

# ∅ 60mm Shaft AbsoluteType

## Diameter ∅ 60mm shaft type Absolute Rotary encoder

### ■ Features

- Able to measure absolute variable angle with BCD code.
- Strong against external impact.
- Memorize the absolute position when power is cut.

### ■ Application

- Precision numerical control machine for industrial plant.

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

### ■ Ordering information

ENP	-	1	-	1	-	1	-	R	-	360	-	1
Series	Output code	Output	Power supply	Revolution direction	Revolution/1Pulse		Control output					
Diameter ∅ 60mm shaft type (External diameter : ∅ 8mm)	1:BCD code	0:Negative logic 1:Positive logic	0:5-12VDC ±5% 1:12-24VDC ±5%	F:Output value increase at CW direction R:Output value increase at CCW direction	006:6 division 008:8 division 012:12 division	016:16 division 024:24 division 360:360 division	1:PNP open collector output 2:NPN open collector output					

\*Since the output type is related with control output, please select the model name in specification when ordering the item.

### ■ Specifications

Item		Diameter ∅ 60mm shaft type of Absolute rotary encoder							
Model	PNP open collector output	ENP-111□-006-P	ENP-111□-008-P	ENP-111□-012-P	ENP-111□-016-P	ENP-111□-024-P	ENP-110□-360-P		
	NPN open collector output	ENP-101□-006-N	ENP-101□-008-N	ENP-101□-012-N	ENP-101□-016-N	ENP-101□-024-N	ENP-100□-360-N		
Resolution		6 division	8 division	12 division	16 division	24 division	360 division		
Electrical specification	Output phase	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 4bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 5bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 6bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 6bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 7bit(BCD, EP)	TS(Signal Pulse) : 10bit(BCD)		
	Output of phase differences	TP1:53° ± 30' TP2:15° ± 30' P:60° ± 30' TS:56° ± 30'	TP1:39° ± 30' TP2:15° ± 30' P:45° ± 30' TS:42° ± 30'	TP1:3° ± 30' TP2:15° ± 30' P:30° ± 30' TS:26° ± 30'	TP1:2° ± 30' TP2:11.25° ± 30' P:22.5° ± 30' TS:19.5° ± 30'	TP1:8° ± 30' TP2:3° ± 30' P:15° ± 30' TS:11° ± 30'	TS:1° ± 30'		
	Control output	PNP open collector output	Output voltage : Min. (Power supply-1.5)VDC, Load current : Max. 32mA						
		NPN open collector output	Load current : Max. 32mA, Residual voltage : Max. 1VDC						
	Response time (Rise & Fall)	PNP open collector output	TON=500ns, TOFF=Max. 2.5μs (Cable length:1m, I sink =32mA)						
		NPN open collector output	TON=400ns, TOFF=Max. 1.5μs (Cable length:1m, I sink =32mA)						
	Max. Response frequency		20kHz						
	Power supply		12-24VDC ±5% (Ripple P-P:Max. 5%)					5-12VDC ±5% (Ripple P-P:Max. 5%)	
	Current consumption		Max. 150mA (disconnection of the load)				Max. 200mA (disconnection of the load)		
	Insulation resistance		Min. 20MΩ (at 500VDC)						
Dielectric strength		500VAC 50/60Hz for 1 minute (Between all terminals and case)							
Connection		Cable outgoing connection							
Mechanical specification	Starting torque	Max. 500gf · cm (0.05N · m)							
	Rotor inertia	Max. 300g · cm <sup>2</sup> (3 × 10 <sup>-5</sup> kg · m <sup>2</sup> )							
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf							
	Mechanical revolution	(Note1)	3600rpm						
Vibration		1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours							
Shock		Max. 75G							
Ambient temperature		-10 ~ 60°C (at non-freezing status), Storage:-25 ~ 85°C							
Ambient humidity		35~85%RH, Storage : 35~90%RH							
Protection		IP50(IEC standard)							
Cable		∅ 8mm, 12P, Length : 1m, Double shield cable							
Accessory		Fixing bracket, Coupling							
Unit weight		Approx. 577g						Approx. 690g	

※(★Note1)Max. allowable revolution ≥ Max. response revolution 【Max. response revolution(rpm) =  $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

