

EP50S Series

Diameter ϕ 50mm Shaft type Absolute Rotary encoder


■ Features

- Compact size of external diameter ϕ 50mm
- Various output code: BCD, Binary, Gray code (Customizable)
- Various and high resolution (720, 1024 divisions)
- Protection structure IP64 (Partial waterproof, Oil proof)



■ Applications

Precision machine tool, Fabric machinery, Robot, Parking system

 Please read "Caution for your safety" in operation manual before using.



■ Ordering information

EP50S	8	–	1024	–	1	–	R	–	P	–	24
Series	Shaft diameter	Pulse/1Revolution	Output code	Revolution direction	Control output	Power supply					
Diameter ϕ 50mm shaft type	ϕ 8mm	Refer to resolution	1 : BCD Code 2 : Binary Code 3 : Gray Code	F : Output value increase at CW direction R : Output value increase at CCW direction	P : PNP open collector output N : NPN open collector output	5 : 5VDC \pm 5% 24 : 12–24VDC \pm 5%					

* Gray code is customizable.

■ Specifications

Item	Diameter ϕ 50mm shaft type of absolute rotary encoder		
Resolution	(Note1) 45, 64, 90, 128, 180, 256, 360, 512, 720, 1024		
Electrical specification	Output code/Output angle	Refer to "Output waveform"	
	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 length : 2m, I sink=32mA)	
	Max. Response frequency	35kHz	
	Power supply	• 5VDC \pm 5% (Ripple P–P : Max. 5%) • 12–24VDC \pm 5% (Ripple P–P : Max. 5%)	
	Current consumption	Max. 100mA (disconnection of the load)	
	Insulation resistance	Min. 100M Ω (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 gland)	
Mechanical specification	Starting torque	Max. 40gf · cm (0.004N · m)	
	Moment of inertia	Max. 40g · cm ² (4×10^{-6} kg · m ²)	
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf	
	Max. allowable revolution	(Note2)	3000rpm
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 50G		
Ambient temperature	–10 to 70°C (at non-freezing status), Storage : –25 to 85°C		
Ambient humidity	35 to 85%RH, Storage: 35 to 90%RH		
Protection	IP64 (IEC standard)		
Cable	ϕ 7mm, 15P, Length : 2m, Shield cable		
Accessory	Fixing bracket, Coupling		
Approval	CE		
Unit weight	Approx. 380g		

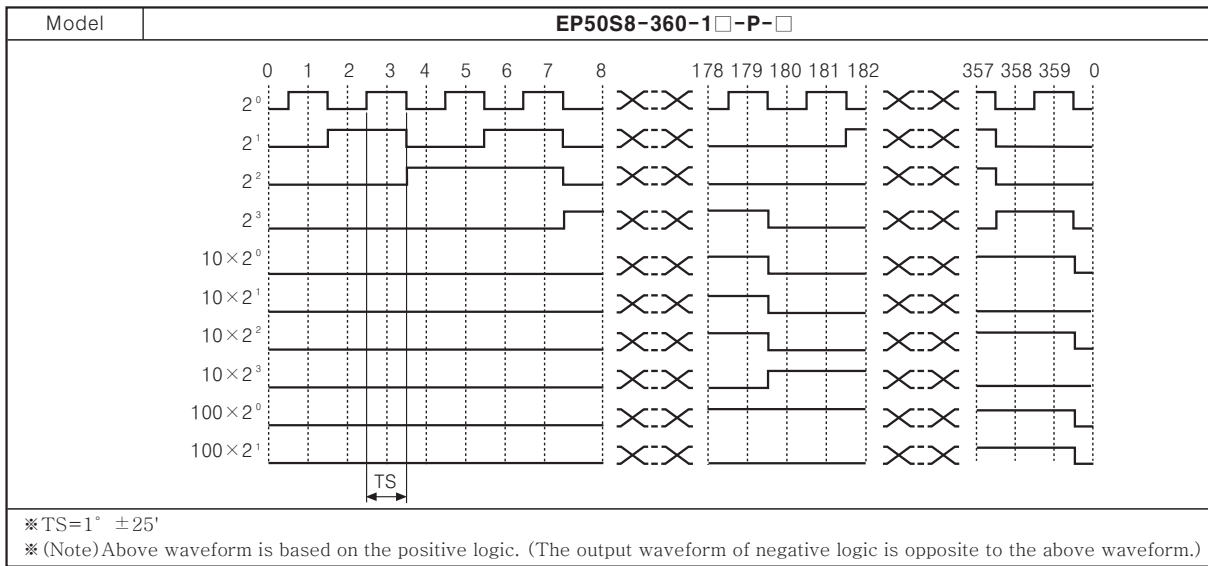
* **(Note1)** Not indicated type is customizable.

