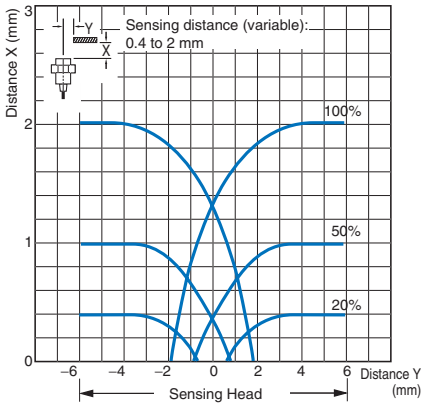
E2C-X1A/-C1A



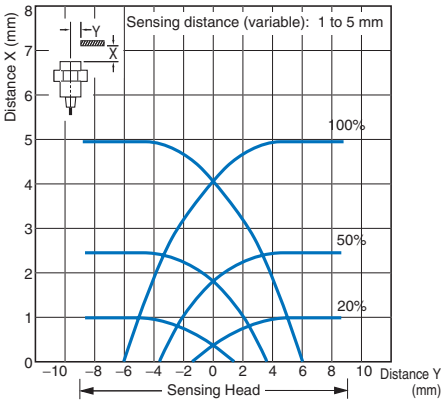
E2C-X1R5A



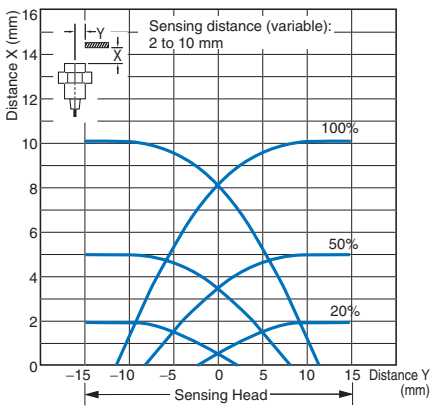
E2C-X2A



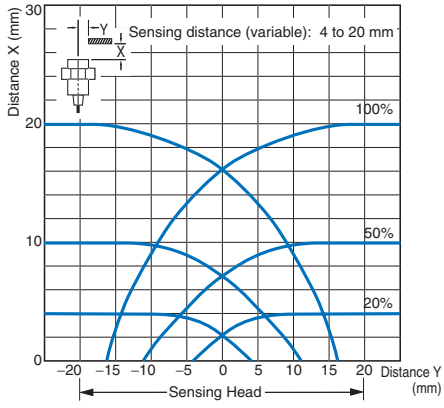
E2C-X5A



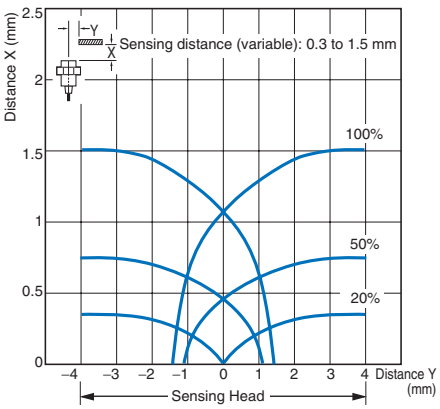
E2C-X10A



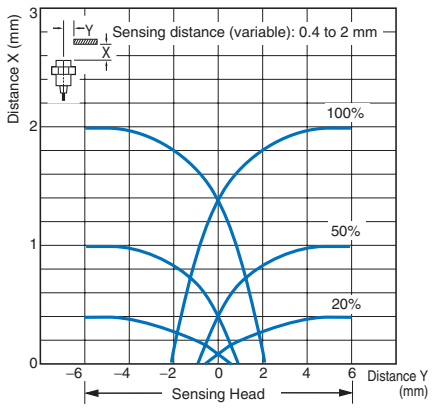
E2C-C20MA



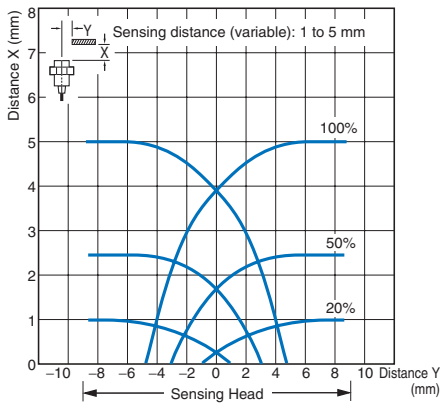
E2C-X1R5AH + E2C-JC4CH



E2C-X2AH + E2C-JC4DH

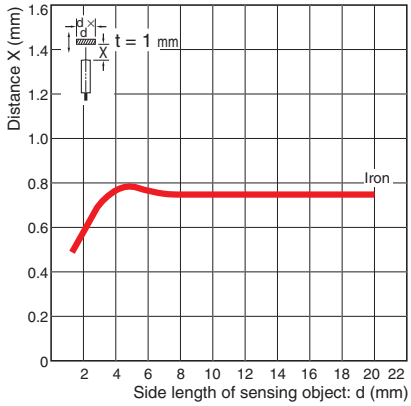


E2C-X5AH + E2C-JC4EH

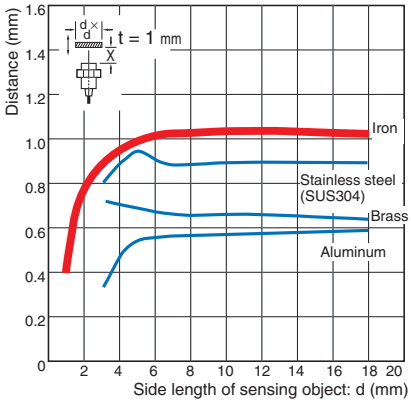


Influence of Sensing Object Size and Material

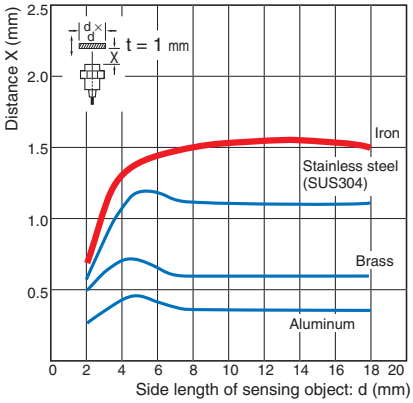
E2C-CR8□



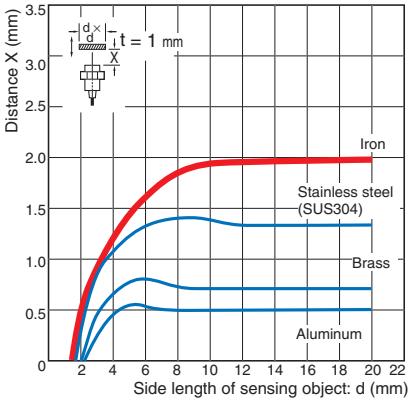
E2C-X1A/-C1A



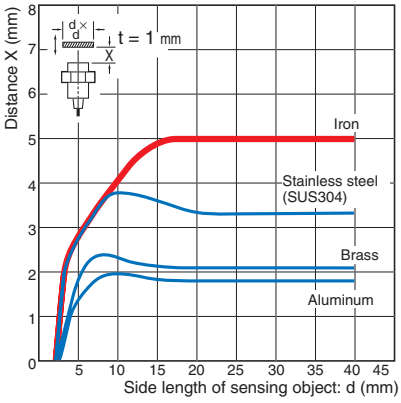
E2C-X1R5A



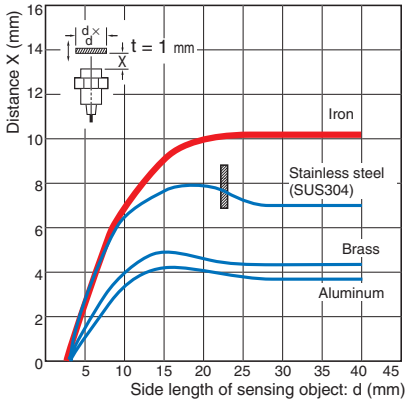
E2C-X2A



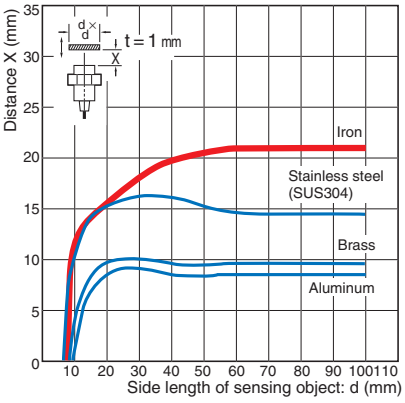
E2C-X5A



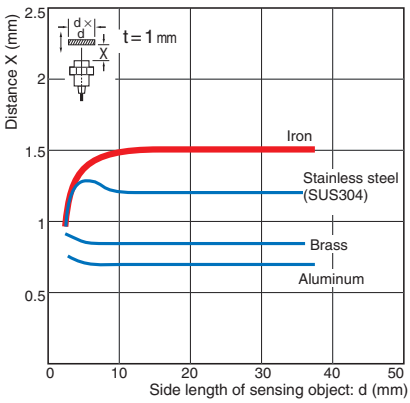
E2C-X10A



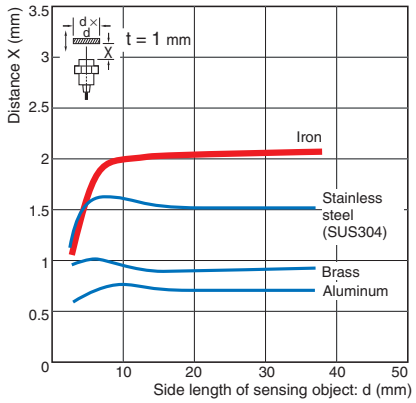
E2C-C20MA



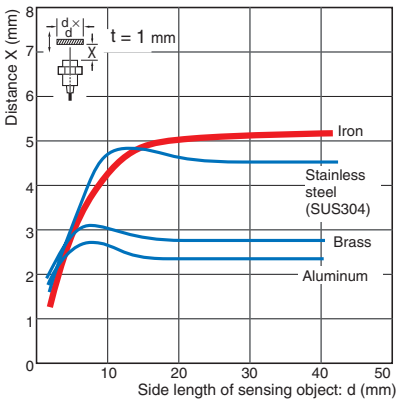
E2C-X1R5AH + E2C-JC4CH



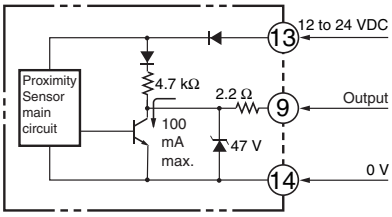
E2C-X2AH + E2C-JC4DH

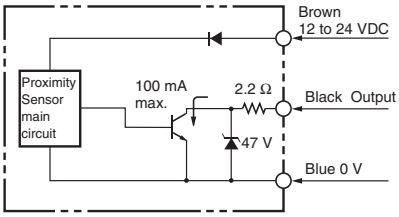
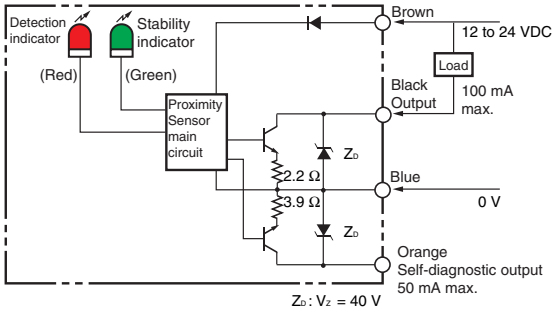
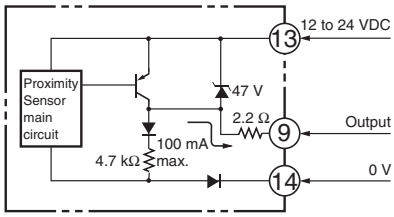
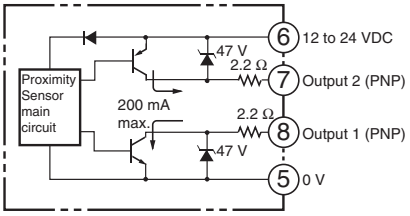
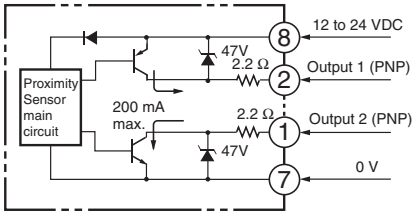


