

Diameter ø50mm Shaft type Incremental Rotary Encoder

Line-up

■ Features

- 12-24VDC power supply of line driver output(Line-up)
- Suitable for measuring angle, position, revolution, speed, acceleration and distance
- Power supply : 5VDC, 12-24VDC ±5%

■ Applications

- Various tooling machinery, packing machine and general industrial machinery etc.



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



■ Ordering information (Former name : ENB)

| E50S | 8 | 8000 | 3 | N | 24 | |
|----------------------------|----------------|---------------------|--|--|--------------------------------|--|
| Series | Shaft diameter | Pulse/1Revolution | Output phase | Output | Power supply | Cable |
| Diameter ø50mm, shaft type | ø8mm | Refer to resolution | 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(※) CR: Axial connector type CS: Radial connector type |

※Standard : E50S8-PULSE-3-N-24

※Cable length: 250mm

■ Specifications

| | | | |
|-------------------------------|--|--|---|
| Item | Diameter ø50mm shaft 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, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000 | | |
| 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=1cycle 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 : Max. 0.5VDC • High - Load current : Max. -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, Connector type(Axial, Radial) | | |
| Mechanical specification | Starting torque | Max. 70gf·cm(0.007N·m) ^{※2} / Max. 800gf·cm(0.08N·m) ^{※3} | |
| | Moment of inertia | Max. 80g·cm ² (8×10 ⁻⁶ kg·m ²) ^{※2} / Max. 400g·cm ² (4×10 ⁻⁵ kg·m ²) ^{※3} | |
| | Shaft loading | Radial : 10kgf, Thrust : 2.5kgf | |
| | Max. allowable revolution ^{※4} | 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. 75G | | |
| Environment | Ambient temperature | -10 to 70°C, storage : -25 to 85°C | |
| | Ambient humidity | 35 to 85%RH, storage : 35 to 90%RH | |
| Protection | Cable type, Connector cable type: IP50(IEC standard) ^{※5} , Connector type: IP65(IEC standard) | | |
| Cable | ø5, 5-wire, Length : 2m, Shield cable(Line driver output : ø5, 8-wire) (AWG 24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter : ø1) | | |
| Accessory | ø8mm coupling, bracket | | |
| Approval | Cable type (Except for line driver output) | | |
| Unit weight | Approx. 275g, Connector type : 180g | | |

※1: ** pulse is only for A, B phase(Line driver output is for A, \bar{A} , B, \bar{B} phase). ※2: This value is for Cable type, Connector cable type(Protection: IP50).

※3: This value is for Cable type, Connector cable type(Protection: IP64)/Connector type (Protection: IP65)

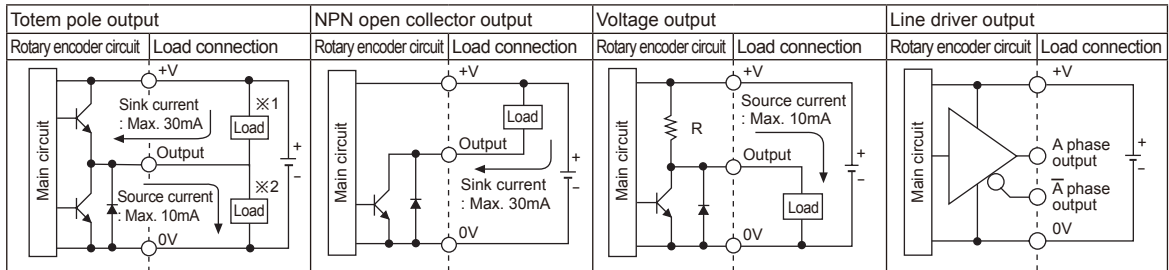
※4: Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

$$\text{【Max. response resolution(rpm) = } \frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec】}$$

※5: 'Cable type, Connector cable type is option as IP64 protection.
※Environment resistance is rated at no freezing or condensation.

