E6C2-C

CSM F6C2-C DS F 3 1

Tough and Easy

- Sealed bearings with IP64 oilproof construction.
- Improved shaft loading performance. Radial: 50 N, Thrust: 30 N
- Pre-wired Models with cable connected at an angle. Side or back cable connections also possible.
- Improved reliability with reverse connection and load short-circuit protection (except for line-driver outputs).





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

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Ordering Information

Encoders [Refer to Dimensions on page 4.]

Power supply voltage	Output configuration	Resolution (pulses/rotation)	Model	
5 to 24 VDC	Open-collector output (NPN)	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ6C (resolution) 2M Example: E6C2-CWZ6C 10P/R 2M	
		720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000		
12 to 24 VDC	Open-collector output (PNP)	100, 200, 360, 500, 600	E6C2-CWZ5B (resolution) 2M Example: E6C2-CWZ5B 100P/R 2M	
		1,000, 2,000		
5 to 12 VDC	Voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ3E (resolution) 2M	
		720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	Example: E6C2-CWZ3E 10P/R 2M	
5 VDC	Line-driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ1X (resolution) 2M Example: E6C2-CWZ1X 10P/R 2M	
		720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000		

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

Name	Model	Remarks	
	E69-C06B		
Countings	E69-C68B	Different end diameter	
Couplings	E69-C610B	Different end diameter	
	E69-C06M	Metal construction	
Flamma	E69-FCA		
Flanges	E69-FCA02	E69-2 Servo Mounting Bracket provided.	
Servo Mounting Bracket	E69-2	Provided with E69-FCA02 Flange.	

Refer to Accessories for details.

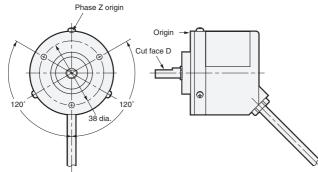
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Ratings and Specifications

Item	Model	E6C2-CWZ6C	E6C2-CWZ5B	E6C2-CWZ3E	E6C2-CWZ1X		
Power su voltage	ipply	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, 200, 30, 40, 50, 60, 100, 200, 1,000, 1,024, 1,200, 1,500, 1,800		300, 360, 400, 500, 600, 720, 800, 0, 2,000		
Output phases		Phases A, B, and Z	Phases A, \overline{A} , B, \overline{B} , Z, and \overline{Z}				
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: $2 \text{ k}\Omega$ Output current: 20 mA max. Residual voltage: 0.4 V max. (at sink current of 20 mA)	AM26LS31 equivalent Output voltage: High level: Io = -20 mA Low level: Is = 20 mA Output voltage: Vo = 2.5 V min. Vs = 0.5 V max.		
Maximum response frequency*3		100 kHz	50 kHz	100 kHz			
Phase dit between		90°±45° between A and B (1/4 T ± 1/8 T)					
Rise and fall times of output		1 μs max. (Control output voltage: 5 V, Load resistance: 1 $k\Omega$, Cable length: 2 m)	I 1 μs max. (Cable length: 2 m, Sink current: 10 mA)		0.1 μs max. (Cable length: 2 m, lo = -20 mA, ls = 20 mA)		
Starting t	torque	10 mN·m max.					
Moment of	of inertia	1×10 ⁻⁶ kg·m² max.; 3 × 10 ⁻⁷ kg·m² max. at 600 P/R max.					
Shaft Radial		50 N					
loading	Thrust	30 N					
Maximun permissil	n ble speed	6,000 r/min					
Protectio	n circuits	Power supply reverse polarity pro-					
Ambient range	temperature	Operating: –10 to 70°C (with no icing), Storage: –25 to 85°C (with no icing)					
Ambient range	humidity	Operating/Storage: 35% to 85% (with no condensation)					
Insulatio	n resistance	20 M Ω 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 500 Hz, 150 m/s² or 2-mm double amplitude for 11 min 3 times each in X, Y, and Z directions					
Shock re	sistance	Destruction: 1,000 m/s ² 3 times each in X, Y, and Z directions					
Degree o	f protection	IEC 60529 IP64, in-house standards: oilproof					
Connecti	on method	Pre-wired Models (Standard cable length: 2 m)					
Material		Case: Zinc alloy, Main unit: Aluminum, Shaft: SUS420J2					
Weight (packed s	state)	Approx. 400 g					
Accesso	ries	Instruction manual					
		+					

Note: Origin Indication

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.