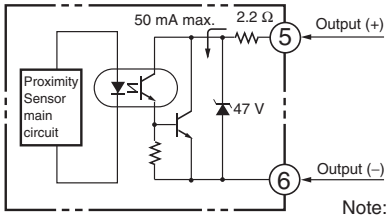
E2C-X5AH + E2C-JC4EH



I/O Circuit Diagrams

<table>
<tr><th>Output configuration</th><th>E2C-GE4A *</th><th>E2C-JC4A, E2C-JC4CH, E2C-JC4DH, E2C-JC4EH</th></tr>
<tr><td>NPN output</td><td>

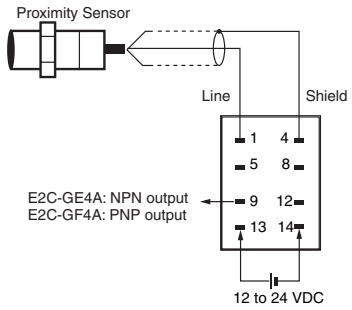
* A voltage output can be used if the NO/NC switch on the E2C-GE4A is set to NC, but an approximately 60-ms pulse will be generated when the power supply is turned ON. An initial reset will thus be required.
If the E2C-GF4A (model for PNP output) is used, the initial pulse will not occur.</td><td>
</td></tr>
<tr><td>NPN output Self-diagnosis Function</td><td colspan="2">E2C-JC4AP

</td></tr>
<tr><td>PNP Output</td><td colspan="2">E2C-GF4A

</td></tr>
<tr><td>Both NPN and PNP outputs</td><td>E2C-WH4A

</td><td>E2C-AM4A

</td></tr>
<tr><td>Transistor/ photocoupler

Relay output</td><td colspan="2">E2C-AK4A


Note: Terminals 1, 2, and 3 are the relay contact output (SPDT).</td></tr>
</table>

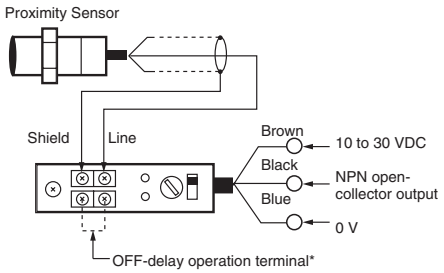
Connections between Amplifier Unit and Sensor

E2C-G□4A



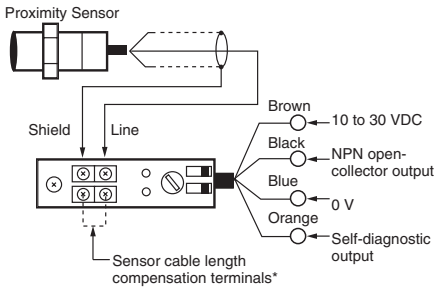
Applicable Socket:
PYF08A

E2C-JC4A



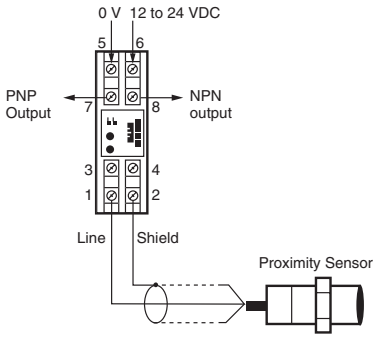
* OFF-delay timer setting
If the OFF-delay operation terminals are shorted, a 40-ms OFF-delay timer will start.

