

# E30S Series

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

### ■ Features

- Diameter  $\phi$  30mm of miniature 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** – **N** – **24** –

Series	Shaft diameter	Pulse/1Revolution	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%	Blank: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

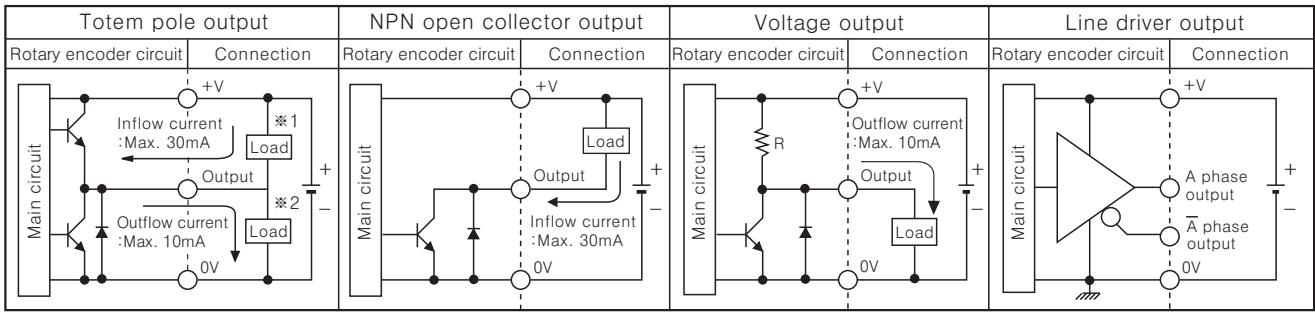
Item	Diameter $\phi$ 30mm shaft type of incremental rotary encoder		
Resolution(P/R)	100, 200, 360, 500, 1000, 1024, 3000 (Not indicated resolution is customizable.)		
Electrical specification	Output phase	A, B, Z phase (Line driver : A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$ phase)	
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=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 voltage : Max. 0.5VDC • High $\Rightarrow$ Load current : Max. –20mA, Output voltage : Min. 2.5VDC
	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	• 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 $\Omega$ (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, 250mm cable outgoing connector type		
Mechanical specification	Starting torque	Max. 20gf $\cdot$ cm (0.002N $\cdot$ m)	
	Moment of 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	(★Note1) 5000rpm	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 50G		
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	IP50 (IEC standard)		
Cable	$\phi$ 5mm, 5P, Length : 2m, Shield cable (Line driver : $\phi$ 5mm, 8P)		
Accessory	$\phi$ 4mm coupling		
Approval	CE (Except for line driver output)		
Unit weight	Approx. 80g		

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

Make sure that max. response revolution should be lower than max. allowable revolution when selecting the resolution.

# Incremental $\phi$ 30mm Shaft Type

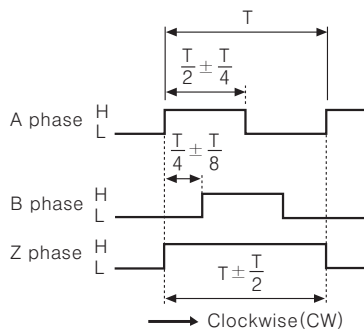
## Control output diagram



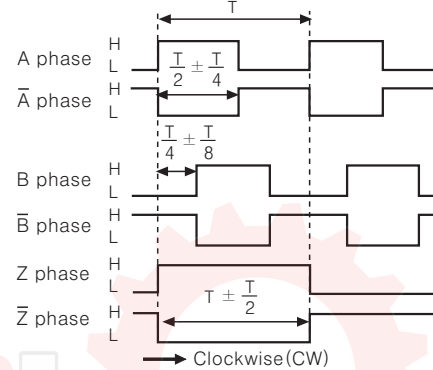
- Totem pole output type can be used for NPN open collector output type (\*1) or Voltage output type (\*2).
- All output circuits of A, B, Z phase are the same. (Line driver output is for A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output waveform

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



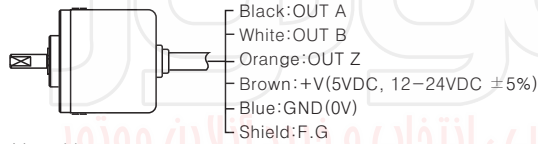
\*CW : Right turn as from the shaft



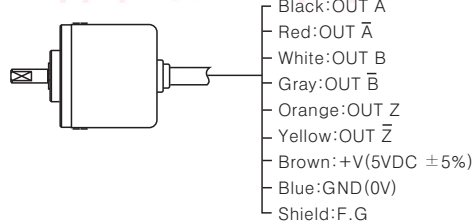
## Connections

### Normal type

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



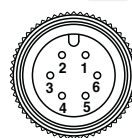
- Line driver output



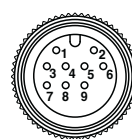
- \* Unused wires must be insulated.
- \* The metal case and shield wire of encoder should be grounded (F.G).

### Cable outgoing connector type

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



- Line driver output

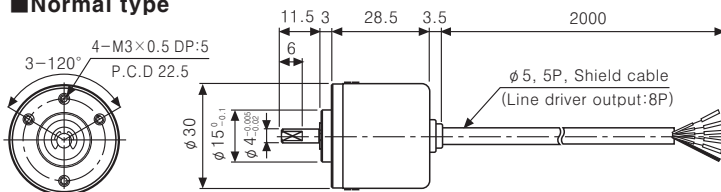


Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT $\bar{B}$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

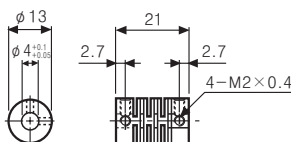
\* F.G(Field Ground):It should be grounded separately.

## Dimensions

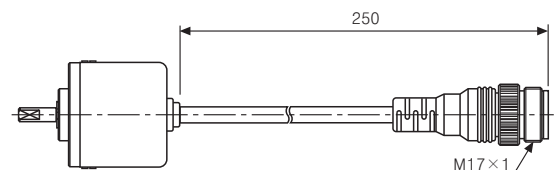
### Normal type



- Coupling(E30S)



### Cable outgoing connector type



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

(Unit:mm)

(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