

# E50S Series

## Diameter $\phi$ 50mm Shaft type Incremental Rotary encoder

### ■ Features

- Suitable for measuring Angle, Position, Revolution, Speed, Acceleration and Distance
- Power supply : 5VDC, 12-24VDC  $\pm$ 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.**



### ■ Ordering information (Former name : ENB)

E50S	8	-	5000	-	3	-	2	-	24	-	
Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable					
Diameter $\phi$ 50mm, shaft type	$\phi$ 8mm	Refer to resolution	2:A, B 3:A, B, Z 4:A, $\bar{A}$ , B, $\bar{B}$ 6:A, A, B, 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%	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 $\phi$ 50mm shaft type of Incremental rotary encoder		
Resolution(P/R)	<b>(Note1)</b> *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, $\bar{A}$ , 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 : Max. 0.5VDC • High $\Rightarrow$ Load current : Max. -20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 $\mu$ s
		NPN open collector output	Max. 1 $\mu$ s
		Voltage output	Max. 1 $\mu$ s
		Line driver output	Max. 0.5 $\mu$ s
	Max. Response frequency	300kHz	
	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), Line driver output:Max. 50mA (disconnection of the load)	
Insulation resistance	Min. 100M $\Omega$ (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	<b>(Note2)</b> Max. 70gf $\cdot$ cm (0.007N $\cdot$ m)/Connector Type : Max. 800gf $\cdot$ cm (0.08N $\cdot$ A)	
	Rotor inertia	Max. 80g $\cdot$ cm <sup>2</sup> ( $8 \times 10^{-6}$ kg $\cdot$ m <sup>2</sup> )/Connector Type : Max. 400gf $\cdot$ cm <sup>2</sup> ( $4 \times 10^{-5}$ kg $\cdot$ m <sup>2</sup> )	
	Shaft loading	Radial : Max. 10kgf, Thrust : Max. 2.5kgf	
	Max. allowable revolution	<b>(Note3)</b> 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 $^{\circ}$ C (at non-freezing status), Storage: -25 ~ 85 $^{\circ}$ C		
Ambient humidity	35~85%RH, Storage: 35~90%RH		
Protection	IP50, Customizable as IP64, Connector integrated type:IP65 (IEC standard)		
Cable	$\phi$ 5mm, 5P, Length : 2m, Shield cable (Line driver output : $\phi$ 5mm, 8P)		
Accessory	$\phi$ 8mm coupling bracket		
Unit weight	Approx. 275g, Connector integrated type:180g		
Approval	<b>CE</b> (Except for Line driver output)		

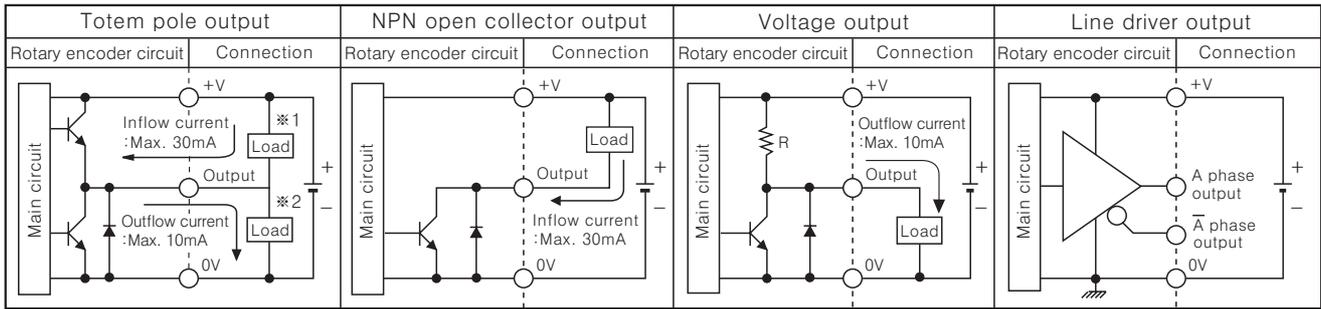
\* **(Note1)** \* pulse is only for A, B phase (Line Driver output is for A,  $\bar{A}$ , B,  $\bar{B}$  phase). It can be produced under 1000P/R for connector integrated type.

