

ENP Series

Diameter ϕ 60mm Shaft type Absolute Rotary encoder

Line-up

Features

- 12-24VDC power supply of 360 division(Line-up)
- Allows to measure absolute variable angle with BCD code
- Strong against external impact
- Memorizing the absolute position when power is cut off



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 - P

Series	Output code	Output	Power supply	Revolution direction	Revolution/1Pulse	Control output
Diameter ϕ 60mm shaft type (External shaft diameter : ϕ 10mm)	1:BCD code	0:Negative logic 1:Positive logic	0:5-12VDC \pm 5% (*) 1:12-24VDC \pm 5%	F:Output value increase at CW direction R:Output value increase at CCW direction	006:6 division 016:16 division 008:8 division 024:24 division 012:12 division 360:360 division	P:PNP open collector output N:NPN open collector output

*Only 360 division

Specifications

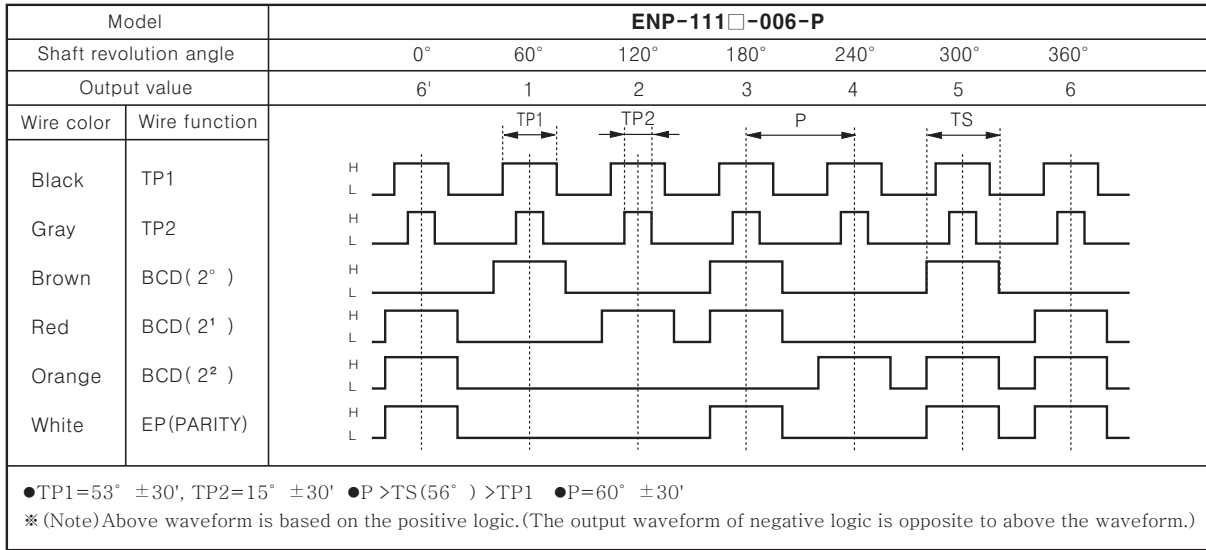
Item		Diameter ϕ 60mm shaft type of absolute rotary encoder					
Model	PNP open collector output	ENP-111□-006-P	ENP-111□-008-P	ENP-111□-012-P	ENP-111□-016-P	ENP-111□-024-P	ENP-110□-360-P
	NPN open collector output	ENP-101□-006-N	ENP-101□-008-N	ENP-101□-012-N	ENP-101□-016-N	ENP-101□-024-N	ENP-100□-360-N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

※ (★Note1) Max. allowable revolution \geq Max. response revolution 【Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$ 】
Make sure that max. response revolution should be lower than max. allowable revolution when selecting the resolution.

