

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/1Revolution	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%	Blank: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, $\bar{A}$, 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(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
		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	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 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, Connector integrated type (Rear, Side)	
Mechanical specification	Starting torque	Max. 70gf $\cdot$ cm (0.007N $\cdot$ m) (Note2) / Max. 800gf $\cdot$ cm (0.08N $\cdot$ m) (Note3)	
	Moment of inertia	Max. 80g $\cdot$ cm ² (8×10^{-6} kg $\cdot$ m ²) (Note2) / Max. 400g $\cdot$ cm ² (4×10^{-5} kg $\cdot$ m ²) (Note3)	
	Shaft loading	Radial : Max. 10kgf, Thrust : Max. 2.5kgf	
	Max. allowable revolution	(Note4) 5000rpm	
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock		Max. 75G	
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		Normal type, Cable outgoing connector type: IP50 (IEC standard) (Note5), Connector integrated type: IP65 (IEC standard)	
Cable		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)	
Accessory		ϕ 8mm coupling, bracket	
Approval		CE (Except for line driver output)	
Unit weight		Approx. 275g, Connector integrated type : 180g	

※ (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).

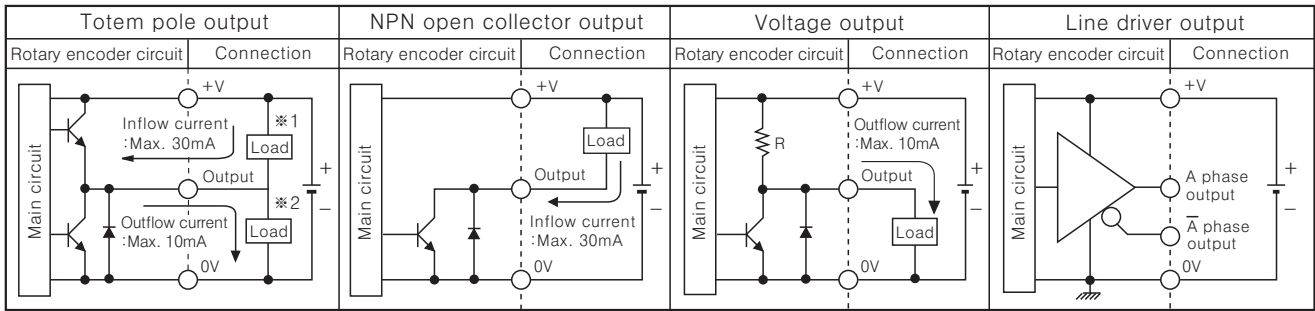
※ (Note3) This value is for normal type, cable outgoing connector type (Protection: IP64)/connector integrated type (Protection: IP65)

※ (Note4) Max. allowable revolution $\geq$ Max. response revolution [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

