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 "Safety Considerations" in the instruction manual before using.

E20S Series

E20HB Series

■ Ordering Information

E20[S] — 2 — 360 — 3 — N — 12 — R

Series	Shaft diameter		Pulses/revolution	Output phase	Control output	Power supply	Cable
Ø20mm S: shaft type	External	2: Ø2mm	100, 200, 320, 360	3: A, B, Z 6: A, Ā, B, B̄, Z, Z̄	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
Ø20mm HB: blind hollow shaft type	Inner	2: Ø2mm 2.5: Ø2.5mm 3: Ø3mm					

※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, Ā, B, B̄, Z, Z̄ 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 cable type, radial cable type
Mechanical specification	Starting torque		Max. 5gf·cm (5×10^{-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

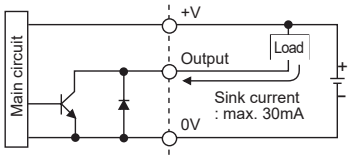
※1: Not indicated resolutions are customizable.

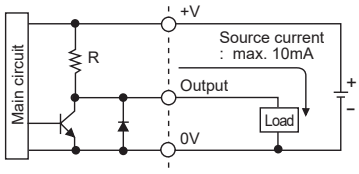
※2: Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

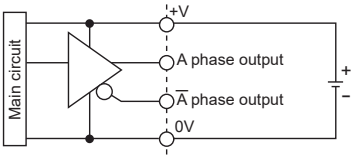
[Max. response revolution (rpm)= $\frac{\text{Max. response frequency}}{\text{Resolution}}$ × 60 sec]

※Environment resistance is rated at no freezing or condensation.

▣ Control Output Diagram

NPN open collector output	
Rotary encoder circuit	Load connection
	

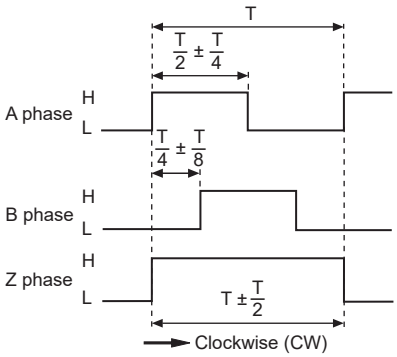
Voltage output	
Rotary encoder circuit	Load connection
	

Line driver output	
Rotary encoder circuit	Load connection
	—

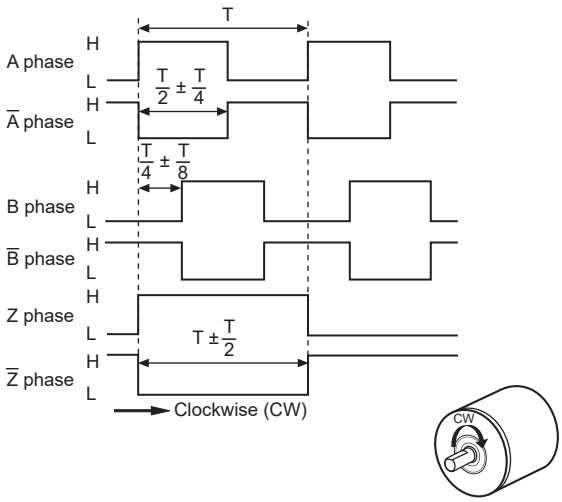
※The output circuit of A, B, Z phase are same. (line driver output is A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$)

▣ Output Waveform

◎ NPN open collector output / Voltage output

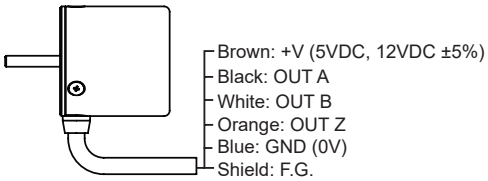


◎ Line driver output

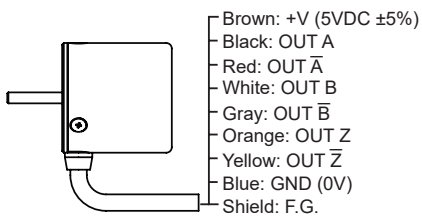


▣ Connections

◎ NPN open collector output / Voltage output



◎ Line driver output

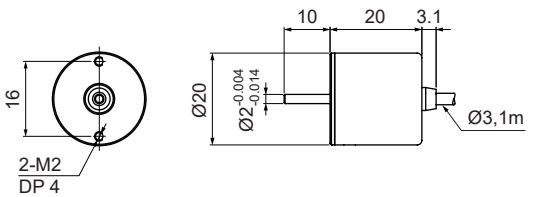


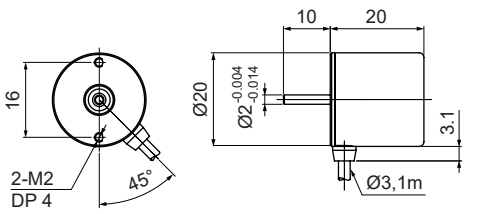
※Do not apply tensile strength over 15N to the cable.

▣ Dimensions

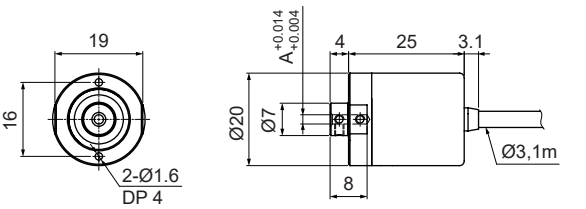
(unit: mm)

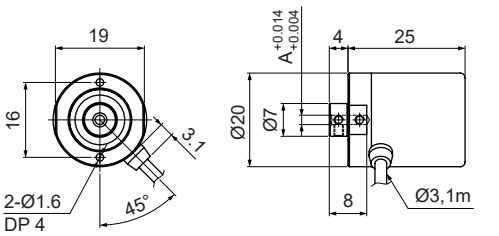
◎ Shaft type





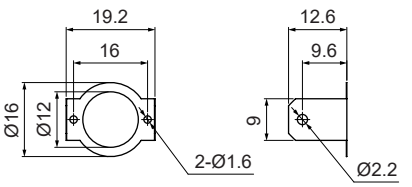
◎ Blind hollow shaft type



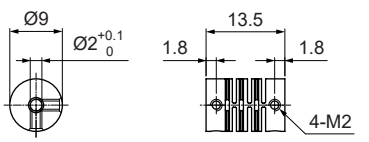


Model	E20HB2	E20HB2.5	E20HB3
A	Ø2	Ø2.5	Ø3

◎ 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.
※Do not put strong impact when insert a coupling into shaft.
Failure to follow this instruction may result in product damage.
※Fix the unit or a coupling by a wrench under 0.15N·m of torque.
※When you install this unit, if eccentricity and deflection angle are larger,
it may shorten the life cycle of this unit.
※For parallel misalignment, angular misalignment, end-play terms, refer to the "Glossary"
section of Technical Description.
※For flexible coupling (ERB series) information, refer to ERB series section.