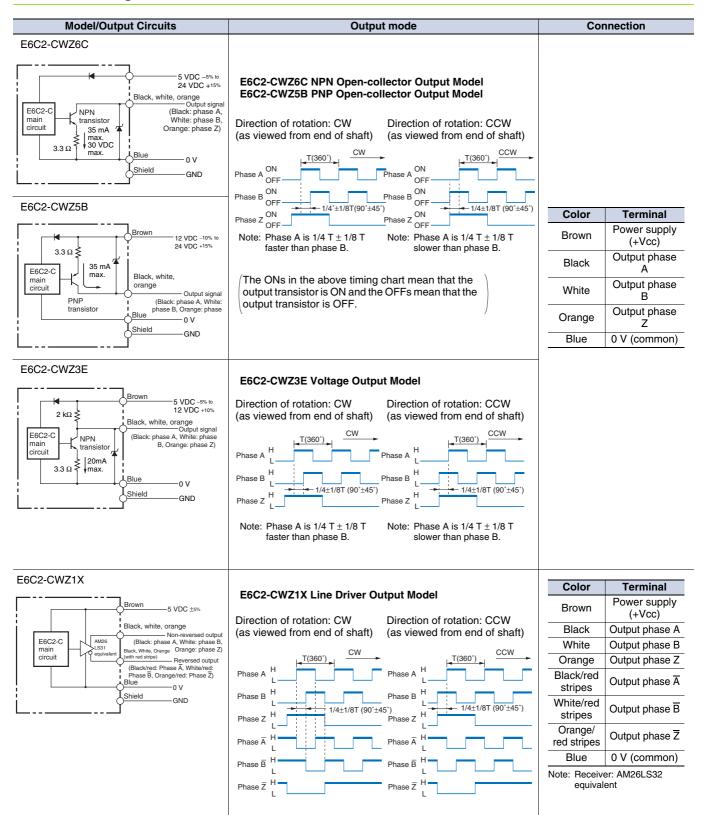
- *1. An inrush current of approximately 9 A will flow for approximately 0.3 ms when the power is turned ON.
 *2. The line driver output is a data transmission circuit compatible with RS-422A and long-distance transmission is possible with a twisted-pair cable.(AM26LS31 equivalent)

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

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

This means that the E6C2-C Rotary Encoder will not operate electrically if its speed exceeds the maximum electrical response speed.

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.

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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

Cable Extension Characteristics

- When the cable length is extended, the output waveform startup time is lengthened and it affects the phase difference characteristics of phases A and B. Conditions will change according to frequency, noise, and other factors. As a guideline, use a cable length of 10 m* or less. If the cable must be more than 2 m, use a Model with a Line-driver Output (max. length for line-driver output: 100 m).
- * Recommended Cable Conductor cross section: 0.2 mm² Spiral shield

Conductor resistance: 92 Ω /km max. (20°C) Insulation resistance: 5 Ω /km min. (20°C)

- The output waveform startup time changes not only according to the length of the cable, but also according to the load resistance and the cable type.
- Extending the cable length not only changes the startup time, but also increases the output residual voltage.

Connection

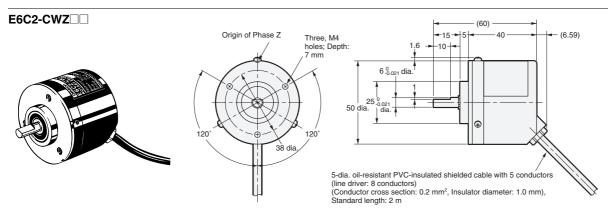
Spurious pulses may be generated when power is turned ON and OFF. Wait at least 0.1 s after turning ON the power to the Encoder before using the connected device, and stop using the connected device at least 0.1 s before turning OFF the power to the Encoder. Also, turn ON the power to the load only after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

(Unit: mm)

Dimensions

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

Encoder



Accessories (Order Separately)

Couplings Flanges

E69-C06B E69-FCA E69-C68B E69-FCA02 E69-C610B

Servo Mounting Bracket

E69-C06M

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E69-2 (Three brackets in a set.)

Refer to Accessories for details.

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Read and Understand This Catalog

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