* **(Note2)** Max. allowable revolution \geq Max. response revolution **[**Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$ **]**
Make sure that max. response revolution should be lower than max. allowable revolution when selecting the resolution.

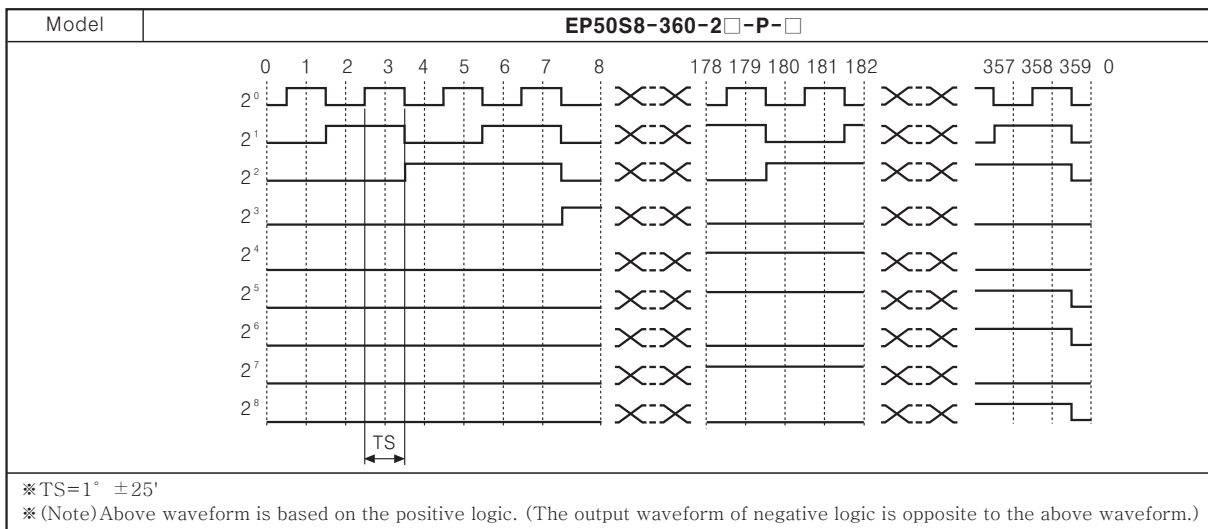
∅ 50mm Shaft Absolute Type

Output waveform

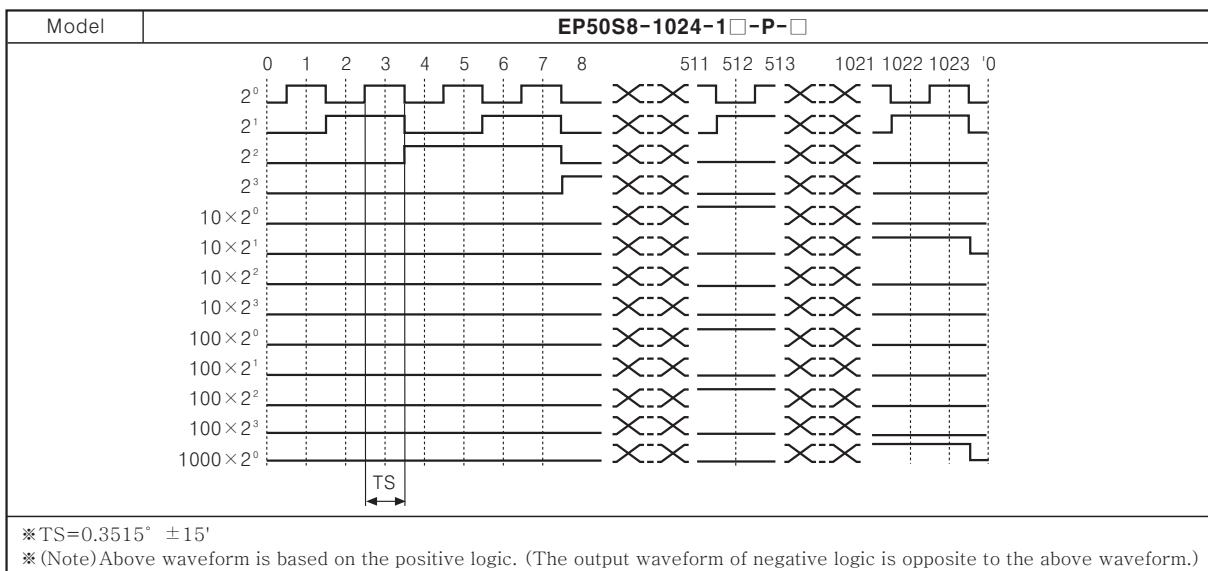
●360 division (BCD CODE output)



