

# Incremental $\phi$ 50mm Shaft Type

## 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	-	
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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, $\bar{B}$ , 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%	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  
※Option:A, B  
※As for option models, ask before making a purchase.

※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 type is available to customize)		
Electrical specification	Output phase	A, B, Z phase (Line driver : A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$ phase)		
	Phase difference of output	Output between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)		
	Control output	Totem pole output	<ul style="list-style-type: none"> <li>• Low <math>\Rightarrow</math> Load current:Max. 30mA, Residual voltage : Max. 0.4VDC</li> <li>• High <math>\Rightarrow</math> 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</li> </ul>	
		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	<ul style="list-style-type: none"> <li>• Low <math>\Rightarrow</math> Load current : Max. 20mA, Residual : Max. 0.5VDC</li> <li>• High <math>\Rightarrow</math> Load current : Max. -20mA, Output voltage : Min. 2.5VDC</li> </ul>	
	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	<ul style="list-style-type: none"> <li>• 5VDC <math>\pm</math>5% (Ripple P-P:Max. 5%)</li> <li>• 12-24VDC <math>\pm</math>5% (Ripple P-P:Max. 5%)</li> </ul>		
	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 (0.008N $\cdot$ A)		
	Rotor inertia	Max. 80g $\cdot$ cm <sup>2</sup> (8 $\times$ 10 <sup>-6</sup> kg $\cdot$ m <sup>2</sup> )/Connector Type : Max. 400gf $\cdot$ cm <sup>2</sup> (4 $\times$ 10 <sup>-5</sup> 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	CE (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) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ ]**

(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

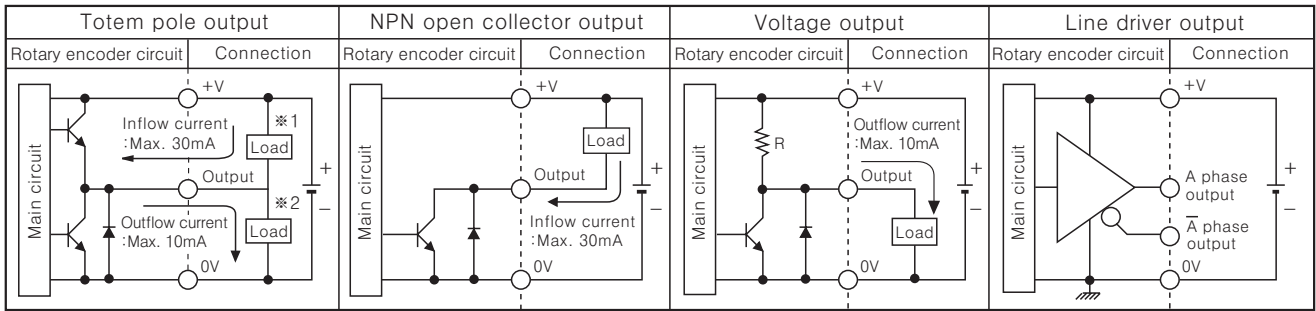
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

# E50S Series

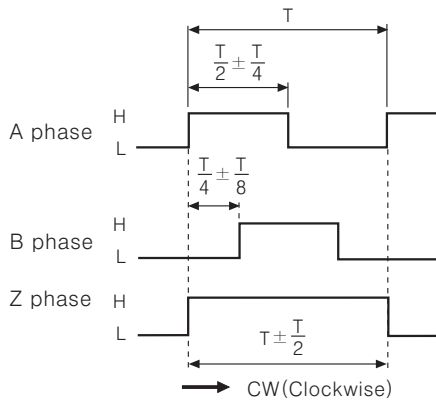
## Control output diagram



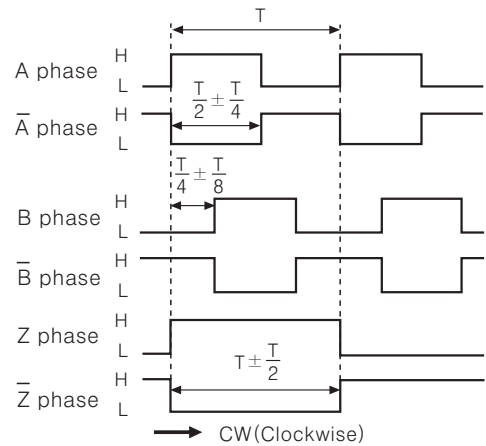
- ☞ Totem pole output type can be used for NPN open collector output type(\*1) or Voltage output type(\*2).
- ☞ All output circuits of A, B, Z phase is same. (Line driver output is for A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output waveform

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



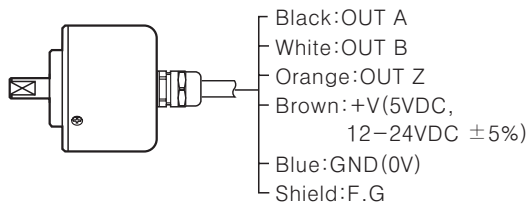
\*CW : As viewed from the shaft



## Connections

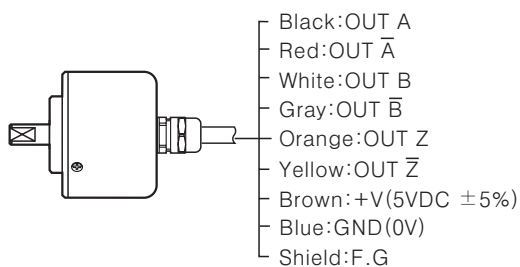
### Normal type

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



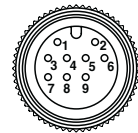
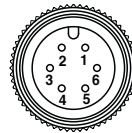
- ☞ Unused wires must be insulated.
- ☞ The metal and shield cable of encoder should be grounded(F.G)

