


# E6A2-C

## Compact Encoder (External Diameter: 25 mm)

- Models with origin output (phase Z) for positioning applications.
- Resolution of 500 ppr in an Encoder with an external diameter of only 25 mm.



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

## Ordering Information

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

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

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

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

Refer to *Accessories* for details.

## Ratings and Specifications

Item	Model	E6A2-CS3E	E6A2-CS3C	E6A2-CS5C	E6A2-CW3E	E6A2-CW3C	E6A2-CW5C	E6A2-CWZ3E	E6A2-CWZ3C	E6A2-CWZ5C
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		30 mA max.	20 mA max.		30 mA max.	20 mA max.		50 mA max.	30 mA max.	
Resolution (pulses/rotation)		10, 20, 60, 100, 200, 300, 360, 500			100, 200, 360, 500					
Output phases		Phase A			Phases A and B			Phases A, B, and Z		
Output configuration		Voltage output	Open-collector output		Voltage output	Open-collector output		Voltage output	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 <sup>-7</sup> kg·m <sup>2</sup> 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 <sup>2</sup> 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	<p>E6A2 main circuit</p> <p>Brown <math>V_{CC}</math> (+5 to 12 V) (E6A2-C□□3C: +5 to 12 V) (E6A2-C□□5C: +12 to 24V)</p> <p>Black, white, orange Output (Black: phase A, White: phase B, Orange: phase Z)</p> <p>Blue 0 V</p> <p>30 VDC 30 mA max.</p>	Output transistor	<table border="1"> <thead> <tr> <th>Color</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>Brown</td> <td><math>V_{CC}</math></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> </tbody> </table> <p>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-C□□□) do not output signals (no connection). 3. Voltage Output Models are capable of sinking a maximum current of 20 mA.</p>	Color	Signal	Brown	$V_{CC}$	Black	Phase A	White	Phase B	Orange	Phase Z	Blue	0 V (common)
Color		Signal													
Brown		$V_{CC}$													
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	<p>E6A2 main circuit</p> <p>Brown <math>V_{CC}</math> (+5 to 12 V)</p> <p>Black, white, orange Output (Black: phase A, White: phase B, Orange: phase Z)</p> <p>Blue 0 V</p> <p>20 mA max.</p> <p>2 kΩ</p>	Direction of rotation: CCW (as viewed from end of shaft)	<table border="1"> <thead> <tr> <th>Color</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>Brown</td> <td><math>V_{CC}</math></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> </tbody> </table> <p>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-C□□□) do not output signals (no connection). 3. Voltage Output Models are capable of sinking a maximum current of 20 mA.</p>	Color	Signal	Brown	$V_{CC}$	Black	Phase A	White	Phase B	Orange	Phase Z	Blue	0 V (common)
Color		Signal													
Brown		$V_{CC}$													
Black	Phase A														
White	Phase B														
Orange	Phase Z														
Blue	0 V (common)														
E6A2-CWZ3E	Direction of rotation: CW (as viewed from end of shaft)	Output transistor													
E6A2-CS3E	Direction of rotation: CCW (as viewed from end of shaft)	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.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

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

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

### ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

2008.11

In the interest of product improvement, specifications are subject to change without notice.

**OMRON Corporation**  
Industrial Automation Company

<http://www.ia.omron.com/>

(c)Copyright OMRON Corporation 2008 All Right Reserved.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.