E2C-JC4AP

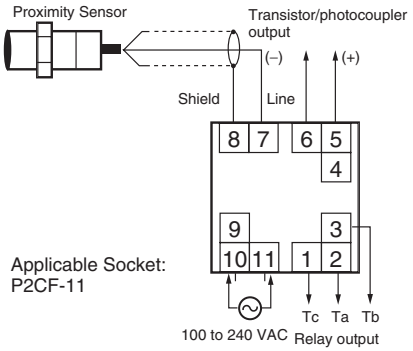


* Sensor Cable Length Compensation
These terminals can be use to switch the cable length.
Terminals shorted: 1 to 3 m
Terminals open: 3 to 5 m

E2C-WH4A

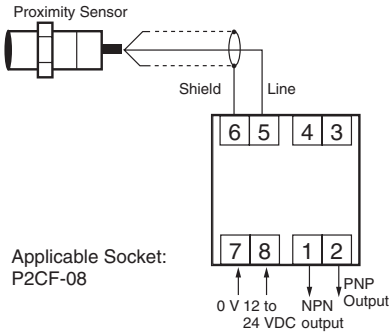


E2C-AK4A



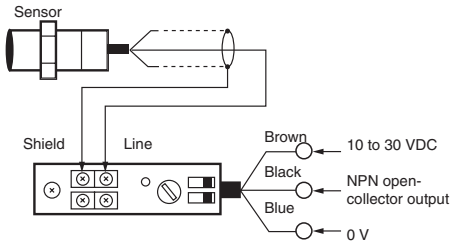
Applicable Socket:
P2CF-11

E2C-AM4A



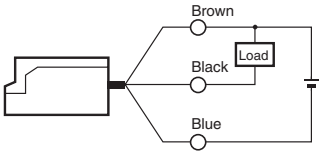
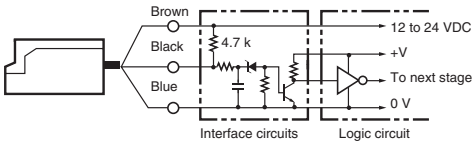
Applicable Socket:
P2CF-08

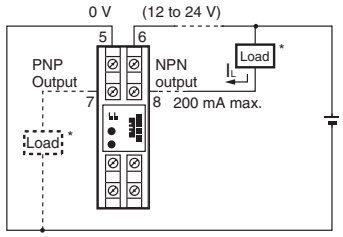
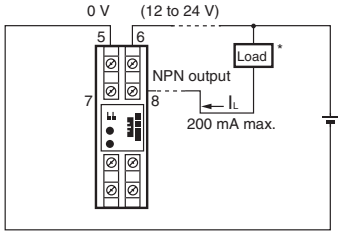
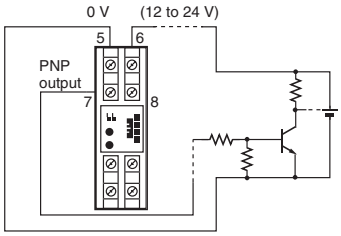
E2C-JC4□H



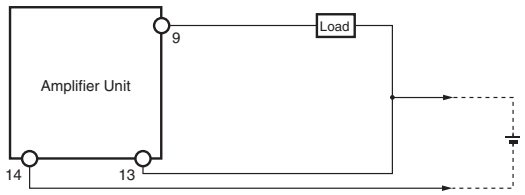
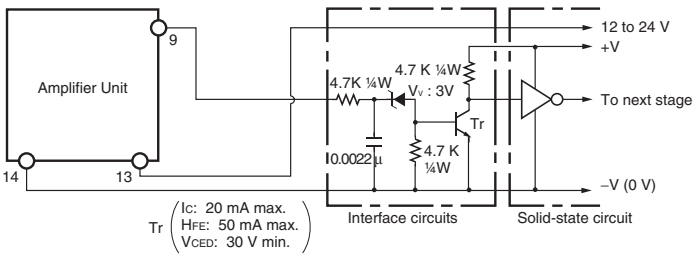
Note: Characteristics will change if the cable length changes. Do not cut or extend the cable.

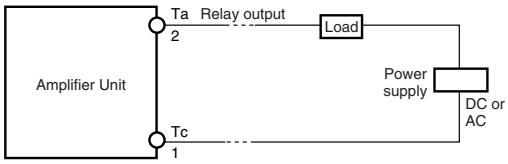
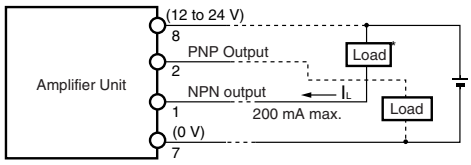
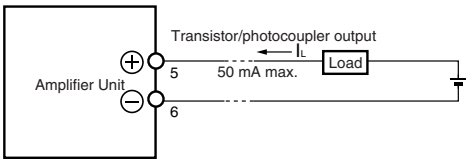
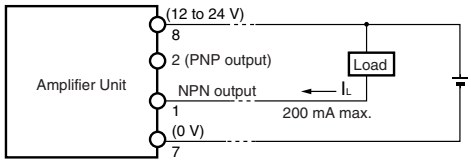
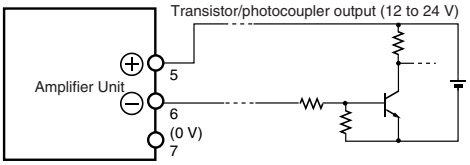
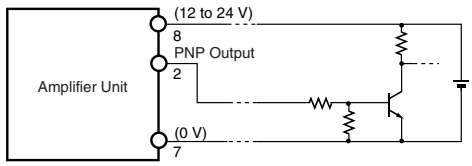
Load Connections

Model / Load	E2C-JC4A, E2C-JC4□H
DC load • **Relay** • **Solenoid** **Current-sinking load** • **Programmable Controller** • **Sensor Controller**	
Voltage load (logic circuit)	

Model / Load	E2C-WH4A
DC load • **Relay** • **Solenoid**	 * Use 40 V maximum when connecting the load to a separate power supply.
Solid-state load • **Programmable Controller** • **Sensor Controller (S3D8)**	 * For a current-sourcing load, connect the PNP output.
Voltage load (logic circuit)	

Note: The E2C-WH4A supports both NPN and PNP open-collector output. It can be connected to a wide variety of load types and power polarities.

Model / Load	E2C-GE4A
DC load • **Relay** • **Solenoid**	
Solid-state load • **Programmable Controller** • **Sensor Controller**	
Voltage load (logic circuit)	
Remarks	When connecting to a CMOS IC or TLL, provide an interface circuit as shown above and connect to the solid-state circuit in the next stage.

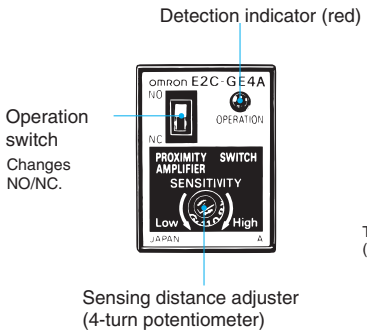
Load \ Model	E2C-AK4A	E2C-AM4A
DC load • **Relay** • **Solenoid**		 * Use 40 V maximum when connecting the load to a separate power supply.
Solid-state load **Current-sinking load (photocoupler)** • **Programmable Controller** • **Sensor Controller**	 * For a current-sourcing load, connect to the negative side of the transistor/photocoupler output.	 * For a current-sourcing load, connect the PNP output.
Voltage loads (logic circuit)		

The E2C-AK4A supports relay and transistor/photocoupler outputs, and the E2C-AM4A supports both NPN and PNP open-collector output. They can be connected to a wide variety of load types and power polarities.

