

# E20 Series

## Diameter Ø20mm Shaft Type/Hollow Shaft Built-In Type Incremental Rotary Encoder

### ■ Features

- Diameter Ø20mm of miniature rotary encoder
- Easy installation at narrow space
- Small shaft inertia moment
- Power supply: 5VDC, 12VDC ±5%
- Various output types

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



E20S Series



E20HB Series

### ■ Ordering Information

<b>E20</b>	<b>S</b>	<b>2</b>	<b>360</b>	<b>3</b>	<b>N</b>	<b>12</b>	<b>R</b>
Series	Shaft type	Hollow type	Pulse/1Revolution	Output phase	Control output	Power supply	Cable
Diameter Ø20mm, 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 ±5% 12: 12VDC ±5%	R: Axial cable type S: Radial cable type
	2: Ø2mm	2: Ø2mm 2.5: Ø2.5mm 3: Ø3mm					

※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 Ø20mm shaft/hollow shaft built-in type incremental rotary encoder		
Resolution (P/R) <sup>※1</sup>	100, 200, 320, 360		
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 - Load current: Max. 20mA, Residual voltage: Max. 0.5VDC • High - Load current: Max. -20mA, Output voltage: Min. 2.5VDC
	Response time (Rise/Fall)	NPN open collector output	Max. 1µs (Cable length: 1m, I sink = 20mA)
		Voltage output	Max. 0.5µs (Cable length: 1m, I sink = 20mA)
		Line driver output	Max. 0.5µs (Cable length: 1m, I sink = 20mA)
	Max. Response frequency	100kHz	
	Power supply	• 5VDC ±5% (Ripple P-P: Max. 5%) • 12VDC ±5% (Ripple P-P: Max. 5%)	
Current consumption	Max. 60mA (disconnection of the load), Line driver output: Max. 50mA (disconnection of the load)		
Insulation resistance	Min. 100MΩ (at 500VDC megger between all terminals and case)		
Dielectric strength	500VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable type (Axial / Radial)		
Mechanical specification	Starting torque	Max. 5gf·cm (5×9.8×10 <sup>-4</sup> N·m)	
	Moment of inertia	Max. 0.5g·cm <sup>2</sup> (5×10 <sup>-8</sup> kg·m <sup>2</sup> )	
	Shaft loading	Radial: 200gf, Thrust: 200gf	
	Max. allowable revolution <sup>※2</sup>	6000rpm	
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 temperature	-10 to 70°C, storage: -20 to 80°C	
	Ambient humidity	35 to 85%RH, storage: 35 to 90%RH	
Protection structure	IP50 (IEC standard)		
Cable	Ø3mm, 5-wire (Line driver output: 8-wire), Length: 1m, Shield cable		
Accessory	Ø2mm Coupling (Shaft type), Bracket (Hollow shaft built-in type)		
Approval	CE (Except line driver output)		
Unit weight	Approx. 35g		

※1: Not indicated resolutions are customizable.

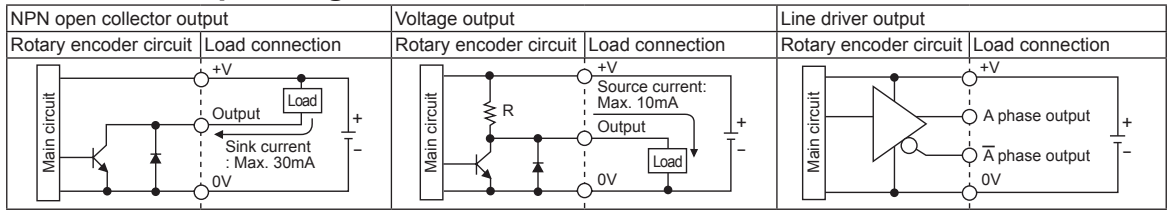
※Environment resistance is rated at no freezing or condensation.

