

CHINA YUMO ELECTRIC CO.,LIMITED
YUEQING YING'S IMPORT & EXPORT CO.,LTD

ADD: ZHAOYANG INDUSTRIAL ZONE, LIUSHI TOWN, YUEQING CITY, ZHEJIANG, 325604 CHINA

TEL: 0086-577-62791815 FAX: 0086-577-62791825

Http://www.yumoelectric.com E-mail:sales@yingselectric.com

E6C2 series

Incremental Rotary Encoder

YUMO®



◆ **Substitute: E6C2**

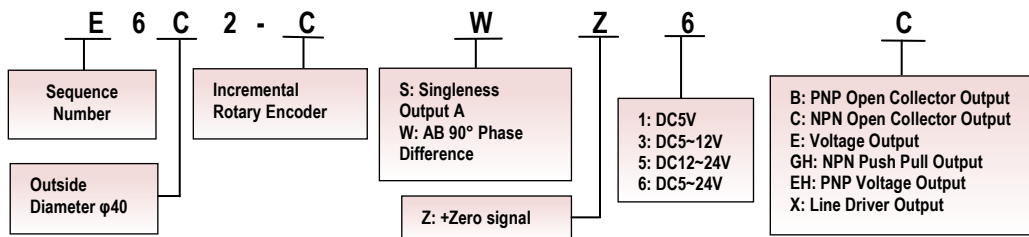
- New General-purpose Incremental Rotary Encoder
- Outside Diameter $\phi 40$ Model: A6B2

◆ **Features**

New General-purpose Incremental Rotary Encoder

- A wide operating voltage range of 5 to 24 VDC (Open-collector Models)
- Resolution of 2000 pulses/revolution in 40-mm housing
- Phase Z can be adjusted with ease using the origin indicating function
- A large load of 30 N in the radial direction and 20 N in the thrust direction is permitted
- The load short-circuit and reversed connection protecting circuit assures highly reliable operation (except for line-driver outputs)

◆ **Ordering Information**



◆ **Note:**

- 1, Please contact sales representative to confirm the correctness and availability of the part number
- 2, When ordering, specify the resolution in addition to the model number (example: A6B2-CWZ6C 100P/R)

◆ **Technical Specifications**

Supply Voltage	Output Configuration	Resolution (Pulses/Rotation)	Model
DC5~24V	Open Collector NPN Output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ6C
		1000	
		1200, 1500, 1800, 2000	
DC12~24V	Open Collector PNP Output	100, 200, 360, 500, 600	E6C2-CWZ5B
		1000	
		2000	
DC5~12V	Voltage Output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ3E
		1000	
		1200, 1500, 1800, 2000	
DC5V	Line Driver Output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ1X
		1000	
		1200, 1500, 1800, 2000	

◆ **Accessories (Order Separately)**

Description	Part Number	Remark
Shaft Coupler	E69-C06B	Provided with the product.
	E69-C68B	Different end diameter
	E69-C10B	Different end diameter
	E69-C06M	Material: Aluminum metal
Mounting Flange	E69-CFBA	---
	E69-CFBA02	E69-2 Servo Mounting Bracket provided.
Mounting Bracket	E69-2	---

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◆ Ratings and Specifications

Model Item	A6B2-CWZ6C	A6B2-CWZ5B	A6B2-CWZ3E	A6B2-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	80mA max	100mA max		160mA max
Resolution (pulses/rotation)	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1000, 1200, 1500, 1800, 2000	100, 200, 360, 500, 600, 1000, 2000	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1000, 1200, 1500, 1800, 2000	
Output Phases	A, B, and Z			A, A-, B, B-, Z, Z-
Phase Difference Of Output	90°±45° between A and B (1/4T±1/8T)			
Output Form	NPN open-collector output	PNP open-collector output	Voltage output	Line driver output
Output Capacity	Applied voltage: 30 VDC max. Sink current: 35mA 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 kΩ Sink current: 20mA max. Residual voltage: 0.4 V max. (at sink current of 20 mA)	AM26LS31 equivalent Output current: High level = I _o = -20mA Low level = I _s = 20mA Output voltage: High level = V _o = 2.5V min. Low level = V _s = 0.5V max
Maximum Response Frequency	100kHz	50 kHz	100 kHz	
Output Rise And Fall Times	1μs max. (Control output voltage: 5V; load resistance: 1kΩ; cable length: 2m)	1μs max. (Cable length: 2 m; Source current: 10mA max.)	1μs max. (Cable length: 2m; Sink current: 10mA max.)	0.1μs max. (Cable length: 2 m; I _o : -20 mA; I _s : 20 mA

