

Autonics ROTARY ENCODER(Absolute Type) EP58 SERIES

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.

Please read the following safety considerations before use.

■ Safety Considerations

- ⚠ Please observe all safety considerations for safe and proper product operation to avoid hazards.
- ⚠ symbol represents caution due to special circumstances in which hazards may occur.
- 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.

⚠ Warning

- 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 equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Install on a device panel to use.** Failure to follow this instruction may result in fire.
- Do not connect, repair, or inspect the unit while connected to a power source.** Failure to follow this instruction may result in fire.
- Check "Connections" before wiring.** Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.** Failure to follow this instruction may result in fire.

⚠ Caution

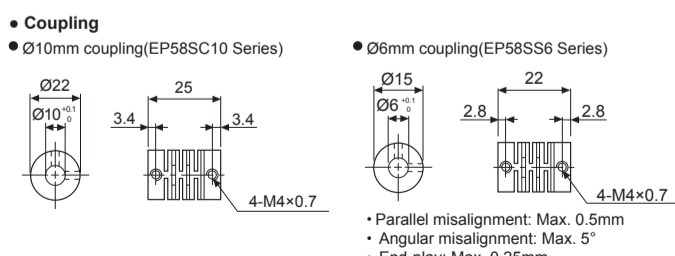
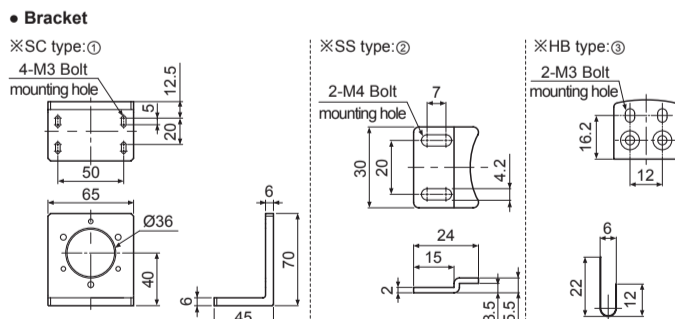
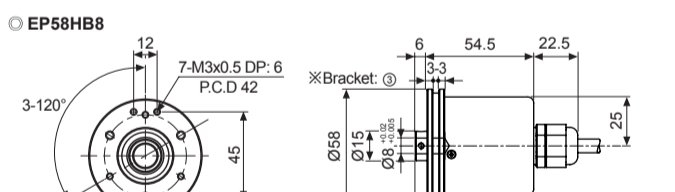
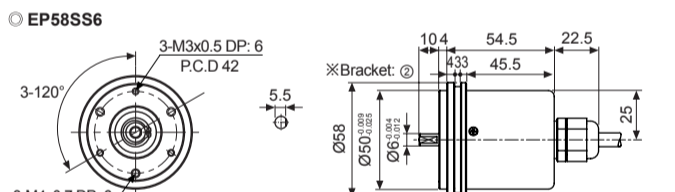
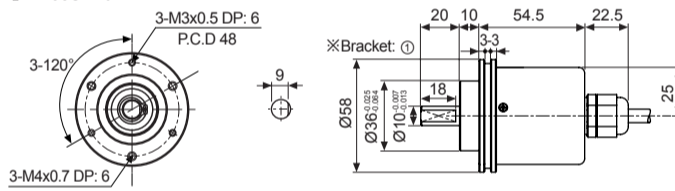
- Use the unit within the rated specifications.** Failure to follow this instruction may result in fire or product damage.
- Do not short the load.** Failure to follow this instruction may result in product damage by fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.** Failure to follow this instruction may result in fire or explosion.
- Do not use the unit near the place where there is the equipment which generates strong magnetic force or high frequency noise and strong alkaline, strong acidic exists.** Failure to follow this instruction may result in product damage.

