

Compact Encoder with External Diameter of 25 mm

- Incremental model
- External diameter of 25 mm.
- Resolution of up to 500 ppr.



Be sure to read *Safety Precautions* on page 3.

Ordering Information

Encoders [Refer to *Dimensions* on page 4.]

Power supply voltage	Output configuration	Output phases	Resolution (pulses/rotation)	Model
5 to 12 VDC	Voltage output	Phases A, B, and Z	100, 200, 360	E6A2-CWZ3E (resolution) 0.5M
	Open-collector output (NPN output)		500	Example: E6A2-CWZ3E 100P/R 0.5M
			100, 200, 360	E6A2-CWZ3C (resolution) 0.5M
			500	Example: E6A2-CWZ3C 100P/R 0.5M
100, 200, 360			E6A2-CWZ5C (resolution) 0.5M	
500			Example: E6A2-CWZ5C 100P/R 0.5M	
12 to 24 VDC				
5 to 12 VDC	Voltage output	Phases A and B	100, 200, 360	E6A2-CW3E (resolution) 0.5M
	Open-collector output (NPN output)		500	Example: E6A2-CW3E 100P/R 0.5M
			100, 200, 360	E6A2-CW3C (resolution) 0.5M
			500	Example: E6A2-CW3C 100P/R 0.5M
100, 200, 360			E6A2-CW5C (resolution) 0.5M	
500			Example: E6A2-CW5C 100P/R 0.5M	
12 to 24 VDC				
5 to 12 VDC	Voltage output	Phase A	10, 20, 60, 100, 200, 300, 360	E6A2-CS3E (resolution) 0.5M
	Open-collector output (NPN output)		500	Example: E6A2-CS3E 10P/R 0.5M
			10, 20, 60, 100, 200, 300, 360	E6A2-CS3C (resolution) 0.5M
			500	Example: E6A2-CS3C 10P/R 0.5M
10, 20, 60, 100, 200, 300, 360			E6A2-CS5C (resolution) 0.5M	
500			Example: E6A2-CS5C 10P/R 0.5M	
12 to 24 VDC				

Accessories (Order Separately) [Refer to *Dimensions* on *Rotary Encoder Accessories*.]

Name	Model	Remarks
Coupling	E69-C04B	Provided with the product.
Servo Mounting Bracket	E69-1	Provided with the E6A2-CWZ□.

Refer to *Accessories* for details.

Ratings and Specifications

Item	Model	E6A2-CWZ3E	E6A2-CWZ3C	E6A2-CWZ5C	E6A2-CW3E	E6A2-CW3C	E6A2-CW5C	E6A2-CS3E	E6A2-CS3C	E6A2-CS5C
Power supply voltage		5 VDC −5% to 12 V +10% ripple (p-p): 5% max.		12 VDC −10% to 24 VDC +15%, ripple (p-p): 5% max.	5 VDC −5% to 12 V +10%, ripple (p-p): 5% max.		12 VDC −10% to 24 VDC +15%, ripple (p-p): 5% max.	5 VDC −5% to 12 V +10%, ripple (p-p): 5% max.		12 VDC −10% to 24 VDC +15%, ripple (p-p): 5% max.
Current consumption*1		50 mA max.	30 mA max.		30 mA max.	20 mA max.		30 mA max.	20 mA max.	
Resolution (pulses/rotation)		100, 200, 360, 500						10, 20, 60, 100, 200, 300, 360, 500		
Output phases		Phases A, B, and Z			Phases A and B			Phase A		
Output configuration		Voltage output	NPN open-collector output		Voltage output	NPN open-collector output		Voltage output	NPN open-collector output	
Output capacity		Output resistance: 2 kΩ Output current: 20 mA max. Residual voltage: 0.4 V max. (Output current: 20 mA max.)	Applied voltage: 30 VDC max. Sink current: 30 mA max. Residual voltage: 0.4 V max. (at sink current of 30 mA)		Output resistance: 2 kΩ Output current: 20 mA max. Residual voltage: 0.4 V max. (Output current: 20 mA max.)	Applied voltage: 30 VDC max. Sink current: 30 mA max. Residual voltage: 0.4 V max. (at sink current of 30 mA)		Output resistance: 2 kΩ Output current: 20 mA max. Residual voltage: 0.4 V max. (Output current: 20 mA max.)	Applied voltage: 30 VDC max. Sink current: 30 mA max. Residual voltage: 0.4 V max. (at sink current of 30 mA)	
Maximum response frequency*2		30 kHz								
Phase difference between outputs		Phase difference between phases A and B: 90°±45°						---		
Output duty factor		---						50±25%		
Rise and fall times of output		1.0 μs max. (Cable length: 500 mm, Sink current: 10 mA)	1.0 μs max. (Cable length: 500 mm, Control output voltage: 5 V, Load resistance: 1 kΩ)		1.0 μs max. (Cable length: 500 mm, Sink current: 10 mA)	1.0 μs max. (Cable length: 500 mm, Control output voltage: 5 V, Load resistance: 1 kΩ)		1.0 μs max. (Cable length: 500 mm, Sink current: 10 mA)	1.0 μs max. (Cable length: 500 mm, Control output voltage: 5 V, Load resistance: 1 kΩ)	
Starting torque		1 mN·m max.								
Moment of inertia		1 × 10 ^{−7} kg·m ² max.								
Shaft loading	Radial	10 N								
	Thrust	50 N								
Maximum permissible speed		5,000 r/min								
Ambient temperature range		Operating: −10 to 55°C (with no icing), Storage: −25 to 80°C (with no icing)								
Ambient humidity range		Operating/storage: 35% to 85% (with no condensation)								
Insulation resistance		20 MΩ min. (at 500 VDC) between current-carrying parts and case								
Dielectric strength		500 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: 500m/s ² 3 times each in X, Y, and Z directions								
Degree of protection*3		IEC 60529 IP50								
Connection method		Pre-wired Models (Standard cable length: 500 mm)								
Material		Case: Aluminum alloy, Main unit: Aluminum, Shaft: SUS420J2, Mounting Bracket: Galvanized iron								
Weight (packed state)		Approx. 35 g								
Accessories		Coupling, Servo Mounting Bracket (provided with the E6A2-CWZ□), Hexagonal wrench, Instruction manual								