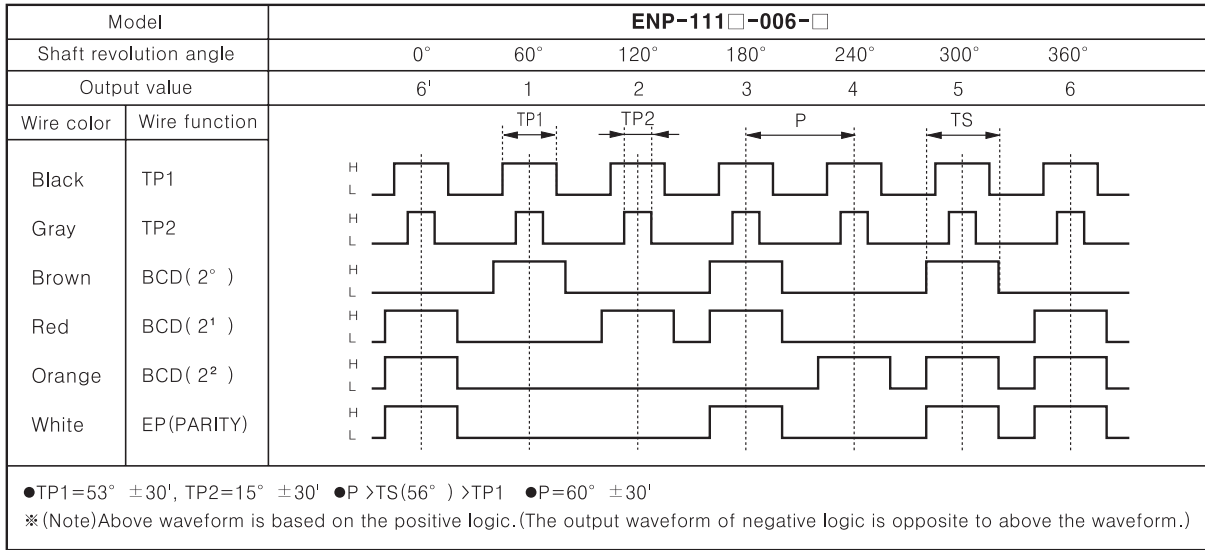
(O) Graphic panel

(P) Production stoppage models & replacement

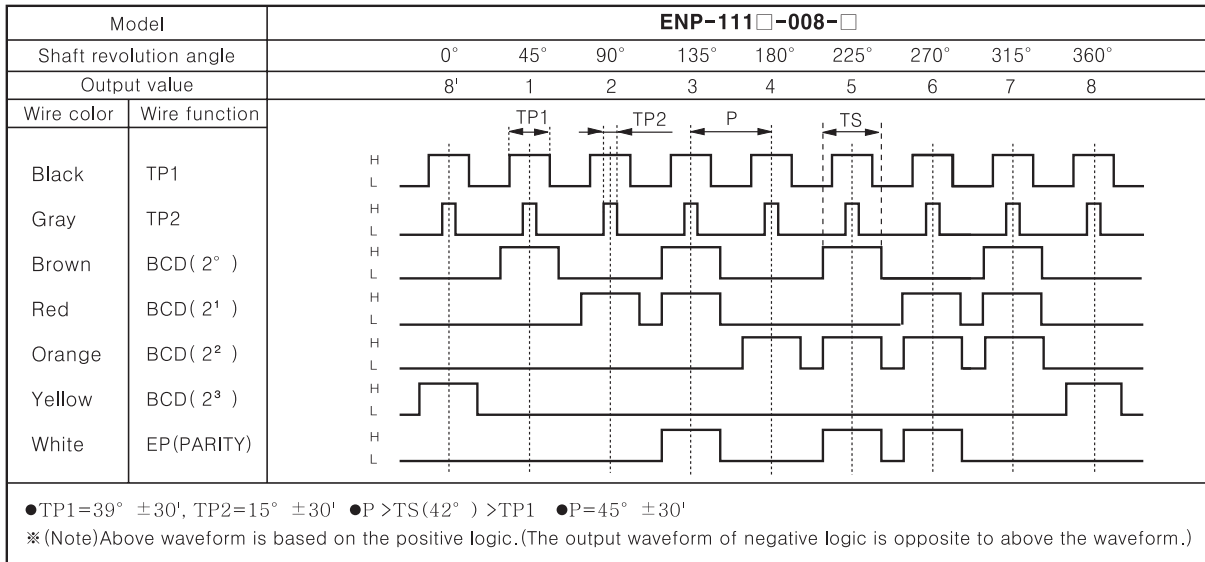
# ENP Series

## Output waveform

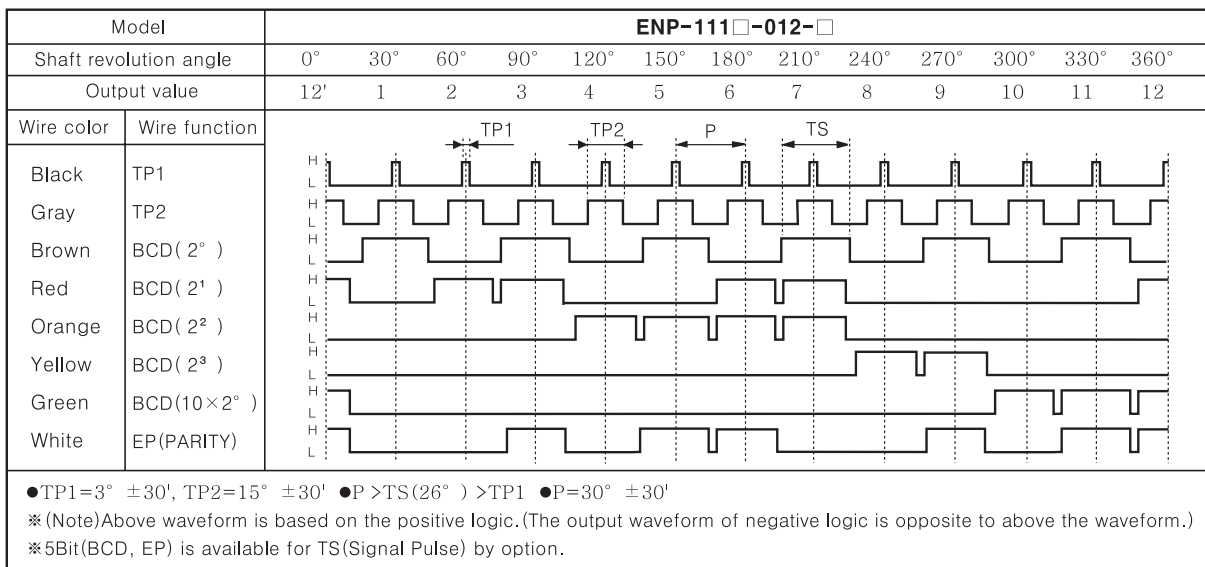
### ● 6 division



### ●8 division



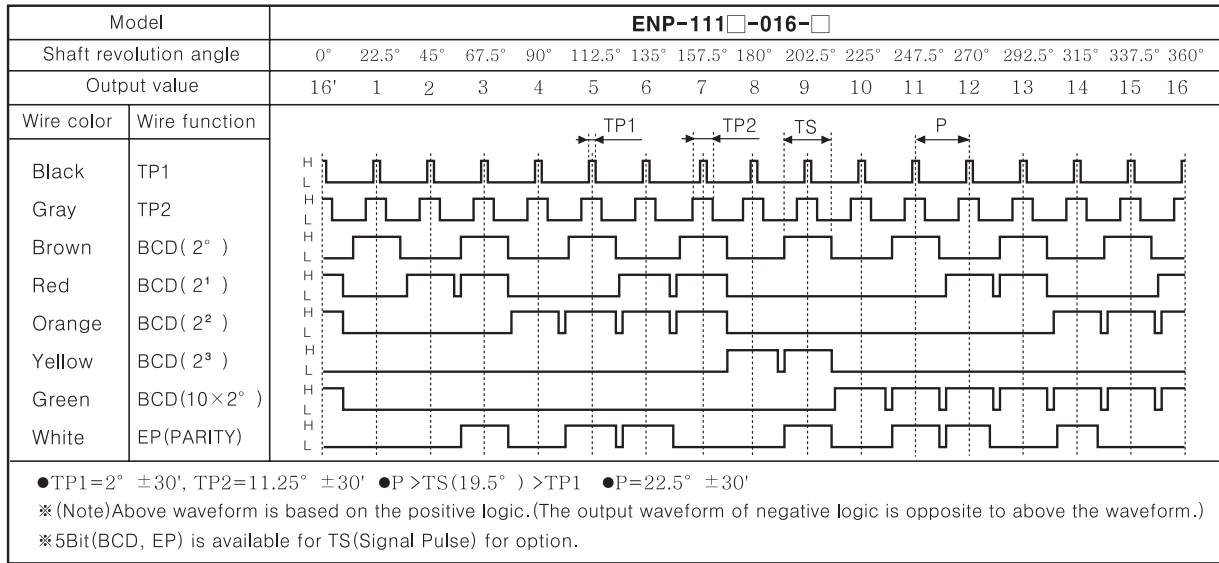
### ●12 division



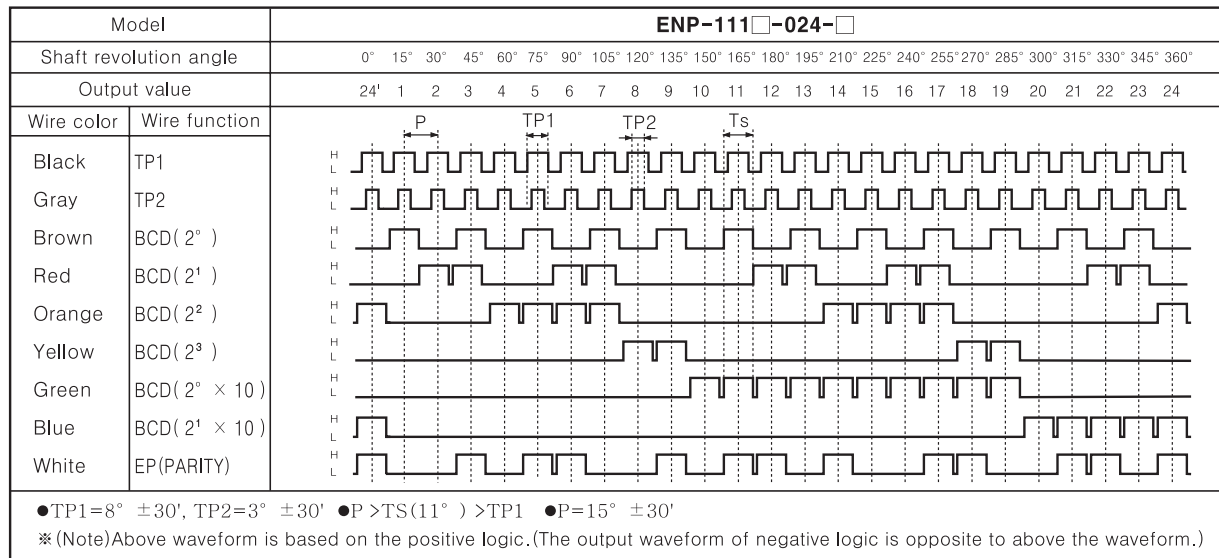
# ∅ 60mm Shaft Absolute Type

## Output waveform

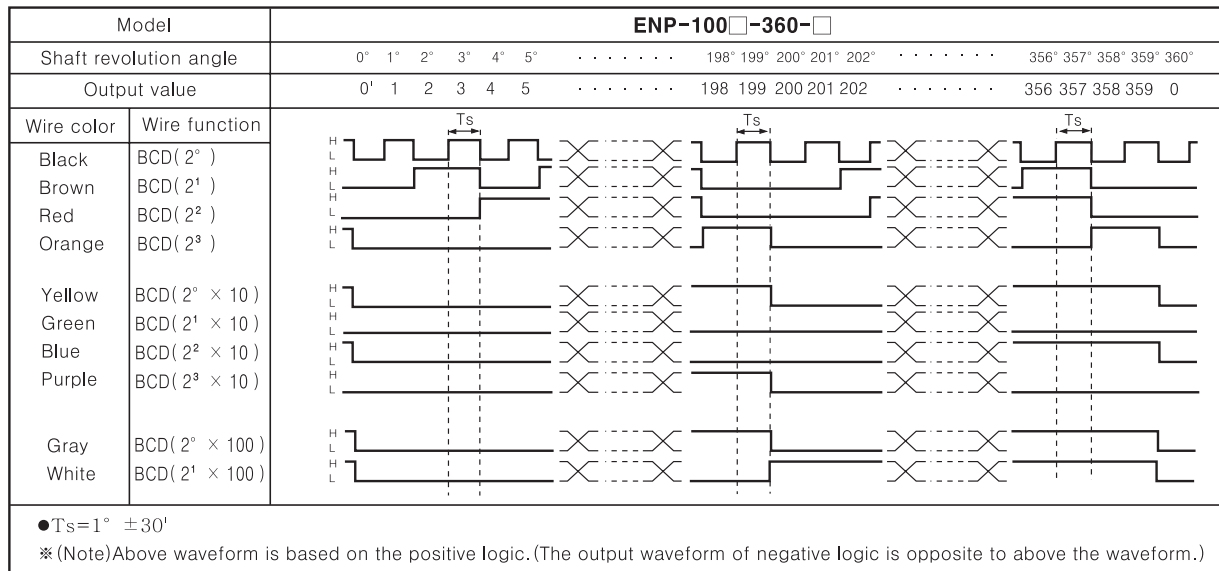
### ●16 division



### ●24 division



### ●360 division



(A) Counter

(B) Timer

(C) Temp. controller

