

Autonics

**ROTARY ENCODER(INCREMENTAL TYPE)
E30S4 SERIES**

M A N U A L



Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Caution for your safety

- ※Please keep these instructions and review them before using this unit.
- ※Please observe the cautions that follow;
- Warning** Serious injury may result if instructions are not followed.
- Caution** Product may be damaged, or injury may result if instructions are not followed.
- ※The following is an explanation of the symbols used in the operation manual.
- ⚠Injury or danger may occur under special conditions.

Warning

- When use this unit for controlling highly affective equipment to human or properties. (Medical instrument, Vehicles, Train, Airplane, combustion apparatus, entertainment etc.), it requires installing a fail safety device.
It may cause serious human injury or a fire, property.

Caution

- Do not drop water or oil on this unit.
It may cause damage or miscontrol due to malfunction.
- Please observe voltage rating.
It may shorten the life cycle or damage to this unit.
- Please check the polarity of power and wrong wiring.
It may result in damage to this unit.
- Do not short circuit the load.
It may result in damage to this unit.

Outline

This unit is very useful to control length, angle and position by converting revolution value of shaft into number of pulse as an optical incremental Encoder.

Ordering information

E30S	4	1024	3	N	24	
Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter φ30mm, shaft type	φ4mm	100, 200, 360, 500, 1000, 1024, 3000	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: Normal type ※ C:Cable outgoing connector type
			※ Standard : A, B, Z	※The power of Line driver is only for 5VDC		※ Cable length : 250mm

※Standard: E30S4 - [PULSE] - 3 - N - 24

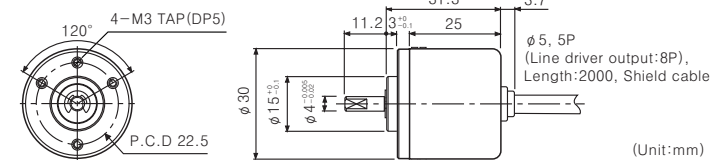
※The above specification are changeable without notice anytime.

Specifications

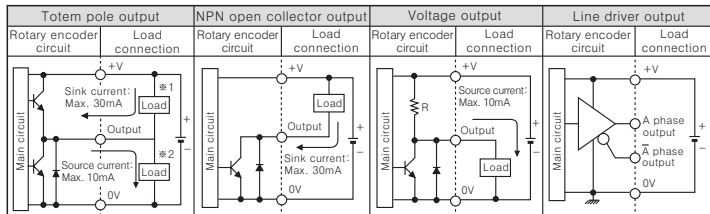
Item	φ30mm Shaft type Incremental Rotary encoder	
Resolution(P/R)	100, 200, 360, 500, 1000, 1024, 3000 (Not indicated type is available to customize)	
Output phase	Output between A and B phase : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)	
Control output	Totem pole output	• Low ⇨ Load current:Max. 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
Electrical specification	Totem pole output	Max. 1μs
	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
	Current consumption	Max. 80mA(disconnection of the load), Line driver output:Max. 50mA(disconnection of the load)
Insulation resistance	Min. 100MΩ(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 • 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	(Note1) 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°C (at non-freezing status), Storage : -25 ~ 85°C	
Ambient humidity	35 ~ 85%RH, Storage : 35-90%RH	
Protection	IP50(IEC specification)	
Cable	φ5mm, 5P(Line driver output:8P), Length:2m, Shield cable	
Accessory	φ4mm coupling	
Weight	Approx. 80g	
Approval	CE (Except Line driver output)	

※(Note1)Max. allowable revolution ≧ Max. response revolution [Max. response revolution (rpm) = $\frac{\text{Max. response frequency} \times 60 \text{ sec}}{\text{Resolution}}$]
Please select the resolution to make lower max. revolution than max. allowable revolution.

