Autonics

ROTARY ENCODER(INCREMENTAL TYPE) E50S/E50SP SERIES



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

■ Caution for your safety

XPlease 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.

XThe 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 miscontrol 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

	diameter	Pulse/ 1Revolution	Output phase	Output	Power supply	Cable
Diameter ø50mm, shaft type	ø8mm	See resolution	2: A, B 3: A, B, Z 4: A, A, B, B 6: A, A, B, B, Z, 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(X) CR: Rear connector integrated type CS: Side connector integrated type

E50S	6	- P	600	. 3	. <u>N</u> -	24	-
Series		External material	Pulse/ 1Revolution	Output phase	Output	Power supply	Cable
Diameter ø50mm, shaft type	6: ø6mm 8: ø8mm	P: Pla- stic	See resolution	2: A, B 3: A, B, Z 4: A, Ā, B, B 6: A, Ā, B, B, Z, 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	d: E50S6F	P-PULSI	E-3-N-24		XThe power of only for 5VD		*Cable length: 250mm

Control output diagram

			<u> </u>				
Totem po	ole output	NPN open co	ollector output	Voltage	output	Line driver output	
Rotary encoder circuit Connection		Rotary encoder circuit Connection		Rotary encoder circuit	Connection	Rotary encoder circuit	Connection
Inflow of Max. 30	Output +	Main circuit	Output + Inflow current: Max. 30mA 0V	Main circuit	Outflow current: Max. 10mA Output Load OV	Main circuit	A phase output + A phase output - OV

 \times The output circuit of A, B, Z phase are the same. (Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{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							
	Totem	oole output	E50S8	E50S P- 3-T-						
Model -	NPN o	oen collector output	E50S83-N	E50S P- 3-N-						
	Voltage	output	E50S8	E50S P- 3-V-						
Line driver output		ver output	E50S8	E50S P						
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, 2004, 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		phase	A, B, Z phase(Line driver output : A, \overline{A} , B, \overline{B} , Z, \overline{Z} phase)							
	Phase difference of output		Phase difference between A and B: $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)							
		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							
	Control	NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	· · · · · · · · · · · · · · · · · · ·						
	Control	Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC							
Floatrical	оафаг	Line driver output	Load current: Max. 20mA, Residual voltage : Max. 0.5VDC High ⇒ Load current: Max20mA, Output voltage(Power voltage 5VDC): Min. 2.5VDC, Output voltage(Power voltage 12-24VDC): Min. (Power voltage-3.0)VDC	-Low = Load current: Max. 20mA, Residual voltage: Max. 0.5VDC -High = Load current: Max20mA, Output voltage: Min. 2.5VDC						
Electrical specification	Res-	Totem pole output								
poomodio	ponse	NPN open collector output	Max. 1μs(Cable length: 2m, I sink=20mA)							
	time (Rise/	Voltage output								
Èa	Fall)	Line driver output	Max. 0.5μs(Cable length:2m, I sink=20mA)							
	Max. F	Response frequency	300kHz	180kHz						
	Power	supply	•5VDC ±5%(Ripple P-P: Max. 5%) •12-24VDC ±5%(Ripple P-P: Max. 5%)							
	Currer	t consumption	Max. 80mA(disconnection of the load), Line driver output: Max. 50mA(disconnection of the load)							
	Insula	ion resistance	Min. 100MΩ(at 500VDC megger between all terminals and case)							
	Dielec	tric strength	750VAC 50/60Hz for 1 minute(Between all terminals and case)							
	Conne	ction	Cable outgoing type, Cable outgoing connector type, Connector integrated type(rear, side)	7 0 0 77 1						
	Startin	g torque	Max. 70gf·cm(0.007N·m) ^{※2} , Max. 800gf·cm(0.08N·m) ^{※3}	Max. 100gf·cm(0.01N·m)						
Mechanical	Mome	nt of inertia	Max. 80g·cm²(8×10 ⁻⁶ kg·m²) ^{※2} , Max. 400g·cm²(4×10 ⁻⁵ kg·m²) ^{※3}	Max. 40g·cm²(4×10 ⁻⁶ kg·m²)						
specification	Shaft I	oading	Radial: Max. 10kg·f, Thrust: Max. 2.5kg·f	Radial: Max. 2kg·f, Thrust: 1kg·f						
	Max. a	llowable revolution ^{×4}	5,000rpm							
Vibration	1		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours							
Shock			Max. 75G							
Δmhient		nt temperature	-10 to 70°C, Storage: -25 to 85°C							
	Environment Ambient humidity		35 to 85% RH, Storage: 25 to 90%RH							
Environment	Ambie		Normal type, Cable outgoing connector type: IP50(IEC standard) ^{※5} ,	IDEA/FO / I I						
Environment Protection	Ambie		Connector integrated type: IP65(IEC standard)	IP50(IEC standard)						
Protection	Ambie		## Action of the Connector of the Connec	IP50(IEC standard)						
Protection Cable	Ambie		Connector integrated type: IP65(IEC standard) ø5mm, 5P, Length: 2m, Shield cable(Line driver output: ø5mm, 8P)	PSU(IEC standard) Ø8(Ø6)mm coupling, Bracket						
	Ambie		Connector integrated type: IP65(IEC standard) 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)							

x2: This value is for normal type, cable outgoing connector type (Protection: IP65). x3: This value is for normal type, cable outgoing connector type (Protection: IP65).