- Line driver output



### Cable outgoing connector/ Connector integrated type

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



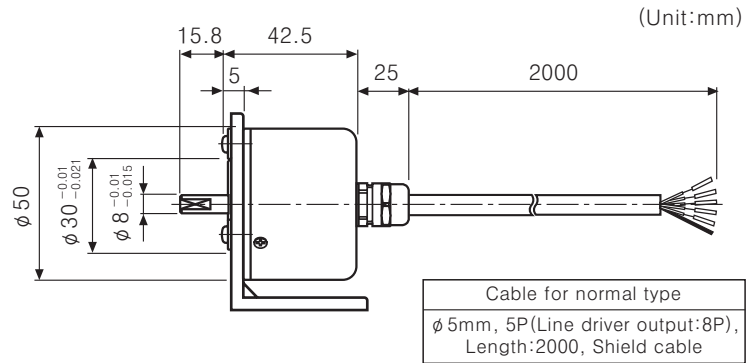
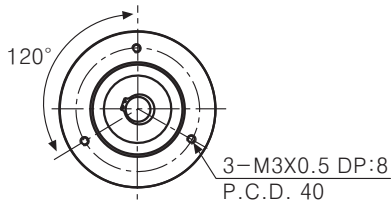
Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT $\bar{B}$	Gray
			⑦	OUT Z	Orange
			⑧	OUT $\bar{Z}$	Yellow
			⑨	F.G	Shield

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

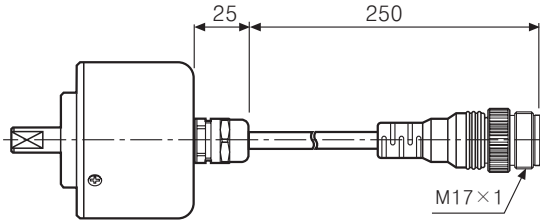
# Incremental $\phi 50\text{mm}$ Shaft Type

## Dimensions

### Normal type

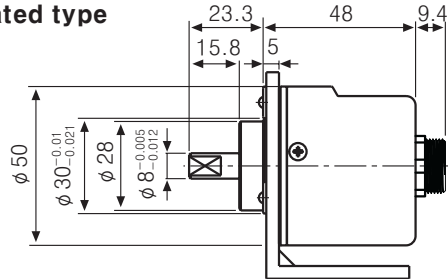
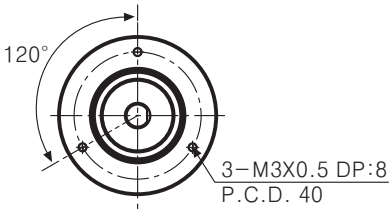


### Cable outgoing connector type

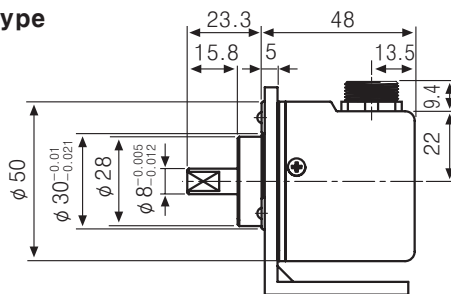
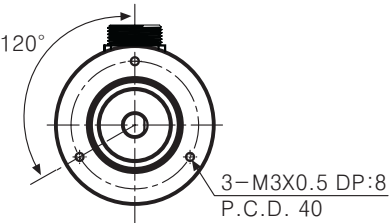


\*Connector cable is customizable and see M-48 for specifications.

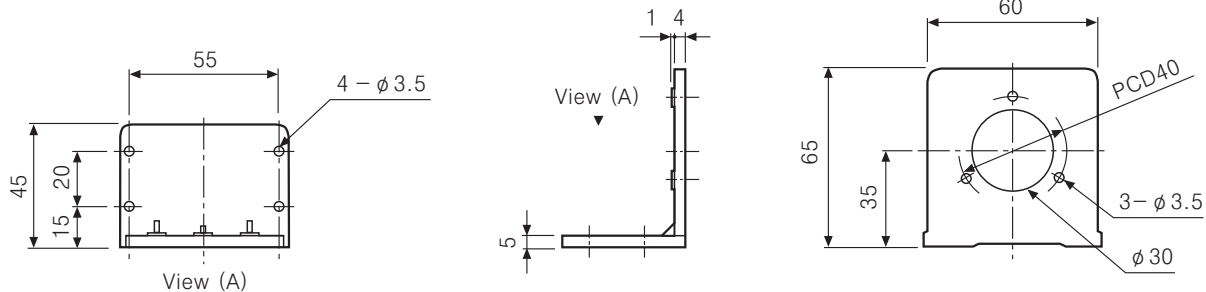
### Rear side outgoing connector integrated type



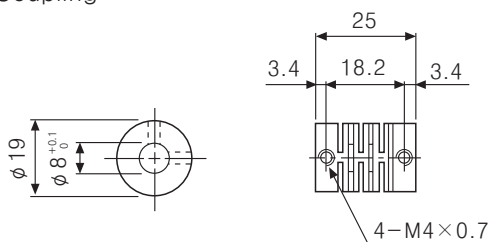
### Side outgoing connector integrated type



### Bracket



### Coupling



- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
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