E50S Series

Diameter ϕ50mm Shaft type Incremental Rotary encoder

▣Features

- Suitable for measuring Angle, Position, Revolution, Speed, Acceleration and Distance
- Power supply : 5VDC, 12−24VDC ±5%
- Cost−effective

▣Applications

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

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

CE

▣Ordering information (Former name : ENB)

E50S	8	−	5000	−	3	−	2	−	24	−	

Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ϕ50mm, shaft type	ϕ8mm	Refer to resolution	2:A, B 3:A, B, Z 4:A, $\overline{A}$, B, $\overline{B}$ 6:A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$	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:Normal type C:Cable outgoing connector type(※) CR:Rear side outgoing connector integrated type CS:Side outgoing connector integrated type

※Standard:E50S8−PULSE−3−N−24 ※Standard:A, B, Z ※The power of Line driver is only for 5VDC ※Cable length:250mm

▣Specifications

Item			Diameter ϕ50mm shaft 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, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000 (Not indicated resolution is customizable.)	
Electrical specification	Output phase		A, B, Z phase(Line driver : A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$ 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 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 ☞ Load current : Max. 20mA, Residual : Max. 0.5VDC • High ☞ Load current : Max. −20mA, Output voltage : Min. 2.5VDC	
	Response time (Rise/Fall)	Totem pole output	Max. 1㎲	• Measuring condition ☞ Cable length : 2m, I sink = Max. 20mA
		NPN open collector output	Max. 1㎲	
		Voltage output	Max. 1㎲	
		Line driver output	Max. 0.5㎲	
	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 mega 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, Connector integrated type (Rear, Side)	
Mechanical specification	Starting torque		**(Note2)** Max. 70gf • cm(0.007N • m)/Connector Type : Max. 800gf • cm(0.08N • A)	
	Rotor inertia		Max. 80g • cm² (8×10^{-6} kg • m²)/Connector Type : Max. 400gf • cm² (4×10^{-5} kg • m²)	
	Shaft loading		Radial : Max. 10kgf, Thrust : Max. 2.5kgf	
	Max. allowable revolution		**(Note3)** 5000rpm	
Vibration			1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours	
Shock			Max. 75G	
Ambient temperature			−10 ~ 70℃(at non−freezing status), Storage:−25 ~ 85℃	
Ambient humidity			35~85%RH, Storage: 35~90%RH	
Protection			IP50, Customizable as IP64, Connector integrated type:IP65(IEC standard)	
Cable			ϕ5mm, 5P, Length : 2m, Shield cable(Line driver output : ϕ5mm, 8P)	
Accessory			ϕ8mm coupling bracket	
Unit weight			Approx. 275g, Connector integrated type:180g	
Approval			CE (Except for Line driver output)	

※**(Note1)**'*' pulse is only for A, B phase(Line Driver output is for A, $\overline{A}$, B, $\overline{B}$ phase). It can be produced under 1000P/R for connector integrated type.
※**(Note1)**Lower torque than the rated value, it can be customizable.
※**(Note3)**Max. allowable revolution ≧ Max. response revolution 【Max. response resolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60$ sec】

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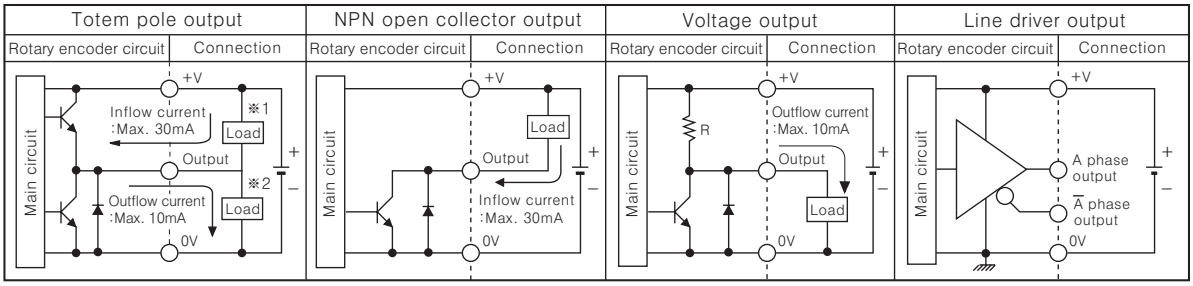
Incremental ϕ50mm Shaft Type

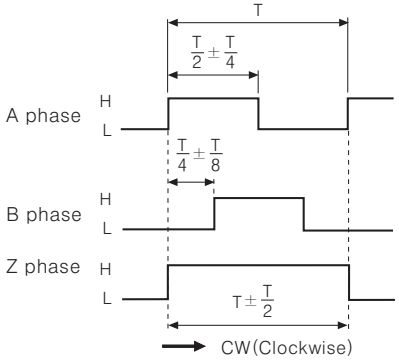
▣Control output diagram



☞ 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 is same. (Line driver output is for A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$)

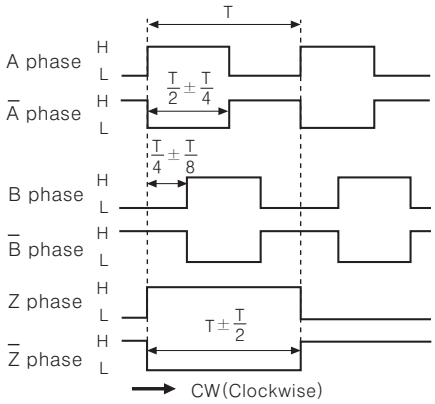
▣Output waveform

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



※CW : As viewed from the shaft

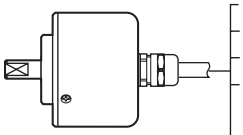
●Line driver output



▣Connections

■Normal type

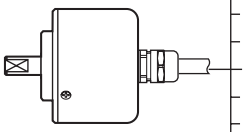
●Totem pole output / NPN open collector output / Voltage output