◆ Note:

*1. An inrush current of approximately 9A will flow for approximately 0.3ms 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.

*3. The maximum electrical response speed is determined by the resolution and maximum response speed as follows:
Maximum electrical response speed (rpm) = Maximum response speed/resolution x 60
This means that the A6B2-C Rotary Encoder will not operate electrically if its speed exceeds the maximum electrical response speed.

Mechanical Specifications		
Starting Torque	0.98mN·m max	
Moment Of Inertia	1 x 10 ⁻⁶ kg.m ² max.	
Shaft Loading	Radial	29.4N
	Thrust	19.6N
Mounting Tolerance	Radial: 0.03mm TIR Max; Axial:0.2mm Max; Shaft Runout: 0.1° Max	
Allowable Shaft Load	Radial: 5N; Axial: 3N	
Maximum Rotating Speed	6000 rpm	
Ambient Temperature Range	Operating: -10 to 70℃ (with no icing), Storage: -25 to 80℃ (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	10 to 500 Hz, 150 m/s ² or 2-mm double amplitude for 11 min 3 times each in X, Y, and Z directions	
Shock Resistance	1,000 m/s ² 3 times each in X, Y, and Z directions	
Degree Of Protection	IEC 60529 IP50	
Connection Method	Pre-wired Models (standard length: 0.5 m)	
Weight	Approx. 100g	
Accessories	Coupling, Hexagonal Wrench, Instruction Manual	