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(E) Panel meter

(F) Tacho/Speed/Pulse meter

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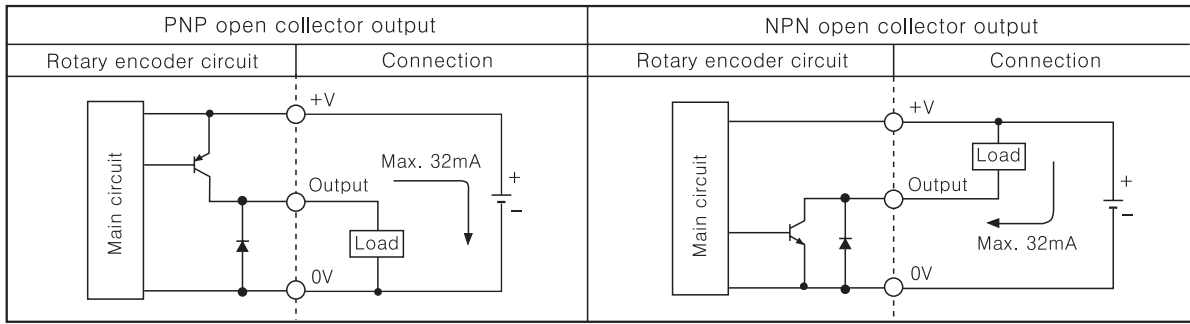
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

# ENP Series

## Control output diagram



※Output circuit of all phases is same.

## Connections

Cable color	6 division	8 division	12 division	16 division	24 division	360 division
1:White	+V					
2:Black	GND(0V)					
3:Shield wire	F.G					
1:Black	TP1					BCD CODE(2 <sup>°</sup> )
