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.

CE

▣ 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, Ā, B, B̄, Z, Z̄	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, Ā, B, B̄, Z, Z̄ 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 - 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	• Measuring condition - Cable length : 2m, I sink = 20mA
		NPN open collector output	Max. 1μs	
		Voltage output	Max. 1μs(5VDC : Output resistance 820Ω), Max. 2μs(12-24VDC : Output resistance 4.7kΩ)	
		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	
Mechanical specification	Starting torque		Max. 20gf·cm(0.002N·m)	
	Moment of inertia		Max. 20g·cm²(2×10^{-6} kg·m²)	
	Shaft loading		Radial : Max. 2kgf, Thrust : Max. 1kgf	
	Max. allowable revolution※1		5000rpm	
Vibration			1.5mm amplitude or 300m/s² 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℃, storage : -25 to 85℃	
		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	

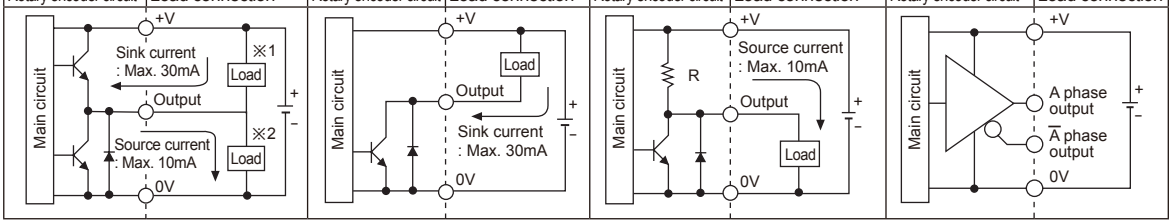
※1: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※Environment resistance is rated at no freezing or condensation.

■ Control output diagram

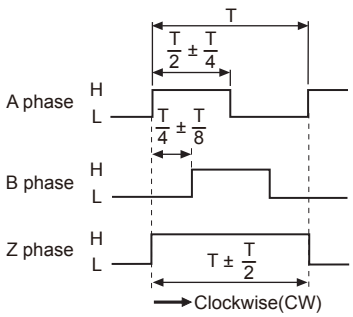
Totem pole output		NPN open collector output		Voltage output		Line driver output	
Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection



- 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, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$)

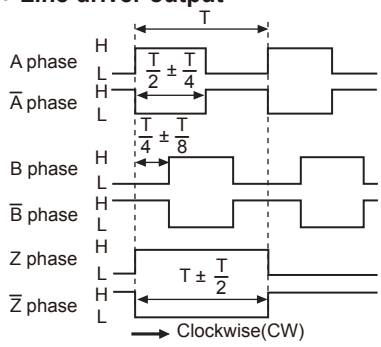
■ Output waveform

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



※CW: Right turn as from the shaft

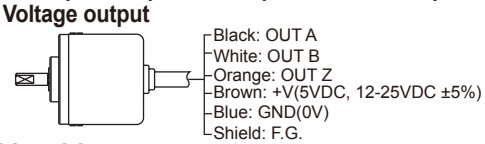
● Line driver output



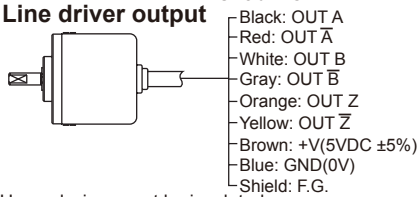
■ Connections

◎ 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

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 $\overline{A}$	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 $\overline{B}$	Gray
			⑦	OUT Z	Orange
			⑧	OUT $\overline{Z}$	Yellow
			⑨	F.G.	Shield

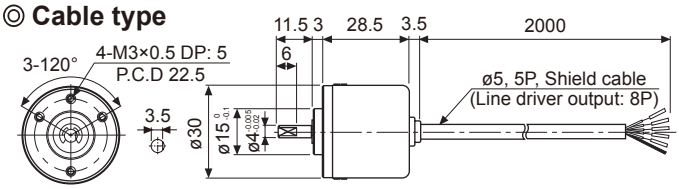
• Line driver output

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

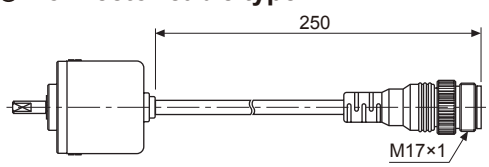
■ Dimensions

(unit: mm)

◎ Cable type

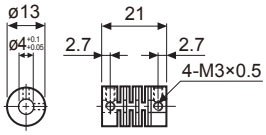


◎ Connector cable type



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

● 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.