

E30S Series

Diameter Ø30mm Shaft Type Incremental Rotary Encoder

■ Features

- Diameter Ø30mm of miniature shaft type rotary encoder
- Easy installation at narrow space
- Small shaft inertia moment
- 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	Control 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) ^{※1}	100, 200, 360, 500, 1000, 1024, 3000		
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)		
Electrical specification	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	Max. 1μs (Cable length: 2m, I sink = 20mA)	
	NPN open collector output		
	Voltage output		Max. 1μs (5VDC: Output resistance 820Ω), Max. 2μs (12-24VDC: Output resistance 4.7kΩ) (Cable length: 2m, I sink = 20mA)
Line driver output	Max. 0.5μs (Cable length: 2m, I sink = 20mA)		
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		
Mechanical specification	Starting torque	Max. 20gf·cm (0.002N·m)	
	Moment of inertia	Max. 20g·cm ² (2×10 ⁻⁶ kg·m ²)	
	Shaft loading	Radial: Max. 2kgf, Thrust: Max. 1kgf	
	Max. allowable revolution ^{※2}	5000rpm	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction 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 structure	IP50 (IEC standard)		
Cable	Ø5mm, 5-wire, Length: 2m, Shield cable (Line driver:Ø5mm, 8-wire)		
Accessory	Ø4mm coupling		
Approval	CE (Except line driver output)		
Unit weight	Approx. 80g		

※1: Not indicated resolutions are customizable.

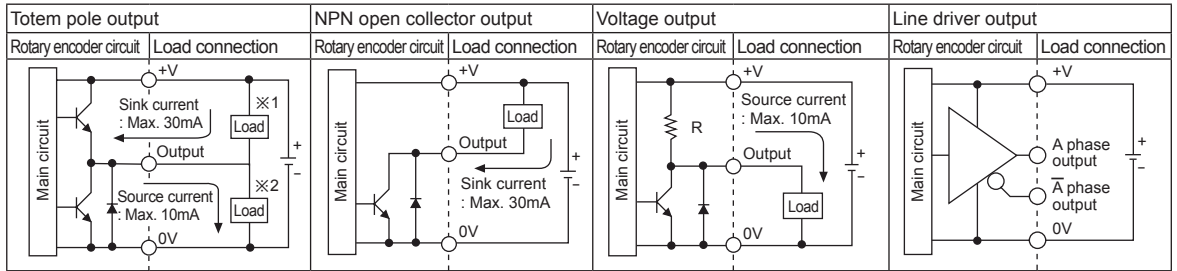
※2: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※Environment resistance is rated at no freezing or condensation.

Incremental Ø30mm Shaft Type

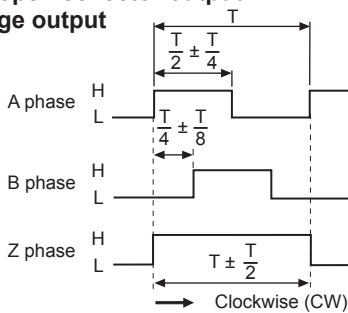
Control Output Diagram



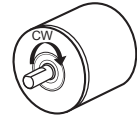
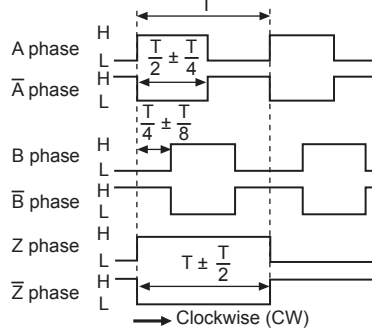
- Totem pole output type can be used for NPN open collector output type (※1) or Voltage output type (※2).
- All output circuits of A, B, Z phase are same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output Waveform

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



- Line driver output



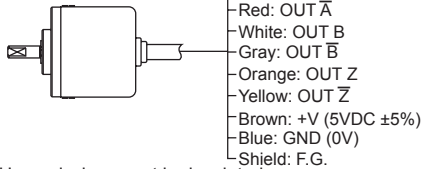
Connections

◎ Cable type

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



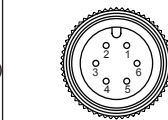
- Line driver output



- ※ 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

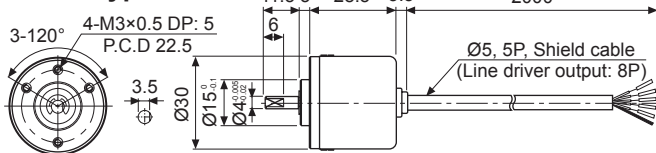


Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G.	Shield	⑥	OUT \bar{B}	Gray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

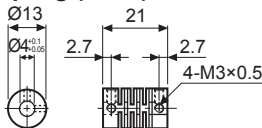
- ※ F.G. (Field Ground): It should be grounded separately.

Dimensions

◎ Cable type



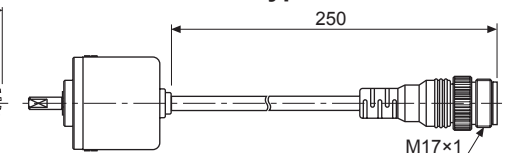
- Coupling (E30S)



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

- ※ For parallel misalignment, angular misalignment, end-play terms, refer to page F-71.
- ※ For flexible coupling (ERB Series) information, refer to page F-64.

◎ Connector cable type



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