Dimensions

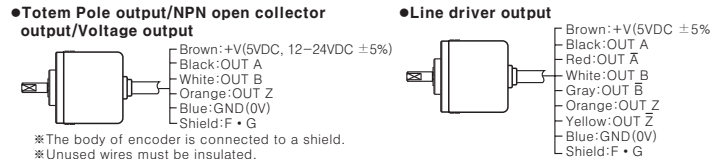


Control output diagram

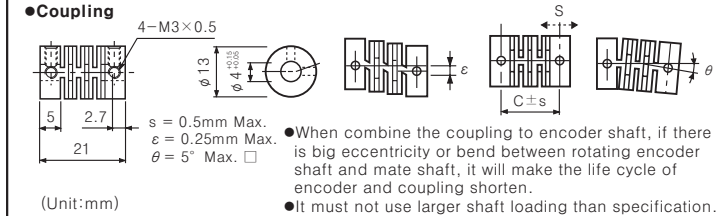


⇨ The output circuit of A, B, Z phase are the same. (Line driver output is A, Ā, B, B̄, Z, Z̄)
⇨ Totem pole output can be used for NPN open collector type(※1) or voltage output type(※2).

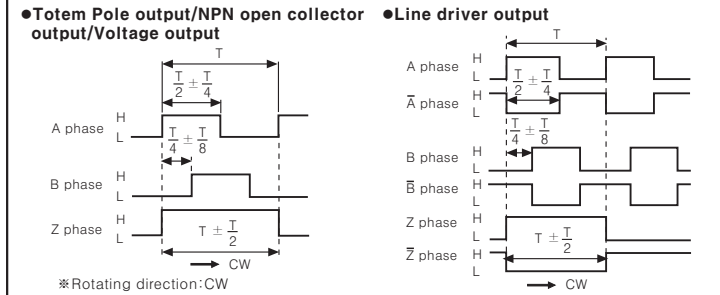
Connections



Accessory



Output waveform



Caution for using

- Installation
 - This unit is consisted of precision components. Therefore please treat this product carefully.
 - When you install this unit, if eccentricity and deflection angle are larger, it may shorten the life cycle of this unit.
 - Environment
 - Please do not use this unit with below environment, it results in malfunction.
 - Place where there is strong vibration or impact.
 - Place where there are lots of flammable or corrosive gases.
 - Place where strong magnet field or electric noise are occurred.
 - Place where is beyond of rating temperature or humidity.
 - Place where strong acids or alkali near by.
 - Place where there is the direct ray of the sun.
 - Vibration and Impact
 - When the strong impact loads on this unit, the error pulse may occur as if the slit is revolving.
 - Therefore please fix bracket firmly when mount this unit, because rotary encoder with high resolution can be easily affected by impact.
 - Wire connection
 - Do not draw the wire with over 30N strength after wiring.
 - When a high voltage or power line pass near by the encoder cable, be sure to wire the encoder cable in separated conduit to prevent malfunction.
 - When extend the cable, please use it after checking the cable and response frequency due to increment of residual voltage or distortion of waveform can be easily occurred. (Preferable shortest distance for operating)
 - Shield wire must be connected to F.G terminal.
 - Installation environment
 - It shall be used indoor
 - Altitude Max. 2000m
 - Pollution Degree 2
 - Installation Category II.
- ※ It may cause malfunction if above instructions are not followed.

Major products

- PROXIMITY SENSOR ■ PHOTOELECTRIC SENSOR ■ AREA SENSOR
- FIBER OPTIC SENSOR ■ DOOR/DOOR SIDE SENSOR ■ PRESSURE SENSOR
- ROTARY ENCODER ■ COUNTER
- TIMER ■ TEMPERATURE TROLLER
- TEMPERATURE/HUMIDITY TRANSDUCER
- POWER CONTROLLER ■ PANEL METER
- TACHO/LINE SPEED/PULSE METER
- DISPLAY UNIT ■ SENSOR CONTROLLER
- SWITCHING POWER SUPPLY
- GRAPHIC PANEL
- 5-PHASE STEPPING MOTOR & DRIVER & CONTROLLER
- LASER MARKING SYSTEM(CO₂, Nd:YAG)

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