

E50S Series

Diameter ϕ 50mm Shaft type Incremental Rotary encoder

Line-up

■ Features

- 12–24VDC power supply of line driver output(Line-up)
- Suitable for measuring angle, position, revolution, speed, acceleration and distance
- Power supply : 5VDC, 12–24VDC $\pm$ 5%

■ 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	—	N	—	24	—	
Series	Shaft diameter	Pulse/1 Revolution	Output phase	Output	Power supply	Cable					
Diameter ø 50mm, shaft type	ø 8mm	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

*Cable length:250mm

■ Specifications

Item			Diameter ϕ 50mm 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
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 $\Rightarrow$ 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(Power supply 5VDC) : Min. 2.5VDC, Output voltage(Power voltage 12−24VDC) : Min. (Power supply−3.0)VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s (Cable length : 2m, I sink = 20mA)
		NPN open collector output	
		Voltage output	
		Line driver output	
	Max. Response frequency		Max. 0.5 μ s (Cable length : 2m, I sink = 20mA)
	Power supply		300kHz
	Current consumption		• 5VDC $\pm$ 5% (Ripple P−P : Max. 5%) • 12−24VDC $\pm$ 5% (Ripple P−P : Max. 5%)
	Insulation resistance		Max. 80mA(disconnection of the load), Line driver output : Max. 50mA(disconnection of the load)
	Dielectric strength		Min. 100M Ω (at 500VDC megger between all terminals and case)
	Connection		750VAC 50/60Hz for 1 minute (Between all terminals and case)
Mechanical specification		Cable outgoing type, 200mm cable outgoing connector type, Connector integrated type(Rear, Side)	
Starting torque		Cable outgoing type, 200mm cable outgoing connector type, Connector integrated type(Rear, Side)	
Moment of inertia		Max. 70gf $\cdot$ cm(0.007N $\cdot$ m) (Note2) / Max. 800gf $\cdot$ cm(0.08N $\cdot$ m) (Note3)	
Shaft loading		Max. 80g $\cdot$ cm ² (8 $\times$ 10 ^{−6} kg $\cdot$ m ²) (Note2) / Max. 400g $\cdot$ cm ² (4 $\times$ 10 ^{−5} kg $\cdot$ m ²) (Note3)	
Max. allowable revolution		Radial : 10kgf, Thrust : 2.5kgf	
Vibration		(Note4) 5000rpm	
Shock		1.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours	
Ambient temperature		Max. 75G	
Ambient humidity		−10 to 70 $^{\circ}$ C (at non−freezing status), Storage : −25 to 85 $^{\circ}$ C	
Protection		35 to 85%RH, Storage : 35 to 90%RH	
Cable		Normal type, Cable outgoing connector type: IP50(IEC standard) (Note5) , Connector integrated type: IP65(IEC standard)	
Accessory		ϕ 5mm, 5P, Length : 2m, Shield cable(Line driver output : ϕ 5mm, 8P) (AWG 24, Core wire diameter : 0.08mm, No. of core wire : 40, Insulator out diameter : ϕ 1mm)	
Approval		ϕ 8mm coupling, bracket	
Unit weight		Normal typr $\Rightarrow$ 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).

※ (Note2) This value is for normal type, cable outgoing connector type (Protection: IP50).

