Incremental 40-mm-dia. Rotary Encoder
E6B2-C

CSM_E6B2-C_DS_E_6_1

General-purpose Encoder with External Diameter of 40 mm

• Incremental model
• External diameter of 40 mm.
• Resolution of up to 2,000 ppr.

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

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

Ordering Information

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

Power supply voltage	Output configuration	Resolution (pulses/rotation)	Model
5 to 24 VDC	NPN open-collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6B2-CWZ6C (resolution) 0.5M Example: E6B2-CWZ6C 10P/R 0.5M
		720, 800, 1,000, 1,024	
		1,200, 1,500, 1,800, 2,000	
12 to 24 VDC	PNP open-collector output	100, 200, 360, 500, 600	E6B2-CWZ5B (resolution) 0.5M Example: E6B2-CWZ5B 100P/R 0.5M
		1,000	
		2,000	
5 to 12 VDC	Voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6B2-CWZ3E (resolution) 0.5M Example: E6B2-CWZ3E 10P/R 0.5M
		1,000	
		1,200, 1,500, 1,800, 2,000	
5 VDC	Line-driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6B2-CWZ1X (resolution) 0.5M Example: E6B2-CWZ1X 10P/R 0.5M
		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
Couplings	E69-C06B	Provided with the product.
	E69-C68B	Different end diameter
	E69-C610B	Different end diameter
	E69-C06M	Metal construction
Flanges	E69-FBA	---
	E69-FBA02	E69-2 Servo Mounting Bracket provided.
Servo Mounting Bracket	E69-2	---

Note: 1. Refer to *Rotary Encoders Accessories* on your OMRON website for details.
2. Refer to *Precautions For Correct Use of Rotary Encoders* on your OMRON website when using the Rotary Encoders together with a Coupling.

OMRON 1

Ratings and Specifications

Item Model	E6B2-CWZ6C	E6B2-CWZ5B	E6B2-CWZ3E	E6B2-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 *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, 2,000	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,200, 1,500, 1,800, 2,000	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000
Output phases	Phases A, B, and Z			Phases A, $\overline{A}$, B, $\overline{B}$, Z, and $\overline{Z}$
Phase difference between outputs	90°±45° between A and B (1/4 T ± 1/8 T)			
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 kΩ Sink current: 20 mA max. Residual voltage: 0.4 V max. (at sink current of 20 mA)	AM26LS31 equivalent Output current High level: I_O = −20 mA Low level: I_S = 20 mA Output voltage: V_O = 2.5 V min. V_S = 0.5 V max.
Maximum response frequency *3	100 kHz	50 kHz	100 kHz	
Rise and fall times of output	1 μs max. (Control output voltage: 5 V, Load resistance: 1 kΩ, Cable length: 2 m max.)	1 μs max. (Cable length: 2 m max., Sink current: 10 mA)		0.1 μs max. (Cable length: 2 m max., I_O = −20 mA, I_S = 20 mA)
Starting torque	0.98 mN·m max.			
Moment of inertia	1×10^{-6} kg·m^2 max.; 3×10^{-7} kg·m^2 max. at 600 P/R max.			
Shaft loading — Radial	30 N			
Shaft loading — Thrust	20 N			
Maximum permissible speed	6,000 r/min			
Protection circuits	Power supply reverse polarity protection, Load short-circuit protection			---
Ambient temperature range	Operating: −10 to 70°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 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	Destruction: 1,000m/s^2 3 times each in X, Y, and Z directions			
Degree of protection	IEC 60529 IP50			
Connection method	Pre-wired Models (Standard cable length: 500 mm)			
Materials	Case: ABS, Main unit: Aluminum, Shaft: SUS420J2			
Weight (packed state)	Approx. 100 g			
Accessories	Coupling, 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.
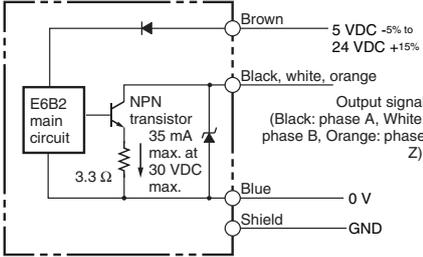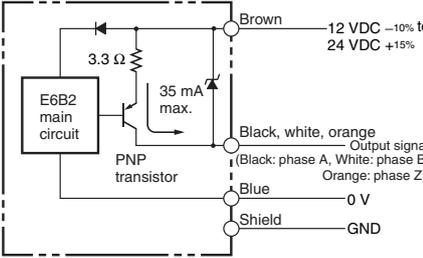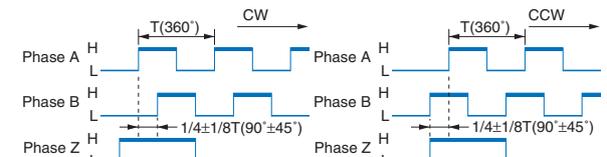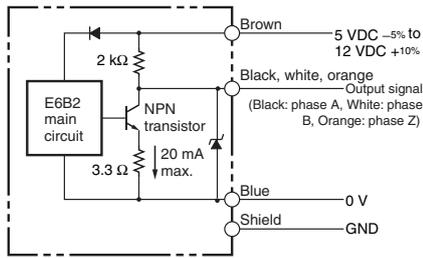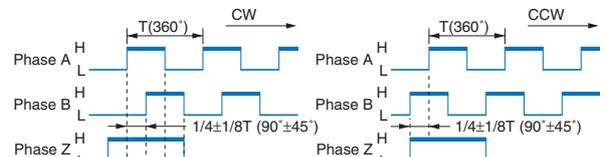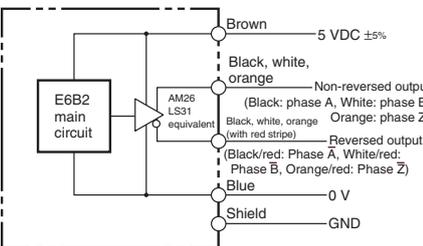*2. The line driver output is a data transmission circuit compatible with RS-422A and long-distance transmission is possible with a twisted-pair cable. The quality is equivalent to AM26LS31.
*3. The maximum electrical response speed is determined by the resolution and maximum response frequency as follows:

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

This means that the E6B2-C Rotary Encoder will not operate electrically if its speed exceeds the maximum electrical response speed.

I/O Circuit Diagrams

Model/Output Circuits	Output mode	Connection

E6B2-CWZ6C

Brown — 5 VDC -5% to 24 VDC +15%
Black, white, orange
E6B2 main circuit — NPN transistor 35 mA max. at 30 VDC max. — Output signal (Black: phase A, White: phase B, Orange: phase Z)
3.3 Ω
Blue — 0 V
Shield — GND

E6B2-CWZ6C NPN Open-collector Output Model
E6B2-CWZ5B PNP Open-collector Output Model

Direction of rotation: CW (as viewed from end of shaft)
Direction of rotation: CCW (as viewed from end of shaft)

T(360°) CW / T(360°) CCW

Phase A ON/OFF, Phase B ON/OFF, Phase Z ON/OFF
1/4±1/8T (90°±45°)
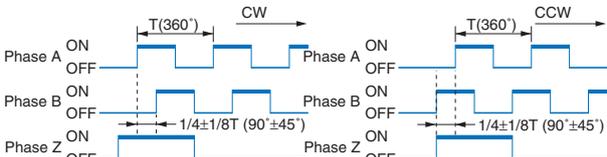
Note: Phase A is 1/4 T ± 1/8 T faster than phase B.
Note: Phase A is 1/4 T ± 1/8 T slower than phase B.

The ONs in the above timing chart mean that the output transistor is ON and the OFFs mean that the output transistor is OFF.

E6B2-CWZ5B

Brown — 12 VDC −10% to 24 VDC +15%
3.3 Ω
E6B2 main circuit — 35 mA max.
Black, white, orange — Output signal (Black: phase A, White: phase B, Orange: phase Z)
PNP transistor
Blue — 0 V
Shield — GND

Color	Terminal
Brown	Power supply (+Vcc)
Black	Output phase A
White	Output phase B
Orange	Output phase Z
Blue	0 V (common)

E6B2-CWZ3E

Brown — 5 VDC −5% to 12 VDC +10%
2 kΩ
Black, white, orange — Output signal (Black: phase A, White: phase B, Orange: phase Z)
E6B2 main circuit — NPN transistor 20 mA max.
3.3 Ω
Blue — 0 V
Shield — GND

E6B2-CWZ3E Voltage Output Model

Direction of rotation: CW (as viewed from end of shaft)
Direction of rotation: CCW (as viewed from end of shaft)

T(360°) CW / T(360°) CCW
Phase A H/L, Phase B H/L, Phase Z H/L
1/4±1/8T(90°±45°)

Note: Phase A is 1/4 T ± 1/8 T faster than phase B.
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.

