

E40 Series

Diameter ø40mm Shaft type/Hollow type/Built-in type Incremental Rotary Encoder

■ Features

- 12-24VDC power supply of line driver output(Line-up)
- Easy installation at narrow space
- Small moment of inertia
- Power supply : 5VDC, 12-24VDC ±5%
- Various output types

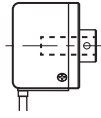
⚠ Please read "Caution for your safety" in operation manual before using.



E40S Series



E40H Series



E40HB Series

■ Ordering information

E40 **H** **8** **5000** **3** **N** **24**

| Series | Shaft type | Hollow type | Pulse/1Revolution | Output phase | Output | Power supply | Cable |
|---|-------------------|--|-------------------|--|--|----------------------------------|---|
| S: Shaft type H: Hollow type HB: Hollow built-in type | External Inner | 6: ø6mm 8: ø8mm 10: ø10mm 12: ø12mm | Series | 2: A, B 3: A, B, Z 4: A, \bar{A} , B, \bar{B} 6: A, \bar{A} , B, \bar{B} , Z, \bar{Z} | T: Totem pole output N: NPN open collector output V: Voltage output L: Line driver output | 5 : 5VDC ±5% 24: 12-24VDC ±5% | No mark: Cable type C: Connector cable type(※) |

※Standard: E40S6-[PULSE]-3-N-24, E40H8-[PULSE]-3-N-24 ※Standard: A, B, Z
E40HB8-[PULSE]-3-N-24

※Cable length : 250mm

■ Specifications

| Item | Diameter ø40mm shaft/hollow shaft/hollow built-in type of incremental rotary encoder | | |
|--------------------------|--|---|--|
| Resolution(P/R)*1 | *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000 (Not indicated resolution is customizable.) | | |
| Electrical specification | Output phase | A, B, Z phase(Line driver A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase) | |
| | Phase difference of output | Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase) | |
| | Control output | Totem pole output | • Low - Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High - Load current:Max. 10mA, Output voltage(Power voltage 5VDC): Min. (Power voltage-2.0)VDC, Output voltage(Power voltage 12-24VDC):Min. (Power voltage-3.0)VDC |
| | | NPN open collector output | Load current : Max. 30mA, Residual voltage : Max. 0.4VDC |
| | | Voltage output | Load current : Max. 10mA, Residual voltage : Max. 0.4VDC |
| | Response time (Rise/Fall) | Line driver output | • Low - Load current : Max. 20mA, Residual voltage : Max. 0.5VDC • High - Load current : -20mA, Output voltage(Power voltage 5VDC): Min. 2.5VDC, Output voltage(Power voltage 12-24VDC): Min. (Power voltage-3.0)VDC |
| | | Totem pole output | Max. 1μs |
| | | NPN open collector output | |
| | Voltage output | | |
| | | Line driver output | Max. 0.5μs |
| | Max. Response frequency | 300kHz | |
| | Power supply | • 5VDC ±5%(Ripple P-P : Max. 5%) • 12-24VDC ±5%(Ripple P-P : Max. 5%) | |
| | Current consumption | Max. 80mA(disconnection of the load), Line driver output : Max. 50mA(disconnection of the load) | |
| Insulation resistance | Min. 100MΩ(at 500VDC megger between all terminals and case) | | |
| Dielectric strength | 750VAC 50/60Hz for 1 minute(Between all terminals and case) | | |
| Connection | Cable type, 250mm connector cable type | | |
| Mechanical specification | Starting torque | Shaft type : Max. 40gf·cm(0.004N·m), Hole type : Max. 50gf·cm(0.005N·m) | |
| | Moment of inertia | Max. 40g·cm ² (4×10 ⁻⁶ kg·m ²) | |
| | Shaft loading | Radial : Max. 2kgf, Thrust : Max. 1kgf | |
| | Max. allowable revolution *2 | 5000rpm | |
| Vibration | 1.5mm amplitude or 300m/s ² at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours | | |
| Shock | Approx. Max. 50G | | |
| Environment | Ambient temperature | -10 to 70°C, storage : -25 to 85°C | |
| | Ambient humidity | 35 to 85%RH, storage : 35 to 90%RH | |
| Protection | IP50(IEC standard) ※Option type is available for IP64 (IEC standard). | | |
| Cable | ø5, 5-wire, Length : 2m, Shield cable(Line driver output : ø5, 8-wire) (AWG24, Core diameter: 0.08, Number of cores: 40, Insulator out diameter: ø1) | | |
| Accessory | • Shaft type : ø6mm coupling standard, ø8mm coupling(Sold separately) • Hole type : Bracket | | |
| Approval | CE (Except line driver output) | | |
| Unit weight | Approx. 160g | | |

