Autonics

Ø50mm Shaft type Absolute Rotary Encoder **EP50S SERIES**

INSTRUCTION MANUAL





Thank you for choosing our Autonics product. Please read the following safety considerations before use.

Safety Considerations

XPlease observe all safety considerations for safe and proper product operation to avoid hazards.

XSafety considerations are categorized as follows.

Warning Failure to follow these instructions may result in serious injury or death.

∆Caution Failure to follow these instructions may result in personal injury or product damage.

XThe symbols used on the product and instruction manual represent the following ▲ symbol represents caution due to special circumstances in which hazards may occur.

⚠ Warning

1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipm ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)

Failure to follow this instruction may result in personal injury, fire, or economic loss.

▲ Caution

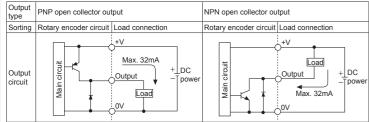
- 1. Do not drop water or oil on this unit.
- Failure to follow this instruction may result in product damage, or mis-control due to malfunction
- 2. Use the unit within the rated specifications.
- Failure to follow this instruction may result in shortening the life cycle of the unit, or product damage Please check the polarity of power and wrong wiring.
- Failure to follow this instruction may result in product damage by burning.
- 4. Do not short circuit the load.

Failure to follow this instruction may result in product damage by burning.

Ordering Information

EP50S	8	1024	- 1	R	- P	24			
Series		Pulses/ revolution	Output code	Rotation direction	Control output	Power supply			
50mm Shaft type	Ø8mm	Refer to resolution	1: BCD code 2: Binary code 3: Gray code	at the shaft		24: 12-24VDC +5%			

Control Output I/O Circuit



XEach bit of output has the same circuit

※Overload or short may cause circuit break

Specifications

Output angle

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	PNP open collector output	EP50S8	EP50S8					JEP.	200	00-2	#-1 U-				_			
	NPN open collector output	EP50S8	N				TD4 E	1 1	2	3	4	5 1	5 / -	_ ×	9 - 🕁		11	
9	solution	6, 8, 10, 1	12, 16, 20, 24, 32, 40, 45, 48	8, 64, 90, 128, 180, 256, 36	60, 512, 720, 1024-division		TP1	ш ; і	uį	4:1	ם יַ ע	۳.	ш:	ш:	п ; г	1:0	1 L	1
	Output code	Division	BCD Code	Binary Code	Gray Code		TP2	ιĖ	ιĠ	i	ė	ė, r	ÀĖ	a é	ιĠ	ė	ė	À
		1024	TS: 0.3515°±15' (13-bit)	TS: 0.3515°±15' (10-bit)	TS: 0.703° ±15' (10-bit)			-:-	-"	7:	-:-	""	Н	-:	-:-	-:-		111
		720	TS: 0.5° ±25' (11-bit)	TS: 0.5° ±25' (10-bit)	TS: 1° ±25' (10-bit)		20 ∶	Ė	٦Ì	 i	ι і г	÷Π	lг	п :	÷	ιİΓ	÷	
			TS: 0.703° ±15' (11-bit)	TS: 0.703° ±15' (9-bit)	TS: 1.406° ±15' (9-bit)		l :	1	П	7 }	▔	17	Т	. =	- : '	┰	1	1
		360		TS: 1° ±25' (9-bit)	TS: 2° ±25' (9-bit)		2 ¹	1	∄	1	<u> </u>	ال	# :	L			≟	1
			TS: 1.406° ±15' (10-bit)	TS: 1.406° ±15' (8-bit)	TS: 2.8125° ±15' (8-bit)				1	111		1		. :				1
		180	TS: 2° ±25' (9-bit)	TS: 2° ±25' (8-bit)	TS: 4° ±25' (8-bit)		2 ²	1:	1:	1:	г			L			-	-
		128	TS: 2.8125° ±15' (9-bit)	TS: 2.8125° ±15' (7-bit)	TS: 5.625° ±15' (7-bit)			11	11	111		1		. :				
		90	TS: 4° ±25' (8-bit)	TS: 4° ±25' (7-bit)	TS: 8° ±25' (7-bit)		2 ³	4	1:	1:	- :	:	نـــــنـــ	╌	\neg	止		-
		64		TS: 5.625° ±15' (6-bit)	TS: 11.25° ±15' (6-bit)		-0	11	11	111		1		. :	- 1	<u>:</u>		
		48	TS: 7.5° ±25' (7-bit)	TS: 7.5° ±25' (6-bit)	TS: 15° ±25' (6-bit)		2º×10	44	1:	1:	- :	:	4	:	_ <u>i</u>	П	-:-	-
		45		TS: 8° ±25' (6-bit)	TS: 16° ±25' (6-bit)			11	н			1		. :				1
			TP1: 5° ±60' (1-bit)	TP1: 5° ±60' (1-bit)	TP1: 5° ±60' (1-bit)		21×10	+÷	 ;	+	-	:	4		÷	÷	+	÷
		40	TP2: 2° ±60' (1-bit) TS: 9° ±60' (6-bit)	TP2: 2° ±60' (1-bit) TS: 9° ±60' (6-bit)	TP2: 2° ±60' (1-bit) TS: 18° ±60' (6-bit)			1	11	Li		1	al i	. :		. : .		
			EP: 9° ±60' (1-bit)	EP: 9° ±60' (1-bit)	EP: 9° ±60' (1-bit)		EP :	ŀ	1:	1	انا	:	TL:	:	7	لپا	:	:
			TP1: 7° ±60' (1-bit)	TP1: 7° ±60' (1-bit)	TP1: 7° ±60' (1-bit)			ITS	sl		TP1		. I Tr	P2	F	> :		
		32			TP2: 2° ±60' (1-bit)			→	H	-	•	-	4		1	▶;		
			TS: 11.25° ±60' (6-bit) EP: 11.25° ±60' (1-bit)	EP: 11.25° ±60' (1-bit)	TS: 22.5° ±60' (5-bit) EP: 11.25° ±60' (1-bit)		XTP1=8° ±60											
			TP1: 8° ±60' (1-bit)	TP1: 8° ±60' (1-bit)	TP1: 8° ±60' (1-bit)		*The above											
		24	TP2: 3° ±60' (1-bit)	TP2: 3° ±60' (1-bit) TS: 15° ±60' (5-bit)	TP2: 3° ±60' (1-bit) TS: 30° ±60' (5-bit)		(The output	wav	veic	HIII (n neg	JallV	E 109	IC IS	opp	Jsea	1.)	_
	Output phase/		TS: 15° ±60' (6-bit)	15: 15 ±00 (5-DII)	15: 30 ±00 (5-bit)	\vdash												

