Autonics

Ø58mm Shaft type Single-turn Absolute Rotary Encoder

EP58 SERIES

INSTRUCTION MANUAL

CE

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

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 equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
   Failure to follow this instruction may result in personal injury, economic loss or fire.
2. **Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in explosion or fire.
3. **Install on a device panel to use.**
   Failure to follow this instruction may result in fire.
4. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in fire.
5. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.
6. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in fire.

⚠Caution

1. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
2. **Do not short the load.**
   Failure to follow this instruction may result in product damage by fire.
3. **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.

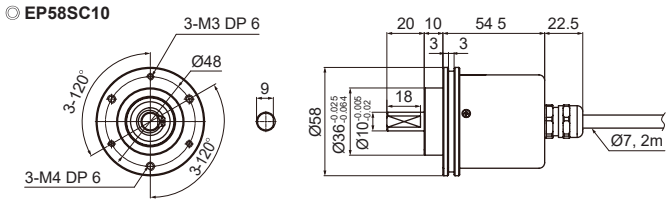
▣ Ordering Information

EP58SC	10	1024	1	R	P	24
Series Ø58mm SC: Shaft clamping type SS: Shaft synchro type HB: Hollow built-in type	Shaft diameter External 10 Ø10mm External 6 Ø6mm Inner 8 Ø8mm	Pulses/ resolution Refer to resolution	Output code 1 BCD code 2 Binary code 3:Gray code	Rotating direction F : Output value increases at CW direction R : Output value increases at CCW direction	Control output P : PNP open collector output N : NPN open collector output	Power supply 5: 5VDC±5% 24: 12-24VDC ±5%

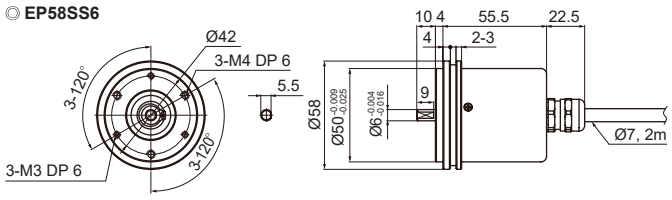
▣ Dimensions

(unit: mm)

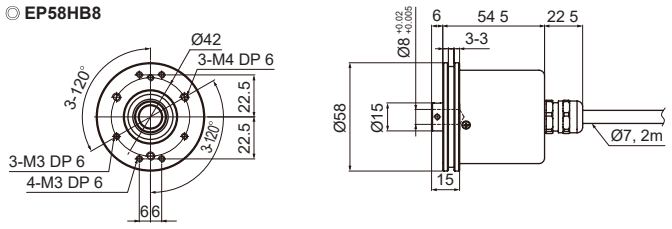
◎ **EP58SC10**



◎ **EP58SS6**

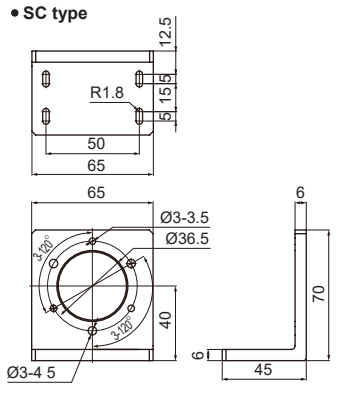


◎ **EP58HB8**

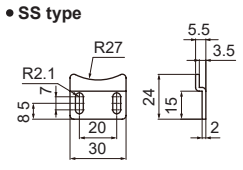


◎ **Bracket**

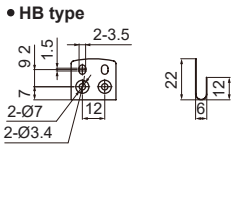
• **SC type**



• **SS type**

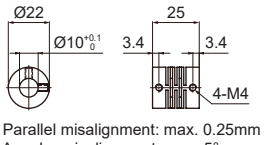


• **HB type**

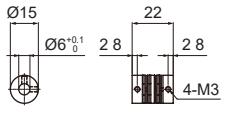


◎ **Coupling**

• **EP58SC10**



• **EP58SS6**



- Parallel misalignment: max. 0.25mm
- Angular misalignment: max. 5°
- End-play: max. 0.5mm