※1: 'v' pulse is only for A, B phase(Line Driver output is for A, \bar{A} , B, \bar{B} phase)

※2: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

$$[\text{Max. response revolution}(\text{rpm})] = \frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ [sec]}$$

※Environment resistance is rated at no freezing or condensation.

Incremental ø40mm Shaft/Hollow Shaft/Built-in type

Control output diagram



- Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
- All output circuits of A, B, Z phase are the same. (Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{Z})

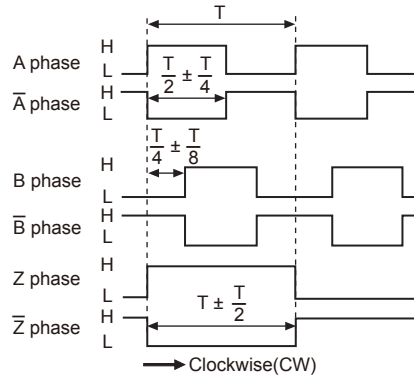
Output waveform

- Totem pole output / NPN open collector output / Voltage output



- ※Z phase output is option.
- ※CW : Right turn as from the shaft.

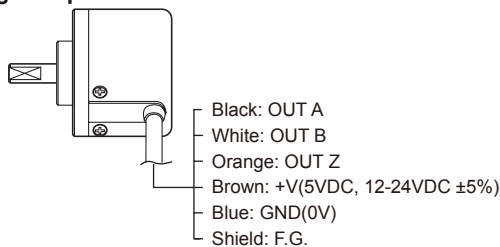
- Line driver output



Connections

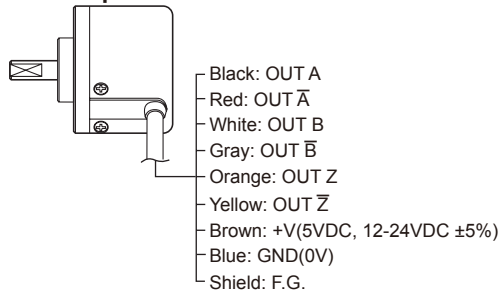
◎ Cable type

- Totem pole output / NPN open collector output / Voltage output



- ※Unused wires must be insulated.
- ※The metal case and shield wire of encoder should be grounded(F.G.).

- Line driver output



◎ Connector cable type

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



| Totem pole output/ NPN open collector output/ Voltage output | | | Line driver output | | |
|--|----------|-------------|--------------------|---------------|-------------|
| Pin No | Function | Cable color | Pin No | Function | Cable color |
| ① | OUT A | Black | ① | OUT A | Black |
| ② | OUT B | White | ② | OUT \bar{A} | Red |
| ③ | OUT Z | Orange | ③ | +V | Brown |
| ④ | +V | Brown | ④ | GND | Blue |
| ⑤ | GND | Blue | ⑤ | OUT B | White |
| ⑥ | F.G. | Shield | ⑥ | OUT \bar{B} | Gray |
| | | | ⑦ | OUT Z | Orange |
| | | | ⑧ | OUT \bar{Z} | Yellow |
| | | | ⑨ | F.G. | Shield |

- ※F.G.(Field Ground): It should be grounded separately.