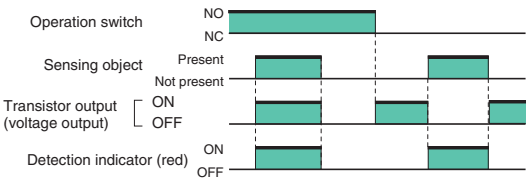
Nomenclature and Timing Charts

Amplifier Units

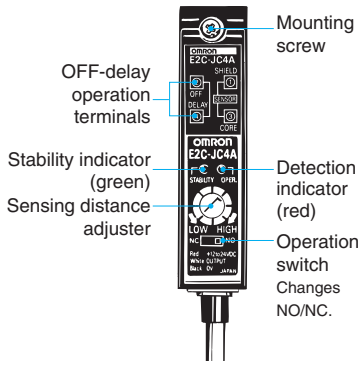
E2C-G□4A



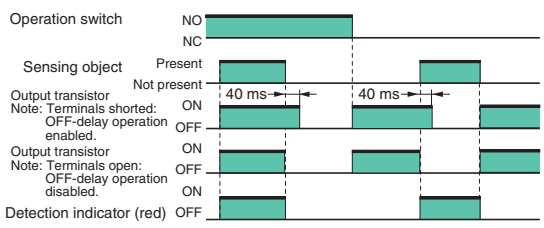
Timing Chart



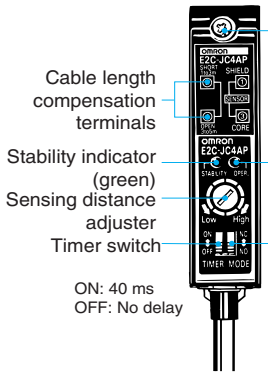
E2C-JC4A



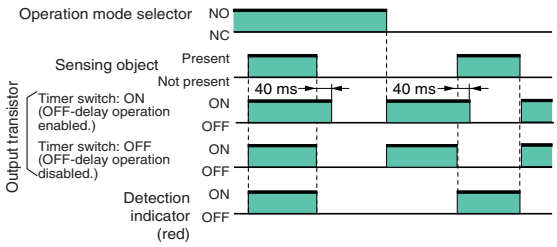
Timing Chart



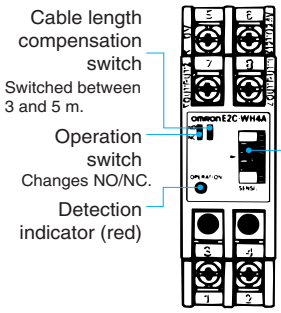
E2C-JC4AP



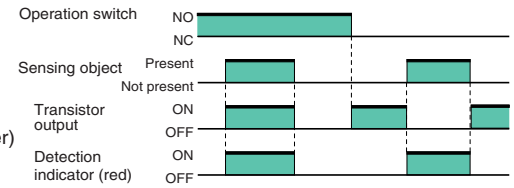
Timing Chart



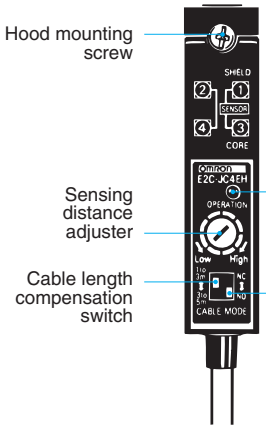
E2C-WH4A



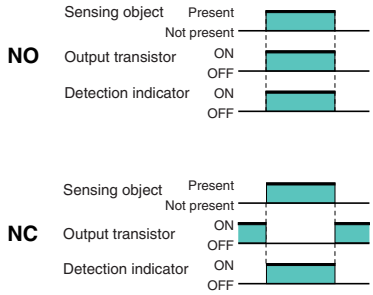
Timing Chart



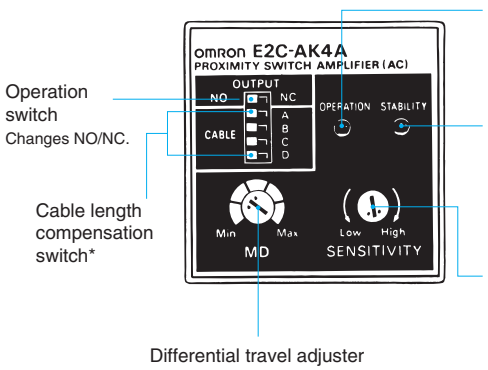
E2C-JC4CH, E2C-JC4DH, E2C-JC4EH



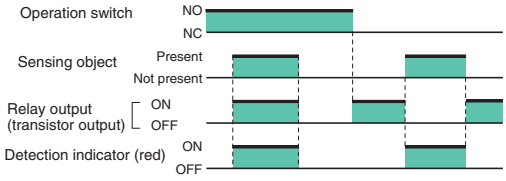
Timing Chart



E2C-A□4A



Timing Chart



* Cable Length Compensation Switching
Set this switch to the proper setting depending on whether the standard cable length is being used or the cable has been cut shorter.

Amplifier Unit Switch Settings

Applicable Sensors / Cable length	0 to 1 m	1 to 2 m	2 to 3 m	3 to 4 m	4 to 5 m	5 to 6 m	6 to 7 m	7 to 8 m	8 to 9 m	9 to 10 m
E2C-CR8A E2C-CR8B E2C-X1A E2C-C1A E2C-X1R5A						——	——	——	——	——
E2C-X2A E2C-X5A E2C-X10A E2C-C20MA										

Note: 1. Mutual Interference Prevention: When mounting Sensors with the same diameter and cable length in parallel, set the DIP switch to modes that differ by 1 m in cable length. Specifications, however, may not be sufficiently met, so always check operation before actual application. This method cannot be used for the E2C-C20MA.
2. When using the E2C-CR5B + E2C-AM4A (or AK4A), set all the pins on the Amplifier Unit DIP switch to the left.

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

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



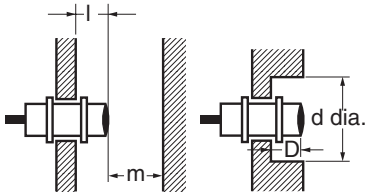
Precautions for Correct Use

Do not use the Encoder under ambient conditions that exceed the ratings.

● Design

Influence of Surrounding Metal

When mounting the Sensor 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.



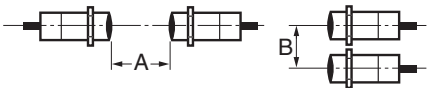
Influence of Surrounding Metal (Unit: mm)

Model / Distance	l	d	D	m
E2C-CR8	0	(3.5)	0	2.4
E2C-X1A		(5)		3
E2C-C1A		(5.4)		
E2C-X1R5A(H)		(8)		4.5
E2C-X2A(H)		(12)		6
E2C-X5A(H)		(18)		15
E2C-X10A		(30)		30
E2C-C20MA	25	120	40	60

Note: Values in parentheses for diameter d are the outer diameters of Shielded Models.

Mutual Interference

When installing Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained. Mutual interference can be prevented by using the cable length compensation switch, but doing so will also change coil characteristics. Specifications such as temperature specifications and sensing distance, may not be sufficiently met, so always check operation before actual application.
This method cannot be used for the E2C-G□4A, E2C-JC4A, E2C-C20MA.



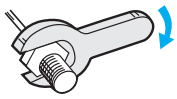
Mutual Interference (Unit: mm)

Model / Distance	A	B
E2C-CR8	20	15
E2C-X1A		
E2C-C1A		
E2C-X1R5A(H)		
E2C-X2A(H)	30	20
E2C-X5A(H)	50	35
E2C-X10A	100	70
E2C-C20MA	300	200

Note: The above values are for a differential travel setting of 5%.

Mounting

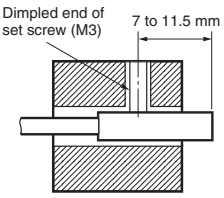
- Do not use excessive force when tightening the nuts on the E2C-X and E2C-C20MA. A washer must be used with the nut.



