


# E6CP-A

## An Absolute Encoder at About the Same Price as an Incremental Encoder.

### Ideal for robot limit signals.

- High-precision detection of automatic machine timing.
- Gray code output for no reading mistakes.
- Plastic body for lightweight construction.



 Be sure to read *Safety Precautions* on page 5.

## Ordering Information

### Encoders [Refer to *Dimensions* on page 5.]

Power supply voltage	Output configuration	Resolution (divisions)	Connector for H8PS Cam Positioner	Model
5 to 12 VDC	Open-collector output	256 (8-bit)	None	E6CP-AG3C 256P/R 2M
12 to 24 VDC			Supported	E6CP-AG5C 256P/R 2M
				E6CP-AG5C-C 256P/R 2M

Note: When connecting to the H8PS, use the E6CP-AG5C-C. It cannot be used on other models.

### Accessories (Order Separately)

[Dimensions: Refer to *Accessories* for coupling dimensions and to page 5 for the dimensions of other accessories.]

Name	Model	Remarks
Couplings	E69-C06B	Provided with the E6CP-AG3C and E6CP-AG5C.
	E69-C68B	Different end diameter
	E69-C610B	Different end diameter
	E69-C06M	Metal construction
Servo Mounting Bracket	E69-2	Provided with the product. (Three brackets in a set.)
Extension Cable	E69-DF5	5 m
	E69-DF10	10 m
	E69-DF20	20 m

Refer to *Accessories* for details.

## Ratings and Specifications

Item	Model	E6CP-AG3C	E6CP-AG5C	E6CP-AG5C-C
Power supply voltage		5 VDC -5% to 12 VDC +10%, ripple (p-p): 5% max.	12 VDC -10% to 24 VDC +15%, ripple (p-p): 5% max.	
Current consumption*1		90 mA max.	70 mA max.	
Resolution (rotations)		256 (8-bit)		
Output code		Gray code		
Output configuration		Open-collector output		
Output capacity		Applied voltage: 28 VDC max. Sink current: 16 mA max. Residual voltage: 0.4 V max. (at sink current of 16 mA)		
Maximum response frequency*2		5 kHz		
Logic		Negative logic (high = 0, low = 1)		
Accuracy		±1° max.		
Direction of rotation		Output code incremented by CW (as viewed from the end of the shaft)		
Rise and fall times of output		1 μs max. (Control output voltage: 16 V, Load resistance: 1 kΩ, Output cable: 2 m max.)		
Starting torque		0.98 mN·m max.		
Moment of inertia		1 × 10 <sup>-6</sup> kg·m <sup>2</sup> max.		
Shaft loading	Radial	30 N		
	Thrust	20 N		
Maximum permissible speed		1,000 r/min		
Ambient temperature range		Operating: -10 to 55°C (with no icing), Storage: -25 to 85°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: 1,000 m/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: 2 m)		Connector Models (Standard cable length: 2 m)
Material		Case: ABS, Main unit: PPS, Shaft: SUS416, Mounting Bracket: Galvanized iron		
Weight (packed state)		Approx. 200 g		
Accessories		Coupling (excluding Connector Models), Servo Mounting Bracket, Instruction manual		

\*1. An inrush current of approximately 8 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:

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

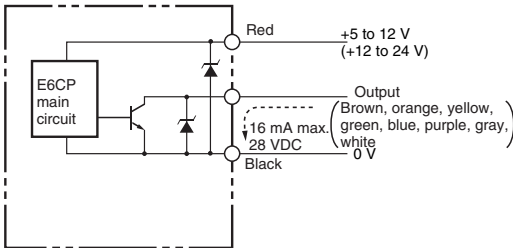
This means that the Rotary Encoder will not operate electrically if its speed exceeds the maximum electrical response speed.