※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, website).**

▣ Speicifications

Type		Ø58mm Single-turn 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		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'	64 -division	TS : Signal pulse(7bit) TS : 5.625°±15'	TS: Signal pulse(6bit) TS:5.625°±15'	TS: Signal pulse(6bit) TS:11 25°±15'
		90 -division	TS: Signal pulse(8bit) TS:4°±25'	TS: Signal pulse(7bit) TS:4°±25'	TS: Signal pulse(7bit) TS:8°±25'	128 -division	TS : Signal pulse(9bit) TS : 2.8125°±15'	TS: Signal pulse(7bit) TS:2.8125°±15'	TS: Signal pulse(7bit) TS 5 625°±15'
		180 -division	TS: Signal pulse(9bit) TS:2°±25'	TS: Signal pulse(8bit) TS 2°±25'	TS: Signal pulse(8bit) TS:4°±25'	256 -division	TS: Signal pulse(10bit) TS:1.406°±15'	TS: Signal pulse(8bit) TS:1.406°±15'	TS: Signal pulse(8bit) TS 2 8125°±15'
		360 -division	TS: Signal pulse(10bit) TS:1°±25'	TS: Signal pulse(9bit) TS:1°±25'	TS: Signal pulse(9bit) TS:2°±25'	512 -division	TS: Signal pulse(11bit) TS 0.703°±15'	TS: Signal pulse(9bit) TS:0.703°±15'	TS: Signal pulse(9bit) TS:1.406°±15'
		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'	1024 -division	TS: Signal pulse(13bit) TS 0.3515°±15'	TS: Signal pulse(10bit) TS:0 3515°±15'	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							
	Control output: 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	Over 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 X, Y, Z direction for 2 hours							
Shock		Approx. max. 50G							
Environment	Ambient temp.	-10 to 70℃, storage: -25 to 85℃							
	Ambient humi	35 to 85%RH, storage: 35 to 90%RH							
Protection structure		IP50(EC standard)							
Cable		Ø7mm, 15-wire, 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.

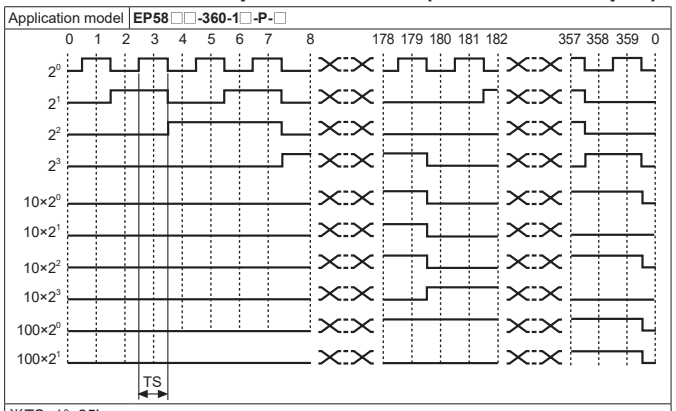
【Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}}$ × 60sec】

※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)

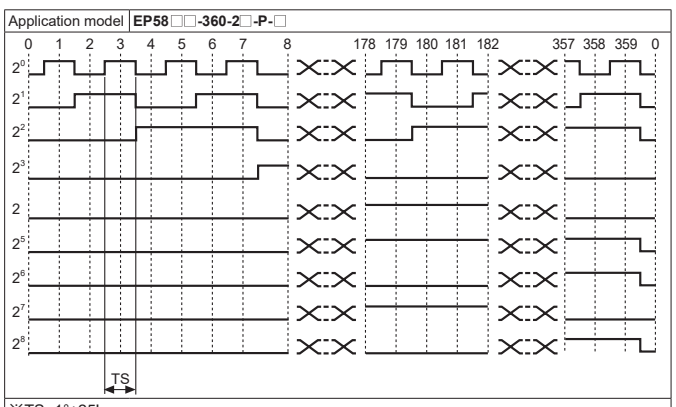
Application model **EP58□□-360-1□-P-□**



※TS=1°±25'
※Above waveform is based on the positive logic.
(The output waveform of negative logic is opposed.)

