

# EP50S Series


## Diameter $\phi$ 50mm Shaft type Absolute Rotary encoder

### ■ Features

- Compact size of external diameter 50mm
- Various output code: BCD, Binary, Gray Code (Customizable)
- Various and high resolution (720, 1024 divisions)
- 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

<b>EP50S</b>	<b>8</b>	-	<b>1024</b>	-	<b>1</b>	-	<b>R</b>	-	<b>P</b>	-	<b>24</b>
Series	Inside	Pulse/1Revolution	Output code	Revolution direction	Control output	Power supply					
Diameter $\phi$ 50mm shaft type	$\phi$ 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 $\phi$ 50mm shaft type of Absolute rotary encoder		
Resolution	<b>(Note1)</b> *6, *8, *12, *16, *24, *32, *40, 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 $\Omega$ (at 500VDC mega 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 $\cdot$ cm (0.004N $\cdot$ m)	
	Rotor inertia	Max. 40g $\cdot$ cm <sup>2</sup> ( $4 \times 10^{-6}$ kg $\cdot$ m <sup>2</sup> )	
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf	
	Max. allowable revolution	<b>(Note2)</b>	3000rpm
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 50G		
Ambient temperature	-10 ~ 70°C (at non-freezing status), Storage: -25 ~ 85°C		
Ambient humidity	35~85%RH, Storage: 35~90%RH		
Protection	IP64 (IEC standard)		
Cable	$\phi$ 7mm, 15P, Length : 2m, Shield cable		
Accessory	Fixing bracket, Coupling		
Unit weight	Approx. 380g		
Approval	<b>CE</b>		

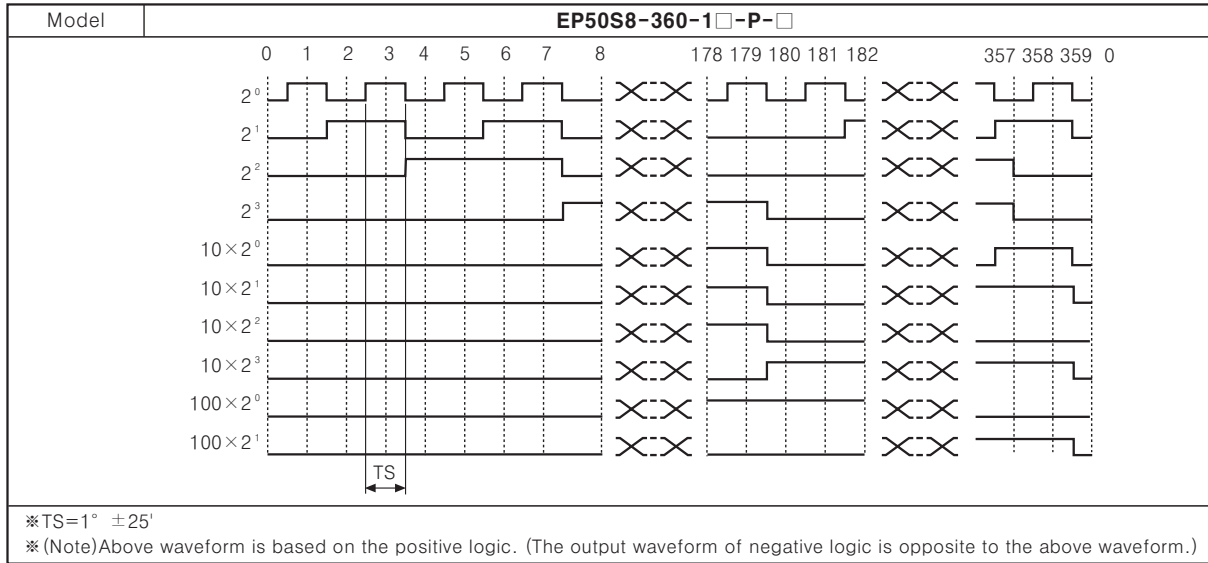
\* **(Note1)** "\*" Marked division in resolution is being developed. Not indicated type is customizable.