■ Ordering Information

EP58SC	10	1024	1	R	P	24
Series Diameter Ø58mm	Shaft diameter	Pulses/resolution	Output code	Rotating direction	Control output	Power supply
SC: Shaft clamping type	External Ø10mm	Refer to resolution	1:BCD code	F: Output value increases at CW direction	P: PNP open collector output	5:5VDC±5%
SS: Shaft synchro type	6 Ø6mm		2:Binary code	R: Output value increases at CCW direction	N: NPN open collector output	
HB: Hollow built-in type	Inner Ø8mm					

■ Dimensions

(unit: mm)



⚠ Do not load overweight on the shaft.
 ⚠ For flexible coupling(ERB Series) information, refer to catalogue.
 ⚠ Do not put strong impact when insert a coupling into shaft. Failure to follow this instruction may result in product damage.
 ⚠ Fix the unit or a coupling by a wrench under 0.15 N·m of torque.
 ⚠ When you install this unit, if eccentricity and deflection angle are larger, it may shorten the life cycle of this unit.
 ⚠ The above specifications are subject to change and some models may be discontinued without notice.
 ⚠ Be sure to follow cautions written in the instruction manual, and the technical descriptions (catalog, homepage).

■ Specifications

Type	Diameter Ø58mm Absolute Rotary Encoder				
Model	PNP open collector output	EP58 □ - □ - □ - □ - P - □			
	NPN open collector output	EP58 □ - □ - □ - □ - N - □			
Resolution(PPR)	45, 90, 180, 360, 720			64, 128, 256, 512, 1024	
Electrical specification	Output code	BCD Code	Binary Code	Gray Code	
	Output phase/Output angle	45 -division	TS: Signal pulse(7bit) TS: 8°±25'	TS: Signal pulse(6bit) TS: 8°±25'	TS: Signal pulse(6bit) TS: 16°±25'
		90 -division	TS: Signal pulse(8bit) TS: 4°±25'	TS: Signal pulse(7bit) TS: 4°±25'	TS: Signal pulse(7bit) TS: 8°±25'
		180 -division	TS: Signal pulse(9bit) TS: 2°±25'	TS: Signal pulse(8bit) TS: 2°±25'	TS: Signal pulse(8bit) TS: 4°±25'
		360 -division	TS: Signal pulse(10bit) TS: 1°±25'	TS: Signal pulse(9bit) TS: 1°±25'	TS: Signal pulse(9bit) TS: 2°±25'
720 -division	TS: Signal pulse(11bit) TS: 0.5°±25'	TS: Signal pulse(10bit) TS: 0.5°±25'	TS: Signal pulse(10bit) TS: 1°±25'	TS: Signal pulse(10bit) TS: 0.703°±15'	
Control output	PNP open collector output	Output voltage: Min.(Power supply-1.5)VDC≒, Load current: Max. 32mA			
	NPN open collector output	Load current: Max. 32mA, Residual voltage: Max. 1VDC≒			
		Response time(Rise, Fall) Ton=800nsec, Toff=Max. 800nsec(Cable: 2m, I 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 the load)			
		Insulation resistance Min. 100MΩ(at 500VDC mega for all terminals and case)			
		Dielectric strength 750VAC 50/60Hz for 1 minute(all terminals and case)			
		Connection Axial cable type (cable gland)			
Mechanical specification	Starting torque	• SC/SS type: Max. 40gf·cm(0.004N·m)		• HB type: Max. 90gf·cm(0.009N·m)	
	Moment of inertia	• SC/SS type: Max. 15g·cm²(1.5×10kg·m²)		• HB type: Max. 20g·cm²(2.0×10kg·m²)	
	Shaft loading	• SC/SS type: Radial: 10kg·f, Thrust: 2.5kg·f		• HB type: Radial: 2kg·f, Thrust: 1kg·f	
	Max. allowable revolution ^{※1}	3,000rpm			
Vibration	1.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z direction for 2 hours				
Shock	Approx. Max. 50G				
Environment	Ambient temp.	-10 to 70°C, Storage: -25 to 85°C			
	Ambient humi	35 to 85%RH, Storage: 35 to 90%RH			
Protection structure	IP50(IEC standard)				
Cable	Ø7mm, 15-wire, Length: 2m, Shield cable				
Accessories	Ø10mm(SC type)/Ø6mm(SS type) coupling, Fixing bracket				
Approval	CE				
Weight ^{※2}	• SC type: Approx. 545g(approx. 435g)		• SS type: Approx. 525g(approx. 415g) • HB type: Approx. 520g(approx. 410g)		