TP1: 15 ±60' (1-bit)
TP2: 2° ±60' (1-bit)
TP2: 2° ±60' (1-bit)
TS: 18° ±60' (5-bit)
EP: 18° ±60' (1-bit)
TP1: 15° ±60' (1-bit)
TP2: 2° ±60' (1-bit)
TP3: 22.5° ±60' (5-bit)
EP: 22.5° ±60' (5-bit)
EP: 22.5° ±60' (1-bit) TP1: 12° ±60' (1-bit) TP2: 2° ±60' (1-bit) TS: 18° ±60' (5-bit) EP: 18° ±60' (1-bit) TP1: 15° ±60' (1-bit) TP2: 2° ±60' (1-bit) TS: 22.5° ±60' (4-bit) EP: 22.5° ±60' (1-bit) TP1: 15° ±60' (1-bit) TP2: 3° ±60' (1-bit) TS: 30° ±60' (5-bit) EP: 30° ±60' (1-bit) TP1: 15° ±60' (1-bit) TP2: 3° ±60' (1-bit) TS: 30° ±60' (4-bit) EP: 30° ±60' (1-bit) TP1: 15° ±60' (1-bit) TP2: 3° ±60' (1-bit) TS: 60° ±60' (4-bit) EP: 30° ±60' (1-bit) TP1: 30° ±60' (1-bit) TP2: 12° ±60' (1-bit) TS: 36° ±60' (4-bit) P: 36° ±60' (1-bit)

TP1: 39° ±60' (1-bit) TP2: 15° ±60' (1-bit) TS: 45° ±60' (3-bit) EP: 45° ±60' (1-bit) TP1: 39° ±60' (1-bit) TP2: 15° ±60' (1-bit) TS: 45° ±60' (3-bit) EP: 45° ±60' (1-bit) TP1: 39° ±60' (1-bit) TP2: 15° ±60' (1-bit) TS: 90° ±60' (3-bit) EP: 45° ±60' (1-bit) collector output Output voltage: min. (power supply-1.5)VDC, Load current: max. 32mA INFIN open collector output Load current: max. 32mA, Residual voltage: max. 1VDC=== output NPN open

Ø50mm shaft type absolute rotary encode

Response time (rise, fall) Ton=800nsec, Toff=max. 800nsec (cable: 2m, 1 sink=32mA)
Max. response frequency 35kHz Power supply 5VDC=±5% (ripple P-P: max. 5%), 12-24VDC=±5% (ripple P-P: max. 5%)

Current consumption Max. 100mA (disconnection of load) Power supply stance Over 100M Ω (at 500VDC megger between all terminals and case) ngth 750VAC 50/60Hz for 1 min (between all terminals and case)

3.000rpm 1.5 mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours Vibration Approx. max. 50G -10 to 70°C, storage: -25 to 85°

Ambient humid. 35 to 85%RH, storage: 35 to 90%RH Ø7mm, 15-wire, 2m, Shield cable (AWG28, core diameter: 0.08mm number of cores: 40, insulator diameter: Ø0.8mm) Cable Accessory

