

φ 40 Body Standard / Hollow Shaft Type

Diameter φ 40mm Shaft type/Hollow type/Built-in type INCREMENTAL Rotary encoder

■ Features

- Easy installation at narrow space
- Small inertia moment
- Wide range of power source :
5VDC, 12-24VDC ±5%
- Various output types

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



■ Ordering information

E40 **H** **8** **5000** **3** **2** **24**

| Series | Shaft type | Hollow type | Pulse/1 Revolution | Output phase | Output | Power supply | Cable |
|----------------|-----------------------------|--|--------------------|--|---|--------------------------------|--|
| S: Shaft type | Outside | Inside | See 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} | 1: Totem pole output 2: NPN open collector output 3: Voltage output L: Line driver output(*) | 5 :5VDC ±5% 24:12-24VDC ±5% | No mark: Normal type (*) 2C: Cable outgoing connector type |
| H: Hollow type | (*) 6: φ 6mm 8: φ 8mm | 6: φ 6mm 8: φ 8mm 10: φ 10mm 12: φ 12mm | | | | | |

* Standard : E40S6-**PULSE**-3-2-24
E40H8-**PULSE**-3-2-24
E40HB8-**PULSE**-3-2-24 } 12-24VDC

* Standard: A, B, Z *The power of Line driver is only for 5VDC

* Cable length : 200mm

■ Specifications

| Item | | Diameter φ40mm shaft type Incremental Rotary encoder | |
|--------------------------|-----------------------------|--|--|
| Resolution(P/R) | | (★Note1) *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 type is available to customize) | |
| Electrical specification | Phase difference of output | Output between A and B phase : $\frac{T}{4} \pm \frac{T}{8}$ (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 : Min. (Power supply-1.5)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 |
| | | Line driver output | Low ⇔ Load current : Max. 20mA, Residual : Max. 0.5V High ⇔ Load current : Max. -20mA, Output voltage : Min. 2.5V |
| | Response time (Rise/Fall) | Totem pole output | Max. 1μs |
| | | NPN open collector output | Max. 1μs |
| | | Voltage output | Max. 1μs |
| | | Line driver output | Max. 0.5μs |
| | Max. Response frequency | | 180kHz |
| Current consumption | | Max. 60mA(disconnection of the load), Line driver output:Max. 50mA(disconnection of the load) | |
| Insulation resistance | | Min. 100MΩ (at 500VDC) | |
| Dielectric strength | | 750VAC 50/60Hz for 1 minute (Between all terminals and case) | |
| Connection | | Cable outgoing type, 200mm cable outgoing connector type | |
| Mechanical specification | Starting torque | Shaft Type : Max. 40gf · cm(0.004N · m), Holl Type : Max. 50gf · cm(0.005N · m) | |
| | Moment of inertia | Max. 40g · cm ² (2×40 ⁻⁶ kg · m ²) | |
| | Shaft loading | Radial : Max. 2kgf, Thrust : Max. 1kgf | |
| | Deviation of shaft position | Radial : Max. 0.1mm, Thrust : Max. 0.2mm | |
| | Max. allowable revolution | (★Note2) 5000rpm | |
| Vibration | | 1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours | |
| Shock | | Max. 50G | |
| Ambient temperature | | -10 ~ 70℃ (at non-freezing status), Storage: -25 ~ 85℃ | |
| Ambient humidity | | 35~85%RH, Storage: 35~90%RH | |
| Protection | | IP50 (IEC specification) | |
| Cable | | 5P, φ 5mm, Length : 2m, Shield cable (Line driver output : 8P, φ 5mm) | |
| Accessory | | φ 6mm coupling standard, φ 8mm coupling (Option) [Applied only for shaft type] | |
| Weight | | Approx. 120g | |
| Approval | | CE (Except Line driver output) | |

※ (★Note1) * pulse is only for A, B phase (Line Driver output is A, \bar{A} , B, \bar{B} phase)

※ (★Note2) Max. allowable revolution ≥ Max. response revolution [Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]

Please select the resolution to make lower max. revolution than max. allowable revolution.

