

Autonics

ROTARY ENCODER(INCREMENTAL TYPE) E50S/E50SP SERIES



E50S

E50SP



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 caution 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.

Caution: Injury or danger may occur under special conditions.

Warning

1. In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.
It may cause a fire, human injury or damage to property.

Caution

1. Do not drop water or oil on this unit.
It may cause damage or malfunction due to malfunction.

2. Please observe the rated voltage.
It may shorten the life cycle or damage to the product.

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.

Ordering information

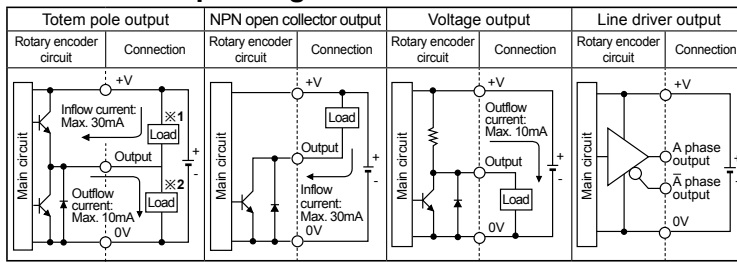
Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
E50S	8	8000	3	N	24	
Diameter ø50mm, shaft type	ø8mm	See resolution	2: A, B 3: A, B, Z 4: A, A, B, B̄ 6: A, A, B, B, Z, Z̄	T: Totem pole output N: NPN open collector output V: Voltage output L: Line driver output	5: 5VDC±5% 24: 12-24VDC±5%	No mark: Normal type C: Cable outgoing connector type(×) CR: Rear connector integrated type CS: Side connector integrated type

Standard: E50S8-[PULSE]-3-N-24 Cable length: 250mm

Series	Shaft diameter	External material	Pulse/1Revolution	Output phase	Output	Power supply	Cable
E50S	6	P: Plastic	600	3	N	24	
Diameter ø50mm, shaft type	6: ø6mm 8: ø8mm	P: Plastic	See resolution	2: A, B 3: A, B, Z 4: A, A, B, B̄ 6: A, A, B, B, 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: E50S6P-[PULSE]-3-N-24 The power of Line driver is only for 5VDC Cable length: 250mm

Control output diagram



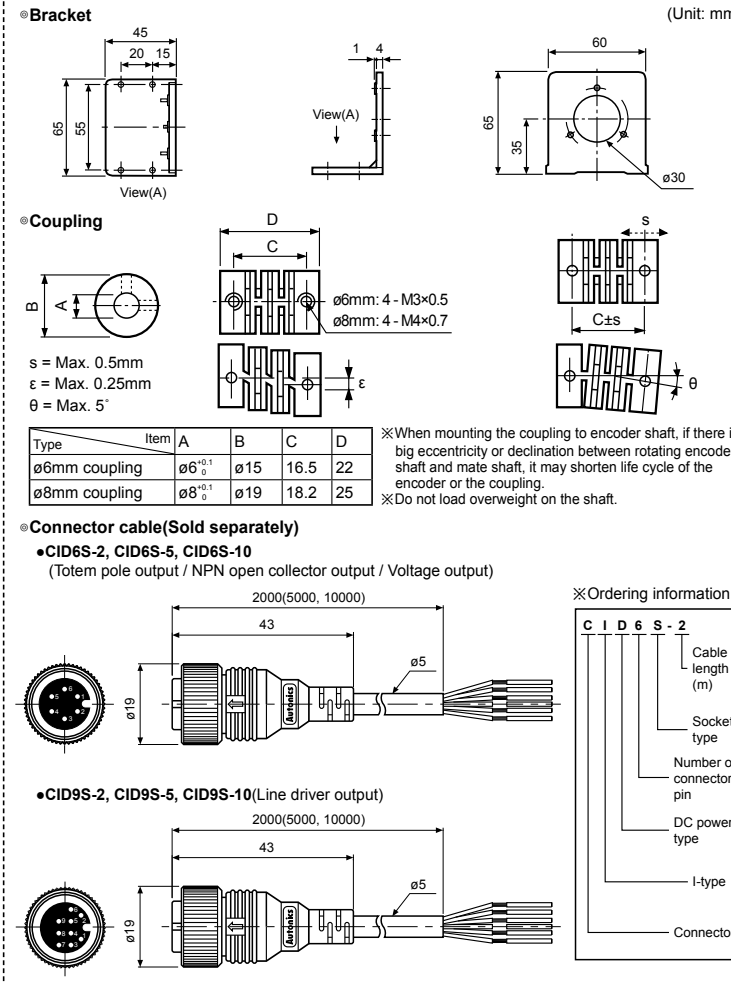
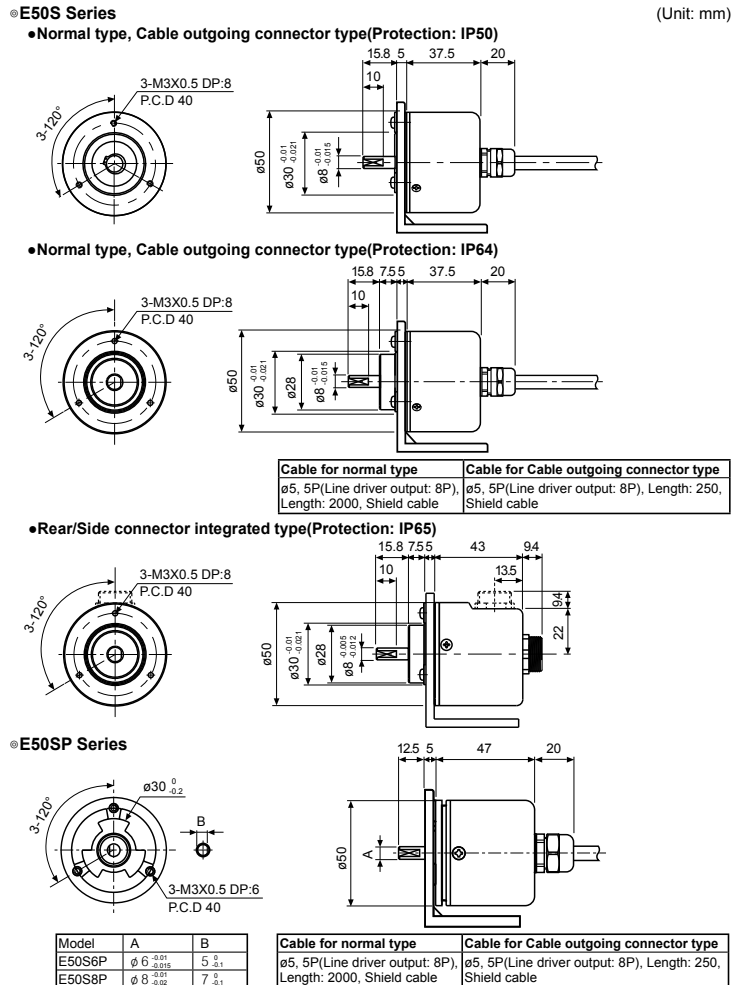
The output circuit of A, B, Z phase are the same. (Line driver output is A, A, B, B, Z, Z)
Totem pole output can be used for NPN open collector type(×1) or voltage output type(×2).
The above specifications are subject to change without notice.

