

# E30S Series

## Diameter ø30mm Shaft type Incremental Rotary Encoder

### ■ Features

- Diameter ø30mm of miniature shaft type rotary encoder
- Easy installation at narrow space
- Small moment of inertia
- Power supply : 5VDC, 12-24VDC ±5%
- Various output types



**⚠ Please read "Caution for your safety" in operation manual before using.**



### ■ Ordering information

**E30S**    **4** — **3000** — **3** — **N** — **24** —

Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ø30mm, shaft type	ø4mm	Refer to resolution	3 : A, B, Z 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:E30S4-[PULSE]-3-N-24

※Standard: A, B, Z

※The power of Line driver is only for 5VDC

※Cable length: 250mm

### ■ Specifications

Item	Diameter ø30mm shaft type of incremental rotary encoder		
Resolution(P/R)	100, 200, 360, 500, 1000, 1024, 3000(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=1 cycle 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
	Response time (Rise/Fall)	Line driver output	• Low - Load current : Max. 20mA, Residual voltage : Max. 0.5VDC • High - Load current : Max. -20mA, Output voltage : Min. 2.5VDC
		Totem pole output	Max. 1μs
		NPN open collector output	Max. 1μs
		Voltage output	Max. 1μs(5VDC : Output resistance 820Ω), Max. 2μs(12-24VDC : Output resistance 4.7kΩ)
	Mechanical specification	Line driver output	Max. 0.5μs
		Max. Response frequency	300kHz
		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	
Starting torque		Max. 20gf·cm(0.002N·m)	
Moment of inertia		Max. 20g·cm <sup>2</sup> (2×10 <sup>-6</sup> kg·m <sup>2</sup> )	
Shaft loading		Radial : Max. 2kgf, Thrust : Max. 1kgf	
Max. allowable revolution <sup>※1</sup>	5000rpm		
Vibration	1.5mm amplitude or 300m/s <sup>2</sup> at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours		
Shock	Approx. Max. 50G		
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 : ø5, 8-wire)		
Accessory	ø4mm coupling		
Approval	CE (Except line driver output)		
Unit weight	Approx. 80g		

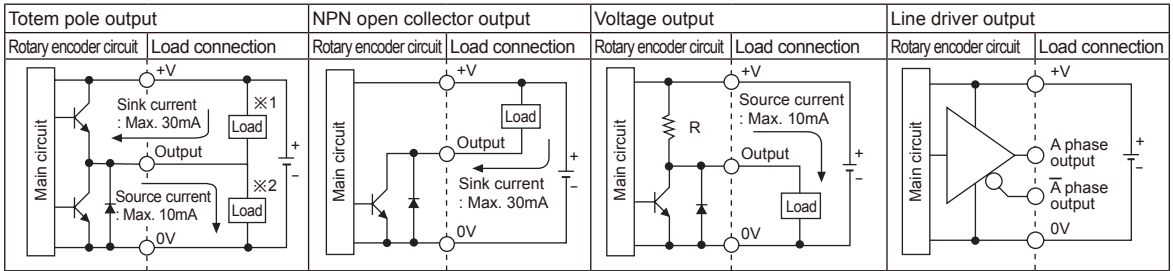
※1: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※Environment resistance is rated at no freezing or condensation.

# Incremental ø30mm Shaft type

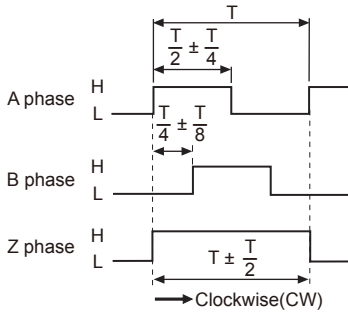
## Control output diagram



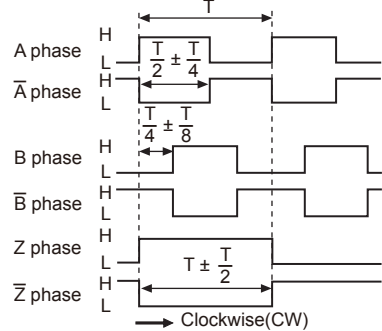
- Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
- All output circuits of A, B, Z phase are the same. (Line driver output is for A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output waveform

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



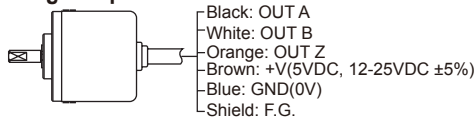
※CW: Right turn as from the shaft



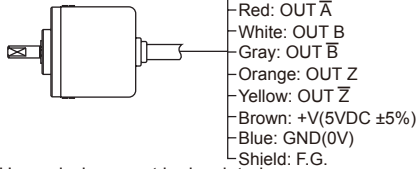
## Connections

### ◎ Cable type

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



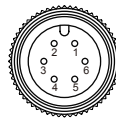
- Line driver output



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

### ◎ Connector cable type

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



- Line driver output

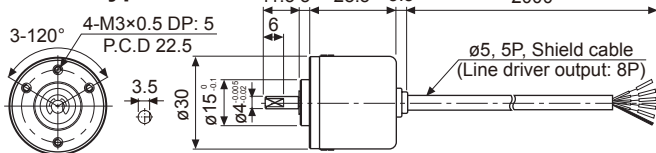


Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G.	Shield	⑥	OUT $\bar{B}$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

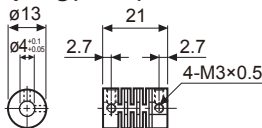
※ F.G.(Field Ground):It should be grounded separately.

## Dimensions

### ◎ Cable type



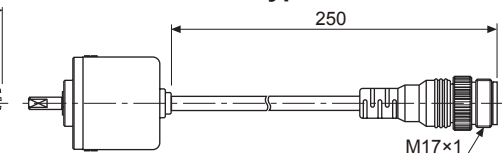
- Coupling(E30S)



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

※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.

### ◎ Connector cable type



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

- (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