

Diameter ø50mm Shaft type Incremental Rotary Encoder

■ Features

- Light plastic body
- Suitable for measuring angle, position, revolution, speed, acceleration and sensing 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.

■ Ordering information

E50S | **8** | **P** | - | **600** | - | **3** | - | **N** | - | **24** | - |

Series	Shaft diameter	External material	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ø50mm, shaft type	6 : ø6mm 8 : ø8mm	Plastic	Refer to resolution	2: A, B 3: A, B, Z 4: A, \bar{A} , B, \bar{B} 6: A, \bar{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 ±5% 24: 12-24VDC ±5%	No mark: Cable type C: Connector cable type(※)

※Standard : E50S8P-PULSE-3-N-24

※The power of Line driver is only for 5VDC

※Cable length : 250mm

■ Specifications

Item	Diameter ø50mm shaft type of incremental rotary encoder			
Resolution(P/R) ^{*1}	*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			
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 - Load current : Max. 30mA, Residual voltage : Max. 0.4VDC • High - Load current : Max. 10mA, Output voltage(Power voltage 5VDC):Min. (Power voltage-2.0)VDC, Output voltage(Power voltage 12-24VDC):Min. (Power voltage-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 voltage : Max. 0.5VDC • High - Load current : Max. -20mA, Output voltage : Min. 2.5VDC	
	Response time (Rise/Fall)	Totem pole output	• Measuring condition - Cable length : 2m, I sink = 20mA	
		NPN open collector output		Max. 1μs
		Voltage output		
		Line driver output		Max. 0.5μs
	Max. Response frequency	180kHz		
	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 megger between all terminals and case)		
Dielectric strength	750VAC 50/60Hz for 1 minute(Between all terminals and case)			
Connection	Cable type, 250mm connector cable type, Connector type(Axial, Radial)			
Mechanical specification	Starting torque	Max. 100gf·cm(0.01N·m)		
	Moment of inertia	Max. 40g·cm ² (4×10 ⁻⁶ kg·m ²)		
	Shaft loading	Radial : 2kgf, Thrust : 1kgf		
	Max. allowable revolution ^{*2}	5000rpm		
Vibration	1.5mm amplitude or 300m/s ² at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours			
Shock	Approx. Max. 75G			
Environment	Ambient temperature	-10 to 70°C, storage : -25 to 85°C		
	Ambient humidity	35 to 85%RH, storage : 35 to 90%RH		
Protection	IP50(IEC standard)			
Cable	ø5, 5-wire, Length : 2m, Shield cable(Line driver output : ø5, 8-wire) (AWG 24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter : ø1)			
Accessory	ø8(ø6)mm coupling, Bracket			
Unit weight	Approx. 235g			

※1: '*' pulse is only for A, B phase(Line Driver output is for A, \bar{A} , B, \bar{B} phase)

※2: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※Environment resistance is rated at no freezing or condensation.



(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 mode power supply

(Q) Stepper motor& Driver&Controller

(R) Graphical/Logic panel

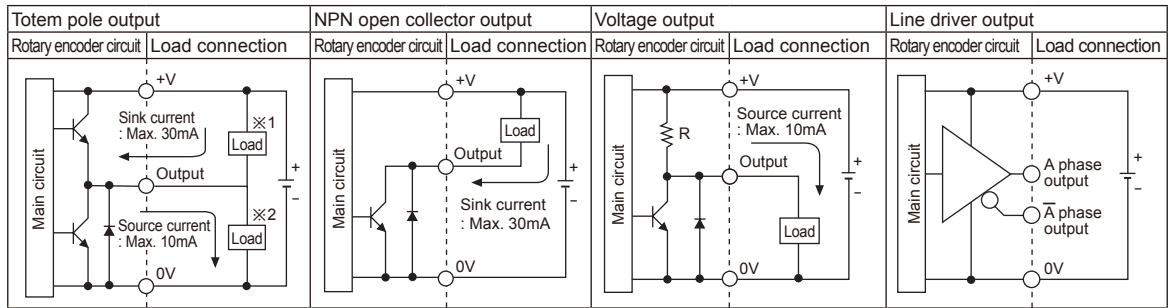
(S) Field network device

(T) Software

(U) Other

E50SP Series

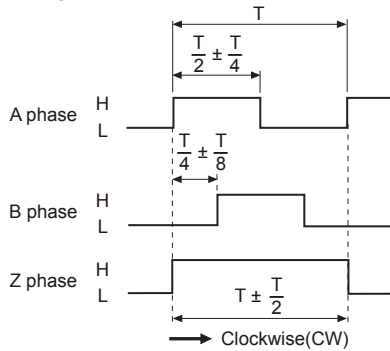
Control output diagram



- 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})