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

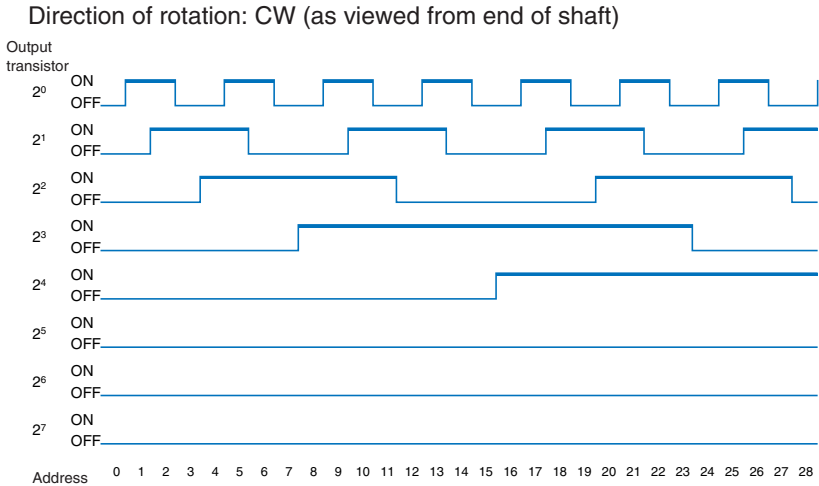
I/O Circuit Diagrams

E6CP-AG3C, E6CP-AG5C	E6CP-AG5C-C
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Output Circuits



Output mode



Connection

Color	E6CP-AG3C	E6CP-AG5C
Red	Power supply 5 to 12 VDC	Power supply 12 to 24 VDC
Black	0 V (common)	
Brown	Output 2 <sup>0</sup>	
Orange	Output 2 <sup>1</sup>	
Yellow	Output 2 <sup>2</sup>	
Green	Output 2 <sup>3</sup>	
Blue	Output 2 <sup>4</sup>	
Purple	Output 2 <sup>5</sup>	
Gray	Output 2 <sup>6</sup>	
White	Output 2 <sup>7</sup>	

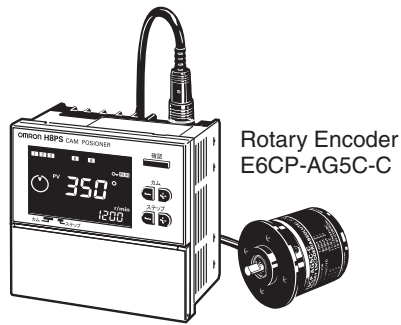
Note: The circuit is the same for all bit outputs.

Terminal No.	E6CP-AG5C-C
1	Connected internally
2	
3	Output 2 <sup>5</sup>
4	Output 2 <sup>1</sup>
5	Output 2 <sup>0</sup>
6	Output 2 <sup>7</sup>
7	Output 2 <sup>4</sup>
8	Output 2 <sup>2</sup>
9	Output 2 <sup>3</sup>
10	Output 2 <sup>6</sup>
11	---
12	Power supply: 12 to 24 VDC
13	0 V (common)

Note: The circuit is the same for all bit outputs.

## Positioner Connection Example

### H8PS Cam Positioner Connection



Note: The E6CP-AG5C cannot be connected to the H8PS.

#### Ordering Information

Model
H8PS-8A
H8PS-8AP
H8PS-8AF
H8PS-8AFP
H8PS-16A
H8PS-16AP
H8PS-16AF
H8PS-16AFP
H8PS-32A
H8PS-32AP
H8PS-32AF
H8PS-32AFP

#### Specifications

<b>Rated voltage</b>	24 VDC
<b>Cam precision</b>	0.5° (for 720 resolution), 1° (for 256/360 resolution)
<b>No. of output points</b>	8-point output type: 8 cam outputs, 1 RUN output, 1 pulse output 16-point output type: 16 cam outputs, 1 RUN output, 1 pulse output 32-point output type: 32 cam outputs, 1 RUN output, 1 pulse output
<b>Encoder response</b>	RUN mode, test mode: 256/360 resolution ..... 1,600 r/min max. (1,200 r/min when advance compensation is set for four cams or more) 720 resolution ..... 800 r/min max. (600 r/min when advance compensation is set for four cams or more)
<b>Additional functions</b>	<ul style="list-style-type: none"> <li>• Origin compensation (zeroing)</li> <li>• Rotation direction switching</li> <li>• Angle display switching</li> <li>• Teaching</li> <li>• Pulse output</li> <li>• Angle/number of rotations display switching</li> <li>• Puncture *</li> <li>• Angle advance</li> <li>• Number of rotations alarm output</li> <li>• Setting with support software (order separately) *</li> </ul>

Note: For 16-point and 32-point output types only

#### Programmable Controller Connection

Connection is possible with the CQM1H-CPU51 and CQM1H-ABB21.

Refer to the *CQM1H Programmable Controller Catalog (P050)* for details on the CQM1H Programmable Controller.

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.

● **Mounting**

For front-surface mounting, the maximum tightening torque is 1.76 N·m. (Effective screw length: 7 mm min.)

● **Wiring**

Spurious pulses may be generated for outputs when power is turned ON. Wait at least 1 s after turning ON the power to the Encoder before using the connected device.