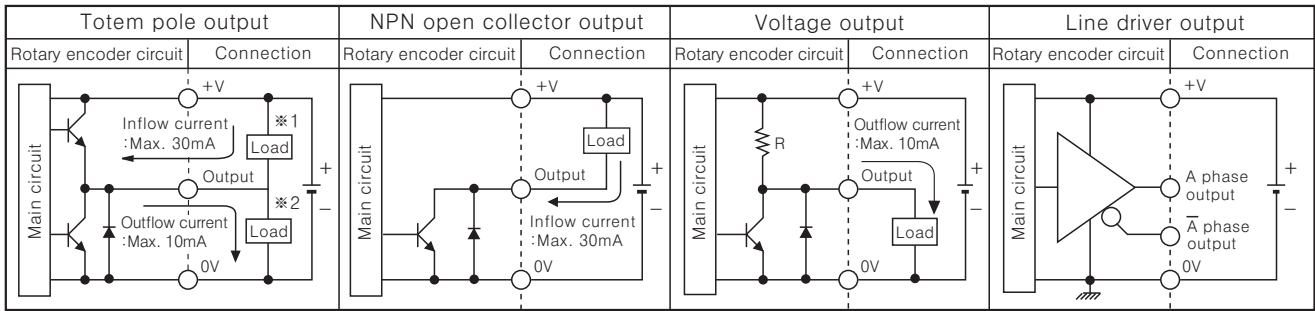
※ (Note3) This value is for normal type, cable outgoing connector type (Protection: IP64)/connector integrated type (Protection: IP65)

※ (Note4) Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.
[Max. response resolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$]

※ (Note5) 'Normal type, cable outgoing connector type is option as IP64 protection.

Incremental ϕ 50mm Shaft Type

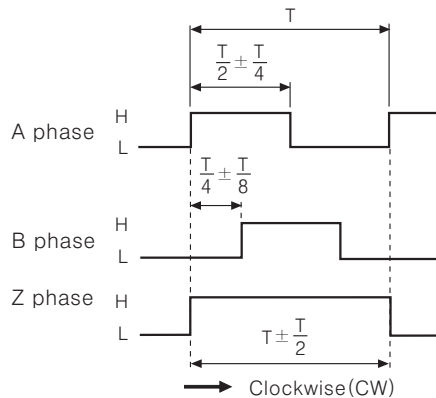
Control output diagram



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

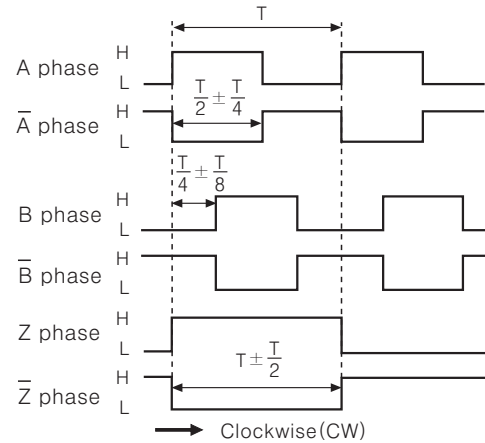
Output waveform

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



※ CW : Right turn as from the shaft

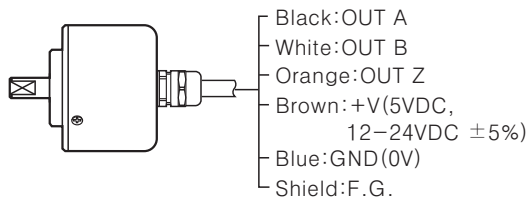
- Line driver output



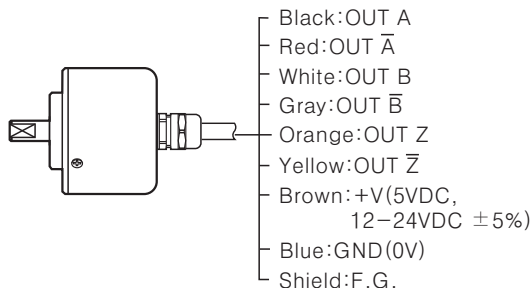
Connections

Normal type

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



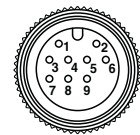
- Line driver output



- ※ Unused wires must be insulated.
- ※ The shield cable and metal case of encoder must be grounded(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 $\bar{A}$	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 must be grounded separately.