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◆ I/O Circuit Diagrams

Model/ Output circuits	Output wave	Connection																								
A6B2-CWZ6C 5 VDC -5% to 24 VDC +15% Output signal (Black: phase A, white: phase B, orange: phase Z) 35 mA max. 30 VDC max. 3.3 Ω 0 V Ground (Shield)	Direction or resolution: CW (As viewed from the end of the shaft) Phase A ON OFF Phase B OFF ON Phase Z ON OFF $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW Note: Phase A is $1/4 \pm 1/8 T$ faster 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 OFF.) --- <tr><td> A6B2-CWZ5B 12 VDC -10% to 24 VDC +15% Output signal (Black: phase A, white: phase B, orange: phase Z) 35 mA max. PNP transistor 3.3 Ω 0 V Ground (Shield) </td><td> Direction or resolution: CCW (As viewed from the end of the shaft) Phase A ON OFF Phase B ON OFF Phase Z ON OFF $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW Note: Phase A is $1/4 \pm 1/8 T$ slower than phase B. --- <tr><td> A6B2-CWZ3E 5 VDC -5% to 12 VDC +10% Output signal (Black: phase A, white: phase B, orange: phase Z) 20 mA max. 2 kΩ 3.3 Ω 0 V Ground (Shield) </td><td> Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW Note: Phase A is $1/4 \pm 1/8 T$ faster than phase B. --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW Note: Phase A is $1/4 \pm 1/8 T$ slower than phase B. --- <tr><td> A6B2-CWZ1X 5 VDC ±5% Non-reversed output (Black: phase A, white: phase B, orange: phase Z) Reversed output (Black/red: phase A̅, white/red: phase B̅, orange/red: phase Z̅) AM26 LS31 equivalent 0 V Ground (Shield) </td><td> Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW </td><td><table><tr><th>Color</th><th>Terminal</th></tr><tr><td>Brown</td><td>Power supply (+Vcc)</td></tr><tr><td>Black</td><td>Output A</td></tr><tr><td>White</td><td>Output B</td></tr><tr><td>Orange</td><td>Output Z</td></tr><tr><td>Black/red stripes</td><td>Output A-</td></tr><tr><td>White/red stripes</td><td>Output B-</td></tr><tr><td>Orange/red stripes</td><td>Output Z-</td></tr><tr><td>Blue</td><td>0V(common)</td></tr></table></td></tr></td></tr></td></tr>	A6B2-CWZ5B 12 VDC -10% to 24 VDC +15% Output signal (Black: phase A, white: phase B, orange: phase Z) 35 mA max. 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A6B2-CWZ5B 12 VDC -10% to 24 VDC +15% Output signal (Black: phase A, white: phase B, orange: phase Z) 35 mA max. PNP transistor 3.3 Ω 0 V Ground (Shield)	Direction or resolution: CCW (As viewed from the end of the shaft) Phase A ON OFF Phase B ON OFF Phase Z ON OFF $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW Note: Phase A is $1/4 \pm 1/8 T$ slower than phase B. --- <tr><td> A6B2-CWZ3E 5 VDC -5% to 12 VDC +10% Output signal (Black: phase A, white: phase B, orange: phase Z) 20 mA max. 2 kΩ 3.3 Ω 0 V Ground (Shield) </td><td> Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW Note: Phase A is $1/4 \pm 1/8 T$ faster than phase B. --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW Note: Phase A is $1/4 \pm 1/8 T$ slower than phase B. --- <tr><td> A6B2-CWZ1X 5 VDC ±5% Non-reversed output (Black: phase A, white: phase B, orange: phase Z) Reversed output (Black/red: phase A̅, white/red: phase B̅, orange/red: phase Z̅) AM26 LS31 equivalent 0 V Ground (Shield) </td><td> Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW </td><td><table><tr><th>Color</th><th>Terminal</th></tr><tr><td>Brown</td><td>Power supply (+Vcc)</td></tr><tr><td>Black</td><td>Output A</td></tr><tr><td>White</td><td>Output B</td></tr><tr><td>Orange</td><td>Output Z</td></tr><tr><td>Black/red stripes</td><td>Output A-</td></tr><tr><td>White/red stripes</td><td>Output B-</td></tr><tr><td>Orange/red stripes</td><td>Output Z-</td></tr><tr><td>Blue</td><td>0V(common)</td></tr></table></td></tr></td></tr>	A6B2-CWZ3E 5 VDC -5% to 12 VDC +10% Output signal (Black: phase A, white: phase B, orange: phase Z) 20 mA max. 2 kΩ 3.3 Ω 0 V Ground (Shield)	Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW Note: Phase A is $1/4 \pm 1/8 T$ faster than phase B. --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW Note: Phase A is $1/4 \pm 1/8 T$ slower than phase B. --- <tr><td> A6B2-CWZ1X 5 VDC ±5% Non-reversed output (Black: phase A, white: phase B, orange: phase Z) Reversed output (Black/red: phase A̅, white/red: phase B̅, orange/red: phase Z̅) AM26 LS31 equivalent 0 V Ground (Shield) </td><td> Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW </td><td><table><tr><th>Color</th><th>Terminal</th></tr><tr><td>Brown</td><td>Power supply (+Vcc)</td></tr><tr><td>Black</td><td>Output A</td></tr><tr><td>White</td><td>Output B</td></tr><tr><td>Orange</td><td>Output Z</td></tr><tr><td>Black/red stripes</td><td>Output A-</td></tr><tr><td>White/red stripes</td><td>Output B-</td></tr><tr><td>Orange/red stripes</td><td>Output Z-</td></tr><tr><td>Blue</td><td>0V(common)</td></tr></table></td></tr>	A6B2-CWZ1X 5 VDC ±5% Non-reversed output (Black: phase A, white: phase B, orange: phase Z) Reversed output (Black/red: phase A̅, white/red: phase B̅, orange/red: phase Z̅) AM26 LS31 equivalent 0 V Ground (Shield)	Direction or resolution: CW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CW --- Direction or resolution: CCW (As viewed from the end of the shaft) Phase A H L Phase B H L Phase Z H L $T (360^\circ)$ $1/4 \pm 1/8 T (90^\circ \pm 45^\circ)$ CCW	<table><tr><th>Color</th><th>Terminal</th></tr><tr><td>Brown</td><td>Power supply (+Vcc)</td></tr><tr><td>Black</td><td>Output A</td></tr><tr><td>White</td><td>Output B</td></tr><tr><td>Orange</td><td>Output Z</td></tr><tr><td>Black/red stripes</td><td>Output A-</td></tr><tr><td>White/red stripes</td><td>Output B-</td></tr><tr><td>Orange/red stripes</td><td>Output Z-</td></tr><tr><td>Blue</td><td>0V(common)</td></tr></table>	Color	Terminal	Brown	Power supply (+Vcc)	Black	Output A	White	Output B	Orange	Output Z	Black/red stripes	Output A-	White/red stripes	Output B-	Orange/red stripes	Output Z-	Blue	0V(common)		
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◆ **Precautions for Correct Use**

