

E40 Series

Diameter Ø40mm Shaft Type/Hollow Type/Built-In Type Incremental Rotary Encoder

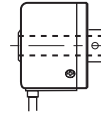
■ Features

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

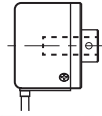
⚠ Please read "Caution for your safety" in operation manual before using.



E40S Series



E40H Series



E40HB Series

■ Ordering Information

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

Series	Shaft type	Hollow type	Pulse/1Revolution	Output phase	Control 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	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 (※)

※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		
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: 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 (Cable length: 2m, I sink = 20mA)
		NPN open collector output	
		Voltage output	
	Max. Response frequency	Line driver output	Max. 0.5μs (Cable length: 2m, I sink = 20mA)
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 at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction 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 structure	IP50 (IEC standard) ※Option type is available for IP64 (IEC standard).		
Cable	Ø5mm, 5-wire, Length: 2m, Shield cable (Line driver output: Ø5mm, 8-wire) (AWG24, Core diameter: 0.08, Number of cores: 40, Insulator out diameter: Ø1mm)		
Accessory	• Shaft type: Ø6mm coupling standard, Ø8mm coupling (Sold separately) • Hole type: Bracket		
Approval	CE (Except line driver output)		
Unit weight	Approx. 120g		

※1: 'v' pulse is only for A, B phase (Line Driver output is for A, \bar{A} , B, \bar{B} phase). Not indicated resolutions are customizable.

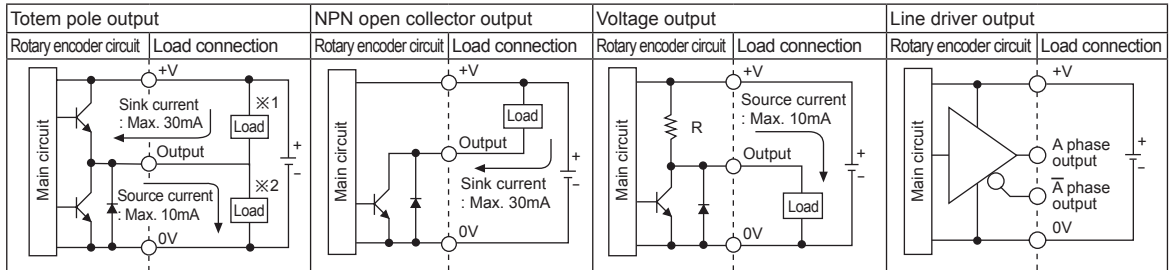
※2: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※Environment resistance is rated at no freezing or condensation.

Incremental Ø40mm Shaft/Hollow Shaft/Built-In Type

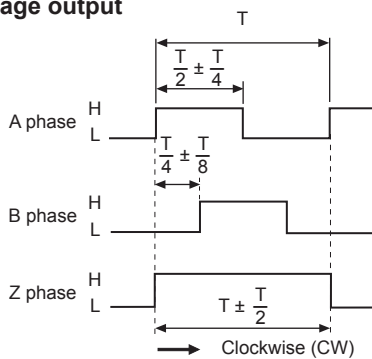
Control Output Diagram



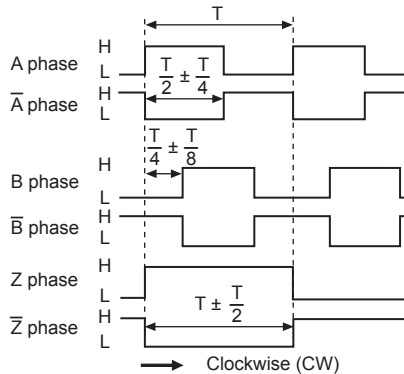
- Totem pole output type can be used for NPN open collector output type (※1) or Voltage output type (※2).
- All output circuits of A, B, Z phase are same. (Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output Waveform

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



- Line driver output

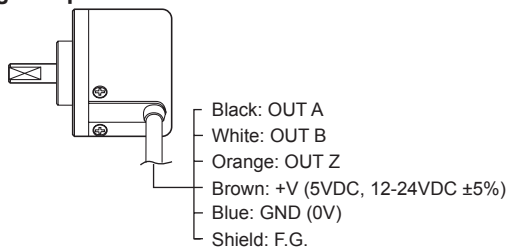


※Z reverse phase output is optional.

