

∅ 60 mm/Shaft type encoder (ABSOLUTE TYPE)

■ Features

- Measurement of displacement angle by "BCD", "BINARY", "GRAY", "INDEX" code.
- A strong construction against vibration.
- Memory retention against power failure.



■ Ordering information

ENP	1	1	1	R	006	1
Series	Output code	Output method	Power supply	Rotating direction	Shaft 1pulses/revolution	Control output
∅ 60mm Shaft type the Encoder (ABSOLUTE Type)	1:BCD CODE 2:BINARY CODE 3:GRAY CODE 4:INDEX CODE	0:Negative logic 1:Positive logic	0:5 to 12VDC ±5% 1:12 to 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

■ Specification

Item		∅ 60mm Shaft type the Encoder(ABSOLUTE TYPE)						
Model	PNP open collector output	ENP-111□-006-1	ENP-111□-008-1	ENP-111□-012-1	ENP-111□-016-1	ENP-111□-024-1	ENP-110□-360-1	
	NPN open collector output	ENP-101□-006-2	ENP-101□-008-2	ENP-101□-012-2	ENP-101□-016-2	ENP-101□-024-2	ENP-100□-360-2	
Output		BCD CODE OUTPUT						
Pulses/revolution		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 difference	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'	TP1:3 °±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'	TS:1 °±30'	
	Control output	PNP open collector output	Output voltage:(power supply-1.5)V, Load current:Max. 80mA					
		NPN open collector output	Load voltage:Max. 30V, load current:Max. 80mA, residual voltage:Max. 1V					
	Response (rise & fall)	PNP open collector output	Max. TON=500ns, Max. TOFF=2.5μs (cable:1m, at Isink=80mA)					
		NPN open collector output	Max. TON=400ns, Max. TOFF=1.5μs (cable:1m, at Isink=80mA)					
	Max.response frequency		20KHz					
	Power supply		12 to 24VDC ±5%(ripple P-P:Max. 3%)					5 to 12VDC ±5% (ripple P-P:Max. 3%)
	Current consumption		Max. 150mA(disconnection of the load)				Max. 200mA(disconnection of the load)	
	Connection		Cable connection					
Mechanical specification	Starting torque	Max. 500gf · cm(49000μN · m)						
	Moment of inertia	Max. 300g · cm ² (3×10 ⁻⁵ kg · m ²)						
	Shaft loading	Radial:5Kg, Thrust:5Kg						
	Deviation of shaft position	Radial:Max. 0.1mm, Thrust:Max. 0.2mm						
	Mechanical revolution(rpm)	5000rpm ★(Note1)						
Insulation resistance		Min. 20MΩ (at 500VDC)						
Dielectric strength		500VAC 50/60Hz for 1 minute						
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		Operating:-10 to 60°C(non-freezing condition), storage:-25 to 85°C						
Ambient Humidity		Operating:35 to 85%RH, storage:35 to 85%RH						
Protection		IP50(IEC specification)						
Cable		12P, ∅ 8mm, length:1m, shield cable						
Weight		About 577g					About 690g	
Accessories		Mounting bracket, coupling						

※ Option except above spec. & rate.
 ※ The weight of above chart is not weight.

★(note1) Max. response frequency(rpm) = $\frac{\text{Max. rpm}}{\text{Revolution}} \times 60$ (but max. rpm ≤ max. allowable rotation)①

■ Output waveform(6 division)

Model		ENP-111□-006-□						
Shaft revolution angle		0°	60°	120°	180°	240°	300°	360°
Output value		6	1	2	3	4	5	6
Wire color	Mode	※(Note)						
Black	TP1							
Gray	TP2							
Brown	BCD(2°)							
Red	BCD(2¹)							
Orange	BCD(2²)							
White	EP(PARITY)							
<p>• TP1=53° ±30°, TP2=15° ±30° • P> TS(56°)> TP1 • P=60° ±30°</p> <p>※(Note)Above waveform is based on the positive logic. (The output waveform of negative logic is opposed to above waveform)</p>								

■ Output waveform(8 division)

Model		ENP-111□-008-□									
Shaft revolution angle		0°	45°	90°	135°	180°	225°	270°	315°	360°	
Output value		8	1	2	3	4	5	6	7	8	
Wire color	Mode	※(Note)									
Black	TP1										
Gray	TP2										
Brown	BCD(2°)										
Red	BCD(2¹)										
Orange	BCD(2²)										
Yellow	BCD(2³)										
White	EP(PARITY)										
<p>• TP1=39° ±30°, TP2=15° ±30° • P> TS(42°)> TP1 • P=45° ±30°</p> <p>※(Note)Above waveform is based on the positive logic. (The output waveform of negative logic is opposed to above waveform)</p>											