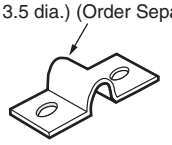
Model	Torque
E2C-X1A	0.98 N·m
E2C-X1R5A(H)	2.0 N·m
E2C-X2A(H)	5.9 N·m
E2C-X5A(H)	15 N·m
E2C-X10A	39 N·m
E2C-C20MA	15 N·m

Note: The above leeways in tighten torque assume that a toothed washer is being used.

- Mounting Unthreaded Cylindrical Models
  When using a set screw, tighten it to a torque of 0.2 N·m max.



Y92E-F3R5 Mounting Bracket (for 3.5 dia.) (Order Separately)



The Y92E-F5R4 (for 5.4 dia.) is also sold separately.

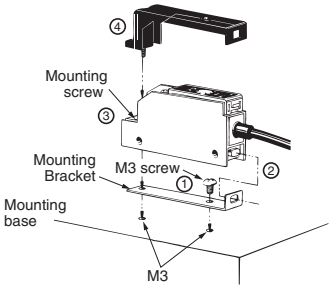
● Mounting

Mounting the Amplifier Unit

E2C-JC4A, E2C-JC4□H

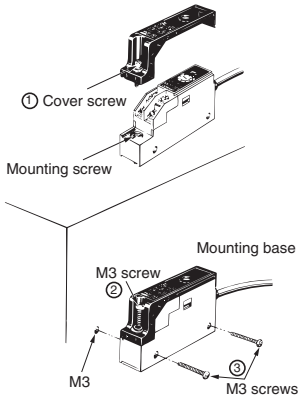
Lengthwise Mounting

(1)Secure the Mounting Bracket with the enclosed M3 screws.
(2)Slide the protrusion on the Amplifier Unit into the holes on the Mounting Bracket.
(3)Secure the Amplifier Unit with mounting screws.
(4)Secure the cover to the case.



Mounting to the Side

(1)Remove the cover screw and mounting screw.
(2)Attached the enclosed M3 screw to the cover and secure the cover to the case.
(3)Secure the Amplifier Unit with M3 screws from the side.



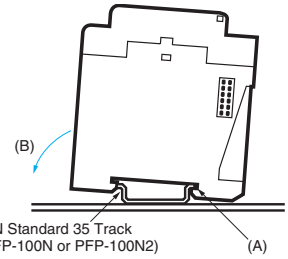
After completing adjustments, attach the enclosed caution label over the adjustment holes to prevent adjustment mistakes.



E2C-WH4A

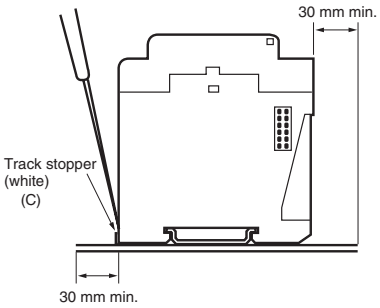
Mounting Method

(1)Mount to DIN Track as shown in the following diagram.
(2)Hook part (A) at the top of the Amplifier Unit on the DIN Track first and then press in on the Amplifier Unit in the direction indicated by (B).



Removing the Amplifier Unit

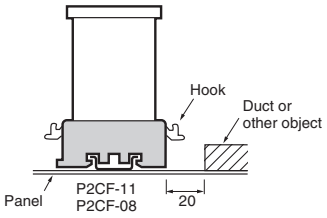
(3)Pull down on the track stopper (C) with a flat-blade screwdriver and then remove the Amplifier Unit from the DIN Track. When using DIN standard 35 track, keep other devices on the track separated from the Amplifier Unit by at least 30 mm to facilitate mounting and removal.



E2C-A□4A

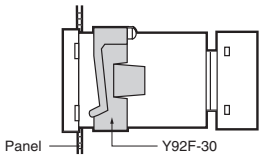
Using P2CF-11, P2CF-08

When aligning the Amplifier Unit vertically with the Socket, consider the space required for the hooks and allow a leeway of about 20 mm above and below the Amplifier Unit.

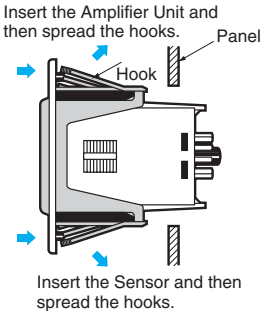


Mounting Embedded in a Panel

(1)When using the Y92F-30 Embedded Mounting Adapter, insert the Amplifier Unit into a square hold in the panel, attach the Adapter from the back and press in to reduce the gap with the panel. Then secure the Adapter with the screws.

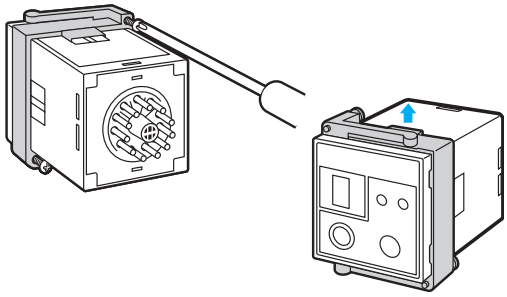


(2)When using the Y92F-70 or Y92F-71 Embedded Mounting Adapter, just press the Amplifier into a square hole in the panel. If the panel coating is too thick and the hooks do not lock in place, spread the hooks from the back by pushing in the directions of the arrows.

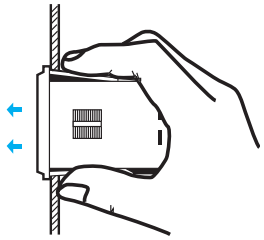


Removing the Amplifier Unit

- When the Amplifier Unit is mounted using the Y92F-30, loosen the screws on the adapter, spread the hooks at the top and bottom, and remove the Adapter.



- Using Y92F-70, Y92F-71
  Press in on the hooks with your thumb and forefinger and press forward on the Amplifier Unit.



● Wiring

Self-diagnostic Output

When not using the self-diagnostic output, connect the orange wire to 0 V or cut it and wrap it with insulation tape so that it does not come into contact with other terminals.

● Miscellaneous

The sensor does not have a water-resistant structure. Do not use it where it would be subjected to water or water vapor.

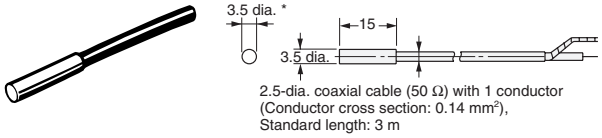
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Main Units

Sensor

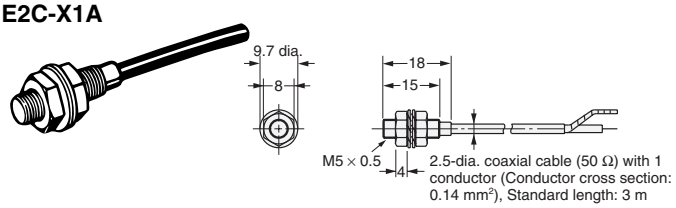
E2C-CR8A/-CR8B



2.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.14 mm²), Standard length: 3 m

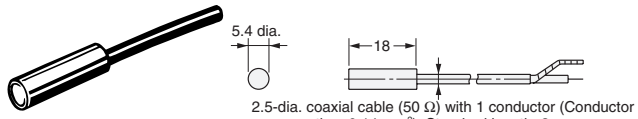
*E2C-CR8B: Diameter is 3.8.