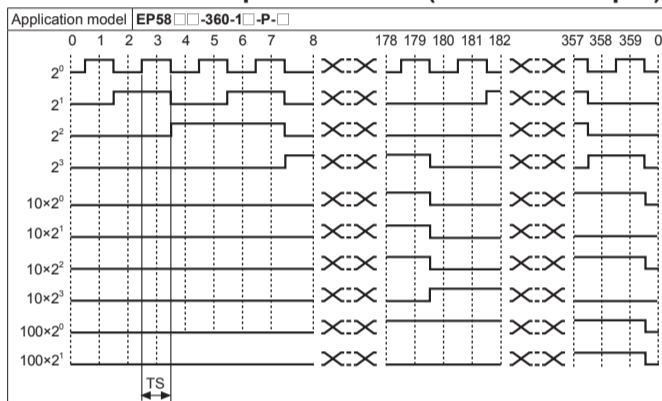
※1: Make sure that Max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

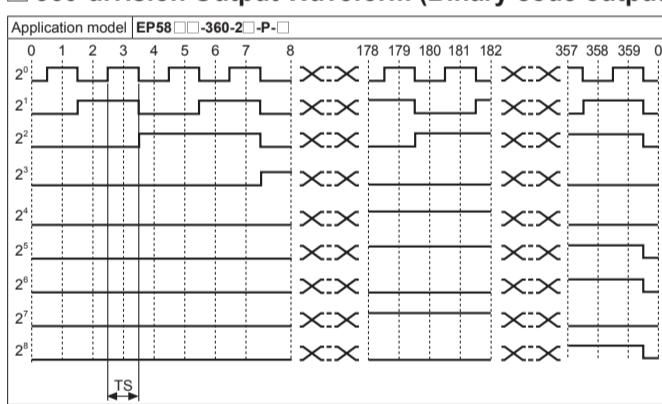
※2: The weight includes packaging. The weight in parenthesis in for unit only.

※Environment resistance is rated at no freezing or condensation.

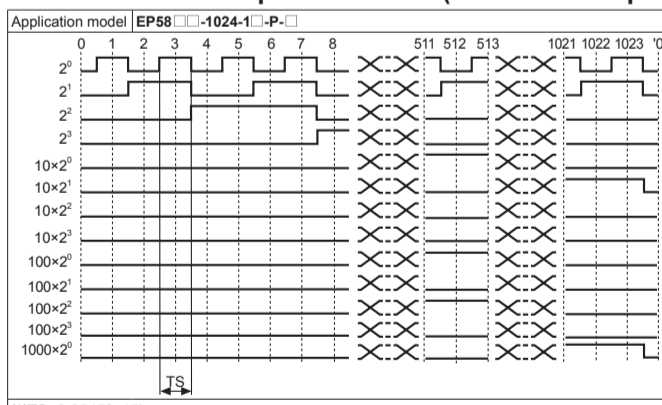
■ 360-division Output Waveform (BCD code output)



