Shaft Type/Blind Hollow Shaft Type Ø20mm Incremental Rotary Encoder

■ Features

- **Ø20mm of miniature rotary encoder**
- Easy installation at narrow space
- Low moment of inertia
- 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

E20[S] — 2 — 360 — 3 — N — 12 — R

Series	Shaft type	Hollow type	Pulses/revolution	Output phase	Control output	Power supply	Cable
Ø20mm, S: Shaft type HB: Blind hollow shaft type	External 2: Ø2mm	Inner 2: Ø2mm 2.5: Ø2.5mm 3: Ø3mm	100, 200, 320, 360	3: A, B, Z 6: A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$	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

※The power of Line driver is only for 5VDC.

■ Specifications

Item			Shaft Type/Blind Hollow Shaft Type Ø20mm Incremental Rotary Encoder
Resolution (PPR)※1			100, 200, 320, 360
Electrical specification	Output phase		A, B, Z phase (line driver output A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$ 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	
		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		Over 100MΩ (at 500VDC megger between all terminals and case)
	Dielectric strength		500VAC 50/60Hz for 1 minute (between all terminals and case)
	Connection		Axial/Radial cable type
Mechanical specification	Starting torque		Max. 5gf·cm (5×9.8×10^{-4} N·m)
	Moment of inertia		Max. 0.5g·cm² (5×10^{-8} kg·m²)
	Shaft loading		Radial: 200gf, Thrust: 200gf
	Max. allowable revolution ※2		6,000rpm
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℃, storage: -20 to 80℃
		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), 1m, Shield cable
Accessory			Ø2mm Coupling (shaft type), Bracket (blind hollow shaft type)
Approval			CE (except line driver output)
Unit weight			Approx. 35g

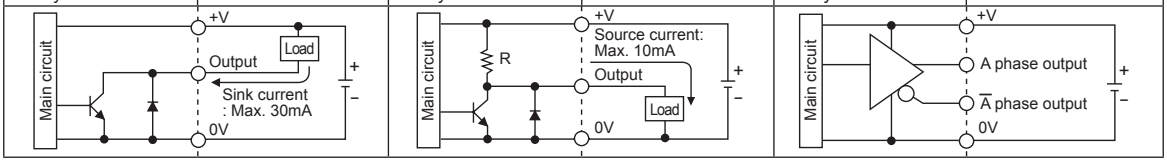
※1: Not indicated resolutions are customizable. ※Environment resistance is rated at no freezing or condensation.

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

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

■ Control Output Diagram

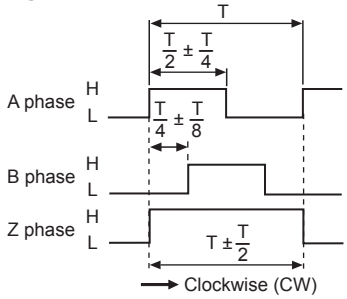
NPN open collector output		Voltage output		Line driver output	
Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection



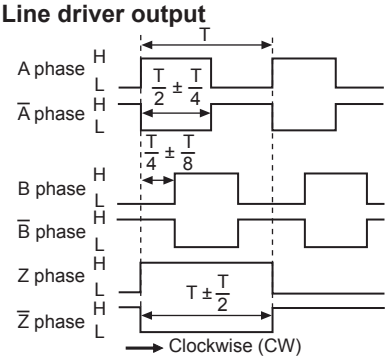
• The output circuit of A, B, Z phase are same. (line driver output is A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$)

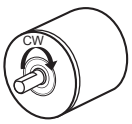
■ Output Waveform

• NPN open collector output / Voltage output



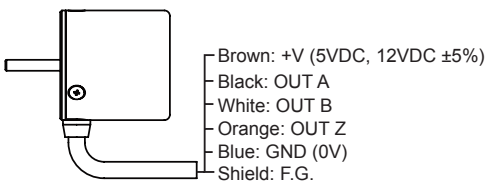
• Line driver output



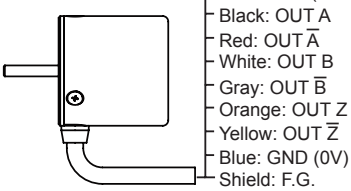


■ Connections

• NPN open collector output / Voltage output



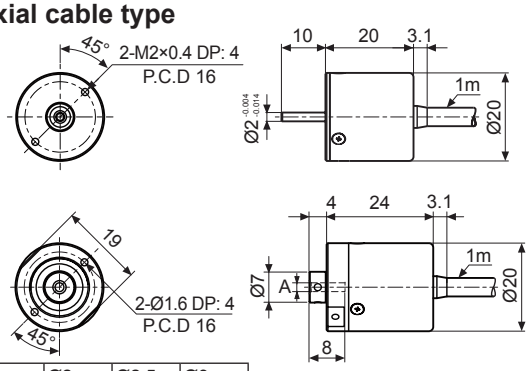
• Line driver output



■ Dimensions

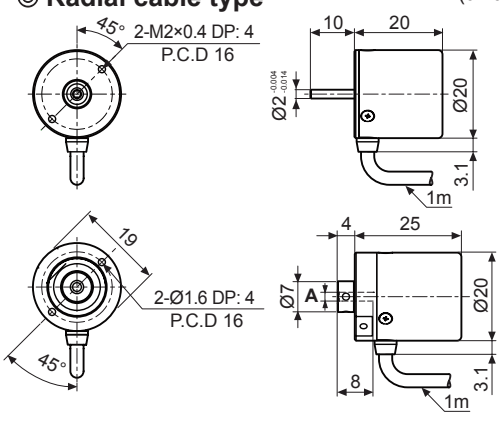
(unit: mm)

◎ Axial cable type

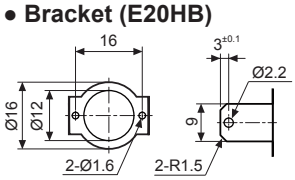


A	Ø2	Ø2.5	Ø3
Tolerance	+0.014 +0.004		

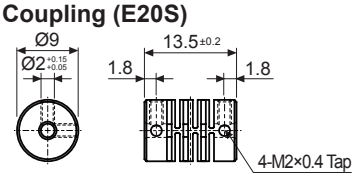
◎ Radial cable type



• Bracket (E20HB)



• Coupling (E20S)



- Parallel misalignment: Max. 0.15mm
- Angular misalignment: Max. 2°
- End-play: Max. 0.5mm

※Do not load overweight on the shaft.
※For parallel misalignment, angular misalignment, end-play terms, refer to page F-87.
※For flexible coupling (ERB series) information, refer to page F-80.

※When mounting the coupling to the encoder shaft, if there is combined misalignment (parallel, angular misalignment) between rotating encoder shaft and mate shaft, it may cause encoder and coupling's life cycle to shorten.