\* **(Note1)** Lower torque than the rated value, it can be customizable.

\* **(Note3)** Max. allowable revolution  $\geq$  Max. response revolution **[Max. response resolution (rpm) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ ]**

# Incremental $\phi$ 50mm Shaft Type

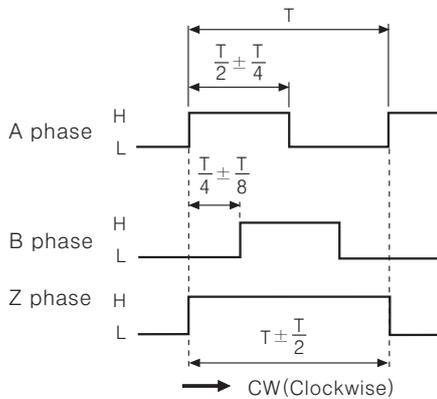
## Control output diagram



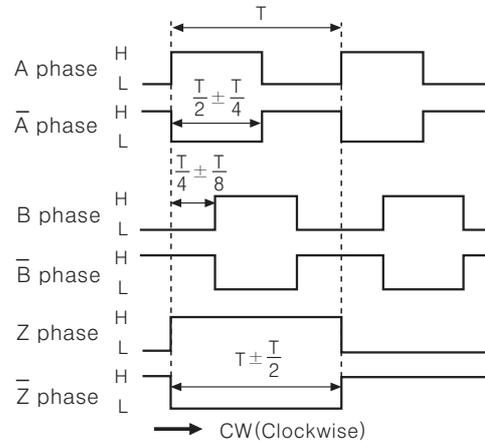
☞ Totem pole output type can be used for NPN open collector output type(\*1) or Voltage output type(\*2).  
 ☞ All output circuits of A, B, Z phase is same. (Line driver output is for A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output waveform

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



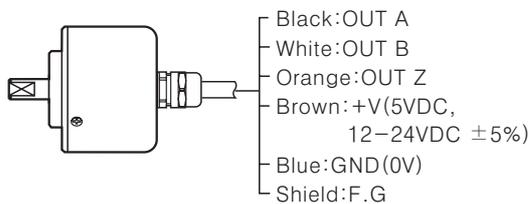
\*CW : As viewed from the shaft



## Connections

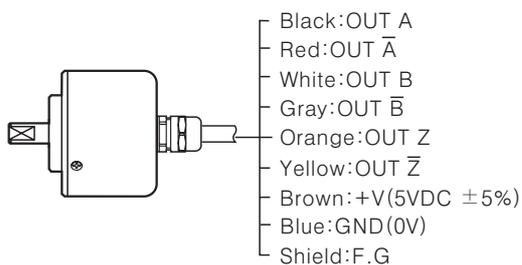
### Normal type

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



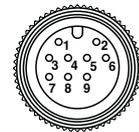
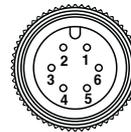
- ※ Unused wires must be insulated.
- ※ The metal and shield cable of encoder should be grounded(F.G)

- Line driver output



### Cable outgoing connector/ Connector integrated type

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

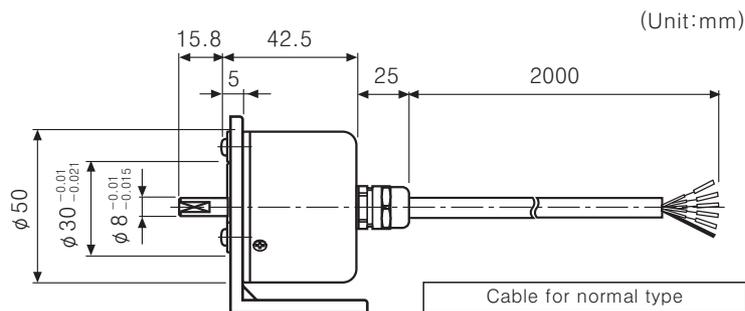
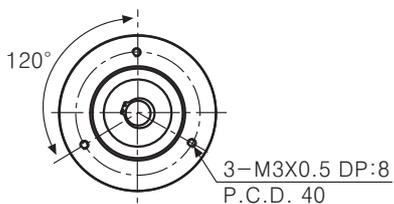
\*F.G(Field Ground):It should be grounded separately.

- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/ Speed/ Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Field network device
- (Q) Production stoppage models & replacement

# E50S Series

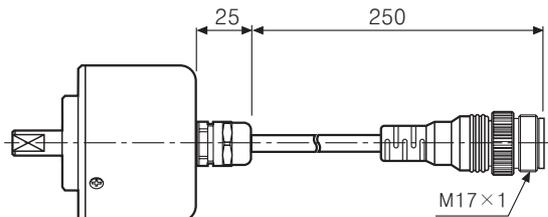
## Dimensions

### Normal type



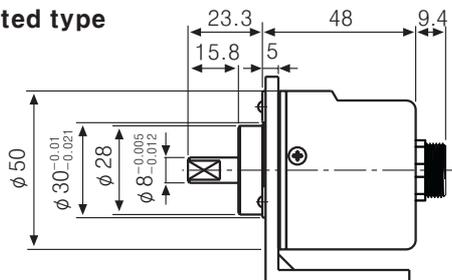
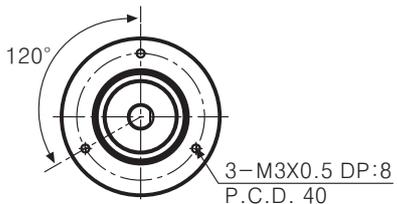
Cable for normal type  
 $\phi 5$ mm, 5P(Line driver output:8P),  
 Length:2000, Shield cable

### Cable outgoing connector type

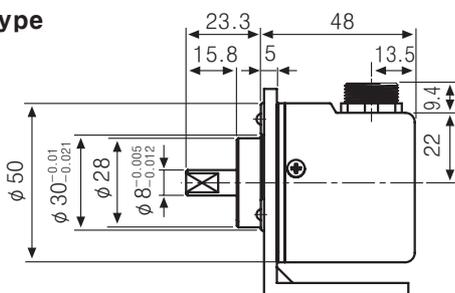
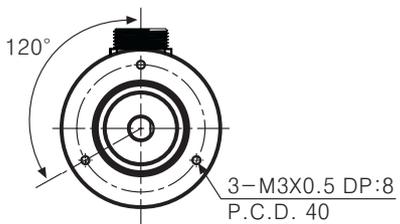


\*Connector cable is customizable and see M-57 for specifications.

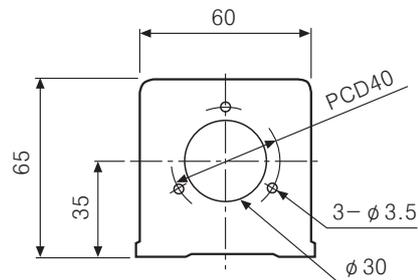
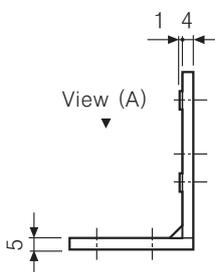
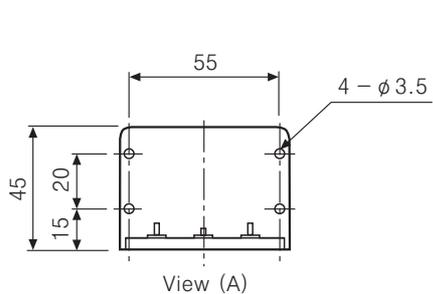
### Rear side outgoing connector integrated type



### Side outgoing connector integrated type



### Bracket



### Coupling