●360 division (BINARY CODE output)



●1024 division (BCD CODE output)

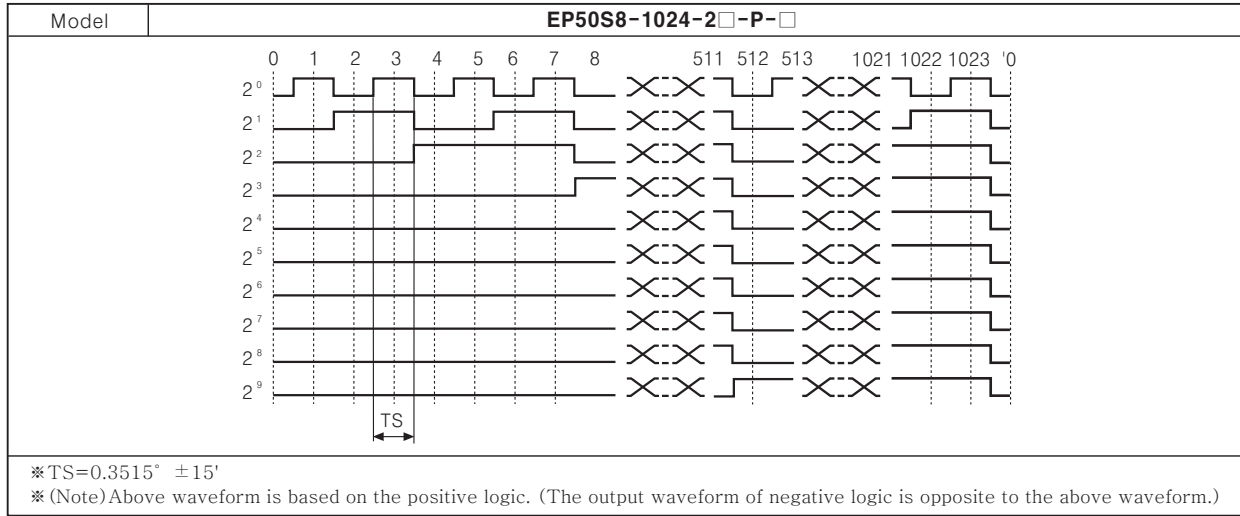


- (A) Photo electric sensor
- (B) Fiber optic sensor
- (C) Door/Area sensor
- (D) Proximity sensor
- (E) Pressure sensor
- (F) Rotary encoder**
- (G) Connector/Socket
- (H) Temp. controller
- (I) SSR/Power controller
- (J) Counter
- (K) Timer
- (L) Panel meter
- (M) Tacho/Speed/Pulse meter
- (N) Display unit
- (O) Sensor controller
- (P) Switching power supply
- (Q) Stepping motor & Driver & Controller
- (R) Graphic/Logic panel
- (S) Field network device
- (T) Production stoppage models & replacement

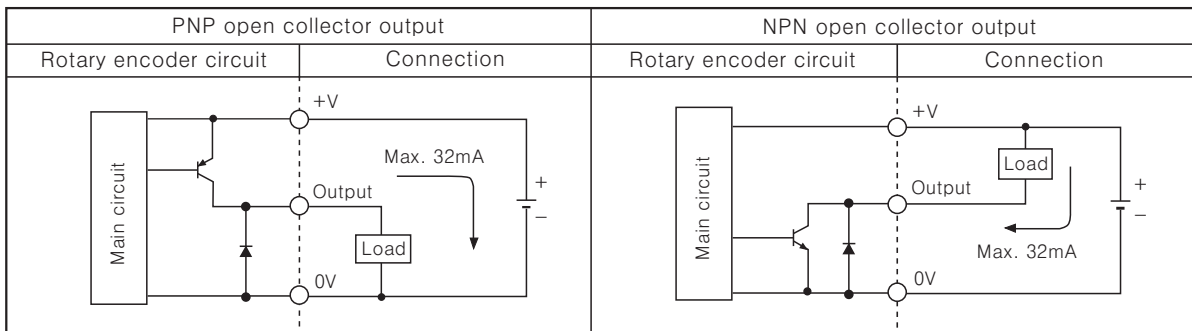
EP50S Series

Output waveform

1024 division (BINARY CODE output)



