

# E60H Series

## Diameter ø60mm Hollow shaft type Incremental Rotary Encoder

### ■ Features

- Diameter ø60mm, Inner diameter of shaft ø20mm
- Easy installation at narrow space
- Suitable for measuring angle, position, revolution, speed, acceleration and distance
- Power supply : 5VDC, 12-24VDC ±5%
- Various output types



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

### ■ Ordering information

**E60H** - **20** - **8192** - **3** - **N** - **24** -

Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ø60mm, hollow shaft type	ø20mm	100, 1024, 500, 8192	3 : A, B, Z 6 : A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$	T : Totem pole output N : NPN open collector output V : Voltage output L : Line driver output(※)	5 : 5VDC ±5% 24 : 12-24VDC ±5%	No mark: Cable type C: Connector cable type(※)

※Standard : E60H20-PULSE-3-N-24

※Cable length : 250mm

### ■ Specifications

Item	Diameter ø60mm hollow shaft type of incremental rotary encoder		
Resolution(P/R)*1	100, 1024, 5000, 8192		
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=1cycle of A phase)	
	Control output	Totem pole output	• Low - Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High - Load current:Max. 10mA, Output voltage(Power voltage 5VDC):Min. (Power voltage-2.0)VDC, Output voltage(Power voltage 12-24VDC):Min. (Power voltage-3.0)VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
	Response time (Rise/Fall)	Line driver output	• Low - Load current : Max. 20mA, Residual voltage : Max. 0.5VDC • High - Load current : Max. -20mA, Output voltage(Power voltage 5VDC):Min. 2.5VDC, Output voltage(Power voltage 12-24VDC):Min. (Power voltage-3.0)VDC
		Totem pole output	Max. 1μs
		NPN open collector output	
		Voltage output	
	Line driver output	Max. 0.5μs	• Measuring condition - Cable length : 2m, I sink = 20mA
	Max. Response frequency	300kHz	
	Power supply	• 5VDC ±5%(Ripple P-P:Max. 5%) • 12-24VDC ±5%(Ripple P-P:Max. 5%)	
	Current consumption	Max. 80mA(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	750VAC 50/60Hz for 1 minute(Between all terminals and case)		
Connection	Cable type, 250mm connector cable type		
Mechanical specification	Starting torque	Max. 150gf·cm(0.015N·m)	
	Moment of inertia	Max. 110g·cm <sup>2</sup> (11×10 <sup>-6</sup> kg·m <sup>2</sup> )	
	Shaft loading	Radial : 5kgf, Thrust : 2.5kgf	
	Max. allowable revolution*2	6000rpm	
Vibration	1.5mm amplitude or 300m/s <sup>2</sup> at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours		
Shock	Approx. Max. 100G		
Environment	Ambient temperature	-10 to 70°C, storage : -25 to 85°C	
	Ambient humidity	35 to 85%RH, storage : 35 to 90%RH	
Protection	IP50(IEC standard)		
Cable	ø5, 5-wire, Length : 2m, Shield cable(Line driver output : ø5, 8-wire) (AWG24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter : ø1)		
Accessory	Bracket 2EA		
Weight*3	Approx. 397g(approx. 330g)		

\*1: Not indicated type is customizable.

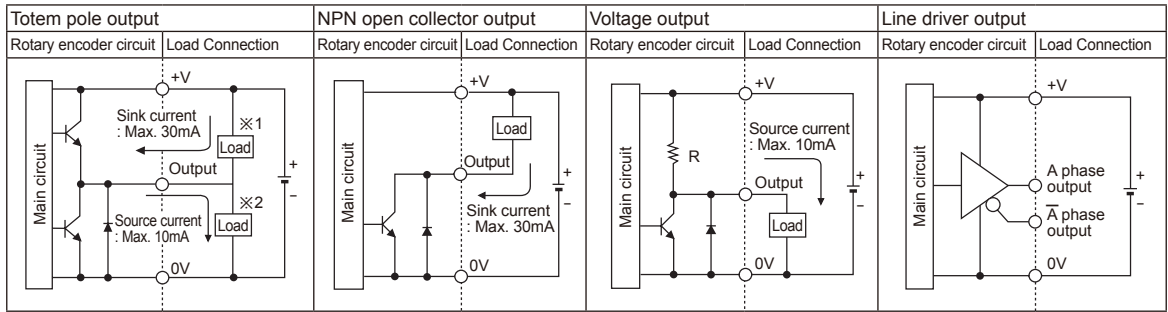
\*3: The weight with packaging and the weight in parentheses is only unit weight.

\*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) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ ] ※Environment resistance is rated at no freezing or condensation.