※2: Make sure that. Max response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

# Incremental Ø20mm Shaft/Hollow Shaft Built-In Type

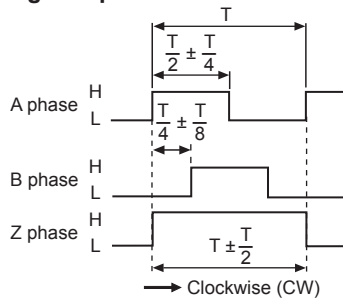
## Control Output Diagram



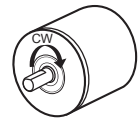
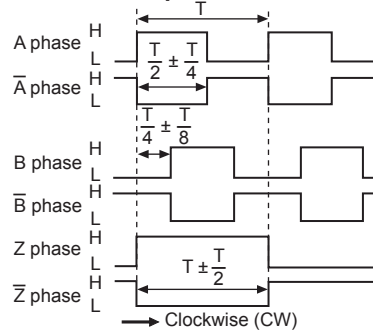
• The output circuit of A, B, Z phase are same. (Line driver output is A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

## Output Waveform

### NPN open collector output / Voltage output

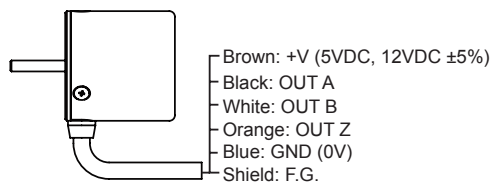


### Line driver output

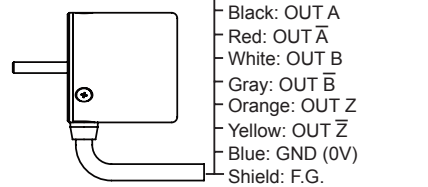


## Connections

### NPN open collector output / Voltage output

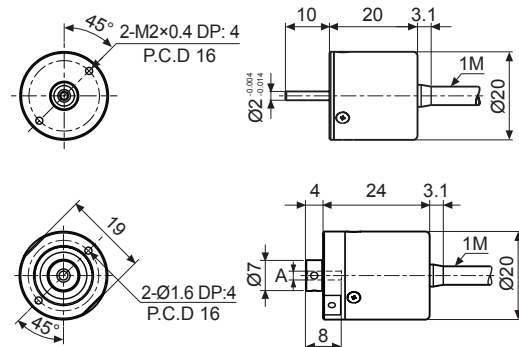


### Line driver output



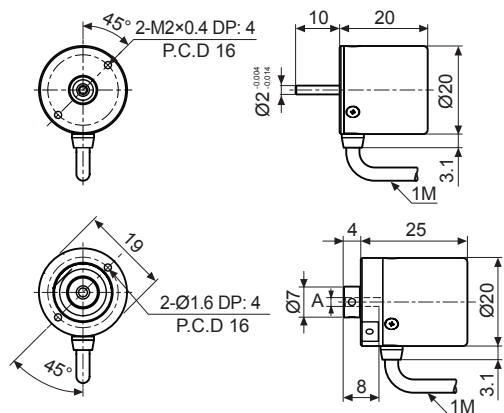
## Dimensions

### ⊙ Axial cable type



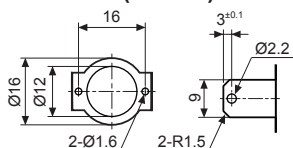
A	Ø2	Ø2.5	Ø3
Tolerance	+0.014	+0.004	

### ⊙ Radial cable type

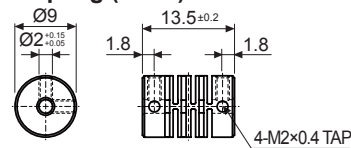


(unit: mm)

### • Bracket (E20HB)



### • Coupling (E20S)



- Parallel misalignment: Max. 0.15mm
- Angular misalignment: Max. 2°
- End-play: Max. 0.2mm

※ For parallel misalignment, angular misalignment, end-play terms, refer to page F-71.

(A)	Photoelectric Sensors
(B)	Fiber Optic Sensors
(C)	Door/Area Sensors
(D)	Proximity Sensors
(E)	Pressure Sensors
(F)	Rotary Encoders
(G)	Connectors/ Sockets
(H)	Temperature Controllers
(I)	SSRs / Power Controllers
(J)	Counters
(K)	Timers
(L)	Panel Meters
(M)	Tacho / Speed / Pulse Meters
(N)	Display Units
(O)	Sensor Controllers
(P)	Switching Mode Power Supplies
(Q)	Stepper Motors & Drivers & Controllers
(R)	Graphic/ Logic Panels
(S)	Field Network Devices
(T)	Software