\* **(Note2)** Max. allowable revolution  $\geq$  Max. response revolution **[Max. response revolution (rpm) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ ]**

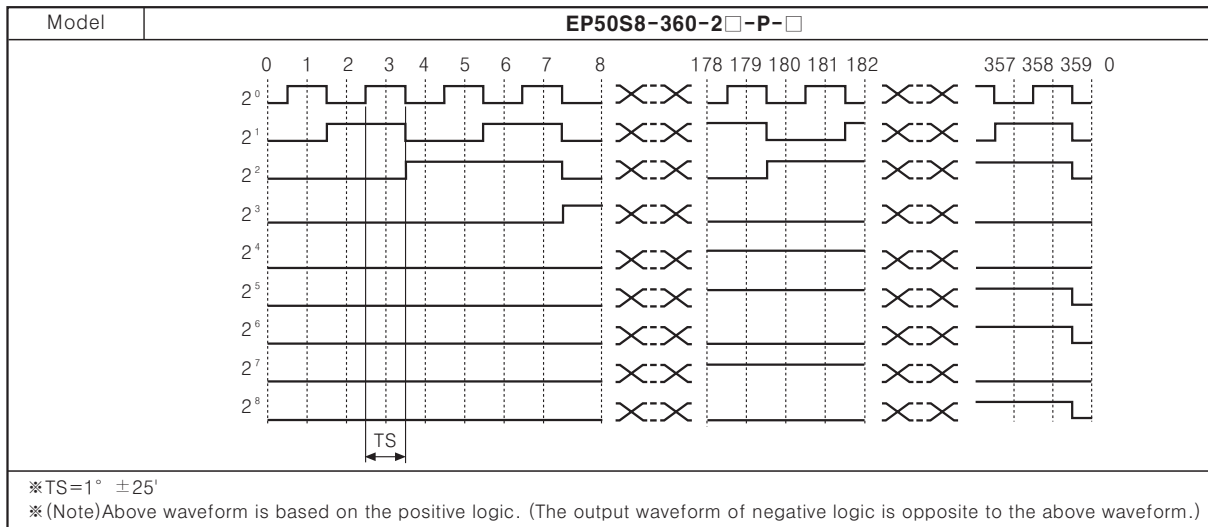
# ∅ 50mm Shaft Absolute Type

## Output waveform

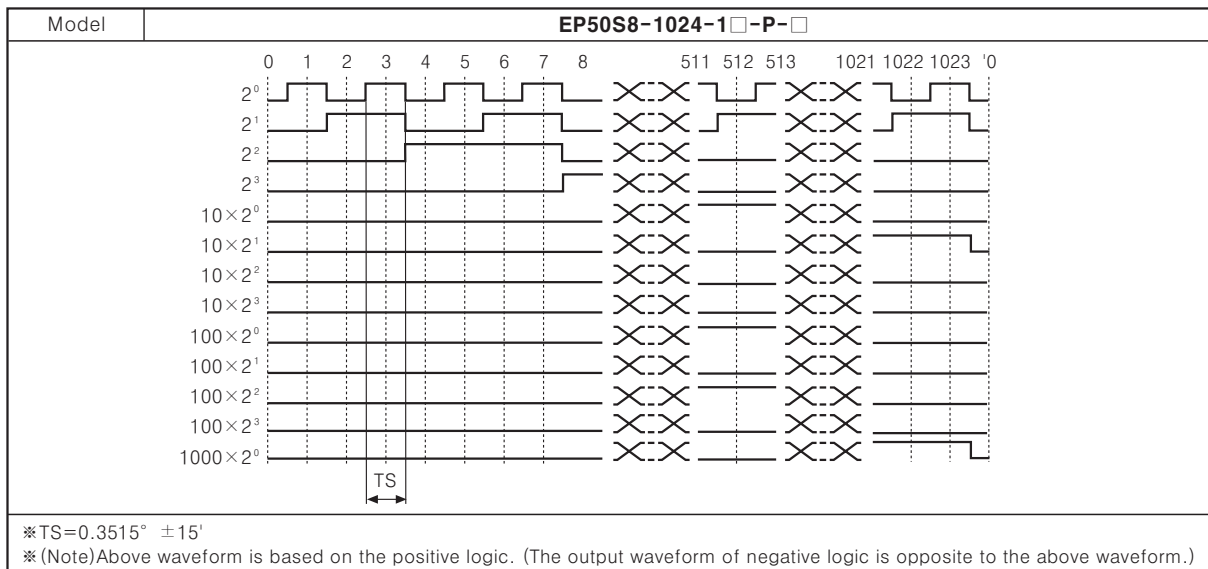
### ●360 division (BCD CODE output)



### ●360 division (BINARY CODE output)



### ●1024 division (BCD CODE output)



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/ Speed/ Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