# Incremental ø60mm Hollow Shaft type

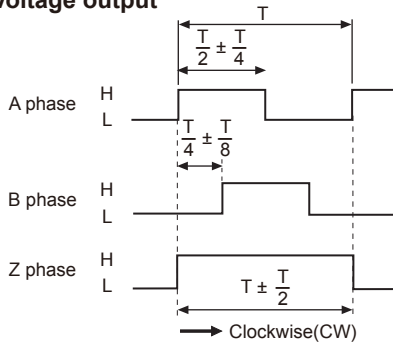
## Control output diagram



- Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
- All output circuits of A, B, Z phase are the same. (Line driver output is A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )

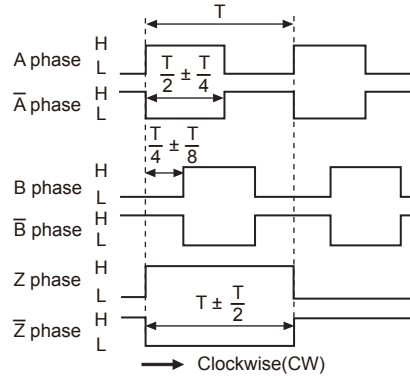
## Output waveform

- Totem pole output / NPN open collector output / Voltage output



※CW : Right turn as from the shaft

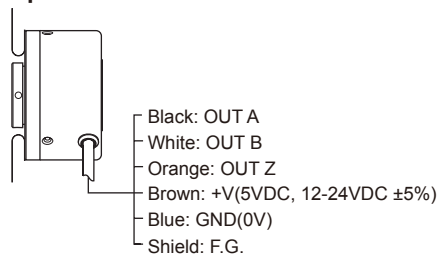
- Line driver output



## Connections

### ◎ Cable type

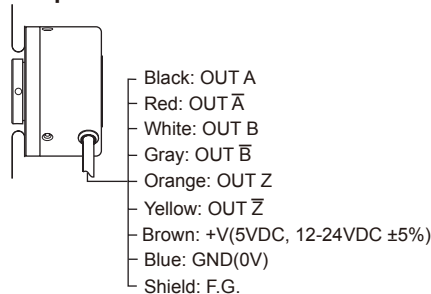
- Totem pole output / NPN open collector output / Voltage output



※Unused wires must be insulated.

※The metal case and shield cable of encoder should be grounded(F.G.).

- Line driver output



### ◎ Connector cable type

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



Totem pole output/ NPN open collector output/ Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT $\bar{A}$	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G.	Shield	⑥	OUT $\bar{B}$	Gray
			⑦	OUT Z	Orange
			⑧	OUT $\bar{Z}$	Yellow
			⑨	F.G.	Shield

※F.G.(Field Ground) : It should be grounded separately.

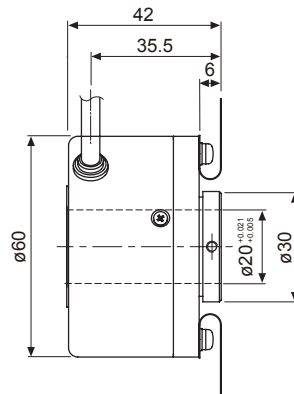
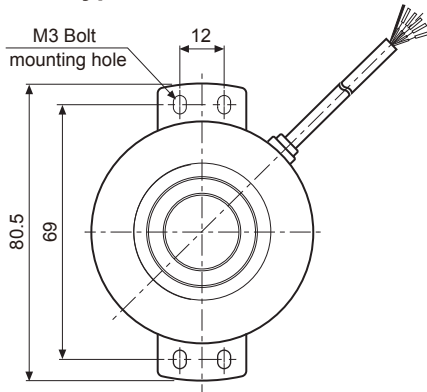
- (A) Photo electric sensor
- (B) Fiber optic sensor
- (C) Door/Area sensor
- (D) Proximity sensor
- (E) Pressure sensor
- (F) Rotary encoder
- (G) Connector/Socket
- (H) Temp. controller
- (I) SSR/ Power controller
- (J) Counter
- (K) Timer
- (L) Panel meter
- (M) Tacho/ Speed/ Pulse meter
- (N) Display unit
- (O) Sensor controller
- (P) Switching mode power supply
- (Q) Stepper motor& Driver&Controller
- (R) Graphic/ Logic panel
- (S) Field network device
- (T) Software
- (U) Other

# E60H Series

## ■ Dimension

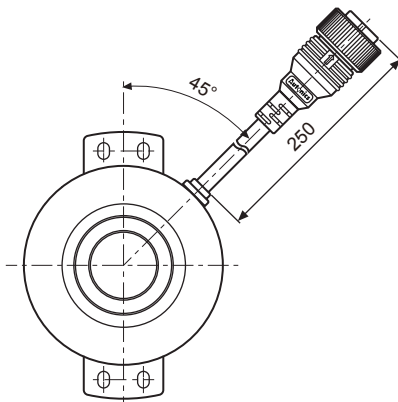
### ◎ Cable type

(unit: mm)

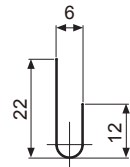
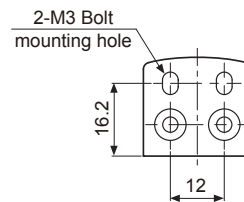


Cable
ø5, 5-wire(Line driver output : 8-wire), Length : 2000m, Shield cable

### ◎ Connector cable type



### ● Bracket



※Connector cable is customizable and refer to the G-10 for specifications.