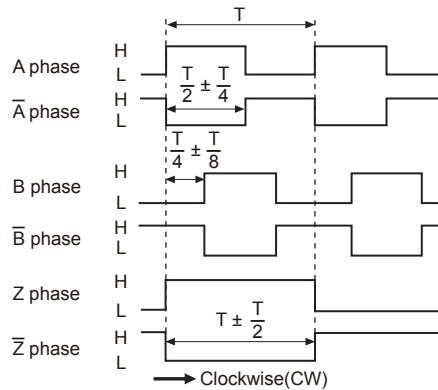
Output waveform

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



※CW : Right turn as from the shaft

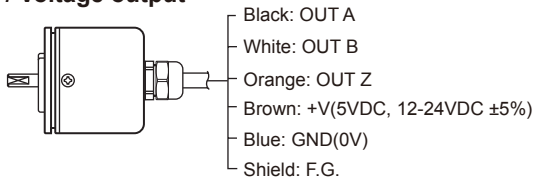
- Line driver output



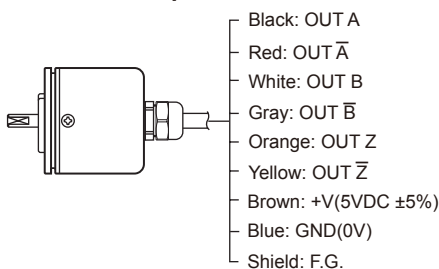
Connections

◎ Cable type

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



- Line driver output

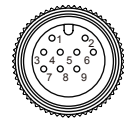


※Unused wires must be insulated.

※The shield cable and metal case of encoder must be grounded(F.G.).

◎ Connector cable 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

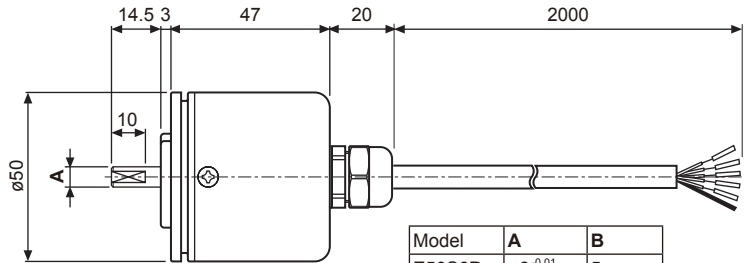
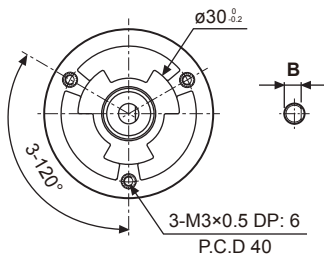
※F.G.(Field Ground) : It must be grounded separately.

Incremental $\phi 50\text{mm}$ Shaft type

■ Dimensions

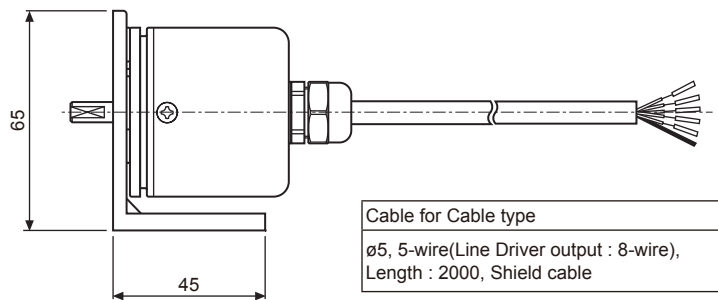
◎ Cable type

(unit: mm)



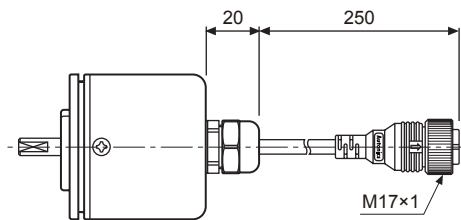
Model	A	B
E50S6P	$\phi 6_{-0.01/-0.015}$	5
E50S8P	$\phi 8_{-0.01/-0.02}$	7

● Connect the bracket



Cable for Cable type
 $\phi 5$, 5-wire (Line Driver output : 8-wire),
Length : 2000, Shield cable

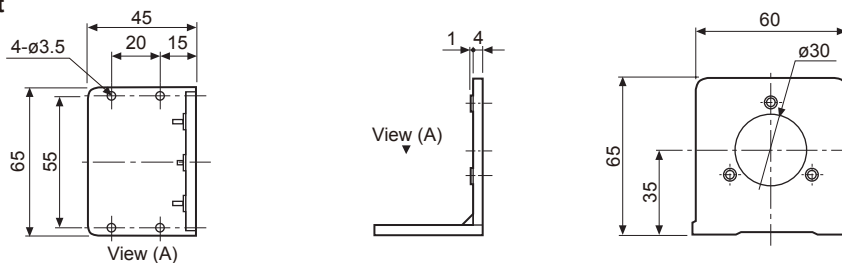
◎ Connector cable type



Cable for Connector cable type
 $\phi 5$, 5-wire (Line Driver output : 8-wire),
Length : 250mm, Shield cable

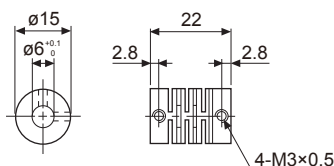
※Connector cable is sold separately and refer to the G-10 for specifications.

● Bracket

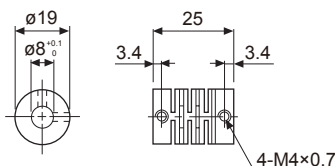


● Coupling (E50SP)

• $\phi 6$ Coupling



• $\phi 8$ Coupling



- Parallel misalignment: Max. 0.25mm
- Angular misalignment: Max. 5°
- End-play: Max. 0.2mm

※For parallel misalignment, angular misalignment, end-play terms, refer to the F-78 page.

※For flexible coupling (ERB Series) information, refer to the F-71 page.

(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 mode power supply
(Q)	Stepper motor& Driver&Controller
(R)	Graphic/Logic panel
(S)	Field network device
(T)	Software
(U)	Other