

# E30S Series

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

### ■ Features

- Miniature  $\phi$  30mm shaft type rotary encoder
- Easy installation at narrow space
- Small moment of inertia
- 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	—	
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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 (*) C: 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

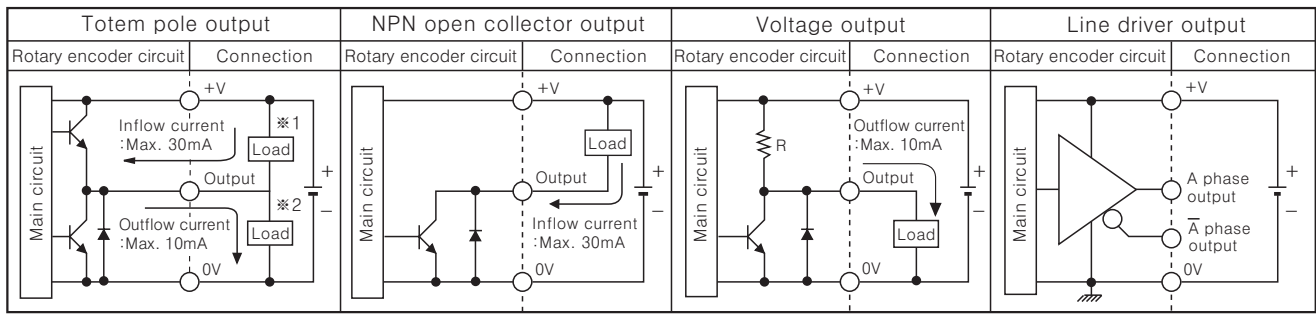
### ■ Specifications

Item		Diameter $\phi$ 30mm shaft type of Incremental rotary encoder	
Resolution (P/R)		100, 200, 360, 500, 1000, 1024, 3000 (Not indicated 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	<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 mega)	
	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> ( $2 \times 10^{-6}$ 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		(Except for Line driver output)	

\* **(★Note1)** Max. allowable revolution  $\geq$  Max. response revolution **[**Max. response revolution (rpm) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ **]**

# Incremental $\phi$ 30mm Shaft Type

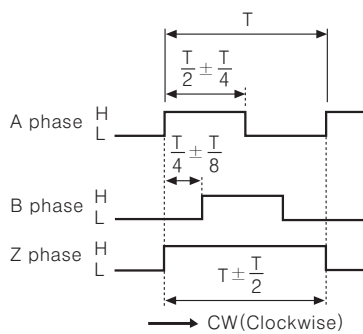
## Control output diagram



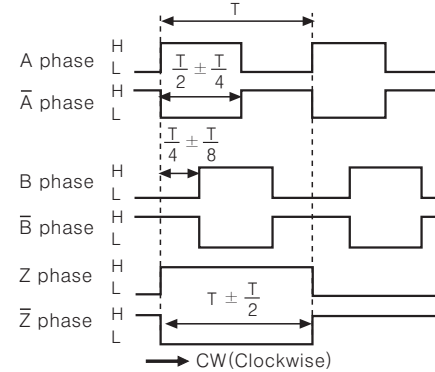
- Totem pole output type can be used for NPN open collector output type (※1) or Voltage output type (※2).
- All output circuits of A, B, Z phase is same. (Line driver output is for A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output waveform

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



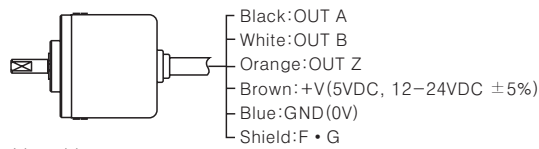
※ CW : As viewed from the shaft



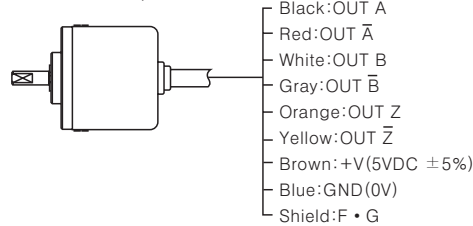
## Connections

### Normal type

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



- Line driver output

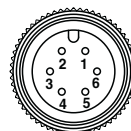


※ Unused wires must be insulated.

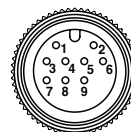
※ The metal case and shield wire of encoder should be grounded(F.G).

### Cable outgoing connector type

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



- Line driver output

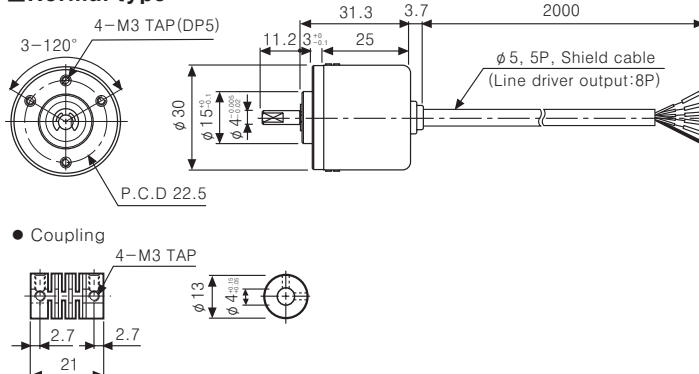


Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT $\bar{B}$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

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

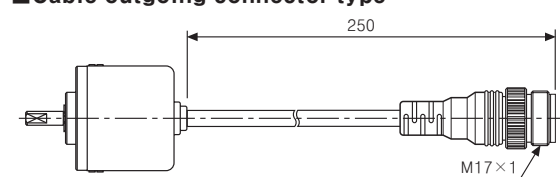
## Dimensions

### Normal type



- Coupling

### Cable outgoing connector type



※ Connector cable is customizable and see M-57 for specifications.

(Unit:mm)

- (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) Field network device
- (Q) Production stoppage models & replacement