

Incremental ϕ 40mm Hollow Shaft/Built-in Type

Diameter ϕ 40mm Hollow shaft built-in type Incremental Rotary encoder

■ Features

- Light plastic body
- Easy installation at narrow space
- Small moment of inertia
- Power supply : 5VDC, 12–24VDC $\pm$ 5%
- Various output types

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

■ Ordering information

E40HB	8	P	600	3	N	24	
Series	Shaft diameter	External material	Pulse/1Revolution	Output phase	Control output	Power supply	Cable
Diameter ϕ 40mm HB : Hollow shaft built-in type	ϕ 8mm	Plastic	Refer to resolution	2 : A, B 3 : A, $\bar{B}$, 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 $\pm$ 5% 24 : 12–24VDC $\pm$ 5%	Blank:Normal type (*) C:Cable outgoing connector type

※Standard:E40HB8P–PULSE–3–N–24

※Standard:A, B, Z

※The power of Line driver is only for 5VDC

※Cable length:250mm

■ Specifications

Item		Diameter ϕ 40mm hollow shaft built-in type of 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, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600	
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 $\Rightarrow$ Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High $\Rightarrow$ Load current:Max. 10mA, Output voltage(Power supply 5VDC):Min. (Power supply–2.0)VDC, Output voltage(Power supply 12–24VDC):Min. (Power supply–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 $\Rightarrow$ Load current : Max. 20mA, Residual voltage : Max. 0.5VDC High $\Rightarrow$ Load current : Max. –20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
		NPN open collector output	Max. 1 μ s
		Voltage output	Max. 1 μ s
		Line driver output	Max. 0.5 μ s
	Max. Response frequency	180kHz	
	Power supply	• 5VDC $\pm$ 5% (Ripple P–P : Max. 5%) • 12–24VDC $\pm$ 5% (Ripple P–P : Max. 5%)	
	Current consumption	Max. 80mA (disconnection of the load)	
	Insulation resistance	Min. 100M Ω (at 500VDC megger between all terminals and case)	
	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	Max. 50gf $\cdot$ cm(0.005N $\cdot$ m)	
	Moment of inertia	Max. 40g $\cdot$ cm ² (4×10^{-6} kg $\cdot$ m ²)	
	Shaft loading	Radial : Max. 3kgf, Thrust : Max. 0.5kgf	
	Max. allowable revolution	(Note2) 3000rpm	
	Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock		Max. 50G	
Ambient temperature		–10 to 70 $^{\circ}$ C (at non–freezing status), Storage : –25 to 85 $^{\circ}$ C	
Ambient humidity		35 to 85%RH, Storage : 35 to 90%RH	
Protection		IP50(IEC standard)	
Cable		ϕ 5mm, 5P, Length : 2m, Shield cable(Line driver output : ϕ 5mm, 8P)	
Accessory		Bracket	
Unit weight		Approx. 130g	

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

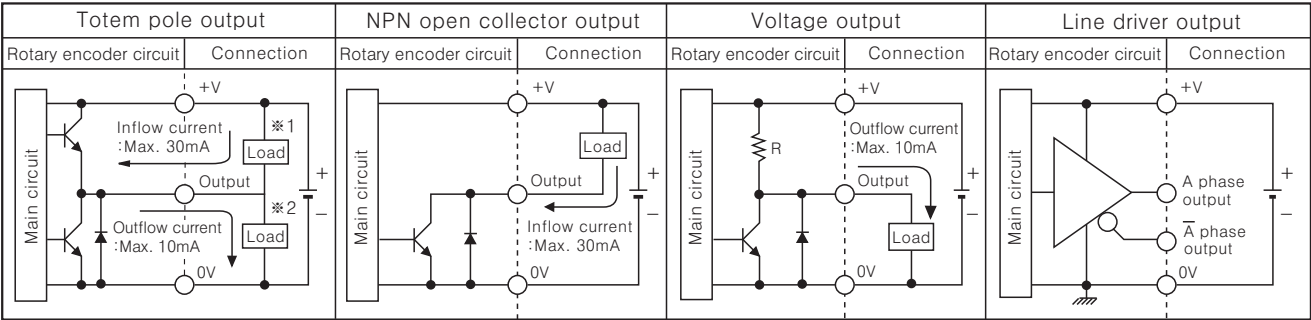
※ (Note2) Max. allowable revolution $\geq$ Max. response revolution [Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$]

Make sure that max. response revolution should be lower than max. allowable revolution when selecting the resolution.

- (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 power supply
- (Q) Stepping motor & Driver & Controller
- (R) Graphic/Logic panel
- (S) Field network device
- (T) Production stoppage models & replacement