(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

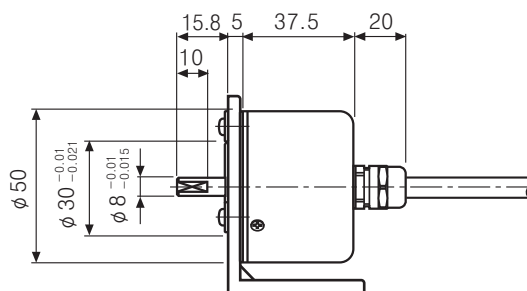
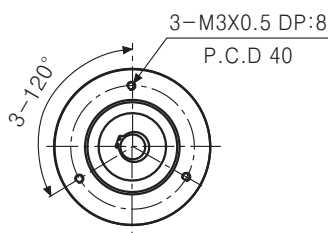
(T) Production stoppage models & replacement

E50S Series

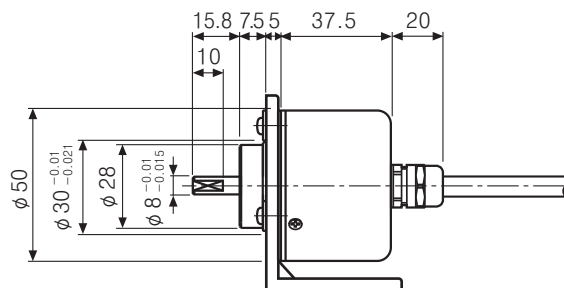
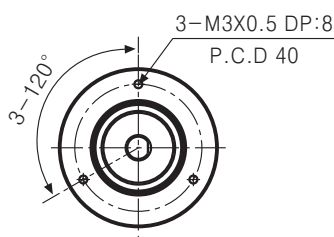
▣ Dimensions

(Unit:mm)

■Normal type, Cable outgoing connector type(Protection : IP50)



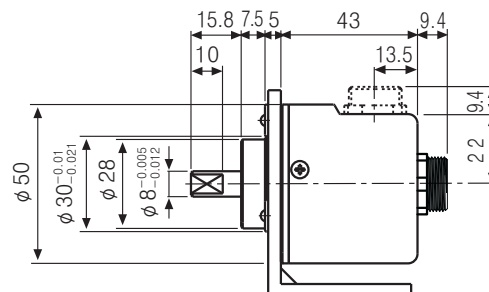
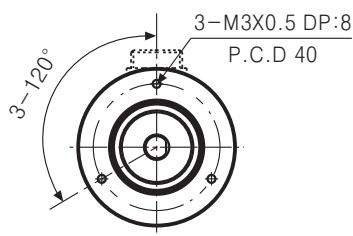
■Normal type, Cable outgoing connector type(Protection : IP64)



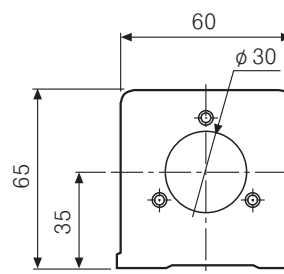
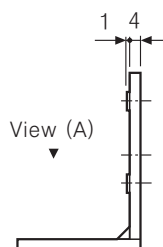
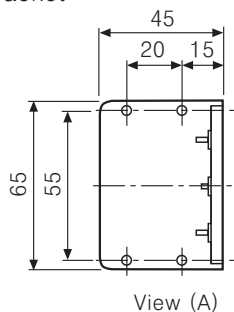
Cable for normal type	Cable for Cable outgoing connector type
ø 5mm, 5P(Line driver output:8P), Length:2000mm, Shield cable	ø 5mm, 5P(Line driver output:8P), Length:250mm, Shield cable

※ Connector cable is sold separately and see G-6 for specifications.

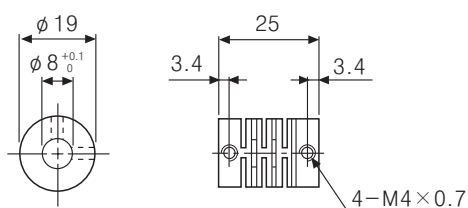
■Rear/Side connector integrated type(Protection: IP65)



- Bracket



- Coupling(E50S)



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

※For parallel misalignment, angular misalignment,
End-play terms, refer to F-69 page.

※For flexible coupling (ERB series) information, refer to F-62 page.