● **Connection**

Spurious pulses may be generated when power is turned ON and OFF. Wait at least 1 s after turning ON the power to the Encoder before using the connected device, and stop using the connected device at least 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.

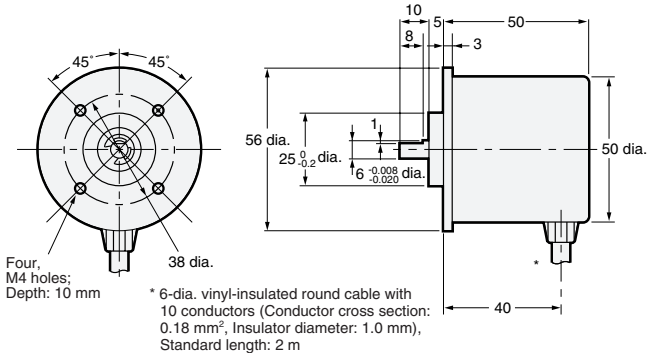
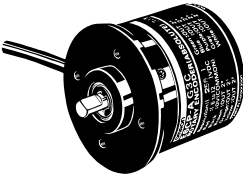
(Unit: mm)

Dimensions

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

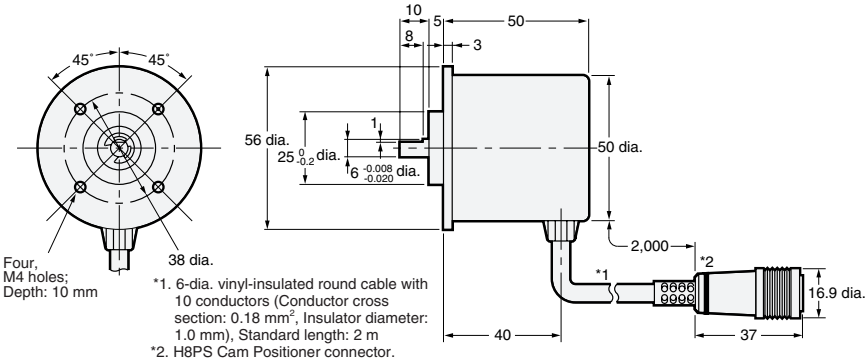
Encoder

E6CP-AG3C  
E6CP-AG5C



The E69-C06B Coupling is provided.

E6CP-AG5C-C



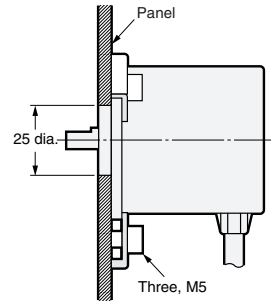
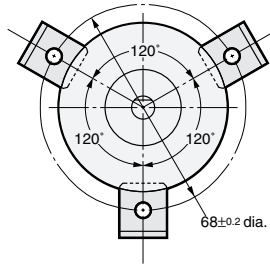
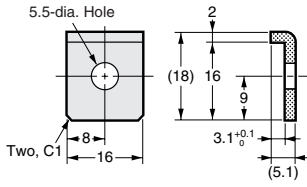
The E69-C06B Coupling is sold separately.

Accessories (Order Separately)

Servo Mounting Bracket

E69-2

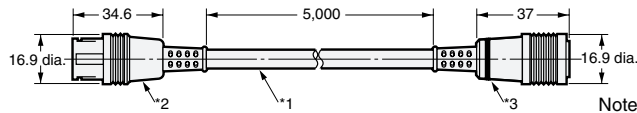
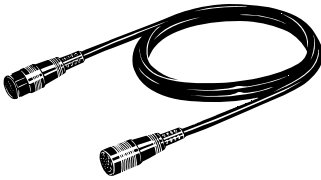
Mounting Bracket Installation



Note: Provided with the product.

Extension Cable

E69-DF5



- \*1. 6-dia. shielded cable with 12 conductors (Conductor cross section: 0.2 mm<sup>2</sup>, Insulator diameter: 1.1 mm), Standard length: 5 m
- \*2. Connects to connector on E6CP-AG5C-C.
- \*3. Connects to H8PS Cam Positioner.

Note: 1. The E69-DF5 (5 m) is also available with the following cable lengths: 10 m, 15 m, 20 m, and 98 m.  
2. Cable can be extended to 100 m when the H8PS Cam Positioner is connected.

Couplings

E69-C06B

E69-C68B

E69-C610B

E69-C06M

Refer to *Accessories* for details.

## Read and Understand This Catalog

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2008.11

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