

# E20 Series

## Diameter $\phi$ 20mm Shaft type/Hollow shaft built-in type Incremental Rotary encoder

NEW

### Features

- Miniature  $\phi$  20mm shaft type rotary encoder
- Easy installation at narrow space
- Small moment of inertia
- Power supply : 5VDC, 12VDC  $\pm$ 5%
- Various output types

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



E20S SERIES



E20HB SERIES

### Ordering information

E20	S	2	360	3	N	12	R
Series	Shaft type	Hollow type	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter $\phi$ 20mm, S: Shaft type HB: Hollow shaft built-in type	External	Inner	100, 200, 320, 360	3 : A, B, Z 6 : A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$	N: NPN open collector output V: Voltage output L: Line driver output(*)	5 : 5VDC $\pm$ 5% 12 : 12VDC $\pm$ 5%	R: Rear side outgoing cable type S: Side outgoing cable type
	2 : $\phi$ 2mm	2 : $\phi$ 2mm 2.5 : $\phi$ 2.5mm 3 : $\phi$ 3mm					

\*Standard : E20S2-[PULSE]-3-N-12-R  
E20HB2-[PULSE]-3-N-12-R

\*Standard : A, B, Z \*The power of Line driver is only for 5VDC

### Specifications

Item	Diameter $\phi$ 20mm shaft/hollow shaft built-in type Incremental Rotary Encoder		
Resolution (P/R)	100, 200, 320, 360 (Not indicated pulse and output type is customizable.)		
Electrical specification	Output phase	A, B, Z phase (Line driver output A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$ phase)	
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)	
	Control output	NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
		Line driver output	• Low $\Rightarrow$ Load current : Max. 20mA, Residual voltage : Max. 0.5VDC • High $\Rightarrow$ Load current : Max. -20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	NPN open collector output	Max. 1 $\mu$ s
		Voltage output	Max. 1 $\mu$ s
		Line driver output	Max. 0.5 $\mu$ s
	Max. Response frequency	100kHz	
	Power supply	• 5VDC $\pm$ 5% • 12VDC $\pm$ 5%	
Current consumption	Max. 60mA (disconnection of the load), Line driver output: Max. 50mA (disconnection of the load)		
Insulation resistance	Min. 100M $\Omega$ (at 500VDC megger between all terminals and case)		
Dielectric strength	500VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable outgoing type (Rear / Side)		
Mechanical specification	Starting torque	Max. 5gf $\cdot$ cm ( $5 \times 10^{-4}$ N $\cdot$ m)	
	Moment of inertia	Max. 0.5g $\cdot$ cm <sup>2</sup> ( $5 \times 10^{-8}$ kg $\cdot$ m <sup>2</sup> )	
	Shaft loading	Radial : 200gf, Thrust : 200gf	
	Max. allowable revolution	(Note1) 6000rpm	
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 $^{\circ}$ C (at non-freezing status), Storage : -20 to 80 $^{\circ}$ C		
Ambient humidity	35 to 85%RH, Storage : 35 to 90%RH		
Protection	IP50 (IEC standard)		
Cable	$\phi$ 3mm, 5P (Line driver output : 8P), Length: 1m, Shield cable		
Accessory	$\phi$ 2mm Coupling (Shaft type), Bracket (Built-in type)		
Approval	CE		
Unit weight	Approx. 35g		

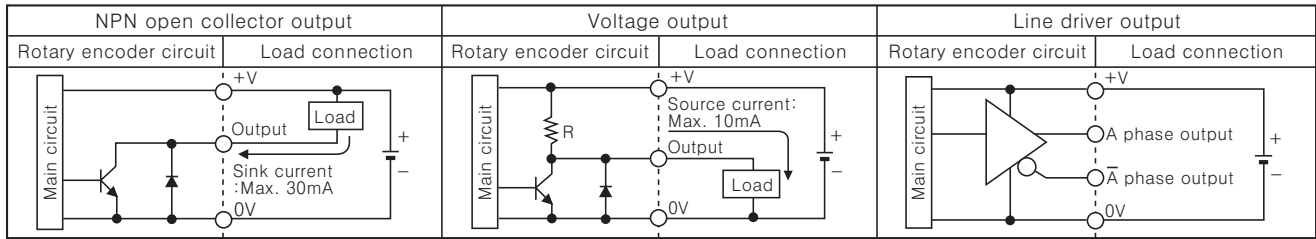
\* (Note1) Max. allowable revolution  $\geq$  Max. response revolution

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

Make sure that Max. response revolution should be lower than Max. allowable revolution when selecting the resolution.

