Incremental 40-mm-dia. Rotary Encoder

# E6B2-C

CSM\_E6B2-C\_DS\_E\_4\_1

# General-purpose Encoder with External Diameter of 40 mm

- Incremental model
- External diameter of 40 mm.
- Resolution of up to 2,000 ppr.



Be sure to read *Safety Precautions* on page 4.

# **Ordering Information**

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

Power supply voltage	Output configura- tion	Resolution (pulses/rotation)	Model	
5 to 24 VDC	NPN open-collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6B2-CWZ6C (resolution) 0.5M Example: E6B2-CWZ6C 10P/R 0.5M	
		720, 800, 1,000, 1,024		
		1,200, 1,500, 1,800, 2,000		
12 to 24 VDC	PNP open-collector output	100, 200, 360, 500, 600	E6B2-CWZ5B (resolution) 0.5M Example: E6B2-CWZ5B 100P/R 0.5M	
		1,000		
		2,000		
5 to 12 VDC	Voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600		
		1,000	E6B2-CWZ3E (resolution) 0.5M Example: E6B2-CWZ3E 10P/R 0.5M	
		1,200, 1,500, 1,800, 2,000		
5 VDC	Line-driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600		
		1,000, 1,024	E6B2-CWZ1X (resolution) 0.5M Example: E6B2-CWZ1X 10P/R 0.5M	
		1,200, 1,500, 1,800, 2,000		

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

Name	Model	Remarks	
	E69-C06B	Provided with the product.	
Couplings	E69-C68B	Different end diameter	
Couplings	E69-C610B	Different end diameter	
	E69-C06M	Metal construction	
Elangea	E69-FBA		
Flanges	E69-FBA02	E69-2 Servo Mounting Bracket provided.	
Servo Mounting Bracket	E69-2		

Refer to Accessories for details.

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## **Ratings and Specifications**

Item	Model	E6B2-CWZ6C	E6B2-CWZ5B	E6B2-CWZ3E	E6B2-CWZ1X		
Power supply voltage		5 VDC –5% to 24 VDC +15%, ripple (p-p): 5% max.	12 VDC -10% to 24 VDC +15%, ripple (p-p): 5% max.	5 VDC –5% to 12 VDC +10%, ripple (p-p): 5% max.	5 VDC ±5%, ripple (p-p): 5% max.		
Current consumption *1		80 mA max.	100 mA max.		160 mA max.		
Resolution (pulses/rotation)		10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	100, 200, 360, 500, 600, 1,000, 2,000	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,200, 1,500, 1,800, 2,000	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000		
Output phases		Phases A, B, and Z	Phases A, $\overline{A}$ , B, $\overline{B}$ , Z, and $\overline{Z}$				
	lifference n outputs	$90^{\circ}\pm45^{\circ}$ between A and B (1/4	4 T ± 1/8 T)		•		
Output configuration		NPN open-collector output	PNP open-collector output	Voltage output (NPN output)	Line driver output *2		
Output capacity		Applied voltage: 30 VDC max. Sink current: 35 mA max. Residual voltage: 0.4 V max. (at sink current of 35 mA)	Applied voltage: 30 VDC max. Source current: 35 mA max. Residual voltage: 0.4 V max. (at source current of 35 mA)	Output resistance: $2 \text{ k}\Omega$ Sink current: 20 mA max. Residual voltage: 0.4 V max. (at sink current of 20 mA)	$\begin{array}{l} AM26LS31 \ equivalent\\ Output current\\ High \ level: \ lo = -20\ mA\\ Low \ level: \ ls = 20\ mA\\ Output \ voltage:\\ Vo = 2.5\ V\ min.\\ Vs = 0.5\ V\ max. \end{array}$		
Maximum response frequency *3		100 kHz	50 kHz	100 kHz			
Rise and fall times of output		1 $\mu$ s max. (Control output voltage: 5 V, Load resis- tance: 1 k $\Omega$ , Cable length: 2 m max.)	1 $\mu$ s max. (Cable length: 2 m max., Sink current: 10 mA)		0.1 μs max. (Cable length: 2 m max., lo = -20 mA, ls = 20 mA)		
Starting torque		0.98 mN·m max.					
Moment of inertia $1 \times 10^{-6}$ kg·m <sup>2</sup> max.; $3 \times 10^{-7}$ kg·m <sup>2</sup> max. at 600 P/R max.							
Shaft	Radial	30 N					
load- ing	Thrust	20 N					
Maximum permissible speed		6,000 r/min					
Protecti	ion circuits	Power supply reverse polarity					
Ambient temperature range		Operating: -10 to 70°C (with no icing), Storage: -25 to 85°C (with no icing)					
Ambient humidity range		Operating/Storage: 35% to 85% (with no condensation)					
Insulation resistan		20 M $\Omega$ min. (at 500 VDC) betw					
Dielectr	ic strength	500 VAC, 50/60 Hz for 1 min between current-carrying parts and case					
Vibratio resistan		Destruction: 10 to 500 Hz, 150 m/s <sup>2</sup> or 2-mm double amplitude for 11 min 3 times each in X, Y, and Z directions					
Shock r	esistance	Destruction: 1,000m/s <sup>2</sup> 3 times each in X, Y, and Z directions					
Degree protecti		IEC 60529 IP50					
Connec method		Pre-wired Models (Standard cable length: 500 mm)					
Material	ls	Case: ABS, Main unit: Aluminum, Shaft: SUS420J2					
Weight (packed	l state)	Approx. 100 g					
Accesso	ories	Coupling, 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 line driver output is a data transmission circuit compatible with RS-422A and long-distance transmission is possible with a twisted-pair cable. The quality is equivalent to AM26LS31.