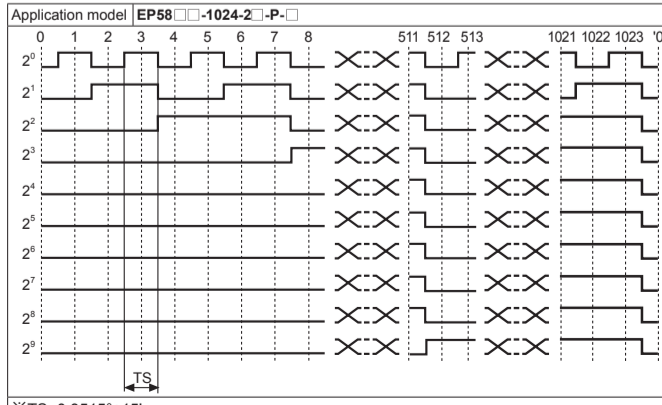
■ 360-division Output Waveform (Binary code output)



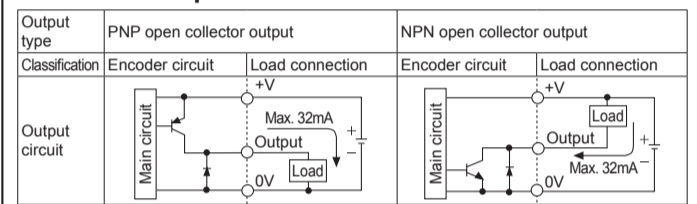
■ 1024-division Output Waveform (BCD code output)



■ 1024-division Output Waveform (Binary code output)



■ Control Output Circuit



※In case of overload or short on output terminal, it may cause output circuit break.

■ Connections

• BCD Code

Color	Resolution	45-division	64-division	90-division	128-division	180-division	256-division	360-division	512-division	720-division	1024-division	
Power	White	+V										
	Black	GND(0V)										
Output wire	Brown	2 ⁰										
	Red	2 ¹										
	Orange	2 ²										
	Yellow	2 ³										
	Blue	2 ⁴ ×10										
	Purple	2 ⁵ ×10										
	Gray	2 ⁶ ×10										
	White/Brown	N-C			2 ⁷ ×10							
	White/Red	N-C				2 ⁸ ×100						
	White/Orange	N-C					2 ⁹ ×100					
White/Yellow	N-C						2 ¹⁰ ×100					
White/Blue	N-C							2 ¹¹ ×100				
White/Purple	N-C								2 ¹² ×1000			
Shield wire	F.G.											

• Binary Code/Gray Code

Color	Resolution	45-division	64-division	90-division	128-division	180-division	256-division	360-division	512-division	720-division	1024-division	
Power	White	+V										
	Black	GND(0V)										
Output wire	Brown	2 ⁰										
	Red	2 ¹										
	Orange	2 ²										
	Yellow	2 ³										
	Blue	2 ⁴										
	Purple	2 ⁵										
	Gray	N-C			2 ⁶							
	White/Brown	N-C					2 ⁷					
	White/Red	N-C							2 ⁸			
	White/Orange	N-C								2 ⁹		
White/Yellow	N-C									2 ¹⁰		
White/Blue	N-C										2 ¹¹	
White/Purple	N-C											2 ¹²
Shield wire	F.G.											

- ※ Unused wires must be insulated.
- ※ The shield cable and metal case should be grounded(F.G.).
- ※ N-C(Not Connected) : Not using.
- ※ Please make sure that short is not occurred when wiring output lines because an exclusive driver IC is used at output circuit.
- ※ Do not apply tensile strength over 30N to the cable.

■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- 5VDC, 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- For using the unit with the equipment which generates noise (switching regulator, inverter, servo motor, etc.), ground the shield wire to the F.G. terminal.
- Ground the shield wire to the F.G. terminal.
- When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
- Check the wire type and response frequency when extending wire because of distortion of waveform or residual voltage increment etc by line resistance or capacity between lines.
- This unit may be used in the following environments.
 - ①Indoors (in the environment condition rated in 'Specifications')
 - ②Altitude max. 2,000m
 - ③Pollution degree 2
 - ④Installation category II

■ Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connector/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System (Fiber, CO₂, Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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