Incremental ø50mm Shaft type

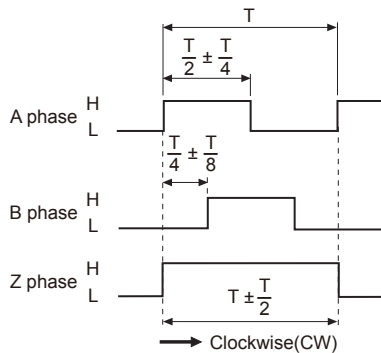
Control output diagram



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

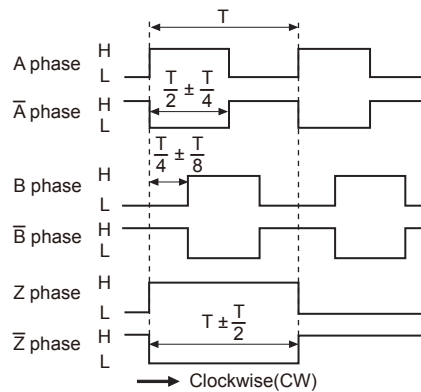
Output waveform

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



※CW : Right turn as from the shaft

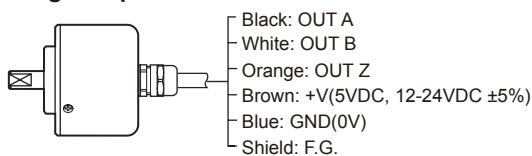
- Line driver output



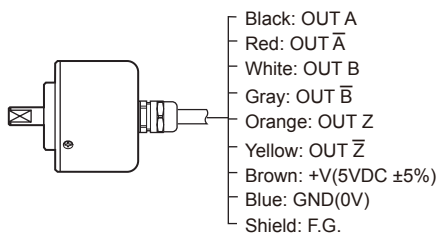
Connections

◎ Cable type

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



- Line driver output

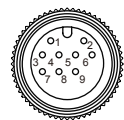


※Unused wires must be insulated.

※The shield cable and metal case of encoder must be grounded(F.G.)

◎ Cable connector type / Connector 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 A-bar | 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 B-bar | Gray |
| | | | ⑦ | OUT Z | Orange |
| | | | ⑧ | OUT Z-bar | Yellow |
| | | | ⑨ | F.G. | Shield |

※F.G.(Field Ground) : It must 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

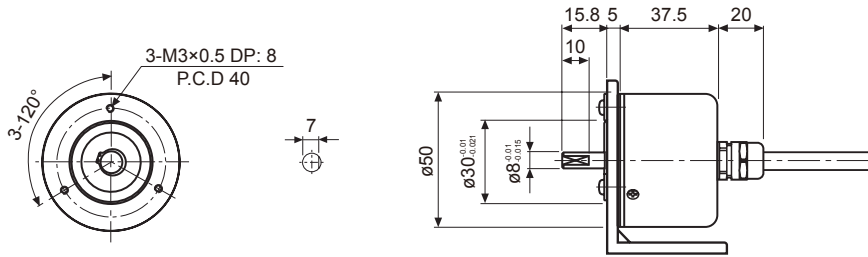
(U) Other

E50S Series

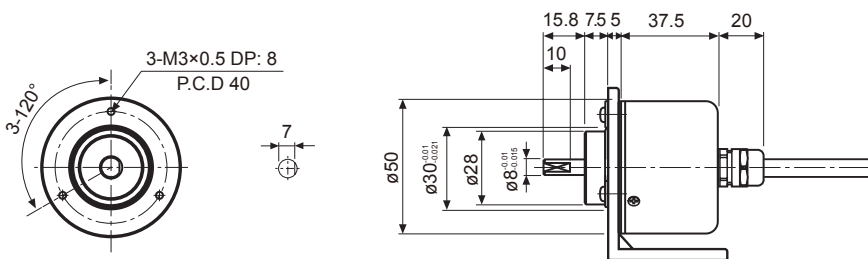
■ Dimensions

(unit: mm)

◎ Cable type, Connector cable type(Protection : IP50)



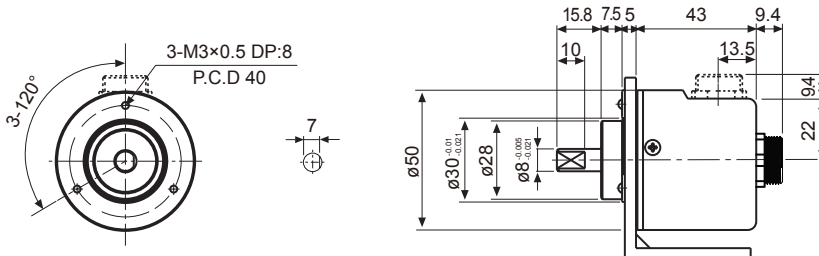
◎ Cable type, Connector cable type(Protection : IP64)



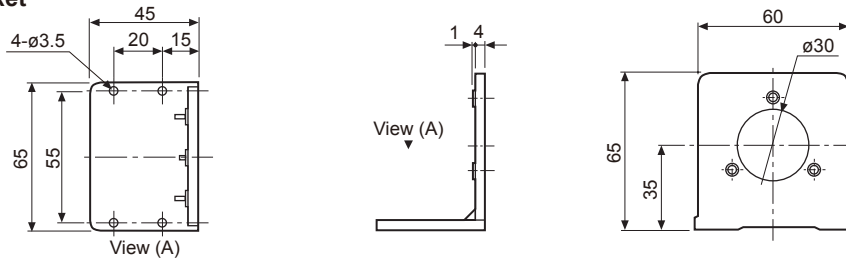
| Cable for Cable type | Cable for Connector cable type |
|---|--|
| ø5, 5-wire(Line driver output: 8-wire), Length: 2000mm, Shield cable | ø5, 5-wire(Line driver output: 8-wire), Length: 250mm, Shield cable |

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

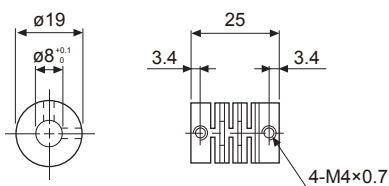
◎ Axial / Radial connector type(Protection: IP65)



● Bracket



● Coupling(E50S)



- 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.