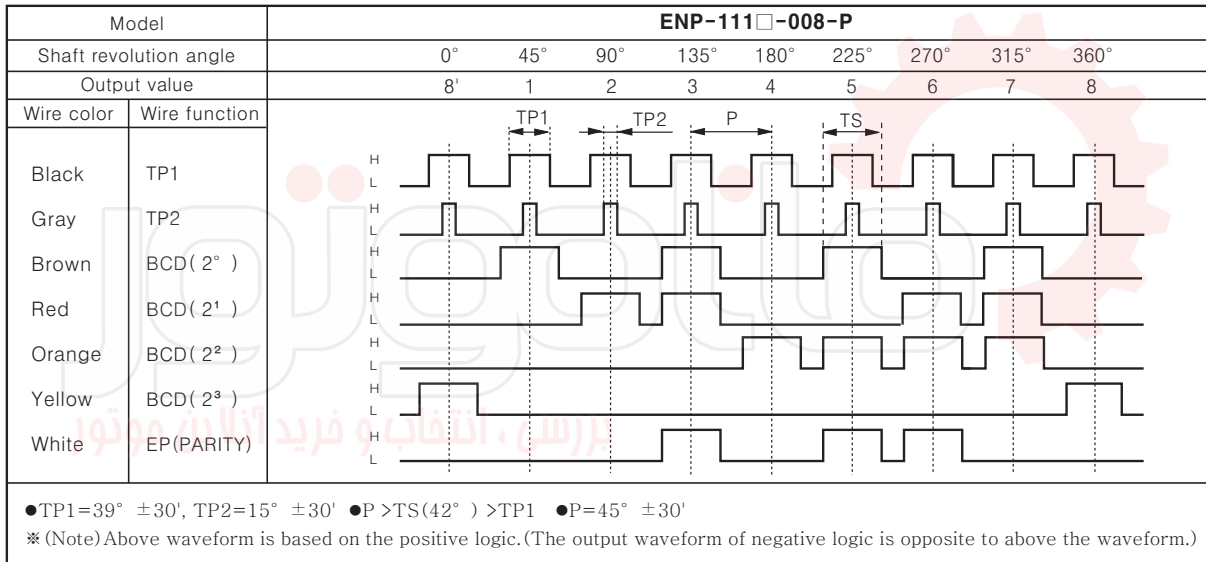
∅ 60mm Shaft AbsoluteType

Output waveform

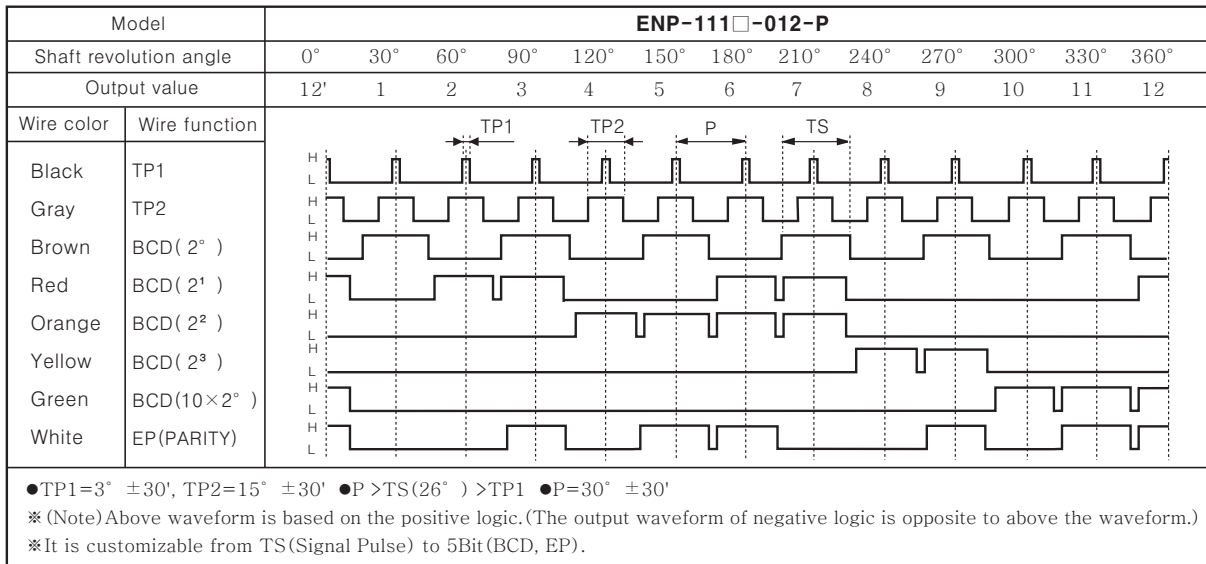
● 6 division



● 8 division



● 12 division



(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 power supply

(Q) Stepping motor & Driver & Controller

(R) Graphic/Logic panel

(S) Field network device

(T) Production stoppage models & replacement

ENP Series

Output waveform

●16 division

Model		ENP-111□-016-P																
Shaft revolution angle		0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°	360°
Output value		16'	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Wire color	Wire function																	
Black	TP1																	
Gray	TP2																	
Brown	BCD(2°)																	
Red	BCD(2 ¹)																	
Orange	BCD(2 ²)																	
Yellow	BCD(2 ³)																	
Green	BCD(10×2°)																	
White	EP(PARITY)																	

