

# ∅ 50mm Shaft Absolute Type


## Diameter ∅ 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)
- IP 64 (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	Inside		Pulse/1Revolution		Output code		Revolution direction		Control output		Power supply
Diameter ∅ 50mm shaft type	∅ 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 ±5% 24 : 12-24VDC ±5%

\* Gray code is customizable.

### ■ Specifications

Item	Diameter ∅ 50mm shaft type of Absolute rotary encoder		
Resolution	<b>(Note1)</b> *6, *8, *12, *16, *24, *32, *40, 45, 60, 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 ±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 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)	
	Rotor inertia	Max. 40g • cm <sup>2</sup> (4 × 10 <sup>-6</sup> kg • 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	∅ 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 ≥ Max. response revolution **[Max. response revolution (rpm) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ ]**

(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

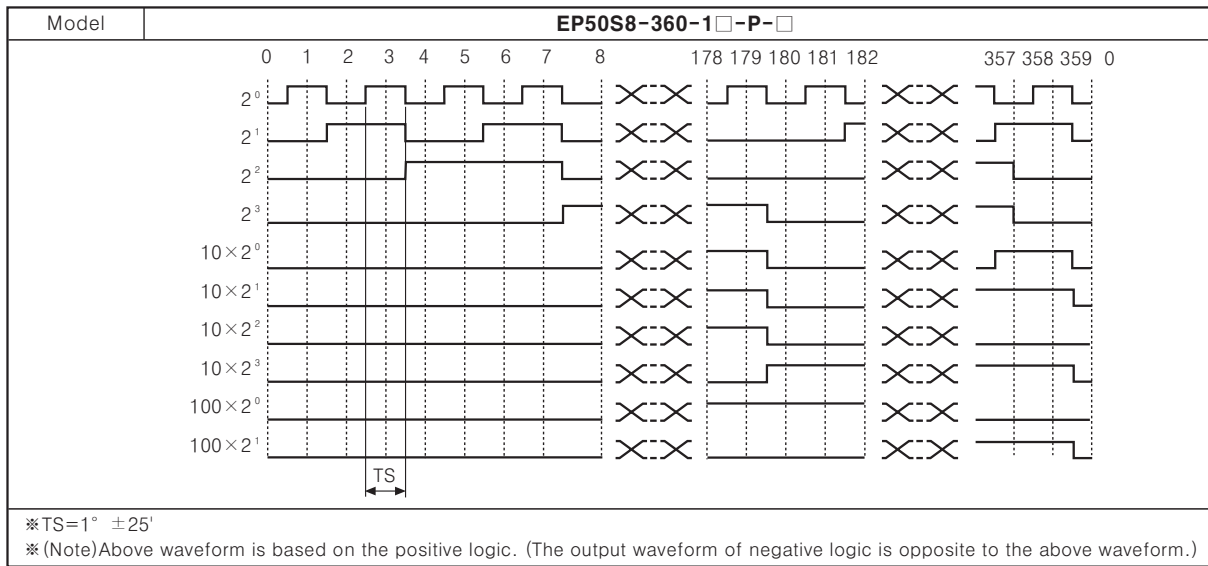
(O) Graphic panel

(P) Production stoppage models & replacement

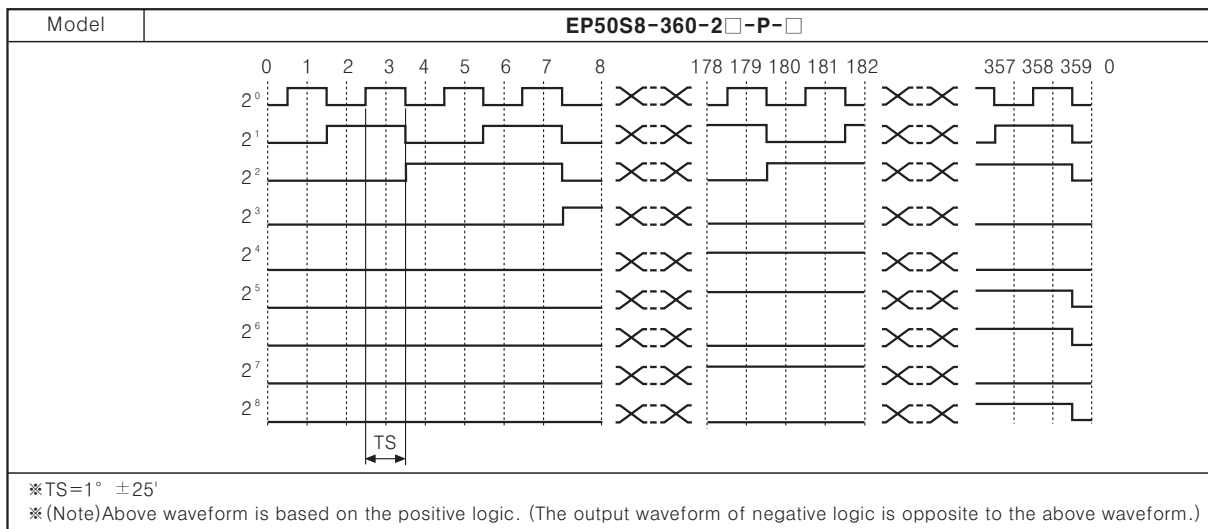
# EP50S Series

## Output waveform

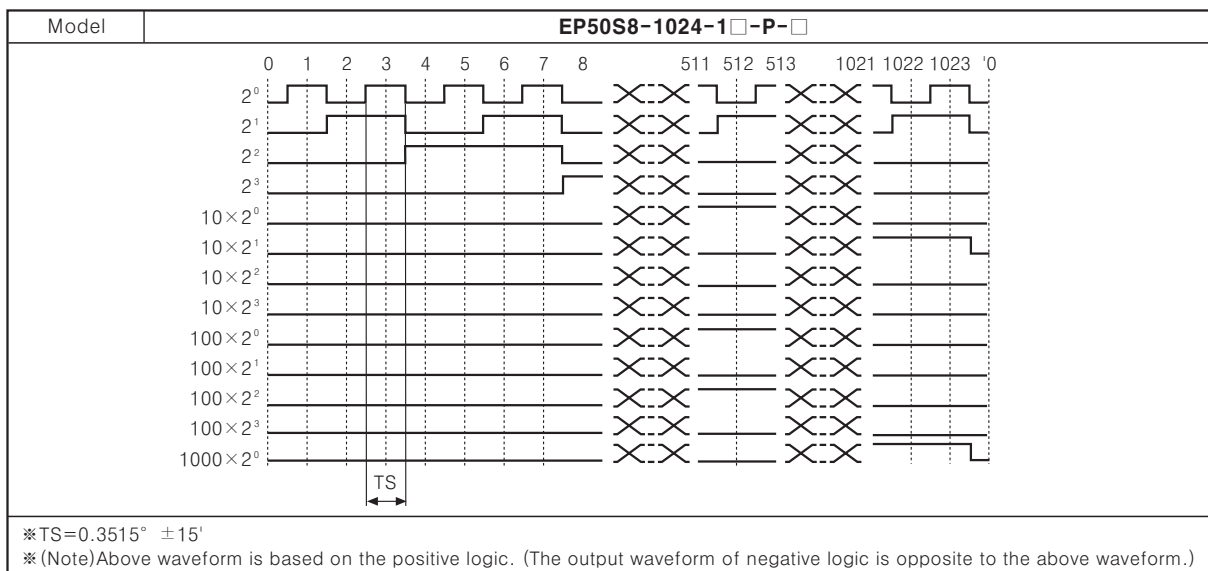
### ●360 division (BCD CODE output)



### ●360 division (BINARY CODE output)



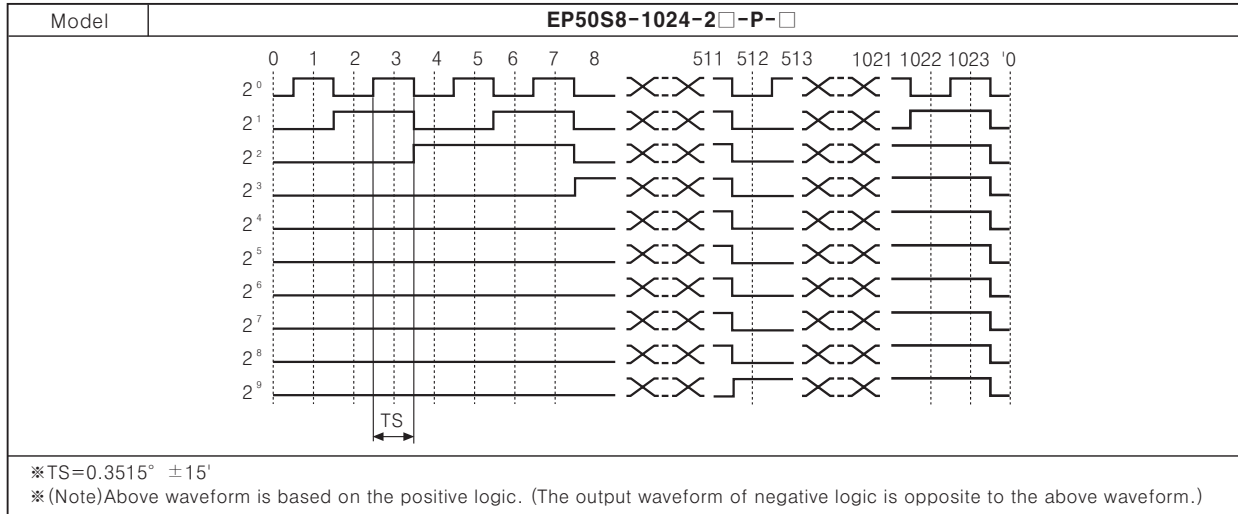
### ●1024 division (BCD CODE output)