Specifications

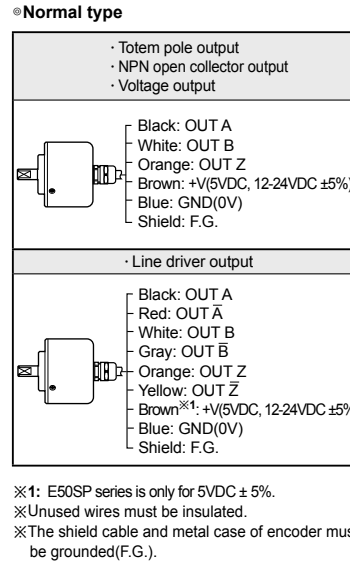
Item	ø50mm Shaft type Incremental Rotary encode	ø50mm P-ø6mm Shaft type Incremental Rotary encode	
Model	Totem pole output	E50S8-□□□□-3-T-□	E50SP-□□□□-3-T-□
	NPN open collector output	E50S8-□□□□-3-N-□	E50SP-□□□□-3-N-□
	Voltage output	E50S8-□□□□-3-V-□	E50SP-□□□□-3-V-□
	Line driver output	E50S8-□□□□-6-L-□	E50SP-□□□□-6-L-5
Resolution(P/R)×1	*1, *2, *5, 10, 12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000	*1, *2, *5, 10, 12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600	
Output phase	A, B, Z phase(Line driver output : A, A, B, B, Z, 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 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(Power voltage 5VDC): Min. 2.5VDC, Output voltage(Power voltage 12-24VDC): Min. (Power voltage-3.0)VDC	
Electrical specification	Totem pole output	Max. 1µs(Cable length: 2m, I sink=20mA)	
	NPN open collector output	Max. 1µs(Cable length: 2m, I sink=20mA)	
	Voltage output	Max. 0.5µs(Cable length: 2m, I sink=20mA)	
	Line driver output	Max. 0.5µs(Cable length: 2m, I sink=20mA)	
Max. Response frequency	300kHz	180kHz	
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 outgoing type, Cable outgoing connector type, Connector integrated type(rear, side) Cable outgoing type, Cable outgoing connector type		
Mechanical specification	Starting torque	Max. 70gf·cm(0.007N·m)×2, Max. 800gf·cm(0.08N·m)×3	Max. 100gf·cm(0.01N·m)
	Moment of inertia	Max. 80g·cm²(8×10⁻⁷kg·m²)×2, Max. 400g·cm²(4×10⁻⁶kg·m²)×3	Max. 40g·cm²(4×10⁻⁶kg·m²)
	Shaft loading	Radial: Max. 10kg·f, Thrust: Max. 2.5kg·f	Radial: Max. 2kg·f, Thrust: 1kg·f
	Max. allowable revolution×4	5,000rpm	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 75G		
Environment	Ambient temperature	-10 to 70°C, Storage: -25 to 85°C	
	Ambient humidity	35 to 85% RH, Storage: 35 to 90%RH	
Protection	Normal type, Cable outgoing connector type: IP50(IEC standard)×5, Connector integrated type: IP65(IEC standard)		IP50(IEC standard)
Cable	ø5mm, 5P, Length: 2m, Shield cable(Line driver output: ø5mm, 8P) (AWG 24, Core wire diameter: 0.08mm, No. of core wire: 40, Insulator out diameter: ø1mm)		ø8(ø6)mm coupling, Bracket
Accessory	ø8mm coupling, Bracket		ø8(ø6)mm coupling, Bracket
Approval	Normal type (Except Line driver output)		-
Unit weight	Approx. 275g, Connector integrated type : Approx. 180g	Approx. 235g	