(A) Photo electric sensor

(B) Fiber optic sensor

(C) Door/Area sensor

(D) Proximity sensor

(E) Pressure sensor

(F) Rotary encoder

(G) Connector/Socket

(H) Temp. controller

(I) SSR/ Power controller

(J) Counter

(K) Timer

(L) Panel meter

(M) Tacho/ Speed/ Pulse meter

(N) Display unit

(O) Sensor controller

(P) Switching mode power supply

(Q) Stepper motor& Driver&Controller

(R) Graphic/ Logic panel

(S) Field network device

(T) Software

(U) Other

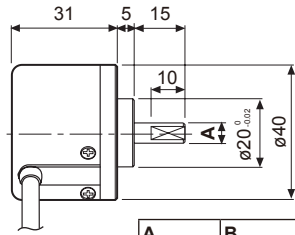
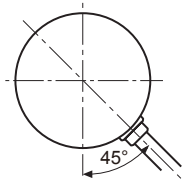
E40 Series

■ Dimensions

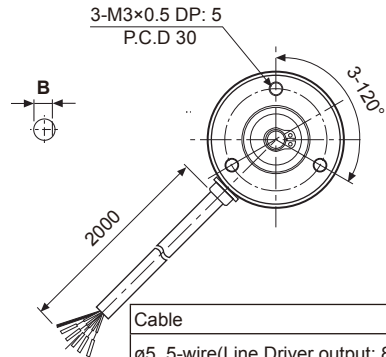
(unit: mm)

◎ Cable type

● Shaft type

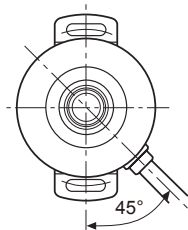


| A | B |
|---------------------------------------|---|
| ø6 ^{-0.01} _{-0.015} | 5 |
| ø8 ^{-0.01} _{-0.02} | 7 |

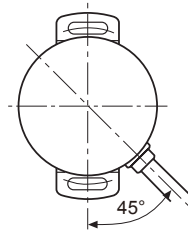
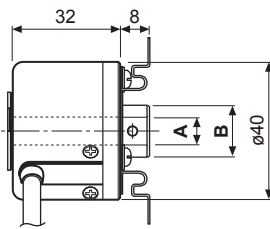


Cable
ø5, 5-wire(Line Driver output: 8-wire),
Length:2000, Shield cable

● Hollow shaft / Hollow shaft built-in type



E40H



E40HB

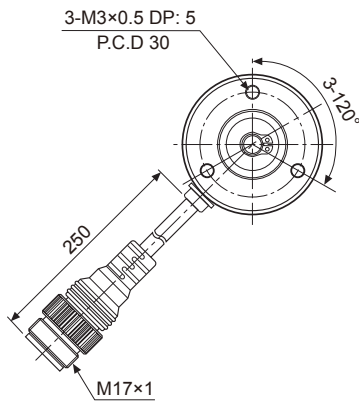


| A | ø6 | ø8 | ø10 | ø12 |
|-----------|-------------|----|-----|-----|
| B | ø15 | | ø17 | |
| Tolerance | +0.015 0 | | | |



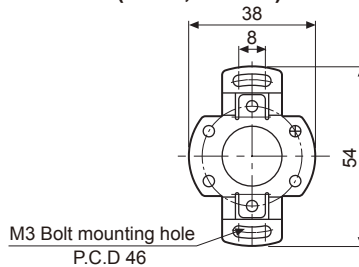
Cable
ø5, 5-wire(Line Driver output: 8-wire),
Length: 2000, Shield cable

◎ Connector cable type



※Connector cable is customizable and refer to the G-10 for specifications.

● Bracket(E40H, E40HB)

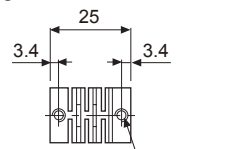


● Coupling(E40S)

● ø6 Coupling



● ø8 Coupling



- Parallel misalignment : Max. 0.25mm
- Angular misalignment: Max. 5°
- End-play: Max. 0.2mm

- ※For parallel misalignment, angular misalignment, end-play terms, refer to the F-78 page.
- ※For flexible coupling(ERB Series) information, refer to the F-71 page.