Control output diagram



Connections

BCD Code

Resolution		6	8	12	16	24	32	40	45	64	90	128	180	256	360	512	720	1024
Color		division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division
Power	White	+V																
	Black	GND(0V)																
Output	Brown	TP1	TP1	TP1	TP1	TP1	TP1	TP1	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	Red	TP2	TP2	TP2	TP2	TP2	TP2	TP2	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹
	Orange	2°	2°	2°	2°	2°	2°	2°	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²
	Yellow	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³
	Blue	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)
	Purple	EP	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)
	Gray	N.C	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)
	White/Brown	N.C	EP	EP	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	N.C	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	
	White/Red	N.C			EP	EP	EP	N.C			(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	
	White/Orange	N.C												(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	
	White/Yellow	N.C														(2 ² ×100)	(2 ² ×100)	
	White/Blue	N.C																
	White/Purple	N.C																
	Shielded wire	F.G																

∅ 50mm Shaft Absolute Type

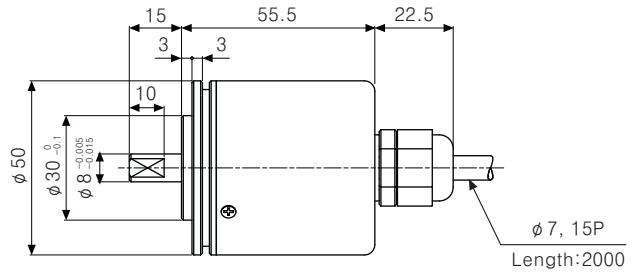
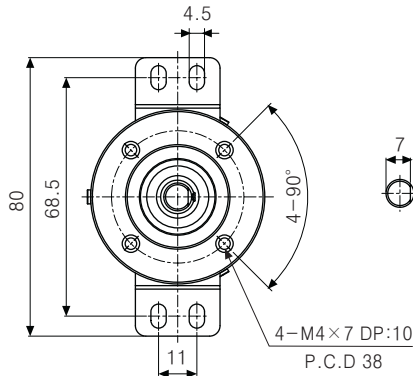
■ Connections

● Binary code

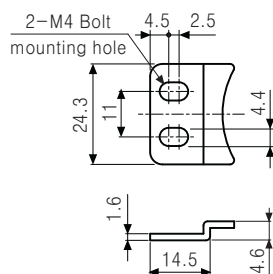
Resolution		6	8	12	16	24	32	40	45	64	90	128	180	256	360	512	720	1024
Color		division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division
Power	White	+V																
	Black	GND(0V)																
Output	Brown	TP1	TP1	TP1	TP1	TP1	TP1	TP1	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	Red	TP2	TP2	TP2	TP2	TP2	TP2	TP2	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹
	Orange	2°	2°	2°	2°	2°	2°	2°	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²
	Yellow	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³
	Blue	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴
	Purple	EP	EP	2 ³	2 ³	2 ³	2 ³	2 ³	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵
	Gray	N.C		EP	EP	2 ⁴	2 ⁴	2 ⁴	N.C		2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶
	White/Brown	N.C				EP	EP	2 ⁵	N.C				2 ⁷	2 ⁷	2 ⁷	2 ⁷	2 ⁷	2 ⁷
	White/Red	N.C						EP	N.C					2 ⁸	2 ⁸	2 ⁸	2 ⁸	
	White/Orange	N.C																
	White/Yellow	N.C																
	White/Blue	N.C																
	White/Purple	N.C																
	Shielded wire	F.G																

- * Unused wires must be insulated.
- * The metal case and shield wire of encoder should be grounded (F.G).
- * N.C : Not Connected.
- * TP1/TP2 : It is an enablement signal to decide signal recognition for output easily because, output signal cycle is long in low resolution model.
- * EP : It is a parity signal to be outputted as odd number of parity.
- * Output cable must not be short-circuited, because Driver IC is used in output circuit.

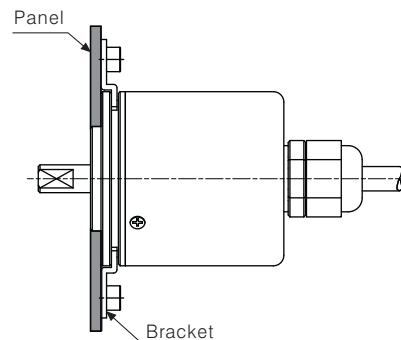
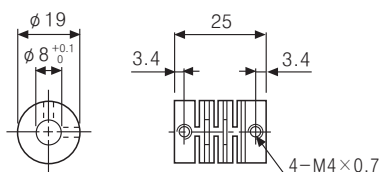
■ Dimensions



● Bracket



● Coupling (EP50S)



(Unit:mm)

- (A) Photo electric sensor
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