# Incremental $\phi$ 20mm Shaft/Hollow shaft built-in Type

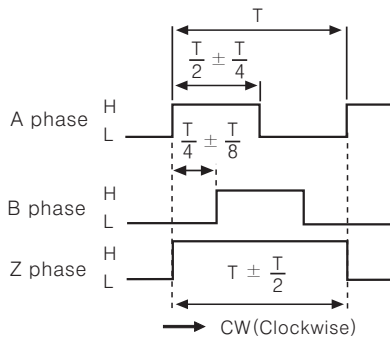
## Control output diagram



The output circuit of A, B, Z phase are the same. (Line driver output is A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

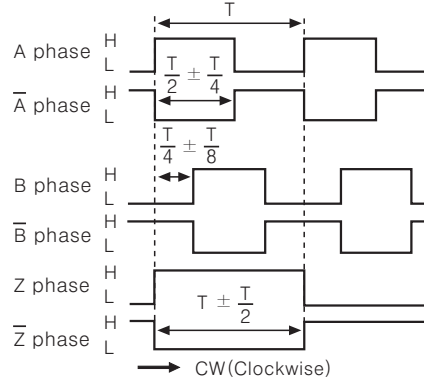
## Output waveform

●NPN open collector output / Voltage output



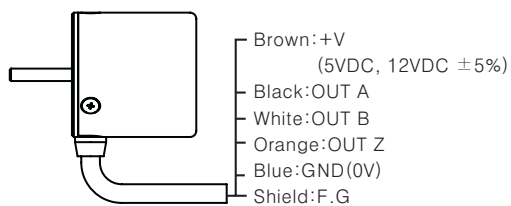
※CW : As viewed from the shaft

●Line driver output

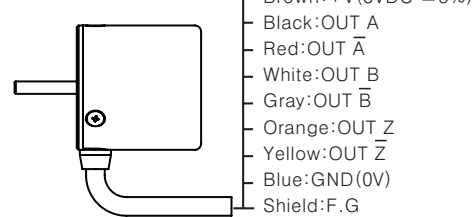


## Connections

●NPN open collector output / Voltage output

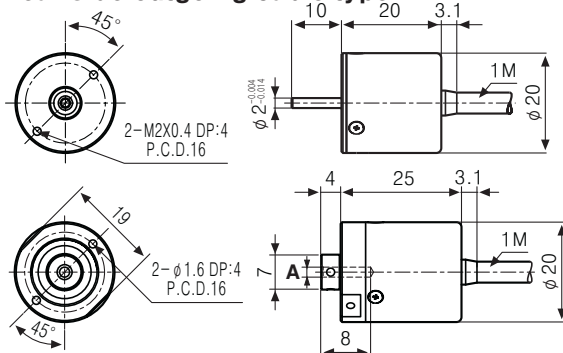


●Line driver output



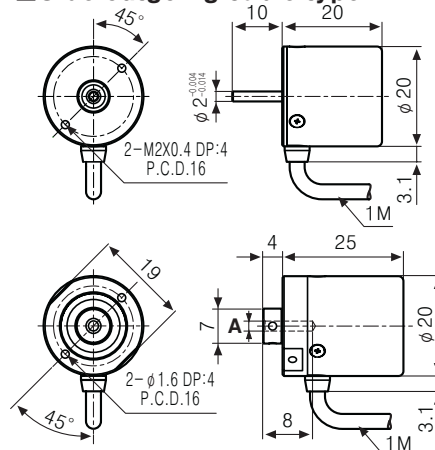
## Dimensions

■Rear side outgoing cable type



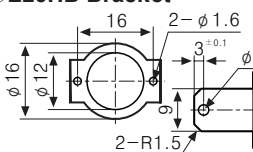
A	$\phi$ 2	$\phi$ 2.5	$\phi$ 3
Tolerance	+0.014, +0.004		

■Side outgoing cable type

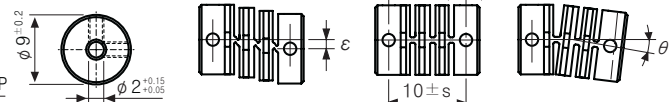
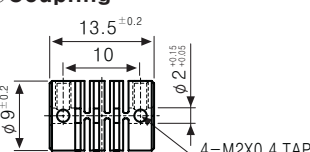


(Unit:mm)

◎E20HB Bracket



◎Coupling



※When combine the coupling to encoder shaft, if there is big eccentricity or bend between rotating encoder shaft and mate shaft, it will make the life cycle of encoder and coupling shorten.  
 ※Do not add too much load on rotation axis.

$s = 0.2\text{mm Max.}$   
 $\epsilon = 0.15\text{mm Max.}$   
 $\theta = 2^\circ \text{ Max.}$

(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