

# Incremental $\phi$ 30mm Shaft Type

## Diameter $\phi$ 30mm Shaft type Incremental Rotary encoder

### ■ Features

- Miniature  $\phi$  30mm shaft type rotary encoder
- Easy installation at narrow space
- Small inertia moment
- Power supply : 5VDC, 12–24VDC  $\pm$ 5%
- Various output types

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



### ■ Ordering information

**E30S** **4** – **1024** – **3** – **2** – **24** –

Series	Shaft diameter	Pulse/1 Revolution	Output phase	Output	Power supply	Cable
Diameter $\phi$ 30mm, shaft type	$\phi$ 4mm	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 $\pm$ 5% 24:12–24VDC $\pm$ 5%	No mark:Normal type (*) 2C:Cable outgoing connector type

\*Standard:E30S4–**PULSE**–3–N–24

\*Standard:A, B, Z

\*The power of Line driver is only for 5VDC

\*Cable length:250mm

### ■ Specifications

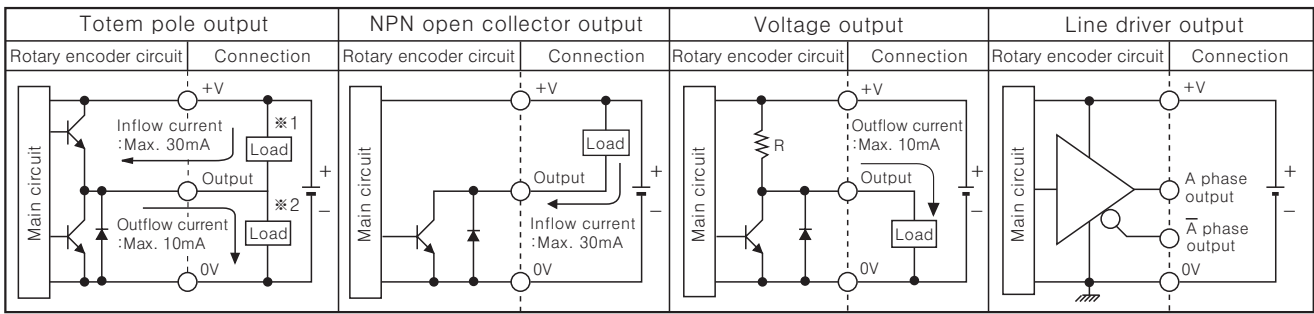
Item		Diameter $\phi$ 30mm shaft type of Incremental rotary encoder		
Resolution (P/R)		100, 200, 360, 500, 1000, 1024, 3000 (Not indicated type is available to customize)		
Electrical specification	Output phase	A, B, Z phase (Line driver : A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$ phase)		
	Phase difference of output	Phase difference 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 (5VDC:Output resistance 820 $\Omega$ ), Max. 2 $\mu$ s (12–24VDC:Output resistance 4.7k $\Omega$ )	
		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)		
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)			
Connection	Cable outgoing type, 250mm cable outgoing connector type			
Mechanical specification	Starting torque	Max. 20gf $\cdot$ cm (0.002N $\cdot$ m)		
	Rotor inertia	Max. 20g $\cdot$ cm <sup>2</sup> (2 $\times$ 10 <sup>–6</sup> kg $\cdot$ m <sup>2</sup> )		
	Shaft loading	Radial : Max. 2kgf, Thrust : Max. 1kgf		
	Max. allowable revolution	<b>(★Note1)</b> 5000rpm		
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours			
Shock	Max. 50G			
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 (IEC standard)			
Cable	$\phi$ 5mm, 5P, Length:2m, Shield cable (Line driver: $\phi$ 5mm, 8P)			
Accessory	$\phi$ 4mm coupling			
Unit weight	Approx. 80g			
Approval	<b>CE</b> (Except for Line driver output)			

\* **(★Note1)** Max. allowable revolution  $\geq$  Max. response revolution **[**Max. response revolution (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

# E30S Series

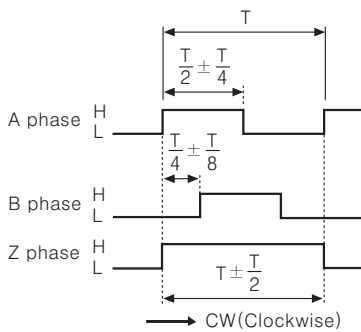
## Control output diagram



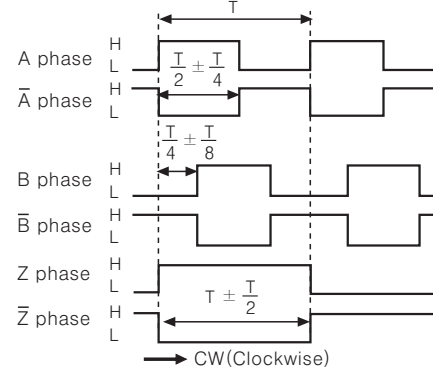
- Totem pole output type can be used for NPN open collector output type(\*1) or Voltage output type(\*2).
- All output circuits of A, B, Z phase is same. (Line driver output is for A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output waveform

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



※ CW : As viewed from the shaft



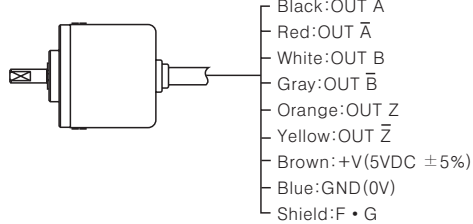
## Connections

### Normal type

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



- Line driver output



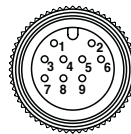
- ※ Unused wires must be insulated.
- ※ The metal case and shield wire of encoder should be grounded(F.G).

### Cable outgoing connector type

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



- Line driver output

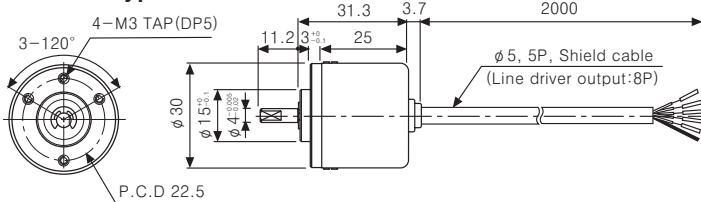


Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT $\bar{B}$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

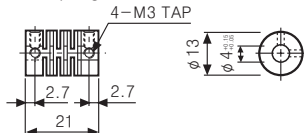
※ F.G(Field Ground):It should be grounded separately.

## Dimensions

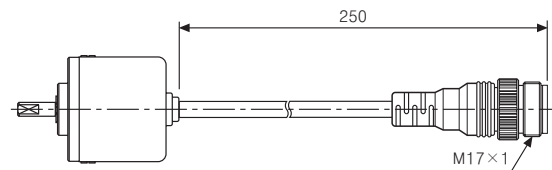
### Normal type



- Coupling



### Cable outgoing connector type



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

(Unit:mm)