2:Brown	BCD CODE(2 <sup>1</sup> )	BCD CODE(2 <sup>2</sup> )	BCD CODE(2 <sup>3</sup> )	BCD CODE(2 <sup>4</sup> )	BCD CODE(2 <sup>5</sup> )	BCD CODE(2 <sup>6</sup> )
3:Red	BCD CODE(2 <sup>1</sup> )	BCD CODE(2 <sup>1</sup> )	BCD CODE(2 <sup>1</sup> )	BCD CODE(2 <sup>1</sup> )	BCD CODE(2 <sup>1</sup> )	BCD CODE(2 <sup>2</sup> )
4:Orange	BCD CODE(2 <sup>2</sup> )	BCD CODE(2 <sup>2</sup> )	BCD CODE(2 <sup>2</sup> )	BCD CODE(2 <sup>2</sup> )	BCD CODE(2 <sup>2</sup> )	BCD CODE(2 <sup>3</sup> )
5:Yellow	NC	BCD CODE(2 <sup>3</sup> )	BCD CODE(2 <sup>3</sup> )	BCD CODE(2 <sup>3</sup> )	BCD CODE(2 <sup>3</sup> )	BCD CODE(2 <sup>°</sup> × 10)
6:Green	NC	NC	BCD CODE(2 <sup>°</sup> × 10)	BCD CODE(2 <sup>°</sup> × 10)	BCD CODE(2 <sup>°</sup> × 10)	BCD CODE(2 <sup>1</sup> × 10)
7:Blue	NC	NC	NC	NC	BCD CODE(2 <sup>1</sup> × 10)	BCD CODE(2 <sup>2</sup> × 10)
8:Purple	NC					BCD CODE(2 <sup>3</sup> × 10)
9:Gray	TP2					BCD CODE(2 <sup>°</sup> × 100)
10:White	EP(PARITY)					BCD CODE(2 <sup>1</sup> × 100)
11:Shield wire	F.G					

※Unused wires must be insulated.

※The metal case and shield wire should be grounded(F.G).

※NC : Not Connected.

※Output cable must not be short-circuited, because Driver IC is used in output circuit.

## Dimensions