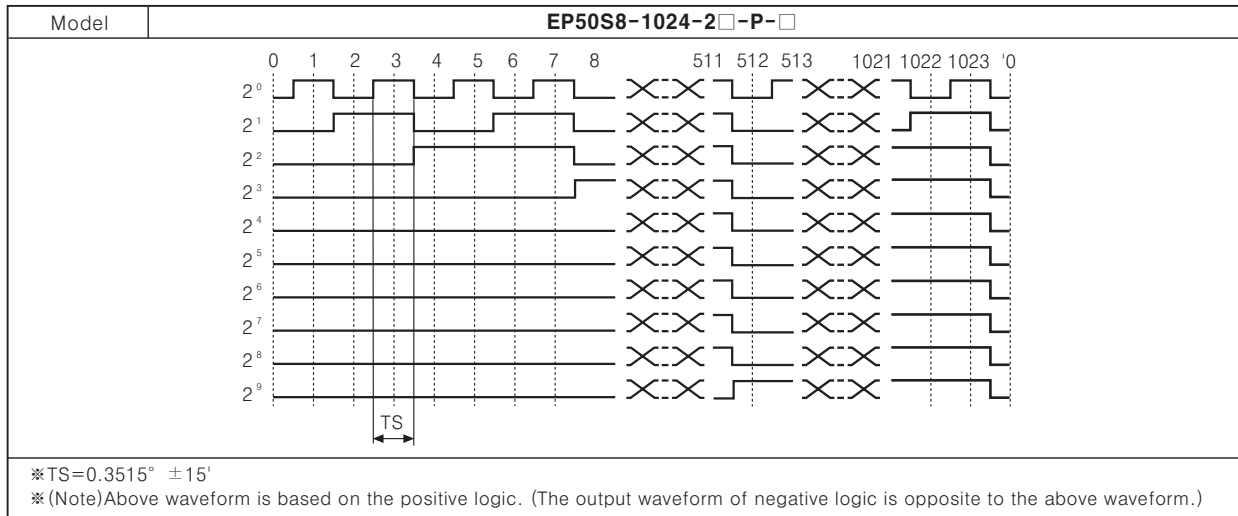
(P) Field network device

(Q) Production stoppage models & replacement

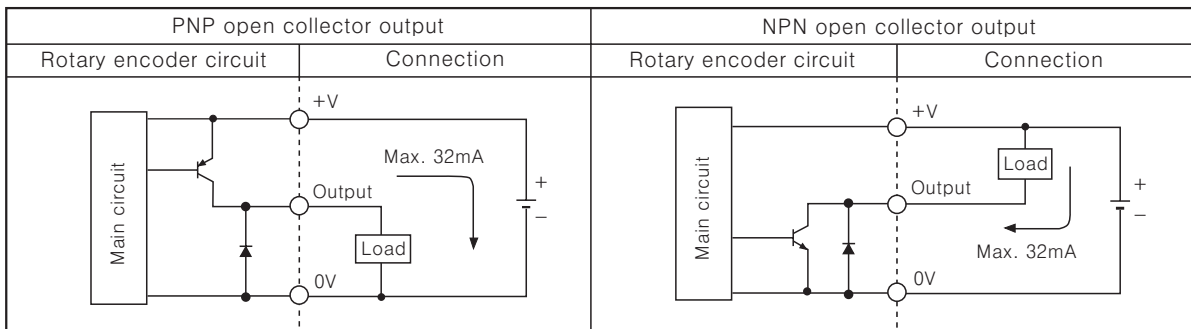
# EP50S Series

## Output waveform

### 1024 division (BINARY CODE output)



## Control output diagram



※Output circuit of all phases is same.