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Proximity sensor

(J) Photo electric sensor

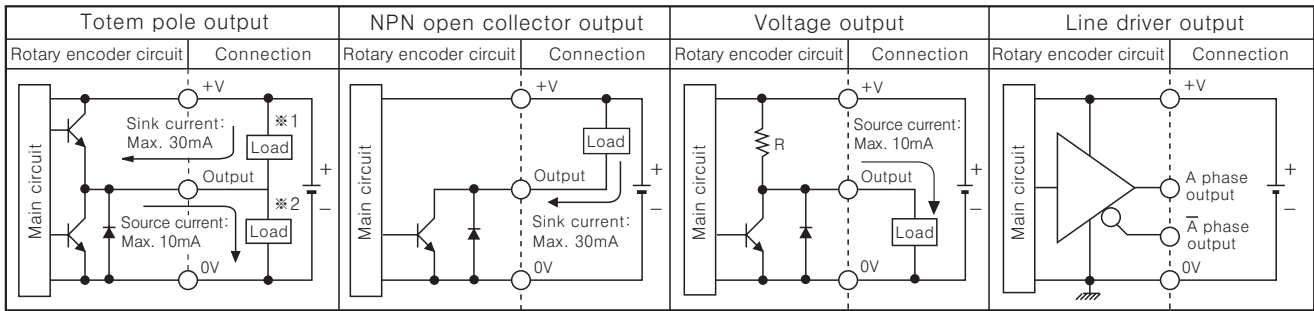
(K) Pressure sensor

(L) Rotary encoder

(M) 5-Phase stepping motor & Driver & Controller

E40 Series

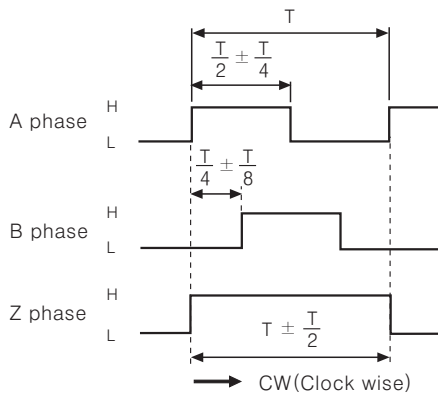
Control output diagram



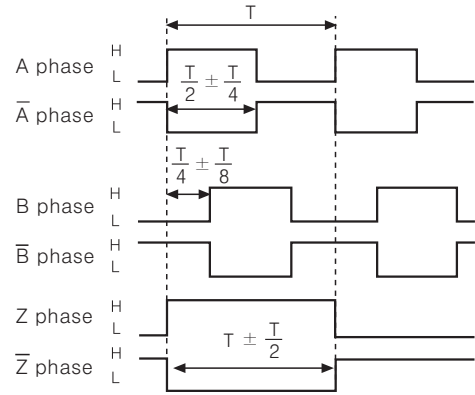
☞ Totem pole output type can be used for NPN open collector output type(*1) or Voltage output type(*2).
 ☞ All output circuits are the same A, B, Z phase(Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output waveform

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



*Inverse type of Z phase is optional.

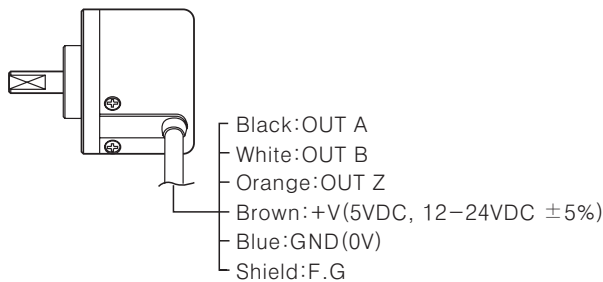


☞ CW : In a view of shaft

Connections

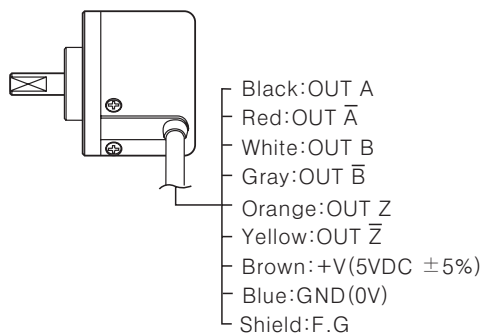
Normal type

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

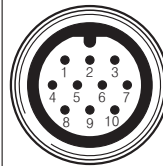


- *Unused wires must be insulated.
- *The body of encoder is connected to a shield.

