Incremental 25-mm-dia. Rotary Encoder

E6A2-C

CSM_E6A2-C_DS_E_8_2

Compact Encoder with External Diameter of 25 mm

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

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

⚠ 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** Example: E6A2-CWZ3E 100P/R 0.5M
			500	
	Open-collector output (NPN output)		100, 200, 360	**E6A2-CWZ3C (resolution) 0.5M** Example: E6A2-CWZ3C 100P/R 0.5M
			500	
12 to 24 VDC			100, 200, 360	**E6A2-CWZ5C (resolution) 0.5M** Example: E6A2-CWZ5C 100P/R 0.5M
			500	
5 to 12 VDC	Voltage output	Phases A and B	100, 200, 360	**E6A2-CW3E (resolution) 0.5M** Example: E6A2-CW3E 100P/R 0.5M
			500	
	Open-collector output (NPN output)		100, 200, 360	**E6A2-CW3C (resolution) 0.5M** Example: E6A2-CW3C 100P/R 0.5M
			500	
12 to 24 VDC			100, 200, 360	**E6A2-CW5C (resolution) 0.5M** Example: E6A2-CW5C 100P/R 0.5M
			500	
5 to 12 VDC	Voltage output	Phase A	10, (20) *, 60, 100, 200, 300, 360	**E6A2-CS3E (resolution) 0.5M** Example: E6A2-CS3E 10P/R 0.5M
			500	
	Open-collector output (NPN output)		10, 20, 60, 100, 200, 300, 360	**E6A2-CS3C (resolution) 0.5M** Example: E6A2-CS3C 10P/R 0.5M
			500	
12 to 24 VDC			10, 20, 60, 100, 200, 300, 360	**E6A2-CS5C (resolution) 0.5M** Example: E6A2-CS5C 10P/R 0.5M
			500	

* Only a 2-m cable is available for the 20P/R Model.

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

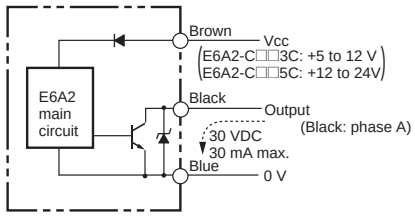
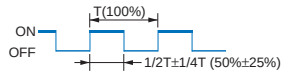
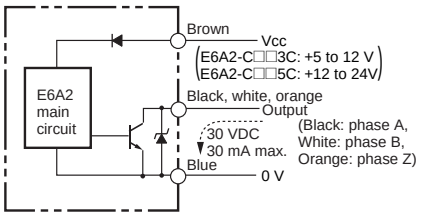
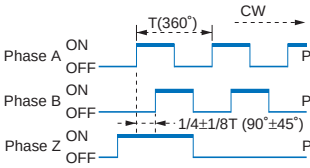
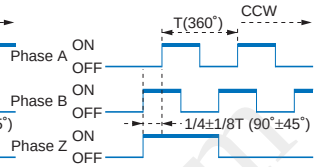
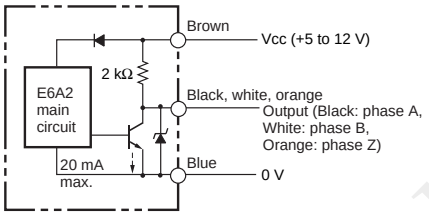
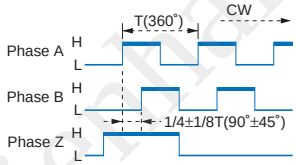
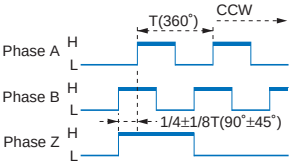
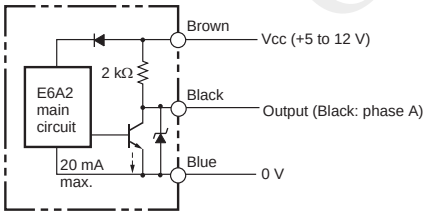
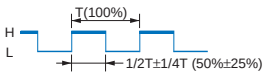
Item \ Model	E6A2-CWZ3E	E6A2-CWZ3C	E6A2-CWZ5C	E6A2-CW3E	E6A2-CW3C	E6A2-CW5C	E6A2-CS3E	E6A2-CS3C	E6A2-CS5C
Power supply voltage	5 VDC −5% to 12 V +10% ripple (p-p): 5% max.		12 VDC −10% to 24 VDC +15%, ripple (p-p): 5% max.	5 VDC −5% to 12 V +10%, ripple (p-p): 5% max.		12 VDC −10% to 24 VDC +15%, ripple (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								
Shaft loading: 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 *1 **E6A2-CS5C *1** 	Output transistor  (The ONs in the above timing chart mean that the output transistor is ON and the OFFs mean that the output transistor is OFF.)	
E6A2-CW3C *2 **E6A2-CW5C *2** **E6A2-CWZ3C** **E6A2-CWZ5C** 	**Output transistor** Direction of rotation: CW (as viewed from end of shaft)  Note: Phase A is 1/4 T ± 1/8 T faster than phase B. Direction of rotation: CCW (as viewed from end of shaft)  Note: Phase A is 1/4 T ± 1/8 T slower than phase B. (The ONs in the above timing chart mean that the output transistor is ON and the OFFs mean that the output transistor is OFF.)	
E6A2-CW3E *2, 3 **E6A2-CWZ3E *3** 	**Output transistor** Direction of rotation: CW (as viewed from end of shaft)  Note: Phase A is 1/4 T ± 1/8 T faster than phase B. Direction of rotation: CCW (as viewed from end of shaft)  Note: Phase A is 1/4 T ± 1/8 T slower than phase B. ("H" and "L" in the diagrams are the output voltage levels of phases A, B, and Z.)	
E6A2-CS3E *1, 3 	Output transistor  ("H" and "L" in the diagrams are the output voltage levels.)	

Color	Signal
Brown	Vcc
Black	Phase A
White	Phase B
Orange	Phase Z
Blue	0 V (common)

*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.

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.

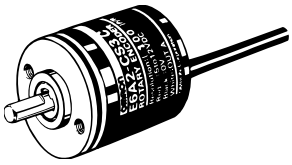
(Unit: mm)

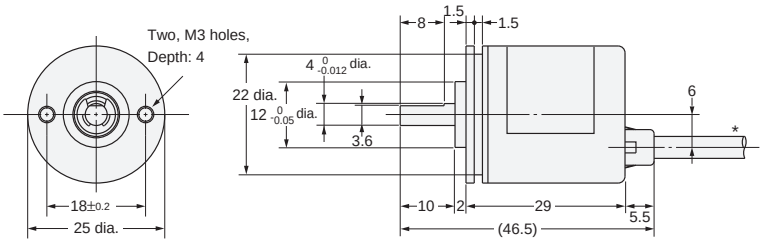
Dimensions

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

Encoder

E6A2-C





* 4-dia. vinyl-insulated round cable with 5 conductors (Conductor cross section: 0.14 mm^2, Insulator diameter: 0.9 mm), Standard length: 500 mm

Accessories (Order Separately)

Coupling	Servo Mounting Bracket
E69-C04B	**E69-1**

Refer to *Accessories* for details.