## 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 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	
	Orange	2°	2°	2°	2°	2°	2°	2°	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	
	Yellow	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>
	Blue	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)
	Purple	EP		2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)
	Gray	NC		(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	NC		EP	EP	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	(2 <sup>1</sup> ×10)	NC		(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)	(2 <sup>3</sup> ×10)
	White/Red	NC				EP	EP	EP	NC			(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)
	White/Orange	NC												(2 <sup>1</sup> ×100)	(2 <sup>1</sup> ×100)	(2 <sup>1</sup> ×100)	(2 <sup>1</sup> ×100)	(2 <sup>1</sup> ×100)	(2 <sup>1</sup> ×100)
	White/Yellow	NC															(2 <sup>2</sup> ×100)	(2 <sup>2</sup> ×100)	(2 <sup>2</sup> ×100)
	White/Blue	NC																	
	White/Purple	NC																	
	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 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>
	Orange	2°	2°	2°	2°	2°	2°	2°	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>
	Yellow	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>1</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>
	Blue	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>
	Purple	EP	EP	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>3</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>
	Gray	NC		EP	EP	2 <sup>4</sup>	2 <sup>4</sup>	2 <sup>4</sup>	NC		2 <sup>6</sup>	2 <sup>6</sup>	2 <sup>6</sup>	2 <sup>6</sup>	2 <sup>6</sup>	2 <sup>6</sup>	2 <sup>6</sup>	2 <sup>6</sup>
	White/Brown	NC			EP	EP	2 <sup>5</sup>	NC				2 <sup>7</sup>	2 <sup>7</sup>	2 <sup>7</sup>	2 <sup>7</sup>	2 <sup>7</sup>	2 <sup>7</sup>	
	White/Red	NC					EP	NC					2 <sup>8</sup>	2 <sup>8</sup>	2 <sup>8</sup>	2 <sup>8</sup>		
	White/Orange	NC																
	White/Yellow	NC																
	White/Blue	NC																
	White/Purple	NC																
	Shielded wire	F.G																

\* Unused wires must be insulated.

\* The metal case and shield wire of encoder should be grounded (F.G).

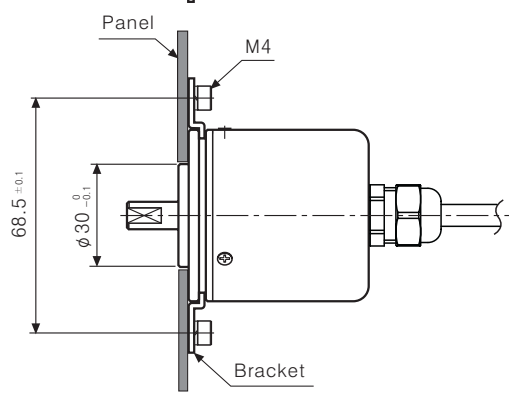
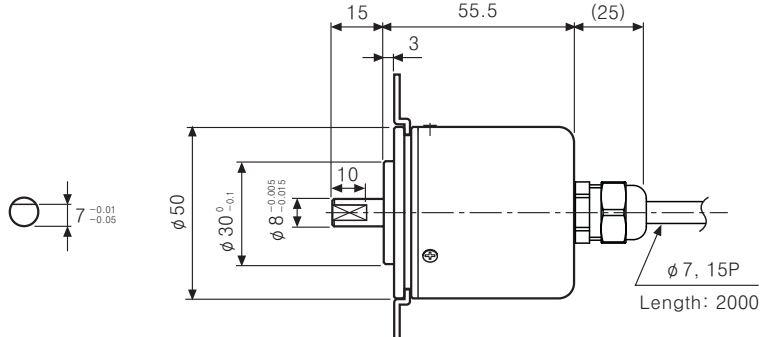
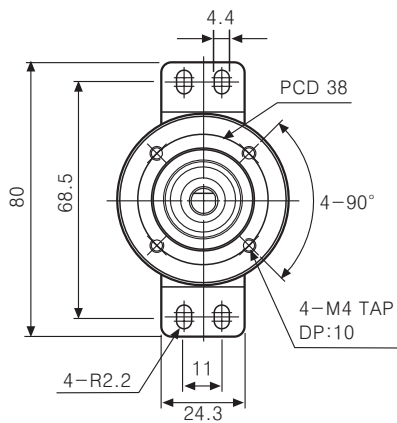
\* NC : Not Connected.

\* TP1/TP2 : It is an enablement signal to decide signal recognition for output easily because, output signal cycle is long in low resolution model.

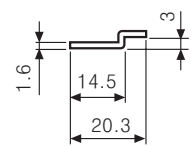
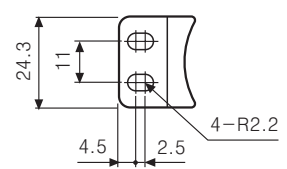
\* Ep : It is a parity signal to be outputted as odd number of parity.

\* Output cable must not be short-circuited, because Driver IC is used in output circuit.

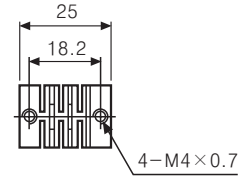
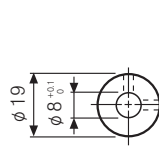
## ■ Dimensions



### ● Bracket



### ● Coupling



(Unit:mm)

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