Autonics

ROTARY ENCODER(INCREMENTAL TYPE)
E30S4 SERIES
M A N U A L

CE

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

1. 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

1. Do not drop water or oil on this unit.
It may cause damage or miscontrol due to malfunction.
2. Please observe voltage rating.
It may shorten the life cycle or damage to this unit.
3. Please check the polarity of power and wrong wiring.
It may result in damage to this unit.
4. 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, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$	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: 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

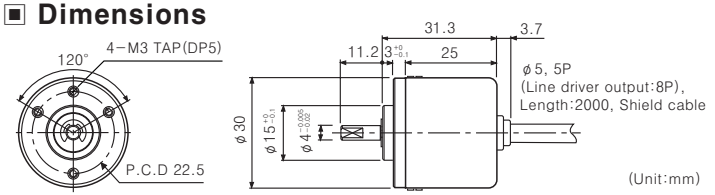
※The above specification are changeable without notice anytime.

■ Specifications

Item			
Resolution(P/R)			100, 200, 360, 500, 1000, 1024, 3000 (Not indicated type is available to customize)
Electrical specification	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
	Control output: NPN open collector output		Load current:Max. 30mA, Residual voltage:Max. 0.4VDC
	Control output: Voltage output		Load current:Max. 10mA, Residual voltage:Max. 0.4VDC
	Control output: 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
	Response time (Rise/Fall): NPN open collector output		Max. 1μs
	Response time (Rise/Fall): Voltage output		Max. 1μs(5VDC:Output resistance 820Ω), Max. 2μs(12–24VDC:Output resistance 4.7kΩ)
	Response time (Rise/Fall): Line driver output		Max. 0.5μs
			• Measuring condition ☞ Cable length:2m, I sink=Max. 20mA
	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 • cm² (2×10⁻⁶kg • m²)
	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℃(at non−freezing status), Storage : −25 ~ 85℃
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)

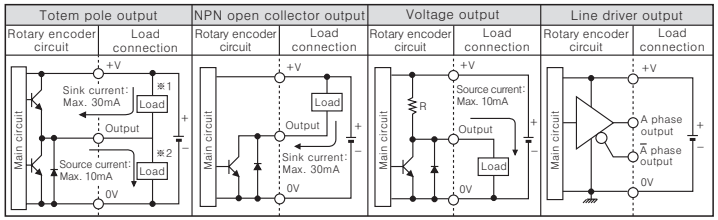
※**(Note1)** Max. allowable revolution≥Max. response revolution [Max. response revolution(rpm)= $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60$ sec]
Please select the resolution to make lower max. revolution than max. allowable revolution.

■ Dimensions



(Unit:mm)

■ Control output diagram



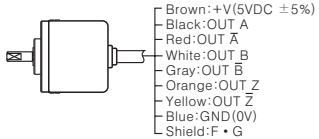
☞ The output circuit of A, B, Z phase are the same.(Line driver output is A, Ā, B, B̄, Z, Z̄)
☞ Totem pole output can be used for NPN open collector type(※1) or voltage output type(※2).

■ Connections

●**Totem Pole output/NPN open collector output/Voltage output**

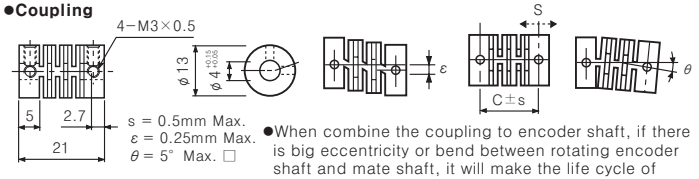
※The body of encoder is connected to a shield.
※Unused wires must be insulated.

●**Line driver output**



■ Accessory

●**Coupling**

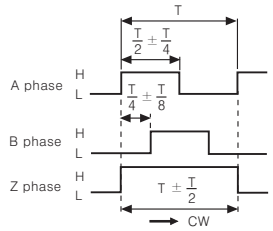


(Unit:mm)

●When combine the coupling to encoder shaft, if there is big eccentricity or bend between rotating encoder shaft and mate shaft, it will make the life cycle of encoder and coupling shorten.
●It must not use larger shaft loading than specification.

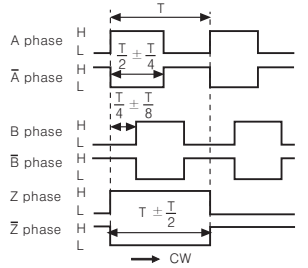
■ Output waveform

●**Totem Pole output/NPN open collector output/Voltage output**



※Rotating direction:CW

●**Line driver output**



■ Caution for using

1. Installation
①This unit is consisted of precision components. Therefore please treat this product carefully.
②When you install this unit, if eccentricity and deflection angle are larger, it may shorten the life cycle of this unit.
2. Environment
Please do not use this unit with below environment, it results in malfunction.
①Place where this unit or component may be damaged by strong vibration or impact.
②Place where there are lots of flammable or corrosive gases.
③Place where strong magnet field or electric noise are occurred.
④Place where is beyond of rating temperature or humidity.
⑤Place where strong acids or alkali near by.
⑥Place where there is the direct ray of the sun.
3. Vibration and Impact
①When the strong impact loads on this unit, the error pulse may occur as if the slit is revolving.
②Therefore please fix bracket firmly when mount this unit, because rotary encoder with high resolution can be easily affected by impact.
4. Wire connection
①Do not draw the wire with over 30N strength after wiring.
②When 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.
③When 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)
④Shield wire must be connected to F.G terminal.
5. Installation environment
①It shall be used indoor ②Altitude Max. 2000m
③Pollution Degree 2 ④Installation 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(CO_2, Nd:YAG)

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