E6B2-CWZ1X

Brown — 5 VDC ±5%
Black, white, orange — Non-reversed output (Black: phase A, White: phase B, Orange: phase Z)
E6B2 main circuit — AM26 LS31 equivalent
Black, white, orange (with red stripe) — Reversed output (Black/red: Phase A̅, White/red: Phase B̅, Orange/red: Phase Z̅)
Blue — 0 V
Shield — GND

E6B2-CWZ1X Line Driver Output Model

Direction of rotation: CW (as viewed from end of shaft)
Direction of rotation: CCW (as viewed from end of shaft)

T(360°) CW / T(360°) CCW
Phase A, Phase B, Phase Z, Phase A̅, Phase B̅, Phase Z̅ (H/L)
1/4±1/8T (90°±45°)

Note: Phase A is 1/4 T ± 1/8 T faster than phase B.
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.

Color	Terminal
Brown	Power supply (+Vcc)
Black	Output phase A
Black/red stripes	Output phase A̅
White	Output phase B
White/red stripes	Output phase B̅
Orange	Output phase Z
Orange/red stripes	Output phase Z̅
Blue	0 V (common)

Note: Receiver: AM26LS32 equivalent

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.

OMRON

Safety Precautions

Be sure to read the precautions for all models in the website at: http://www.ia.omron.com/.

⚠ 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 Safe Use |
| --- |

Incorrect wiring may damage internal circuits.

Precautions for Correct Use

Do not use the Encoder under ambient conditions that exceed the ratings.

● Mounting

- Origin Indication

It is easy to adjust the position of phase Z with the origin indication function. 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.
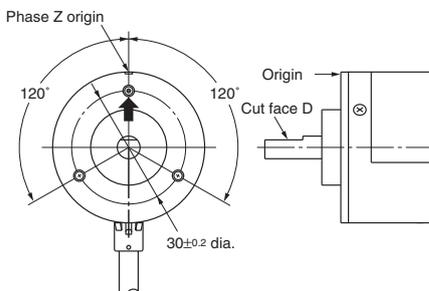
- Do not extend the length of the cable to more than 2 m. If the cable must be more than 2 m, use a Model with a Line-driver Output (max. length: 100 m).

● 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

E6B2-C
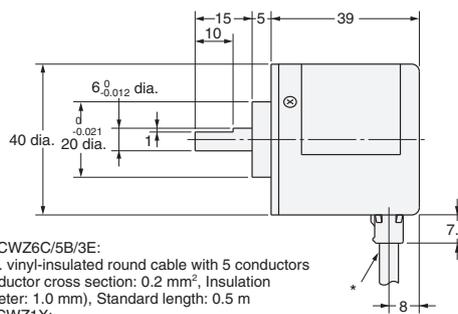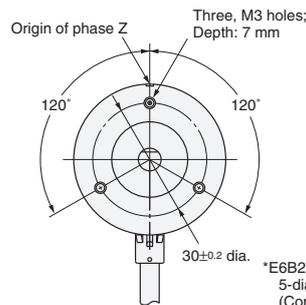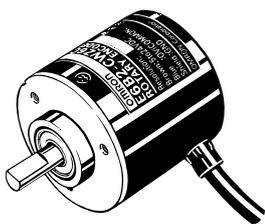
*E6B2-CWZ6C/5B/3E:
5-dia. vinyl-insulated round cable with 5 conductors (Conductor cross section: 0.2 mm², Insulation diameter: 1.0 mm), Standard length: 0.5 m
E6B2-CWZ1X:
5-dia. vinyl-insulated round cable with 8 conductors (Conductor cross section: 0.2 mm², Insulation diameter: 1.0 mm), Standard length: 0.5 m

Accessories (Order Separately)

Couplings
E69-C06B
E69-C68B
E69-C610B
E69-C06M

Flanges
E69-FBA
E69-FBA02

Servo Mounting Bracket
E69-2

Refer to *Rotary Encoders Accessories* on your OMRON website for details.

Terms and Conditions Agreement

2017.7

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

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Encoders *category:*

Click to view products by Omron *manufacturer:*

Other Similar products are found below :

6-1393048-0 6-1393048-5 62AG22-H5-P 62B22-LP-030C 63K25 63K32 63KS100 63KS64 63R100 63R50-020 63RS256-060 700-09-36 RE12D300-201-1 1393047-3 2-1393047-2 T101-5C2-111-M1 T101-5C3-111-M1 T101-5C4-111-M1 385001M0439 385001M0216 V23401H1409B101 V23401T8002B802 V23401U6019B609 E69-1 E69DF10 E69-FCA 62B11-LP-100S 62N11-P 62S22-H9-120S 62S30-L0-200C 62V15-02-080S 63K64 63KS100-040 63R64-050 63RS64 700-16-16 V23401D3002B301 3-1393048-1 63KS128 63KS256 1-1879391-5 GH65C11-N-SO 62S15-M0-P 63R64 1393047-1 E69-FCA02 E69-FCA04 E69-DF20 E69-DF2 63R50