■ Output waveform(12 division)

Model		ENP-111□-012-□													
Shaft revolution angle		0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°	
Output value		12	1	2	3	4	5	6	7	8	9	10	11	12	
Wire color	Mode	※(Note)													
Black	TP1														
Gray	TP2														
Brown	BCD(2°)														
Red	BCD(2¹)														
Orange	BCD(2²)														
Yellow	BCD(2³)														
Green	BCD(10×2°)														
White	EP(PARITY)														
<p>• TP1=3° ±30°, TP2=2° ±15° • P> TS(26°)> TP1 • P=30° ±30°</p> <p>※(Note)Above waveform is based on the positive logic. (The output waveform of negative logic is opposed to above waveform)</p>															

■ Output waveform(16 division)

Model		ENP-11□-016-□																	
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	Mode	※(Note)																	
Black	TP1																		
Gray	TP2																		
Brown	BCD(2 ⁰)																		
Red	BCD(2 ¹)																		
Orange	BCD(2 ²)																		
Yellow	BCD(2 ³)																		
Green	BCD(10×2 ⁰)																		
White	EP(PARITY)																		
<p>• TP1=2° ±30´, TP2=11.5° ±30´ • P> TS(19.5°)> TP1 • P=22.5° ±30´</p> <p>※(Note)Above waveform is based on the positive logic. (The output waveform of negative logic is opposed to above waveform)</p>																			

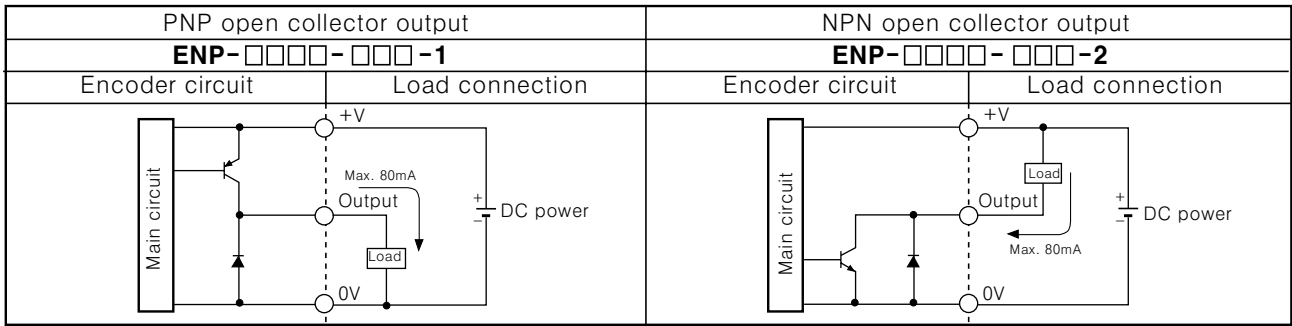
■ Output waveform(24 division)

Model		ENP-11□-024-□																											
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	Mode	※(Note)																											
Black	TP1																												
Gray	TP2																												
Brown	BCD(2 ⁰)																												
Red	BCD(2 ¹)																												
Orange	BCD(2 ²)																												
Yellow	BCD(2 ³)																												
Green	BCD(2 ⁴ × 10)																												
Blue	BCD(2 ⁵ × 10)																												
White	EP(PARITY)																												
<p>• TP1=8° ±30´, TP2=3° ±30´ • P> TS(11°)> TP1 • P=15° ±30´</p> <p>※(Note)Above waveform is based on the positive logic. (The output waveform of negative logic is opposed to above waveform)</p>																													

■ Output waveform(360 division)

Model		ENP-100□-360-□																																			
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	Mode	※(Note)																																			
Black	BCD(2 ⁰)																																				
Brown	BCD(2 ¹)																																				
Red	BCD(2 ²)																																				
Orange	BCD(2 ³)																																				
Yellow	BCD(2 ⁴ × 10)																																				
Green	BCD(2 ⁵ × 10)																																				
Blue	BCD(2 ⁶ × 10)																																				
Violet	BCD(2 ⁷ × 10)																																				
Gray	BCD(2 ⁸ × 100)																																				
White	BCD(2 ⁹ × 100)																																				
<p>• TP1=1° ±30´</p> <p>※(Note)Above waveform is based on the positive logic. (The output waveform of negative logic is opposed to above waveform)</p>																																					