- Black:OUT A
- White:OUT B
- Orange:OUT Z
- Brown:+V(5VDC, 12−24VDC ±5%)
- Blue:GND(0V)
- Shield:F.G

※Unused wires must be insulated.
※The metal and shield cable of encoder should be grounded(F.G)

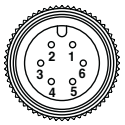
●Line driver output



- Black:OUT A
- Red:OUT $\overline{A}$
- White:OUT B
- Gray:OUT $\overline{B}$
- Orange:OUT Z
- Yellow:OUT $\overline{Z}$
- Brown:+V(5VDC ±5%)
- Blue:GND(0V)
- Shield:F.G

■Cable outgoing connector/ Connector integrated 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 $\overline{A}$	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 $\overline{B}$	Gray
			⑦	OUT Z	Orange
			⑧	OUT $\overline{Z}$	Yellow
			⑨	F.G	Shield

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

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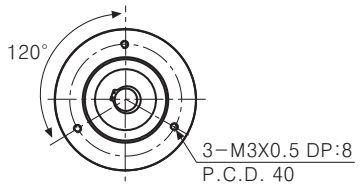
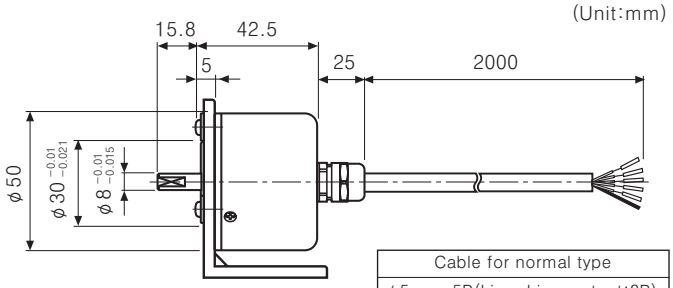
E50S Series

▣Dimensions

(Unit:mm)

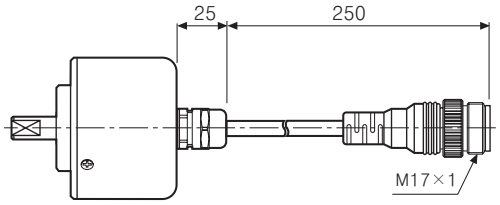
■Normal type





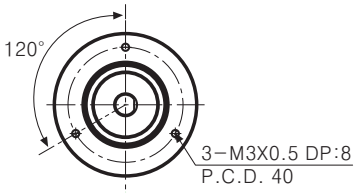
Cable for normal type
ϕ5mm, 5P(Line driver output:8P), Length:2000, Shield cable

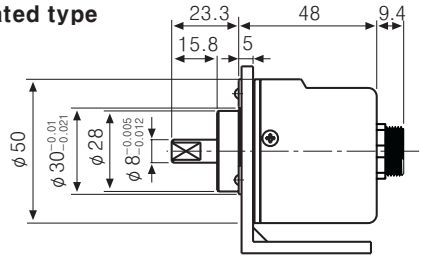
■Cable outgoing connector type



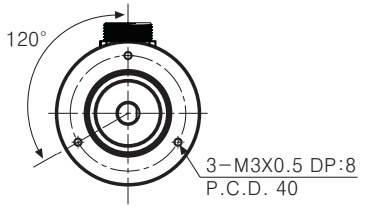
※Connector cable is customizable and see M−57 for specifications.

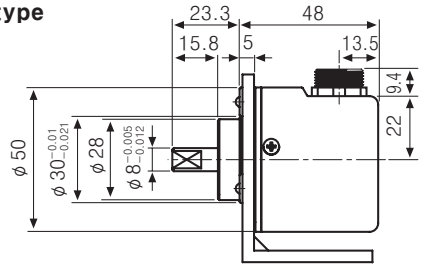
■Rear side outgoing connector integrated type



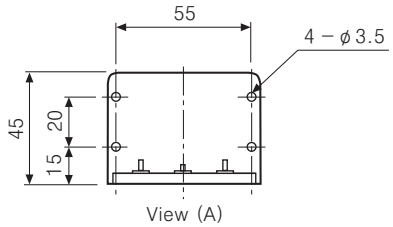


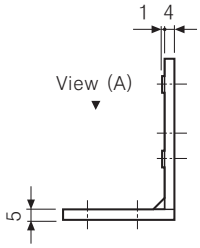
■Side outgoing connector integrated type

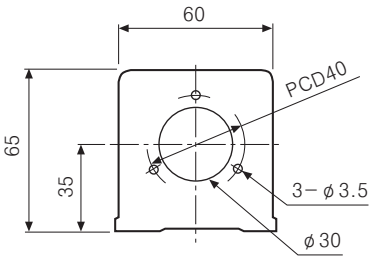




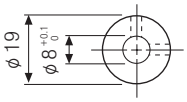
●Bracket

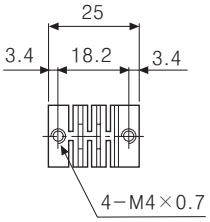






●Coupling





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