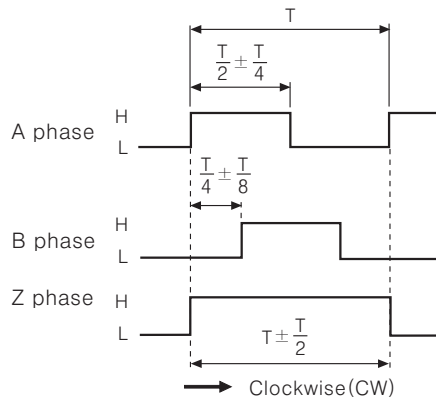
Control output diagram



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

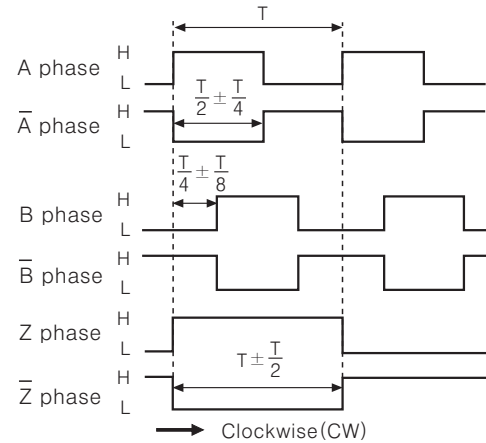
Output waveform

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



※ CW : Right turn as from the shaft

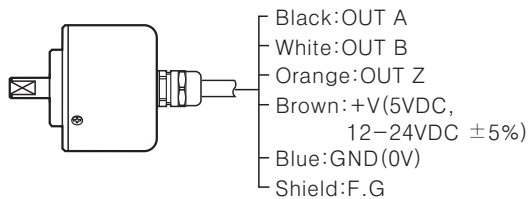
- Line driver output



Connections

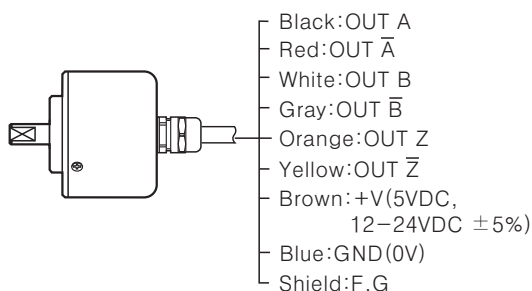
Normal type

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



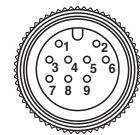
- ※ Unused wires must be insulated.
- ※ The metal and shield cable of encoder should be grounded(F.G)

- 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) 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

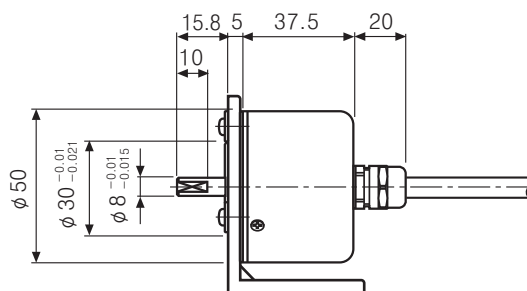
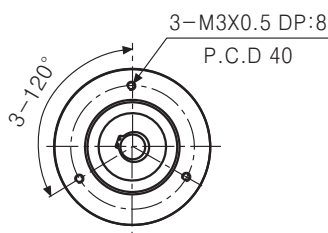
(T) Production stoppage models & replacement

E50S Series

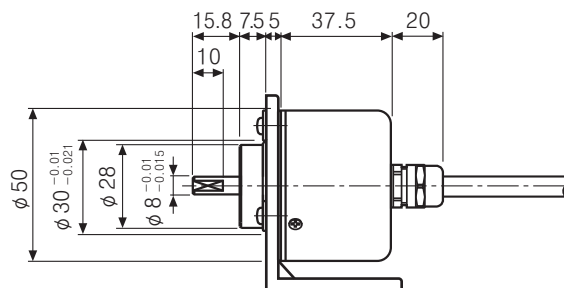
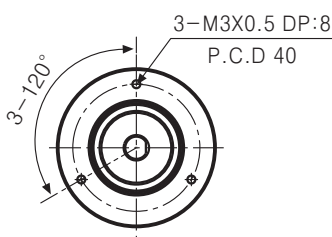
■ Dimensions

(Unit:mm)

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



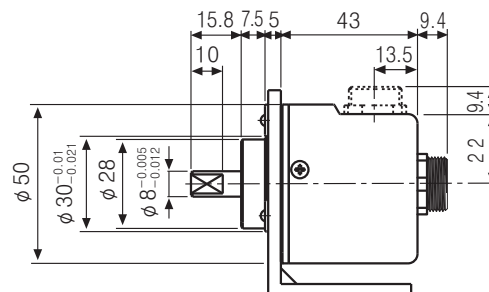
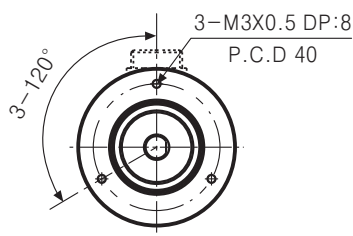
■ Normal type, Cable outgoing connector type(Protection : IP64)



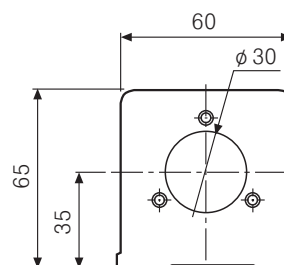
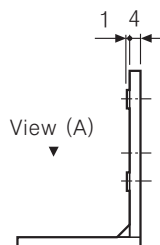
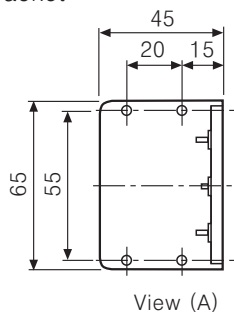
Cable for normal type	Cable for Cable outgoing connector type
φ 5mm, 5P(Line driver output:8P), Length:2000, Shield cable	φ 5mm, 5P(Line driver output:8P), Length:250, Shield cable

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

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



● Bracket



● Coupling(E50S)