■ Control output circuit

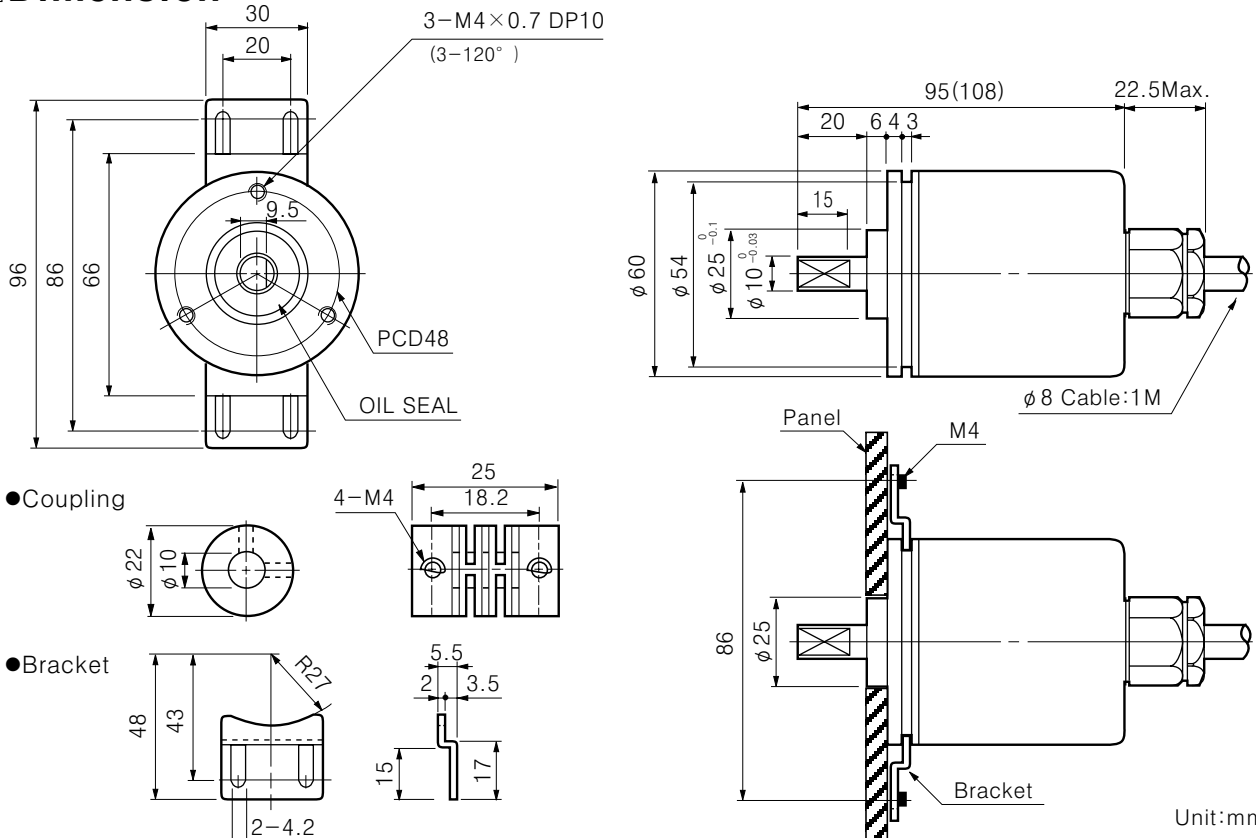


■ Cable connections

Wire color	6 division	8 division	12 division	16 division	24 division	360 division
1:White	Power +V					
2:Black	Power GND					
3:Shield	F · G					
1:Black	TP1					BCD CODE(2 ⁰)
2:Brown	BCD CODE(2 ⁰)	BCD CODE(2 ¹)	BCD CODE(2 ²)	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)
3:Red	BCD CODE(2 ¹)	BCD CODE(2 ²)	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)	BCD CODE(2 ⁶)
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	NC	BCD CODE(2 ³)	BCD CODE(2 ⁴)	BCD CODE(2 ⁵)	BCD CODE(2 ⁶)	BCD CODE(2 ⁷ × 10)
6:Green	NC	NC	BCD CODE(2 ² × 10)	BCD CODE(2 ³ × 10)	BCD CODE(2 ⁴ × 10)	BCD CODE(2 ⁵ × 10)
7:Blue	NC	NC	NC	NC	BCD CODE(2 ¹ × 10)	BCD CODE(2 ² × 10)
8:Violet	NC					
9:Gray	TP2					
10:White	EP (PARITY)					
11:Shield	F · G					

※ Non-usig wires must be insulated.
 ※ Encoder case must be earth.

■ Dimension



Unit:mm