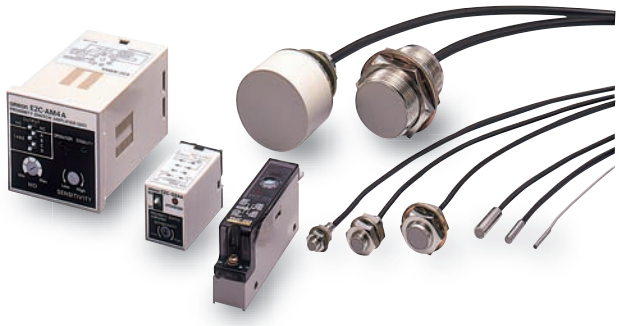
Separate Amplifier Proximity Sensor with Adjustment Potentiometer

E2C/E2C-H

CSM_E2C_E2C-H_DS_E_9_7

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-JC4AP 2M *	DC/ (NPN)	Yes	Yes
	5.4 dia.	1 (2) mm	E2C-C1A 3M		E2C-JC4A 2M	DC/ (NPN)	Yes	---
	M8	1.5 (3) mm	E2C-X1R5A 3M		E2C-AM4A	DC/ (NPN / PNP)	---	---
	M12	2 (5) mm	E2C-X2A 3M		E2C-AK4A	AC	---	---
	M18	5 (10) mm	E2C-X5A 3M					
	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 3M		E2C-JC4CH 2M
	M12	2 mm	E2C-X2AH 3M		E2C-JC4DH 2M
	M18	5 mm	E2C-X5AH 3M		E2C-JC4EH 2M

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

Accessories (Order Separately)

Mounting Brackets **A Mounting Bracket is not provided with the Sensor. Order a Mounting Bracket separately if required.**
[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 **A Socket is not provided with the Amplifier Unit. Order a Socket separately if required.**
[Refer to Dimension on page 21.]

Name	Model	Applicable Amplifier Unit	Remarks
Front Connection Sockets	**PYFZ-08**	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	
	PY08	E2C-GE4A E2C-GF4A	

Nut Sets **A Nut Set is included with the Sensor. Order a Nut Set when required, e.g., if you lose the nuts.**

Model	Applicable Sensors	Applicable Sensor diameter	Set contents
Y92E-NWM05	E2C-X1A	M5	Clamping nuts (brass with nickel plating): 2 Toothed washer (iron with zinc plating): 2

Adapters **An Adapter is not provided with the Amplifier Unit. Order an Adapter separately if required.**
[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	Vinyl chloride (PVC)					Polyethylene (PE)	
	Clamping nut	---	Brass, nickel-plated (except E2C-C1A)					
	Toothed washer	---	Iron, 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-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.	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. (30 VDC max.) (Residual voltage: 1.5 V max.)	PNP Load resistance: 4.7 kΩ, 100 mA max. (30 VDC max.) (Residual voltage: 1.5 V max.)	NPN Open-collector output 100 mA max. (30 VDC max.) (Residual voltage: 0.7 V max.) (E2C-JC4AP: 1 V max.)	NPN/PNP output Open-collector output 200 mA max. (30 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) 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. (30 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	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	

*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

Item \ Model	E2C-GE4A	E2C-GF4A	E2C-JC4A E2C-JC4AP	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. 140 g	Approx. 250 g
Accessories	Instruction manual		Caution labels, Mounting Bracket (E2C-JC4A: M3 × 15 Phillips mounting screw), instruction manual	Instruction manual	

*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. (30 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.