E2C-X1A



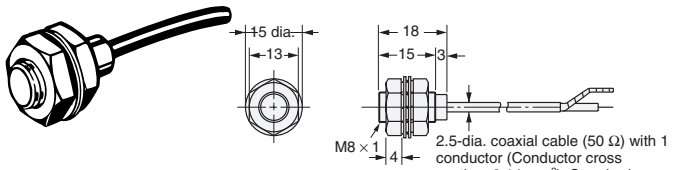
2.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.14 mm²), Standard length: 3 m

E2C-C1A



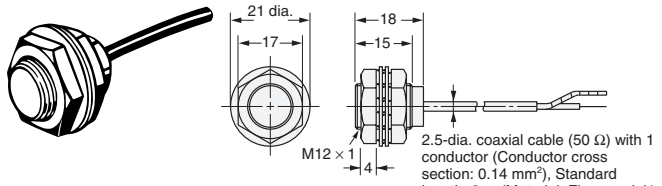
2.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.14 mm²), Standard length: 3 m

E2C-X1R5A
E2C-X1R5AH*



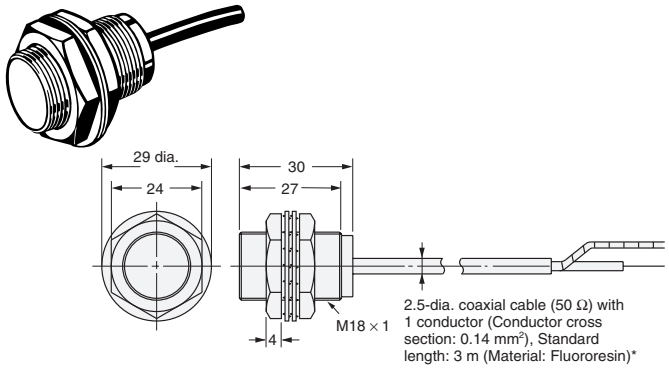
2.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.14 mm²), Standard length: 3 m (Material: Fluororesin)*

E2C-X2A
E2C-X2AH*



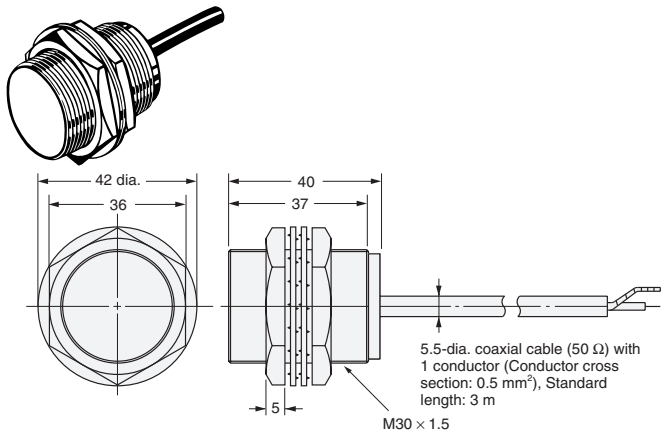
2.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.14 mm²), Standard length: 3 m (Material: Fluororesin)*

E2C-X5A
E2C-X5AH*



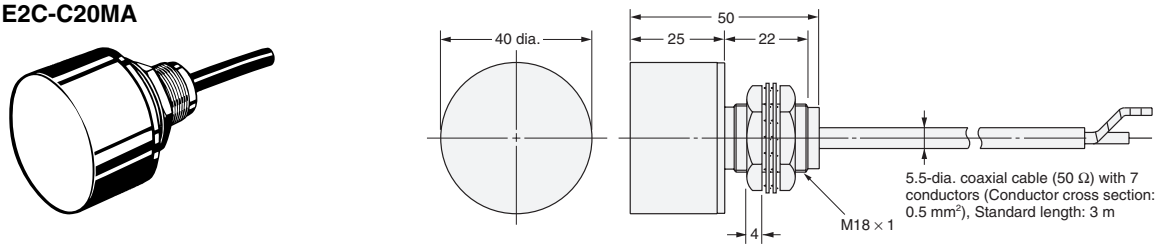
2.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.14 mm²), Standard length: 3 m (Material: Fluororesin)*

E2C-X10A



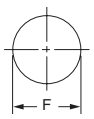
5.5-dia. coaxial cable (50 Ω) with 1 conductor (Conductor cross section: 0.5 mm²), Standard length: 3 m

E2C-C20MA



5.5-dia. coaxial cable (50 Ω) with 7 conductors (Conductor cross section: 0.5 mm²), Standard length: 3 m

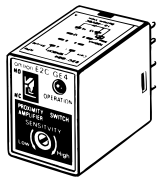
Mounting Hole Dimensions

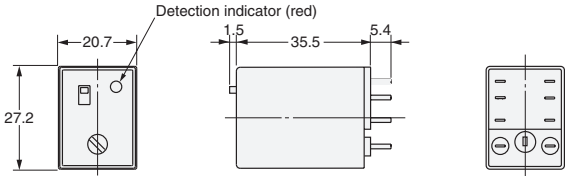


Model	F (mm)	Model	F (mm)	Model	F (mm)
E2C-CR8A	3.7-dia. $^{+0.3}_{0}$	E2C-X1A	5.4-dia. $^{+0.5}_{0}$	E2C-X5A	18.5-dia. $^{+0.5}_{0}$
E2C-CR8B	4.0-dia. $^{+0.3}_{0}$	E2C-X1R5A	8.5-dia. $^{+0.5}_{0}$	E2C-X10A	30.5-dia. $^{+0.5}_{0}$
E2C-C1A	5.7-dia. $^{+0.3}_{0}$	E2C-X2A	12.5-dia. $^{+0.5}_{0}$	E2C-C20MA	18.5-dia. $^{+0.5}_{0}$

Amplifier Units

E2C-GE4A
E2C-GF4A

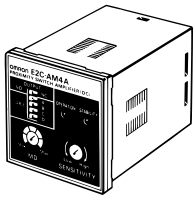


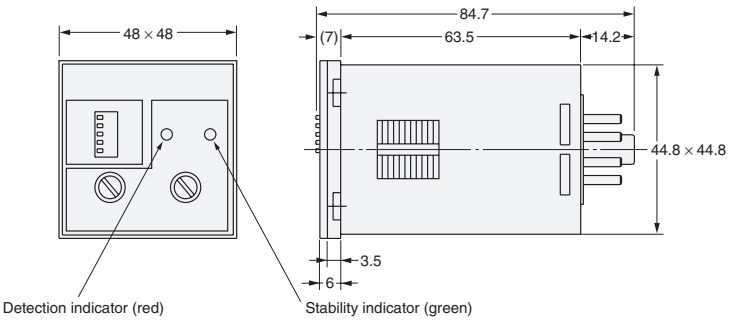


Applicable Sockets (Sold Separately)
- PYF08A

Hold-down Clip
- PYC-A1

E2C-AK4A (11-pin)
E2C-AM4A (8-pin)



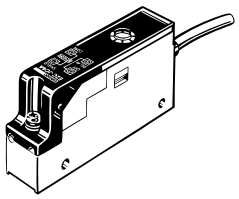


Applicable Sockets (Sold Separately)

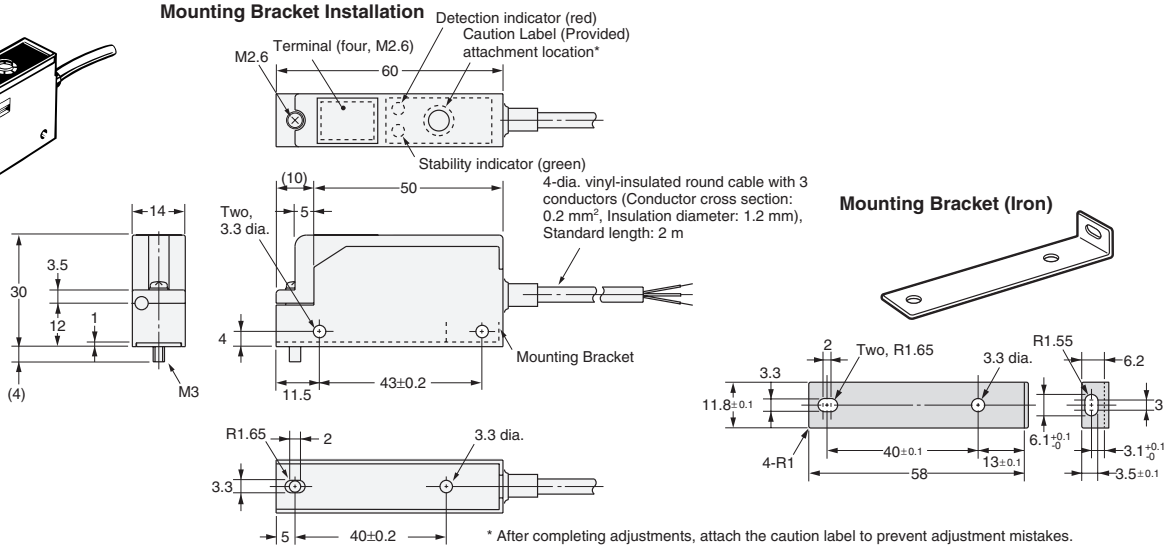
For E2C-AK4A (11-pin)
- P2CF-11
- P3GA-11