- Line driver output



Cable outgoing connector type



| Pin No. | Cable color | Totem pole output NPN open collector output Voltage output | Line driver output |
|---------|-------------|--|--------------------|
| ① | Black | OUT A | OUT A |
| ② | Red | N.C | OUT \bar{A} |
| ③ | Brown | +V | +V |
| ④ | Blue | GND | GND |
| ⑤ | White | OUT B | OUT B |
| ⑥ | Gray | N.C | OUT \bar{B} |
| ⑦ | Orange | OUT Z | OUT Z |
| ⑧ | Yellow | N.C | OUT \bar{Z} |
| ⑨ | Shield | F.G | F.G |
| ⑩ | Purple | N.C | N.C |

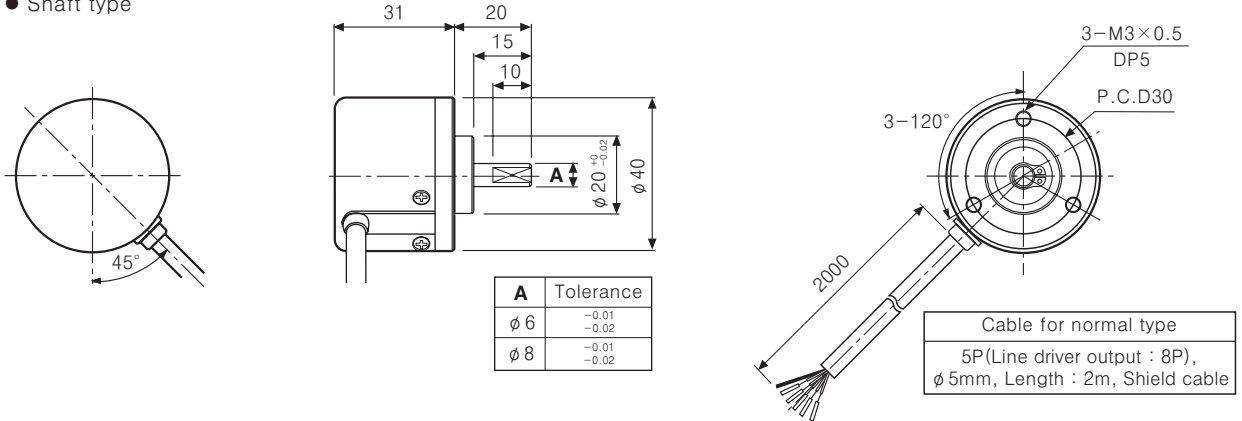
- *N.C(Not Connected)
- *F.G(Field Ground)