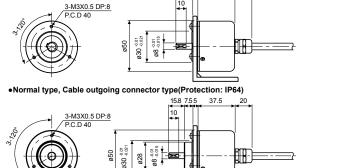
(Unit: mm)

**\times 4: Max. allowable revolution ≥ Max. response revolution [Max. response revolution(rpm) = \frac{Max. response frequency}{Resolution} \times 60 \text{ sec.}] Please select the resolution to make lower max. revolution than max. allowable revolution.

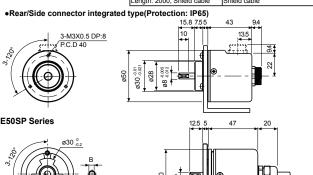
※5: Normal type, cable outgoing connector type is option as IP64 protection ※Environment resistance is rated at no freezing or condensation.

Dimensions





3-M3X0.5 DP:8 P.C.D 40	10 10 80 80 90	-
	Cable for normal type	Cable for Cable outgoing connector type
	ø5, 5P(Line driver output: 8P), Length: 2000, Shield cable	ø5, 5P(Line driver output: 8P), Length: 250 Shield cable



↓ [[]	
ble for normal type	Cable for Cable outgoing connector type
	ø5, 5P(Line driver output: 8P), Length: 250, Shield cable

(Unit: mm) C. ø6mm: 4 - M3×0.5 **∢∏** ø8mm: 4 - M4×0 7 s = Max. 0.5mm ε = Max. 0.25mm

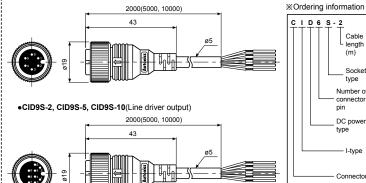
Type Item	А	В	С	D	When mounting the coupling to encoder shaft, if there is big eccentricity or declination between rotating encoder
ø6mm coupling	ø6 ^{+0.1}	ø15	16.5	22	shaft and mate shaft, it may shorten life cycle of the
ø8mm coupling	ø8 ^{+0.1}	ø19	18.2	25	encoder or the coupling. XDo not load overweight on the shaft.

Connector cable(Sold separately)

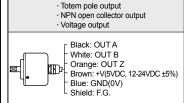
 $\theta = \text{Max. } 5^{\circ}$

•CID6S-2, CID6S-5, CID6S-10

(Totem pole output / NPN open collector output / Voltage output)



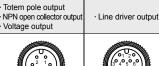
Connections



· Line driver output Black: OUT A Red: OUT A White: OUT B Gray: OUT B - Orange: OUT_Z Yellow: OUT Z Brown*1: +V(5VDC, 12-24VDC ±5%) - Blue: GND(0V)

%1: E50SP series is only for 5VDC ± 5%. *Unused wires must be insulated **The shield cable and metal case of encoder must be grounded(F.G.).

Cable outgoing connector type/ Connector integrated type



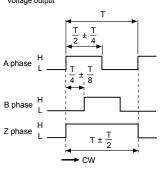


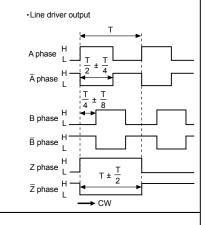
Pin No.	color	Function	Pin No.	color	Function
1	Black	OUTA	1	Black	OUTA
2	White	OUT B	2	Red	OUTĀ
3	Orange	OUT Z	3	Brown	+V
4	Brown	+V	4	Blue	GND
5	Blue	GND	5	White	OUTB
6	Shield	F.G.	6	Gray	OUTB
			7	Orange	OUT Z
			8	Yellow	OUT Z
			9	Shield	F.G.

XIt must be isolation grounded.

Output waveform

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





XClockwise(CW): Right turn as from the shaft

Caution for using

1. Installation

①This unit consists of precision components. If you drop this unit, it may lose the function Please treat this product carefully.

②When 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.

③Do not put strong impact with hammer, etc when insert coupling into shaft

2. For using

①Please 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.

③When 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.

Please do not use this unit with below environment, or it may cause malfunction.

①Place where this unit or component may be damaged by strong vibration or impact.

@Place where there is a lot of flammable or corrosive gases ③Place where strong magnet field or electric noise occurs.

④Place where is beyond of the rated temperature or humidity.

Pressure sensors

⑤Place where strong acids or alkali near by.

6 Place where there is the direct ray of the sun.

4. Vibration and Impact

①If 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.

①Do 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. XIt may cause malfunction if above instructions are not followed.

Major products



Display units Rotary encoders Power controllers

Fiber optic sensors 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

Autonics Corporation

Satisfiable Partner For Factory Automation ■ HEAD QUARTERS

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The proposal of a product improvement and

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