

# 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 inner diameter	Pulse/1Revolution	Output phase	Control output	Power supply	Cable
Diameter Ø60mm, hollow shaft type	Ø20mm	100, 1024, 5000, 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: Cable connector type (※)

※Standard : E60H20-PULSE-3-N-24

※Cable length : 250mm

### ■ Specifications

Item	Diameter Ø60mm hollow shaft type of incremental rotary encoder		
Resolution (P/R) <sup>※1</sup>	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=1 cycle 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
		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
	Res- ponse time (rise/ fall)	Totem pole output	Max. 1μs (Cable length : 2m, I sink = 20mA)
		NPN open collector output	
		Voltage output	
		Line driver output	Max. 0.5μs (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 cable connector type		
Mechanical specification	Starting torque	Max. 150gf·cm (0.0147 N·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 <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. 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 structure	IP50 (IEC standard)		
Cable	Ø5mm, 5-wire, Length : 2m, Shield cable (Line driver output : Ø5mm, 8-wire) (AWG24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter : Ø1mm)		
Accessory	Bracket 2EA		
Approval	CE		
Weight <sup>※3</sup>	Approx. 397g (approx. 330g)		

※1: Not indicated resolutions are customizable.

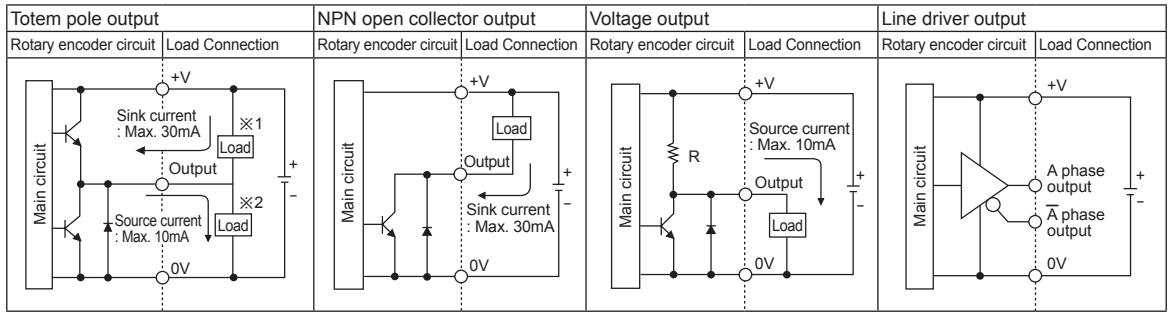
※3: The weight includes packaging. The weight in parentheses is for unit only.

※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

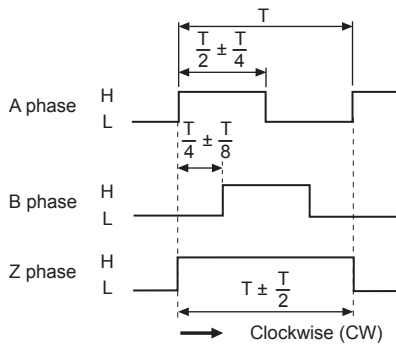
## Control Output Diagram



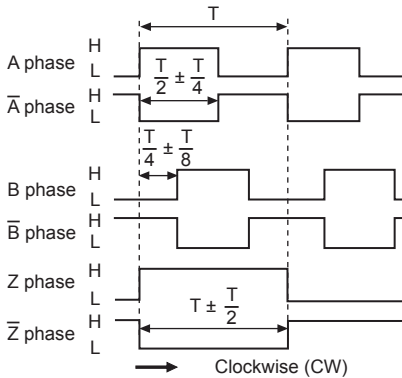
- All output circuits of A, B, Z phase are same. (Line driver output is A,  $\bar{A}$ , B,  $\bar{B}$ , Z,  $\bar{Z}$ )
- Totem pole output type can be used for NPN open collector output type (※1) or Voltage output type (※2).

## Output Waveform

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



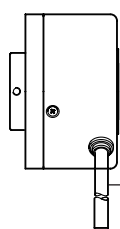
- Line driver output



## Connections

### ◎ Cable type

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

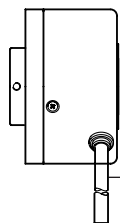


- Black: OUT A
- White: OUT B
- Orange: OUT Z
- Brown: +V (5VDC, 12-24VDC ±5%)
- Blue: GND (0V)
- Shield: F.G.

※Unused wires must be insulated.

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

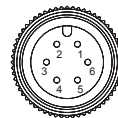
- Line driver output



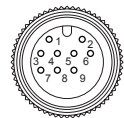
- Black: OUT A
- Red: OUT  $\bar{A}$
- White: OUT B
- Gray: OUT  $\bar{B}$
- Orange: OUT Z
- Yellow: OUT  $\bar{Z}$
- Brown: +V (5VDC, 12-24VDC ±5%)
- Blue: GND (0V)
- Shield: F.G.

### ◎ Cable connector 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) 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

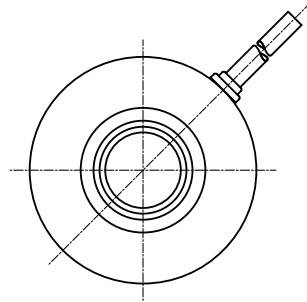
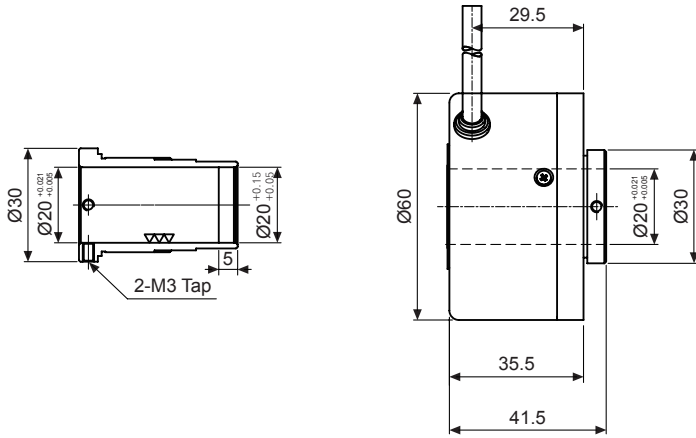
(T) Software

# E60H Series

## ■ Dimension

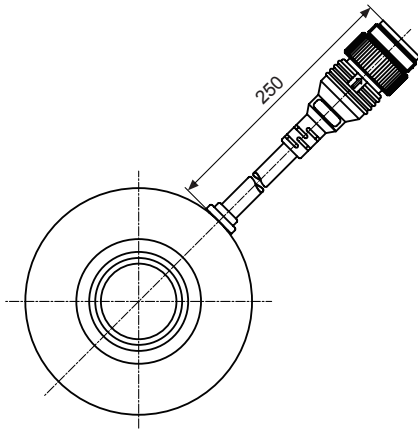
### ◎ Cable type

(unit: mm)

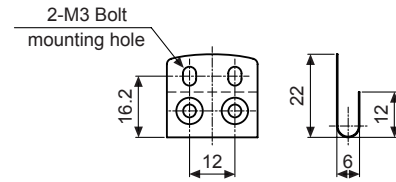


Cable for cable type  
 Ø5mm, 5-wire (Line driver output : 8-wire),  
 Length : 2000mm, Shield cable

### ◎ Cable connector type



### ● Bracket



※Connector cable is sold separately and refer to page G-10 for specifications.