E40HBP Series

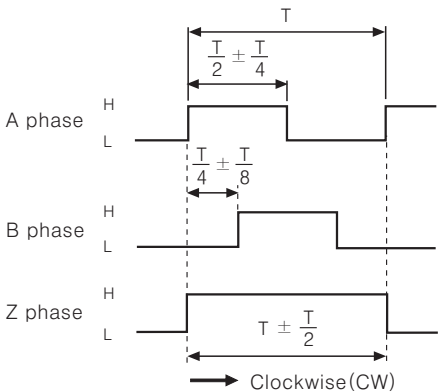
Control output diagram



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

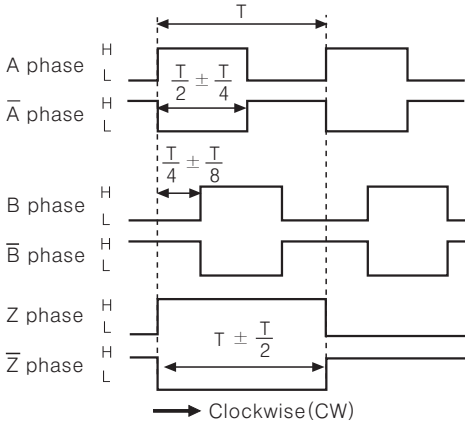
Output waveform

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



※CW : Right turn as from the shaft

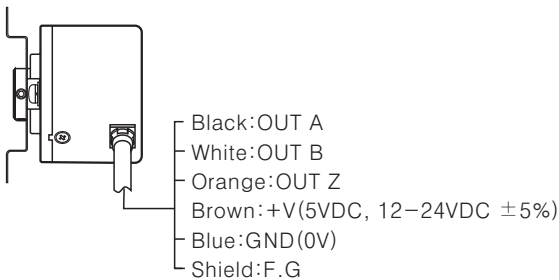
- Line driver output



Connections

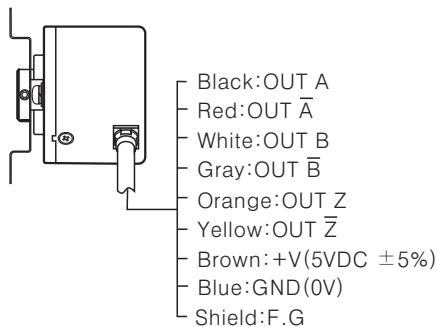
Normal type

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



※Unused wires must be insulated.

- Line driver output



Cable outgoing 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 $\bar{A}$	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

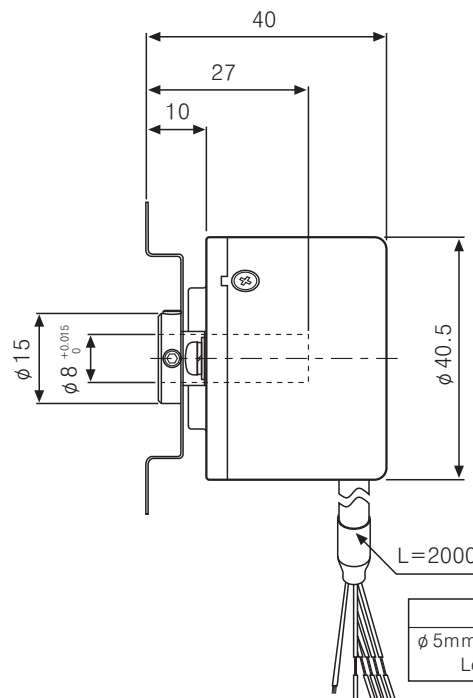
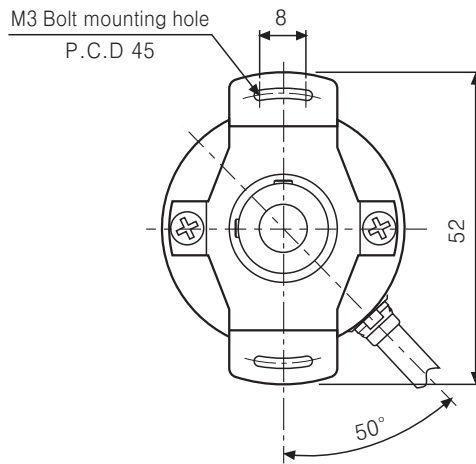
※F.G(Field Ground):It should be grounded separately .

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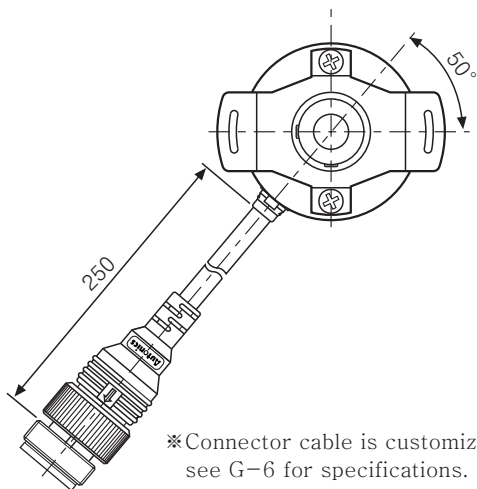
■ Dimensions

■ Normal type

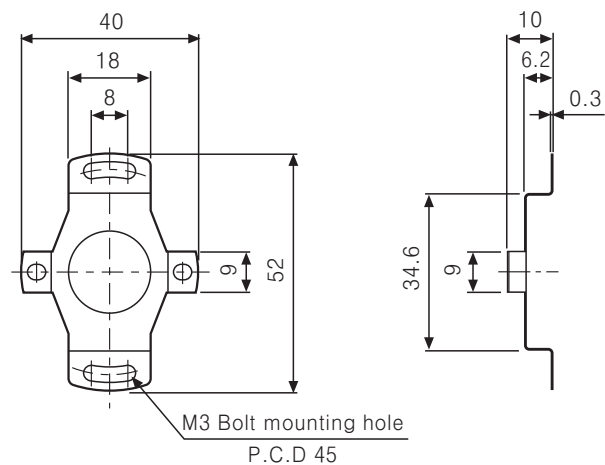
(Unit:mm)



■ Cable outgoing connector type



● Bracket



(A)	Photo electric sensor
(B)	Fiber optic sensor
(C)	Door/Area sensor
(D)	Proximity sensor
(E)	Pressure sensor
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(H)	Temp. controller
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