Input to More than One Counter from Encoder (with Voltage Output)

Use the following formula to obtain the number of counters to be connected to a single A6B2-C Rotary Encoder.

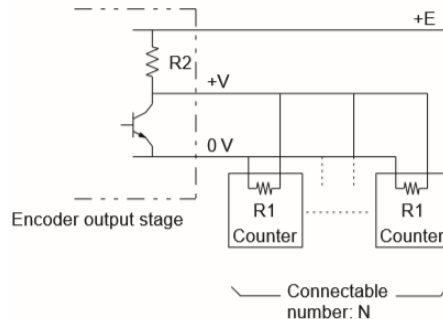
$$\text{Number of counters (N)} = R1 \times (E - V) / (V \times R2)$$

E: Voltage supplied to Rotary Encoder

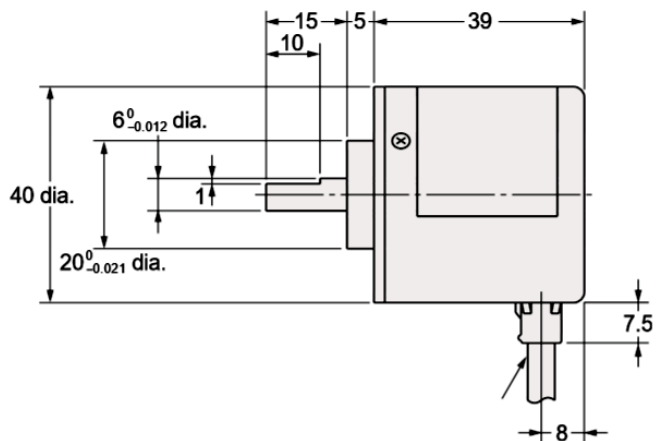
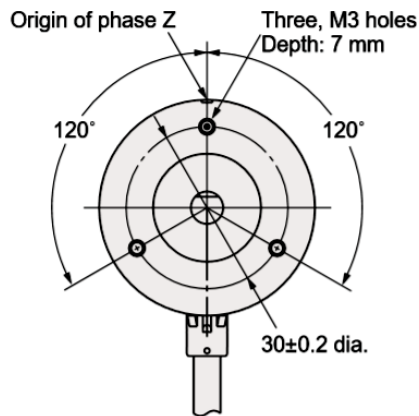
V: Minimum input voltage of the counter

R2: Output resistance of the Rotary Encoder

R1: Input resistance of the counter



◆ **Dimensions(mm)**



A6B2-CWZ6C/5B/3E:

5 dia. vinyl-insulated shielded 5-conductor cable (Conductor cross section: 0.2 mm², Insulator diameter: 1.0 mm), Standard length: 500 mm

A6B2-CWZ1X:

5 dia. vinyl-insulated shielded 8-conductor cable (Conductor cross section: 0.2 mm², Insulator diameter: 1.0 mm), Standard length: 500 mm