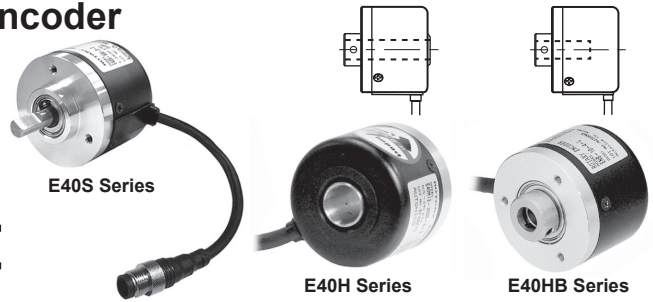


E40 Series

Shaft Type/Hollow Shaft Type/Blind Hollow Shaft Type Ø40mm Incremental Rotary Encoder

■ Features

- Easy installation at narrow space
- Low moment of inertia
- Power supply: 5VDC, 12-24VDC ±5%
- Various output types



⚠ Please read "Safety Considerations" in the instruction manual before using. **CE**

■ Ordering Information

E40	H	8	5000	3	N	24	
Series	Shaft diameter	Pulses/revolution	Output phase	Control output	Power supply	Cable	
Ø40mm S: shaft type	External 6: Ø6mm 8: Ø8mm	Refer to resolution	2: A, B 3: A, B, Z 4: A, \bar{A} , B, \bar{B} 6: A, \bar{A} , \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 : Radial cable type C: Radial cable connector type	
Ø40mm H: hollow shaft type, HB: blind hollow shaft type	Inner 6: Ø6mm 8: Ø8mm 10: Ø10mm 12: Ø12mm						

■ Specifications

Item	Shaft Type/Hollow Shaft Type/Blind Hollow Shaft Type Ø40mm Incremental Rotary Encoder		
Resolution (PPR) ^{*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= Output voltage (power voltage 12-24VDC= min. (power voltage-2.0)VDC= 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= =
		Line driver output	• [Low] - Load current: max. 20mA, residual voltage: max. 0.5VDC= • [High] - Load current: max. -20mA, output voltage (power voltage 5VDC= Output voltage (power voltage 12-24VDC= min. (power voltage-3.0)VDC= =
	Response time (rise/fall)	Totem pole output	Max. 1µs (cable length: 2m, I sink = 20mA)
		NPN open collector output	
		Voltage output	
		Line driver output	
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	Over 100MΩ (at 500VDC megger between all terminals and case)		
Dielectric strength	750VAC 50/60Hz for 1 minute (between all terminals and case)		
Connection	Radial cable type, Radial cable connector type		
Mechanical specification	Starting torque	• S type: max. 40gf·cm (0.004N·m) • H/HB 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}	5,000rpm	
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)		
Cable	Ø5mm, 5-wire (line driver output: 8-wire), 2m, Shield cable (AWG24, core diameter: 0.08, number of cores: 40, insulator out diameter: Ø1mm)		
Accessory	• S type: Ø6mm coupling, Ø8mm coupling • H/HB type: bracket		
Approval	CE (except line driver output)		
Unit weight	Approx. 120g		

*1: * pulse is only for A, B phase (line driver output is for A, \bar{A} , B, \bar{B} phase). Not indicated resolutions are customizable.

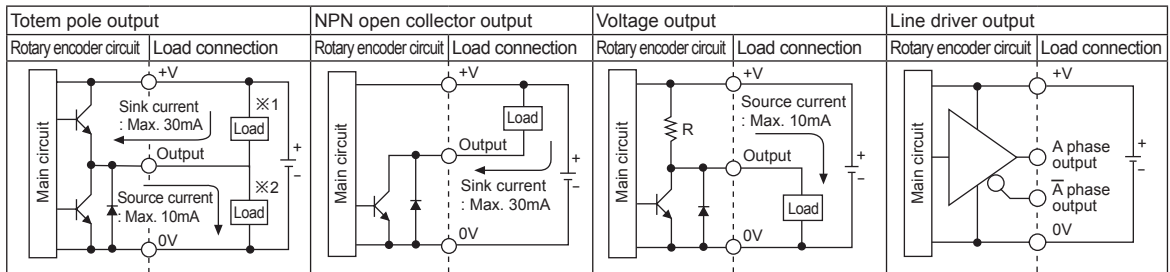
*2: Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

*Environment resistance is rated at no freezing or condensation.

Incremental Ø40mm Shaft/Hollow Shaft/Blind Hollow Shaft Type

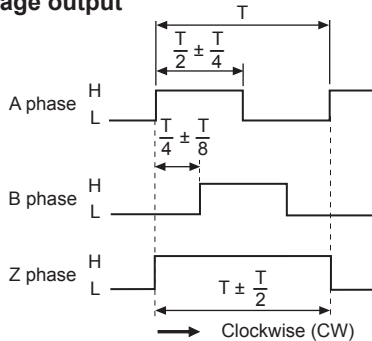
Control Output Diagram



- 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})

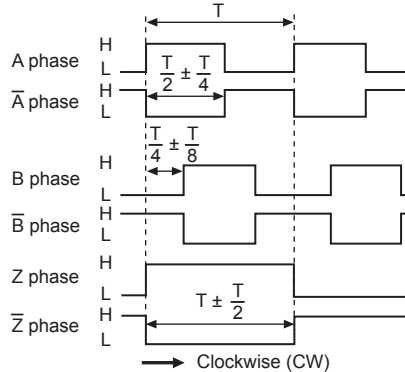
Output Waveform

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



※Z reverse phase output is optional.