For E2C-AM4A (8-pin)
- P2CF-08
- P3G-08

E2C-JC4A



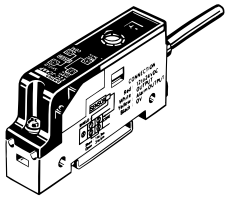
Mounting Bracket Installation



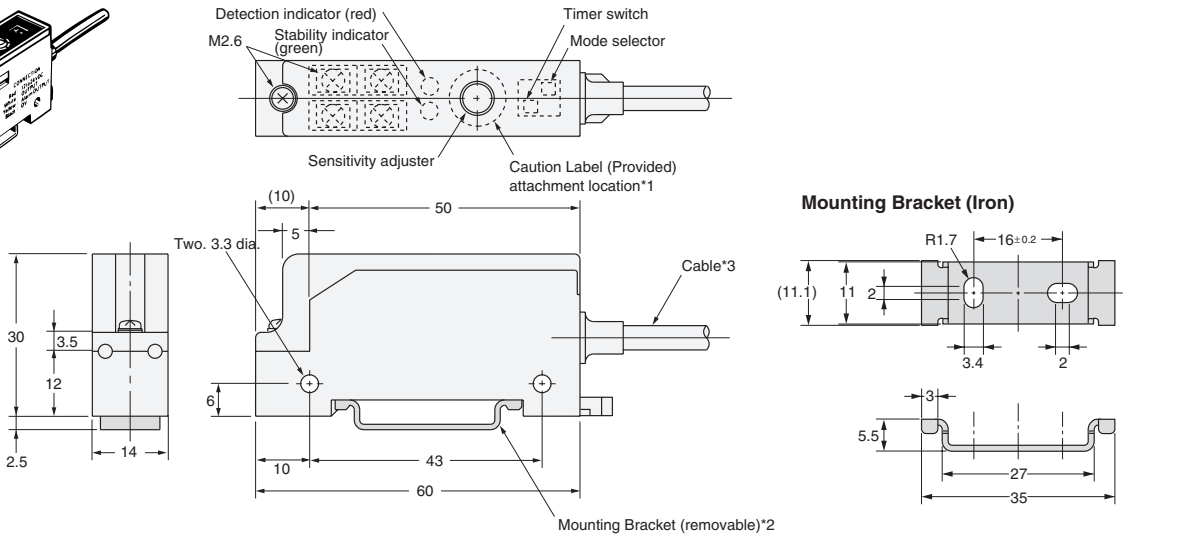
Mounting Bracket (Iron)

* After completing adjustments, attach the caution label to prevent adjustment mistakes.

E2C-JC4AP



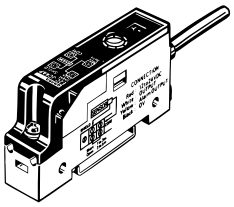
Mounting Bracket Installation

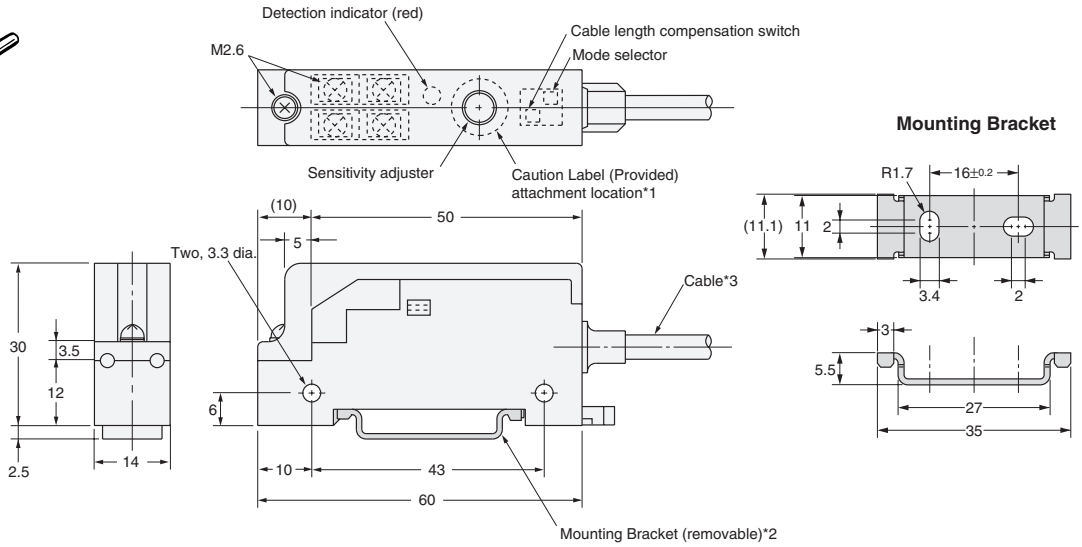


Mounting Bracket (Iron)

*1. After completing adjustments, attach the caution label to prevent adjustment mistakes.
*2. Not required when mounting to DIN Track.
*3: 4.5-dia. vinyl-insulated round cable with 4 conductors (Conductor cross section: 0.2 mm², Insulator diameter: 1.2 mm), Standard length: 2 m

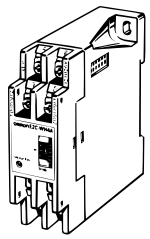
E2C-JC4□H

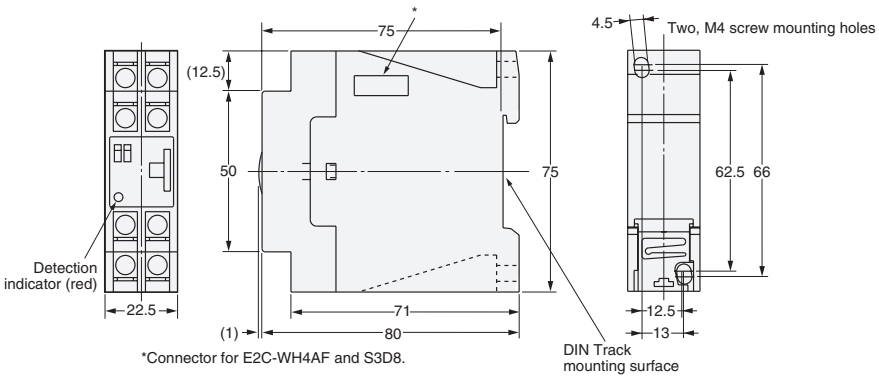




*1. After completing adjustments, attach the caution label to prevent adjustment mistakes
*2. Not required when mounting to DIN Track.
*3. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm^2, Insulator diameter: 1.2 mm), Standard length: 2 m
The cable can be extended up to 200 m (separate metal conduit).

E2C-WH4A



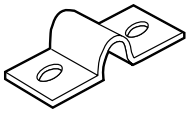


*Connector for E2C-WH4AF and S3D8.