Approval | Meight**3 | Approx. 482g (approx. 398g)

**X1: TS=Signal Pulse, TP=Timing Pulse, EP=Even Parity

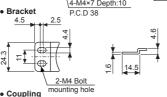
**X2: In case of Parallel type model, Make sure that Max. response revolution should be lower than or equal to

max, allowable revolution when selecting the resolution

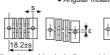
[Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]

※3: The weight includes packaging. The weight in parenthesis is for unit only

0 4-M4×7 Depth:10



 End-play (s): Max. 0.5mm Parallel misalignment (ε): Max. 0.25mm Angular misalignment (θ): Max. 5







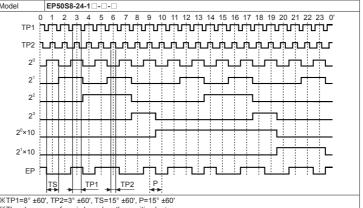
(unit: mm)

When mounting the coupling to encoder shaft, if there is combined misalignment (parallel, and between rotating encoder shaft and mate shaft, it may shorten life cycle of encoder and couple. Do not load overweight on the shaft.

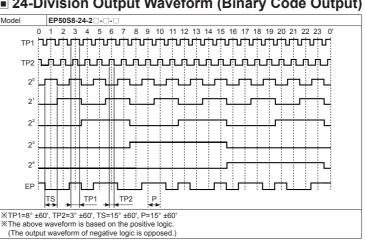
Ø8*8

Dimensions

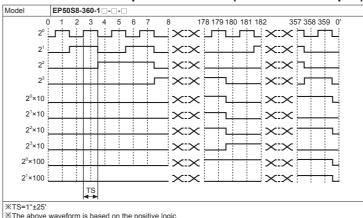
24-Division Output Waveform (BCD Code Output)



24-Division Output Waveform (Binary Code Output)



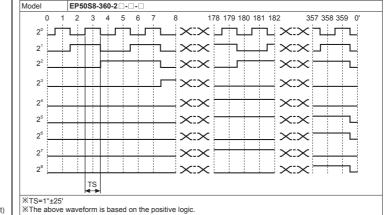
360-Division Output Waveform (BCD Code Output)



XThe above waveform is based on the positive logic.
(The output waveform of negative logic is opposed.

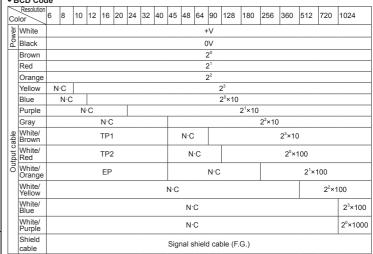
(The output waveform of negative logic is opposed.)

360-Division Output Waveform (Binary Code Output)

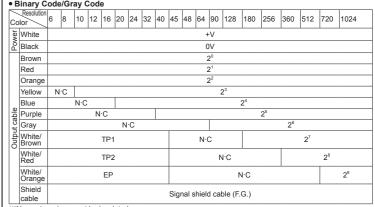


Connection

BCD Code



Binary Code/Gray Code



XNon-using wires must be insulated

※Encoder case and shield cable must be grounded

※N·C (Not Connected): Not using.

*Please make sure not to short when wiring output cables because the dedicated driver IC is used at output

Cautions During Use

Handle the unit with care since it consists of precision components

②Be careful not to make eccentricity and deflection angle larger, it may shorten the life cycle. ③Do not put strong impact when inserting coupling into shaft.

2. For using

①Please connect shield wire to F.G. terminal.

@Do not connect and short circuit during power on, or it may cause damage to the unit. When using switching mode power supply, install the surge absorber on power line for absorbing surge and make the wire as short as possible to avoid noise.

. Environment

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

Place where is beyond of rating temperature or humidity.

(5) Place where strong acids or alkali near by.

. Vibration and Impact

①When the strong impact loads on this unit, it may cause an error. @Encoder with high resolution can be easily affected by vibration.

Please use Bracket for more stable unit mounting

(3) Please use the flexible coupling (ERB Series) when the application needs severe acceleration or

Wire connection

①Do not draw the wire with over strength 30N after wiring.

SSR/Power Controllers

Timers
Panel Meters

②If 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.

Failure to follow these instructions may result in product damage.

Major Products

■ Temperature/Humidity Transducers

Fiber Optic Sensors

■ Door Side Sensors Area Sensors

Proximity Sensors

Pressure Sensors ■ Rotary Encoders

Connector/Sockets

■ Display Units Sensor Controller Switching Mode Power Supplies Control Switches/Lamps/Buzzers

I/O Terminal Blocks & Cables Stepper Motors/Drivers/Motion Controllers

■ Stepper Motions/Diversimotion Controllers
■ Graphic/Logic Panels
■ Field Network Devices
■ Laser Marking System (Fiber, Co₂, Nd: YAG)
■ Laser Welding/Cutting System

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