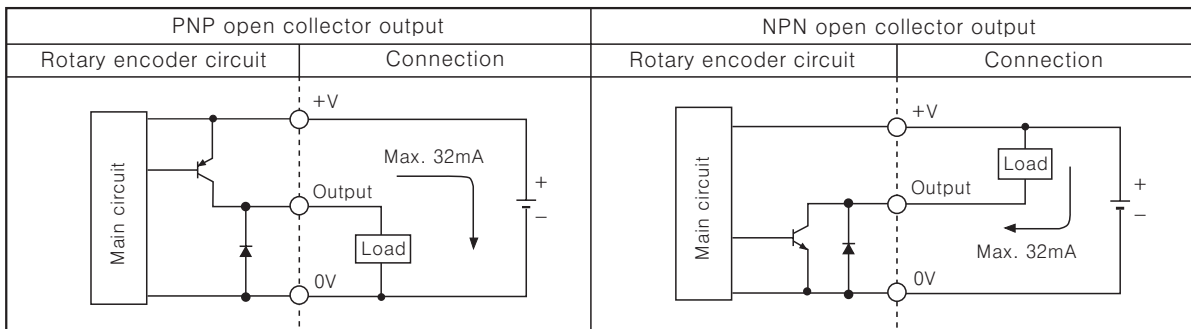
# ∅ 50mm Shaft Absolute Type

## 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	60	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	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°	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>	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>	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>	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)	(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)	(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)	(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)	(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)	(2 <sup>2</sup> ×100)	
	White/Blue	NC																			
	White/Purple	NC																			
Shielded wire	F.G																				

(A) Counter

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(P) Production stoppage models & replacement

# EP50S Series

## ■ Connections

### ● Binary code

Resolution	6	8	12	16	24	32	40	45	60	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	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°	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>	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>	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 <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>	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>	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>	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>	2 <sup>8</sup>	
	White/Orange	NC																	2 <sup>9</sup>	2 <sup>9</sup>
	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).

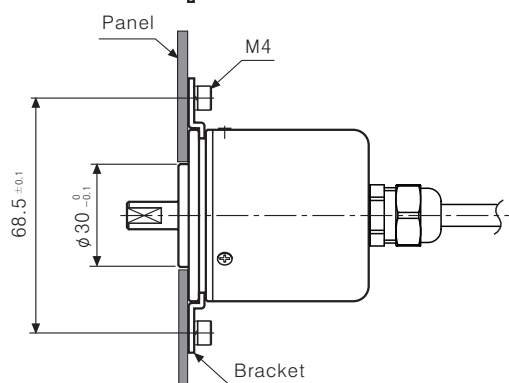
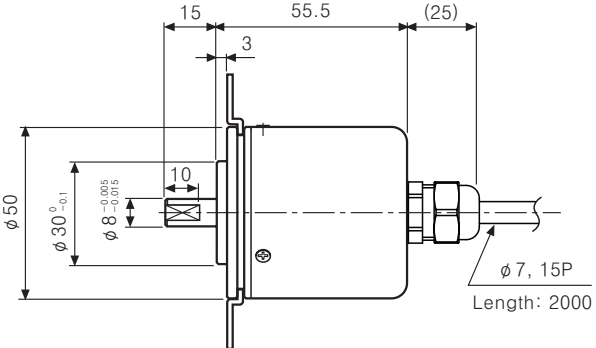
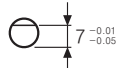
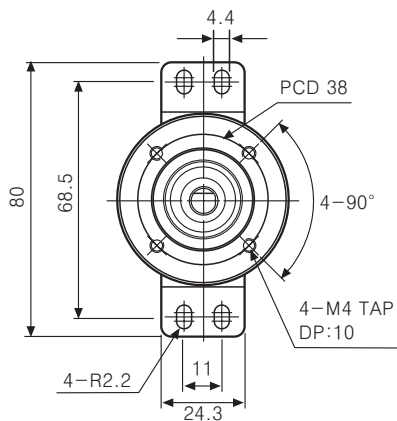
※ NC : Not Connected.

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

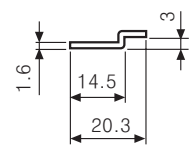
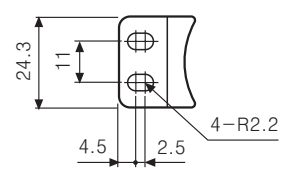
※ Ep : It is a parity signal to be outputted as odd number of parity.

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

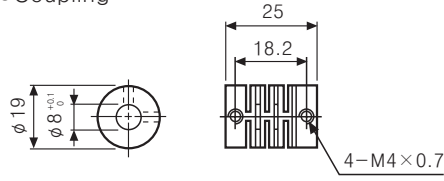
## ■ Dimensions



### ● Bracket



### ● Coupling



(Unit:mm)