▣ 360-division Output Waveform (Binary code output)

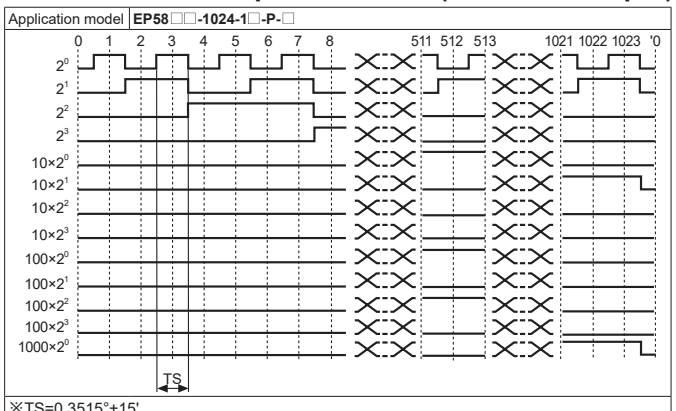
Application model **EP58□□-360-2□-P-□**



※TS=1°±25'
※Above waveform is based on the positive logic.
(The output waveform of negative logic is opposed.)

▣ 1024-division Output Waveform (BCD code output)

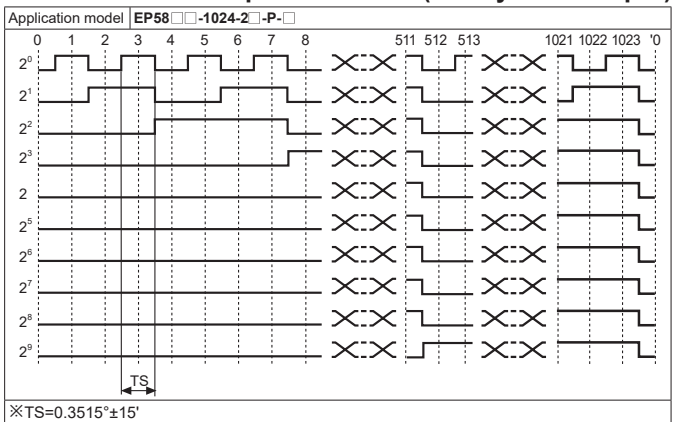
Application model **EP58□□-1024-1□-P-□**



※TS=0.3515°±15'
※Above waveform is based on the positive logic.
(The output waveform of negative logic is opposed.)

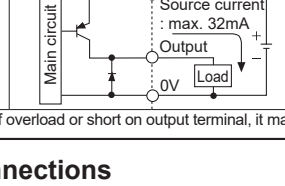
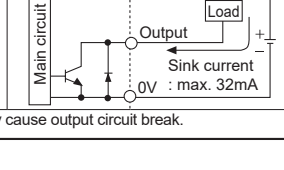
▣ 1024-division Output Waveform (Binary code output)

Application model **EP58□□-1024-2□-P-□**



※TS=0.3515°±15'
※Above waveform is based on the positive logic.
(The output waveform of negative logic is opposed.)

▣ Control Output Circuit

Output type	PNP open collector output		NPN open collector output	
Classfication	Encoder circuit	Load connection	Encoder circuit	Load connection
Output circuit				

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

▣ Connections

◎ **BCD Code**

Color		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	2^0×10									
	Purple	2^1×10									
	Gray	2^2×10									
	White/Brown	N C	2^3×10								
	White/Red	N C		2^0×100							
	White/Orange	N C			2^1×100						
	White/Yellow	N C				2^2×100					
	White/Blue	N C					2^3×100				
	White/Purple	N C					2^0×1000				
	Shield wire	F.G.									

◎ **Binary Code/Gray Code**

Color		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									
	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									
	White/Blue	N C									
	White/Purple	N C									
	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

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. 5VDC, 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
3. 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.
4. Ground the shield wire to the F.G. terminal.
5. When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
6. Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
7. 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.
8. 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, CO_2, 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