●TP1=2° ±30', TP2=11.25° ±30' ●P>TS(19.5°)>TP1 ●P=22.5° ±30'
 ※(Note) Above waveform is based on the positive logic.(The output waveform of negative logic is opposite to above the waveform.)
 ※It is customizable from TS(Signal Pulse) to 5Bit(BCD, EP).

●24 division

Model		ENP-111□-024-P																									
Shaft revolution angle		0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°	360°	
Output value		24'	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Wire color	Wire function																										
Black	TP1																										
Gray	TP2																										
Brown	BCD(2°)																										
Red	BCD(2 ¹)																										
Orange	BCD(2 ²)																										
Yellow	BCD(2 ³)																										
Green	BCD(2° × 10)																										
Blue	BCD(2 ¹ × 10)																										
White	EP(PARITY)																										

●TP1=8° ±30', TP2=3° ±30' ●P>TS(11°)>TP1 ●P=15° ±30'
 ※(Note) Above waveform is based on the positive logic.(The output waveform of negative logic is opposite to above the waveform.)

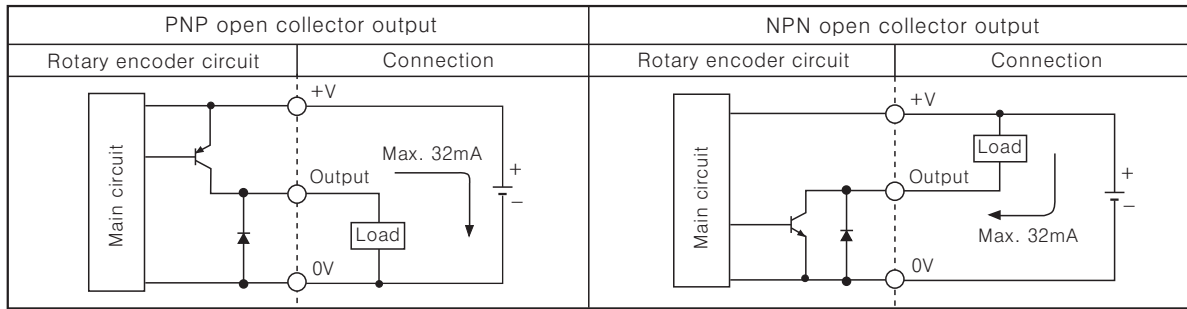
●360 division

Model		ENP-100□-360-P																		
Shaft revolution angle		0°	1°	2°	3°	4°	5°	...	198°	199°	200°	201°	202°	...	356°	357°	358°	359°	360°	
Output value		0'	1	2	3	4	5	...	198	199	200	201	202	...	356	357	358	359	0	
Wire color	Wire function																			
Black	BCD(2°)																			
Brown	BCD(2 ¹)																			
Red	BCD(2 ²)																			
Orange	BCD(2 ³)																			
Yellow	BCD(2° × 10)																			
Green	BCD(2 ¹ × 10)																			
Blue	BCD(2 ² × 10)																			
Purple	BCD(2 ³ × 10)																			
Gray	BCD(2° × 100)																			
White	BCD(2 ¹ × 100)																			

●Ts=1° ±30'
 ※(Note) Above waveform is based on the positive logic.(The output waveform of negative logic is opposite to above the waveform.)