×1: 1, 2, 5 P/R are output A and B phase only.(But Line driver output : A, A, B, B phase)
×2: This value is for normal type, cable outgoing connector type (Protection: IP50). ×3: This value is for normal type, cable outgoing connector type (Protection: IP64)/connector integrated type (Protection: IP65)
×4: Max. allowable revolution ≥ Max. response revolution [Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$] Please select the resolution to make lower max. revolution than max. allowable revolution.
×5: Normal type, cable outgoing connector type is option as IP64 protection.
×Environment resistance is rated at no freezing or condensation.

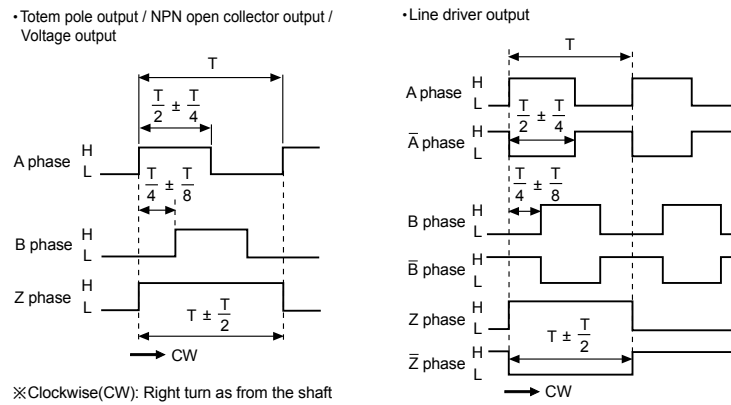
Dimensions



Connections



Output waveform



Caution for using

- Installation**
 - This unit consists of precision components. If you drop this unit, it may lose the function. Please treat this product carefully.
 - When you install this unit, if eccentricity and deflection angle are larger, load is applied to the shaft. It may shorten the life cycle of this unit.
 - Do not put strong impact with hammer, etc when insert coupling into shaft.
 - For using**
 - Please use attached Sil Twist pair wire and use proper receiver for RS-422A communication.
 - Do not cut or connect circuit when power is ON. It may cause damage to the unit.
 - When the power source is Switching Power, it may cause surge. Install a surge absorber in power line. Wire should be shorter in order not to be influenced by noise.
 - Environment**
 - Please do not use this unit with below environment, or it may cause malfunction.
 - Place where there is a lot of flammable or corrosive gases.
 - Place where strong magnet field or electric noise occurs.
 - Place where is beyond of the rated temperature or humidity.
 - Place where strong acids or alkali near by.
 - Place where there is the direct ray of the sun.
 - Vibration and Impact**
 - If a big impact or strong vibration applies to the product it may cause pulse errors. Be sure that when installing this unit.
 - Encoder with high resolution can be easily affected by vibration, therefore tighten fixing bracket when installing this unit.
 - Wire connection**
 - Do not pull out the wire with over 30N strength after fixing the unit and wiring the cable.
 - If wire encoder cable with high voltage line or power cable in the same conduit, it may cause a malfunction or mechanical problem. Please wire it separately or use separated conduit.
- It may cause malfunction if above instructions are not followed.**

Major products

- Proximity sensors
- Area sensors
- Display units
- Rotary encoders
- Power controllers
- Photoelectric sensors
- Door/Door side sensors
- Graphic/Logic panels
- Temperature controllers
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Switching power supplies
- Stepping motors/drivers/motion controllers
- Field network devices
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system
- Counters
- Timers
- Panel meters
- Pressure sensors
- Fiber optic sensors
- Sensor controllers

Autonics Corporation
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