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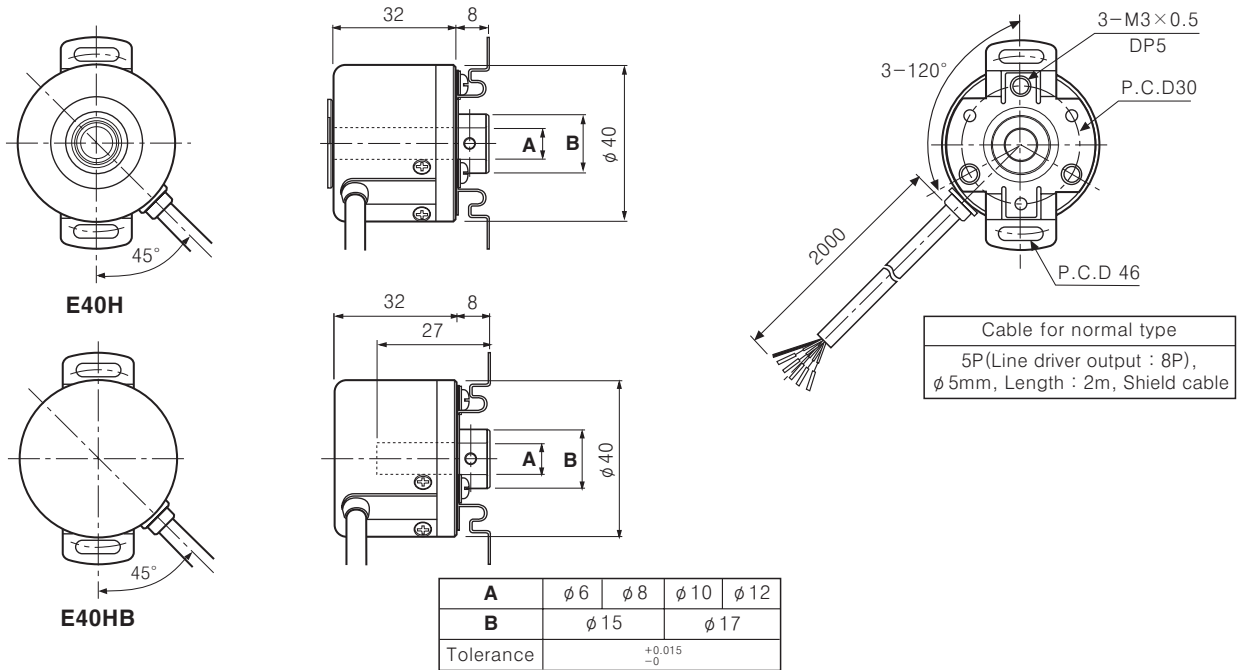
Dimensions

Normal type

Shaft type

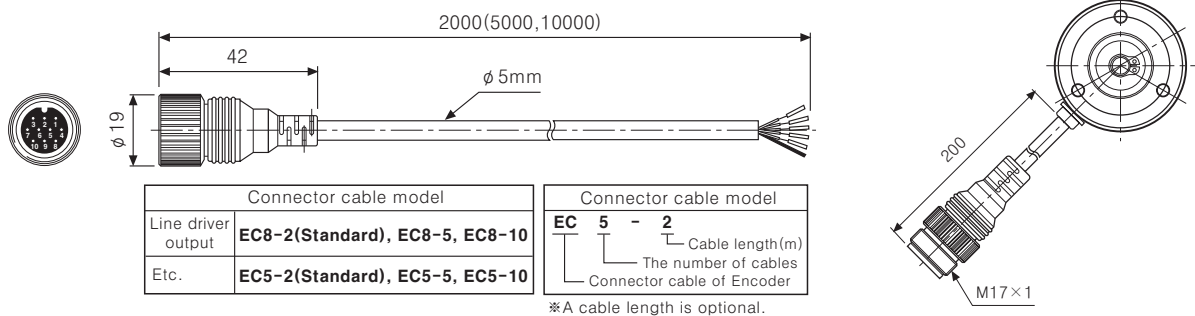


Hollow shaft / Hollow shaft built-in type



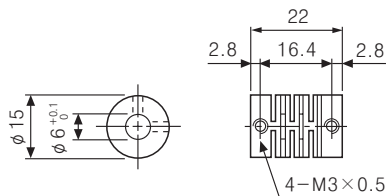
Cable outgoing connector type

Connector cable(Accessory)

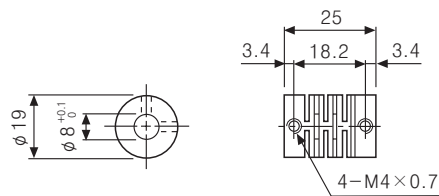


Coupling(E40S)

[φ 6 Coupling]



[φ 8 Coupling]



Unit:mm

(A)
Counter

(B)
Timer

(C)
Temp.
controller

(D)
Power
controller

(E)
Panel
meter

(F)
Tacho/
Speed/
Pulse
meter

(G)
Display
unit

(H)
Sensor
controller

(I)
Proximity
sensor

(J)
Photo
electric
sensor

(K)
Pressure
sensor

(L)
Rotary
encoder

(M)
5-Phase
stepping
motor &
Driver &
Controller