∅ 60mm Shaft Absolute Type

Control output diagram



※Output circuit of each output signal 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					
	TP1					BCD CODE(2 ⁶)
1:Black	BCD CODE(2 ⁰)	BCD CODE(2 ¹)	BCD CODE(2 ²)	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)
2:Brown	BCD CODE(2 ¹)	BCD CODE(2 ²)	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)	BCD CODE(2 ⁶)
3:Red	BCD CODE(2 ²)	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)	BCD CODE(2 ⁶)	BCD CODE(2 ⁷)
4:Orange	BCD CODE(2 ²)	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)	BCD CODE(2 ⁶)	BCD CODE(2 ⁷)
5:Yellow	N.C	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)	BCD CODE(2 ⁶)	BCD CODE(2 ⁷ × 10)
6:Green	N.C	N.C	BCD CODE(2 ⁴ × 10)	BCD CODE(2 ⁵ × 10)	BCD CODE(2 ⁶ × 10)	BCD CODE(2 ⁷ × 10)
7:Blue	N.C	N.C	N.C	N.C	BCD CODE(2 ⁷ × 10)	BCD CODE(2 ⁸ × 10)
8:Purple	N.C					BCD CODE(2 ³ × 10)
9:Gray	TP2					BCD CODE(2 ⁶ × 100)
10:White	EP(PARITY)					BCD CODE(2 ⁷ × 100)
11:Shield wire	F.G					

※Unused wires must be insulated.

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

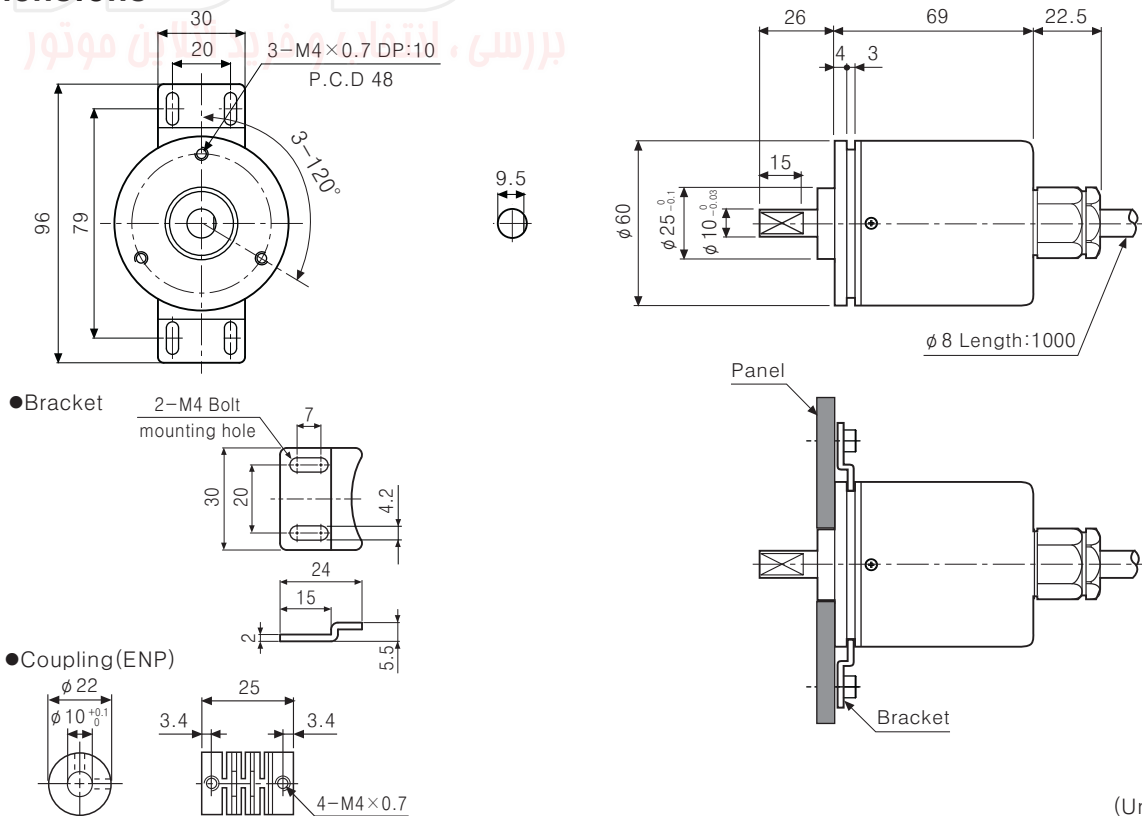
※N.C : Not Connected.

※TP1/TP2 : It is an enablement signal to decide signal recognition for output easily because, output signal cycle is long in low resolution model.

※EP : It is a parity signal to be outputted as odd number of parity.

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

Dimensions



(Unit:mm)

- (A) Photo electric sensor
- (B) Fiber optic sensor
- (C) Door/Area sensor
- (D) Proximity sensor
- (E) Pressure sensor
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