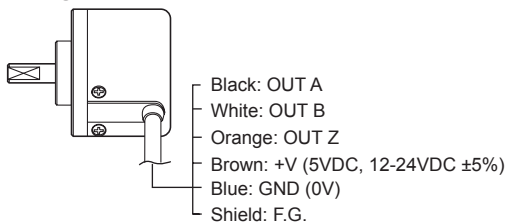
- Line driver output



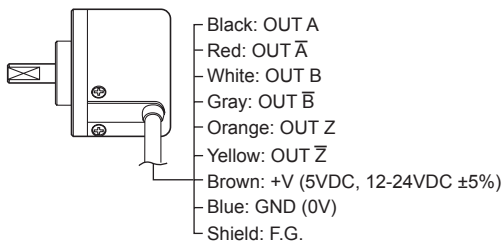
Connections

Radial cable type

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



- Line driver output



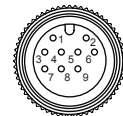
- ※Non-using wires must be insulated.
- ※The shield cable and metal case of encoder must be grounded (F.G.).
- ※Do not apply tensile strength over 30N to the cable.

Radial cable connector type

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



Pin No	Cable color	Function
①	Black	OUT A
②	White	OUT B
③	Orange	OUT Z
④	Brown	+V
⑤	Blue	GND
⑥		F.G.



Pin No	Cable color	Function
①	Black	OUT A
②	Red	OUT \bar{A}
③	Brown	+V
④	Blue	GND
⑤	White	OUT B
⑥	Gray	OUT \bar{B}
⑦	Orange	OUT Z
⑧	Yellow	OUT \bar{Z}
⑨	Shield	F.G.

※F.G. (field ground): It should be grounded separately.

SENSORS

CONTROLLERS

MOTION DEVICES

OTHERS

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Vision Sensors

(E) Proximity Sensors

(F) Pressure Sensors

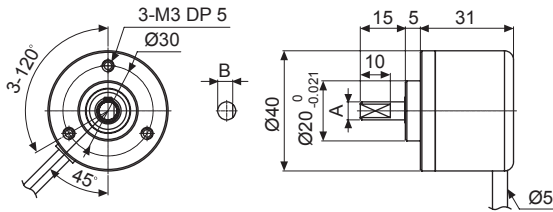
(G) Rotary Encoders

(H) Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets

E40 Series

■ Dimensions

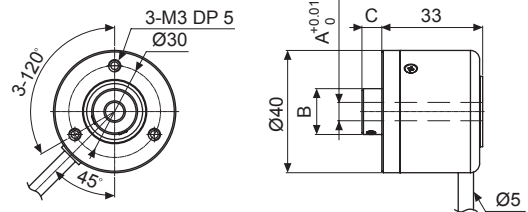
◎ Shaft type



A	Ø6	-0.004 -0.016	Ø8	-0.005 -0.02
B	5		7	

Cable for radial cable type
Ø5mm, 5-wire (line driver output: 8-wire), Length: 2m, Shield cable
Cable for radial cable connector type
Ø5mm, 5-wire (line driver output: 8-wire), Length: 250mm, Shield cable

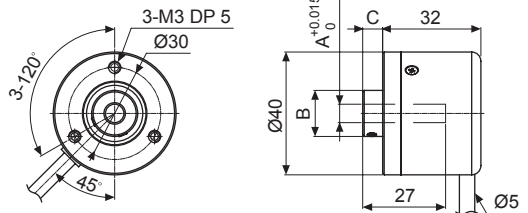
◎ Hollow shaft type



A	Ø6	Ø8	Ø10	Ø12
B	Ø15		Ø17	
C	6.5		6.3	

Cable for radial cable type
Ø5mm, 5-wire (line driver output: 8-wire), Length: 2m, Shield cable
Cable for radial cable connector type
Ø5mm, 5-wire (line driver output: 8-wire), Length: 250mm, Shield cable

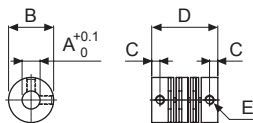
◎ Blind hollow shaft type



A	Ø6	Ø8	Ø10	Ø12
B	Ø15		Ø17	
C	6.5		6.3	

Cable for radial cable type
Ø5mm, 5-wire (line driver output: 8-wire), Length: 2m, Shield cable
Cable for radial cable connector type
Ø5mm, 5-wire (line driver output: 8-wire), Length: 250mm, Shield cable

◎ Coupling (shaft type)



- Parallel misalignment: max. 0.25mm
- Angular misalignment: max. 5°
- End-play: max. 0.5mm

	A	B	C	D	E
E40S6 Ø6mm coupling	Ø6	Ø15	2.8	22	4-M3
E40S8 Ø8mm coupling	Ø8	Ø19	3.4	25	4-M4

- ✗ Do not load overweight on the shaft.
- ✗ Do not put strong impact when insert a coupling into shaft.
Failure to follow this instruction may result in product damage.
- ✗ Fix the unit or a coupling by a wrench under 0.15 N·m of torque.
- ✗ When you install this unit, if eccentricity and deflection angle are larger, it may shorten the life cycle of this unit.
- ✗ For parallel misalignment, angular misalignment, end-play terms, refer to page G-98.
- ✗ For flexible coupling (ERB series) information, refer to page G-91.

◎ Bracket (Hollow shaft, blind hollow shaft type)