*1. An inrush current of approximately 9 A will flow for approximately 0.3 ms when the power is turned ON.

*2. The maximum electrical response speed is determined by the resolution and maximum response frequency as follows:

$$\text{Maximum electrical response speed (rpm)} = \frac{\text{Maximum response frequency}}{\text{Resolution}} \times 60$$

This means that the E6A2-C Rotary Encoder will not operate electrically if its speed exceeds the maximum electrical response speed.

*3. No protection is provided against water or oil.

I/O Circuit Diagrams

Model	Output circuits	Output mode	Connection												
E6A2-CS3C E6A2-CS5C	(Black: phase A, White: phase B, Orange: phase Z)	Output transistor	<table><tr><th>Color</th><th>Signal</th></tr><tr><td>Brown</td><td>Vcc</td></tr><tr><td>Black</td><td>Phase A</td></tr><tr><td>White</td><td>Phase B</td></tr><tr><td>Orange</td><td>Phase Z</td></tr><tr><td>Blue</td><td>0 V (common)</td></tr></table> Note: 1. The white and orange wires of Single Models (E6A2-CS□□) do not output signals (no connection). 2. The white and orange wires of Single Models (E6A2-CS□□) do not output signals (no connection). 3. Voltage Output Models are capable of sinking a maximum current of 20 mA.	Color	Signal	Brown	Vcc	Black	Phase A	White	Phase B	Orange	Phase Z	Blue	0 V (common)
Color		Signal													
Brown		Vcc													
Black	Phase A														
White	Phase B														
Orange	Phase Z														
Blue	0 V (common)														
E6A2-CW3C E6A2-CW5C	Direction of rotation: CW (as viewed from end of shaft)	Output transistor													
E6A2-CWZ3C E6A2-CWZ5C	Direction of rotation: CCW (as viewed from end of shaft)	Output transistor													
E6A2-CW3E	Output (Black: phase A, White: phase B, Orange: phase Z)	Direction of rotation: CCW (as viewed from end of shaft)													
E6A2-CWZ3E		Output transistor													
E6A2-CS3E		Output transistor													

Note: 1. *(H) and (L) indicate the output levels of Voltage Output Models.
2. Output A leads B by $1/4 T \pm 1/8 T$ when the shaft revolves clockwise, while A lags behind B by $1/4 T \pm 1/8 T$ when the shaft revolves counterclockwise.

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.

● Wiring

Spurious pulses may be generated when power is turned ON and OFF. Wait at least 0.1 s after turning ON the power to the Encoder before using the connected device, and stop using the connected device at least 0.1 s before turning OFF the power to the Encoder. Also, turn ON the power to the load only after turning ON the power to the Encoder.

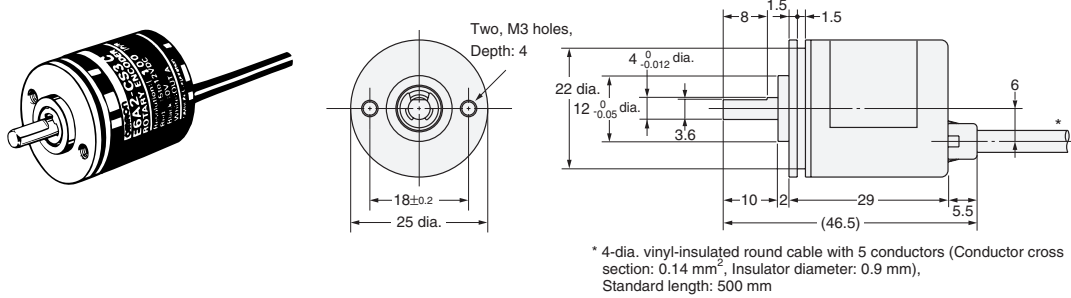
(Unit: mm)

Dimensions

Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

Encoder

E6A2-C



Accessories (Order Separately)

Coupling

Servo Mounting Bracket

E69-C04B

E69-1

Refer to *Accessories* for details.

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranty 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.

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The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS 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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

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

PERFORMANCE DATA

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