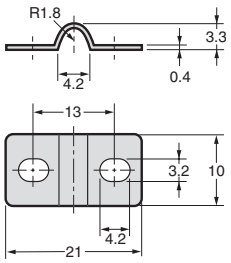
Accessories (Order Separately)

Mounting Bracket

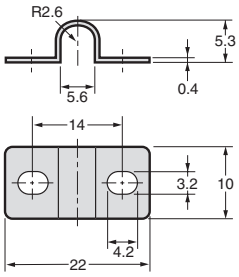
Mounting Bracket (for Unthreaded Cylindrical Models)
Y92E-F3R5 (for 3.5 dia.)
Y92E--F5R4 (for 5.4 dia.)



Y92E-F3R5

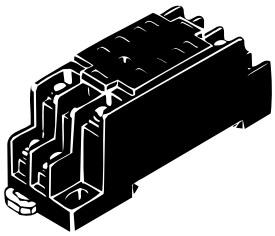


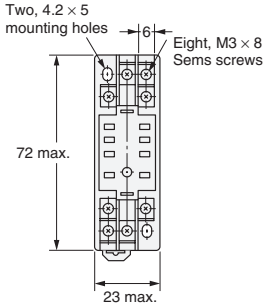
Y92E-F5R4



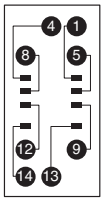
Front Connection Sockets

PYF08A

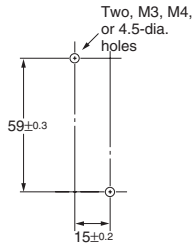




Terminal Arrangement and Internal Connections (Top View)

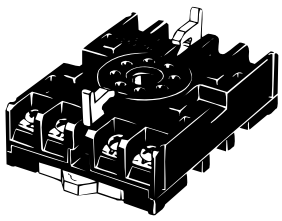


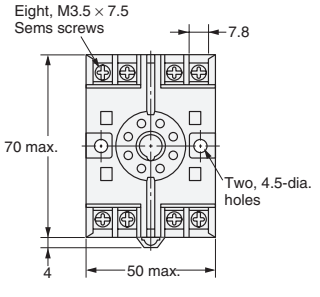
Mounting Hole Dimensions



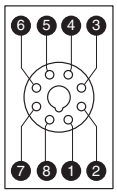
Note: Track mounting is also possible.

P2CF-08

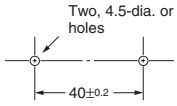




Terminal Arrangement and Internal Connections (Top View)

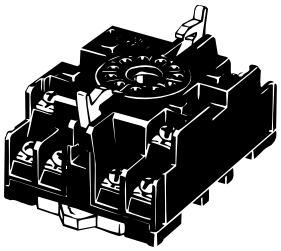


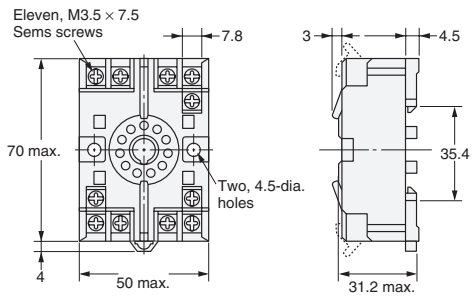
Mounting Hole Dimensions



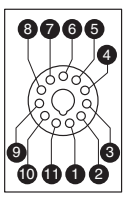
Note: Track mounting is also possible.

P2CF-11

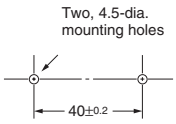




Terminal Arrangement and Internal Connections (Top View)



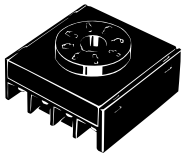
Mounting Hole Dimensions

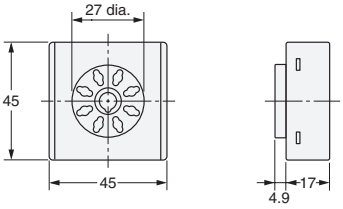


Note: Track mounting is also possible.

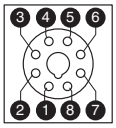
Back Connection Sockets

P3G-08

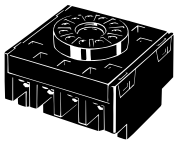


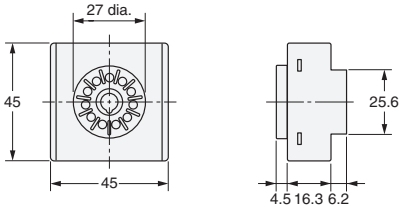


Terminal Arrangement and Internal Connections (Bottom View)

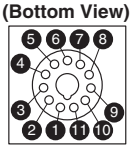


P3GA-11



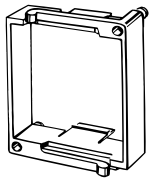


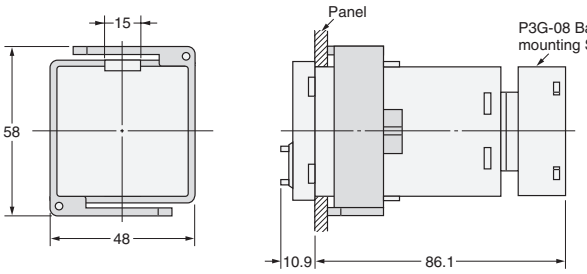
Terminal Arrangement and Internal Connections (Bottom View)



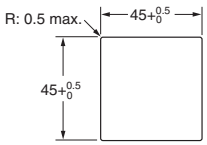
Embedded Mounting Adapter (for E2C-AK4A/E2C-AM4A Amplifier Unit)

Y92F-30



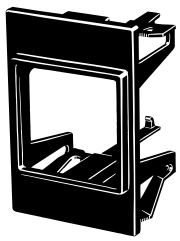


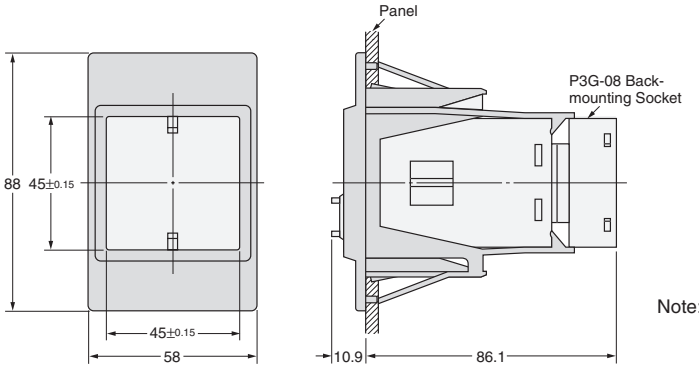
Mounting Hole Dimensions



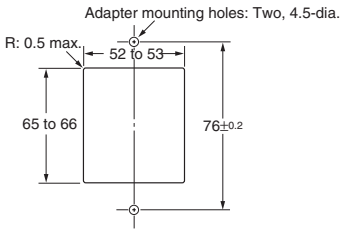
Note 1. Suitable mounting panel thickness: 1 to 5 mm
Note 2. Check the direction of the Adapter, which depends on whether Amplifier Units are arranged vertically or horizontally.

Y92F-70





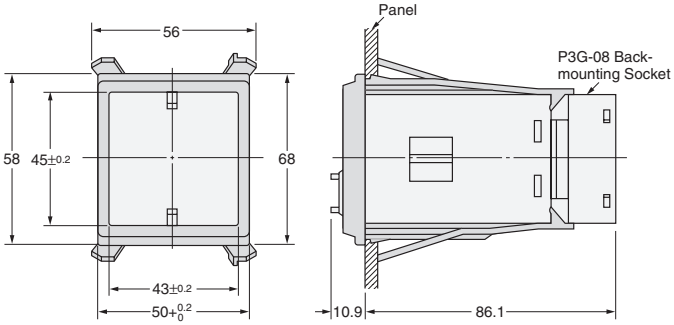
Mounting Hole Dimensions



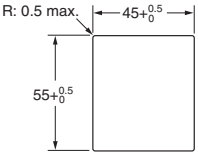
Note: Suitable mounting panel thickness: 1 to 3.2 mm

Y92F-71





Mounting Hole Dimensions



Note: Suitable mounting panel thickness: 1 to 3.2 mm

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