Connections

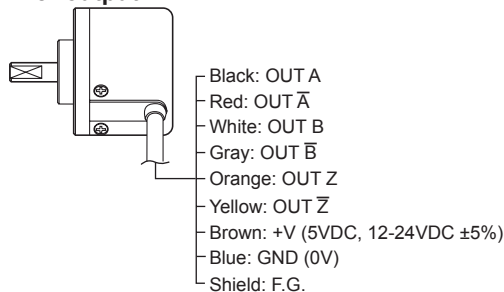
⊙ Cable type

- 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) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(K) Timers

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

(R) Graphic/Logic Panels

(S) Field Network Devices

(T) Software

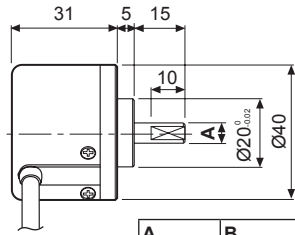
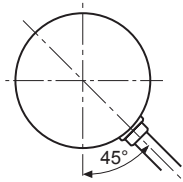
E40 Series

■ Dimensions

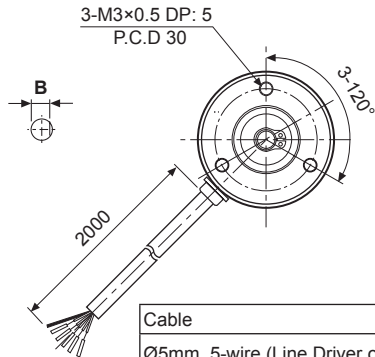
(unit: mm)

◎ Cable type

● Shaft type

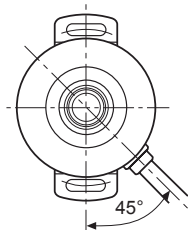


A	B
Ø6 ^{-0.01} _{0.015}	5
Ø8 ^{-0.01} _{0.02}	7

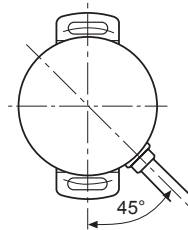
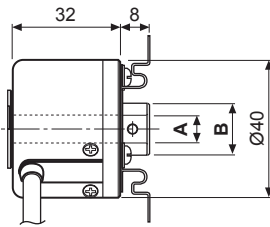


Cable
 Ø5mm, 5-wire (Line Driver output: 8-wire),
 Length:2000mm, Shield cable

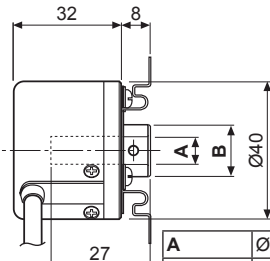
● Hollow shaft / Hollow shaft built-in type



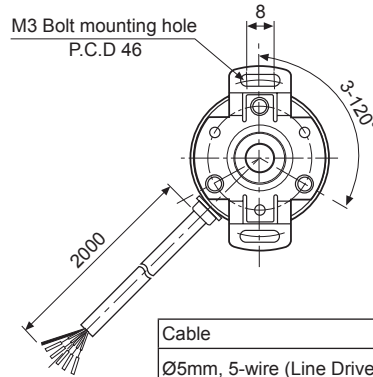
E40H



E40HB

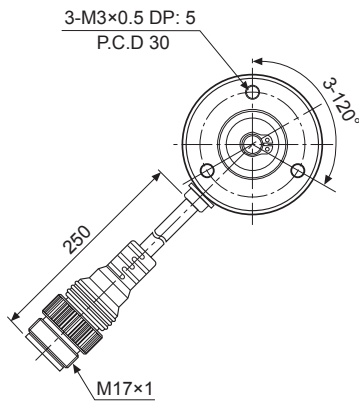


A	Ø6	Ø8	Ø10	Ø12
B	Ø15	Ø17		
Tolerance	+0.015 0			



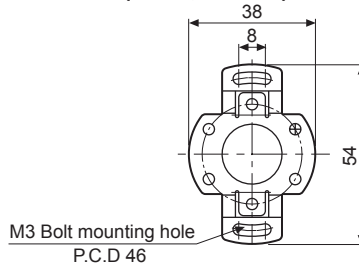
Cable
 Ø5mm, 5-wire (Line Driver output: 8-wire),
 Length: 2000mm, Shield cable

◎ Connector cable type



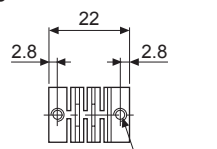
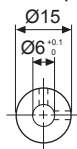
※Connector cable is sold separately and refer to page G-10 for specifications.

● Bracket (E40H, E40HB)

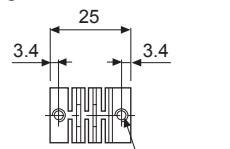
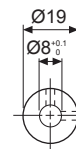


● Coupling (E40S)

● Ø6 Coupling



● Ø8 Coupling



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

- ※For parallel misalignment, end-play terms, refer to page F-71.
- ※For flexible coupling (ERB Series) information, refer to page F-64.