\*3. The maximum electrical response speed is determined by the resolution and maximum response frequency as follows:

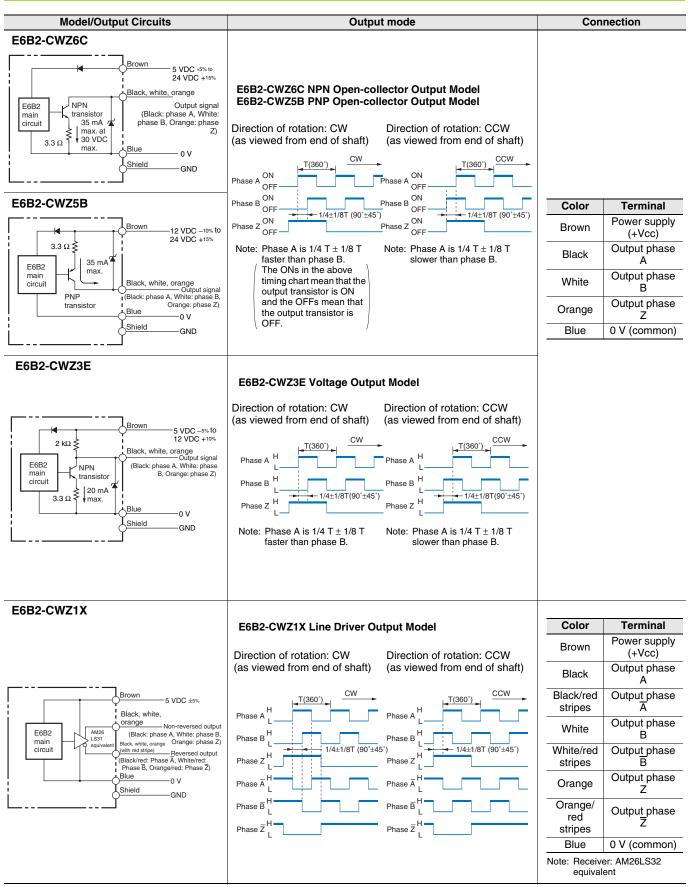
Maximum response frequency ×60 Maximum electrical response speed (rpm) = -

Resolution

This means that the E6B2-C Rotary Encoder will not operate electrically if its speed exceeds the maximum electrical response speed.

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## I/O Circuit Diagrams



Note: 1. The shielded cable outer core (shield) is not connected to the inner area or to the case.

2. The phase A, phase B, and phase Z circuits are all identical.

3. Normally, connect GND to 0 V or to an external ground.

## **Safety Precautions**

#### Refer to Warranty and Limitations of Liability.

#### <u> WARNING</u>

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

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#### **Precautions for Safe Use**

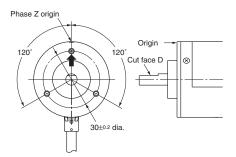
Incorrect wiring may damage internal circuits.

#### Precautions for Correct Use

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

#### Mounting

- Origin Indication
- It is easy to adjust the position of phase Z with the origin indication function. The following illustration shows the relationship between phase Z and the origin. Set cut face D to the phase Z origin as shown in the illustration.



• Do not extend the length of the cable to more than 2 m. If the cable must be more than 2 m, use a Model with a Line-driver Output (max. length: 100 m).

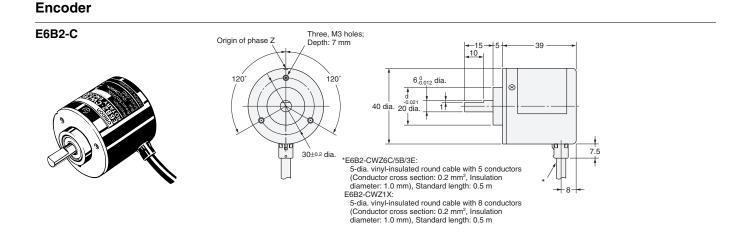
#### Wiring

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.



#### Accessories (Order Separately)

Couplings E69-C06B E69-C68B E69-C610B E69-C06M Refer to *Accessories* for details. Flanges E69-FBA E69-FBA02

### Servo Mounting Bracket E69-2

#### **Read and Understand This Catalog**

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- · 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.

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#### Disclaimers

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

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#### DIMENSIONS AND WEIGHTS

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

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