

Autonics

ROTARY ENCODER (ABSOLUTE TYPE) ENP SERIES

M A N U A L



Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the caution that follow;

Warning Serious injury may result if instructions are not followed.

Caution Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.

Caution: Injury or danger may occur under special conditions.

Warning

1. In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.
It may cause a fire, human injury or damage to property.

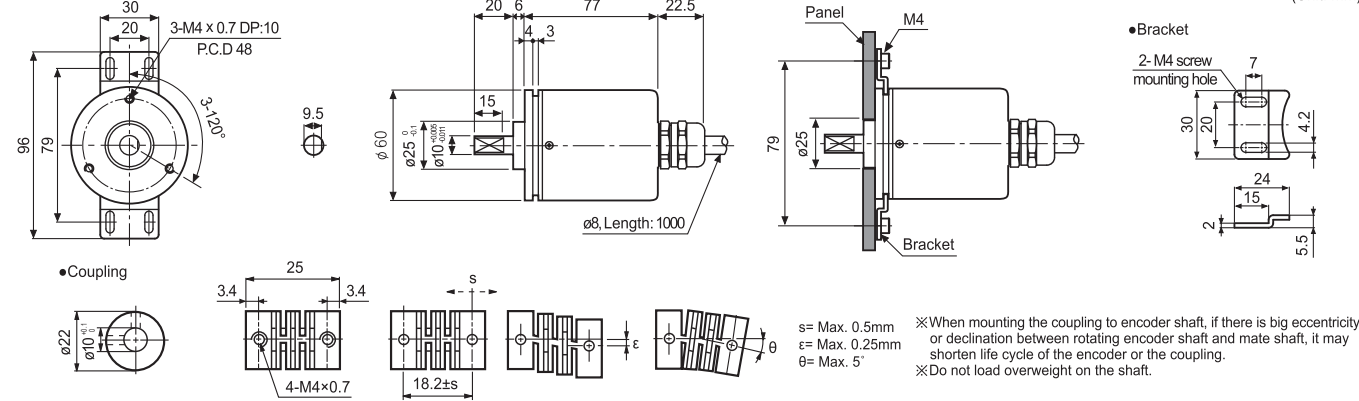
Caution

- Do not drop water or oil on this unit.
It may cause damage or malfunction due to malfunction.
- Please observe the rated voltage.
It may damage or shorten the life cycle of the product.
- Please check the polarity of power and wrong wiring.
It may result in damage to the product.
- Do not short circuit the load.
It may result in damage to the product.

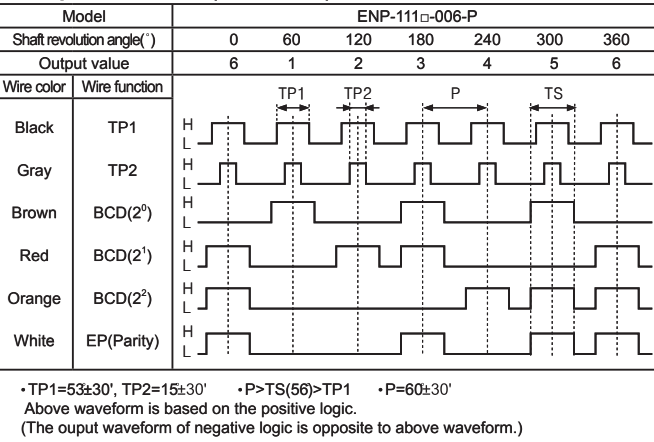
Ordering information

ENP	-	1	1	1	R	-	360	-	P
Series	Output code	Output method	Power supply	Rotating direction	Resolution/1 revolution	Control output			
Diameter ø60mm (Shaft diameter: ø10mm)	1: BCD code 0: Negative logic 1: Positive logic	0: 5VDC ±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	N: NPN open collector output P: PNP open collector output				

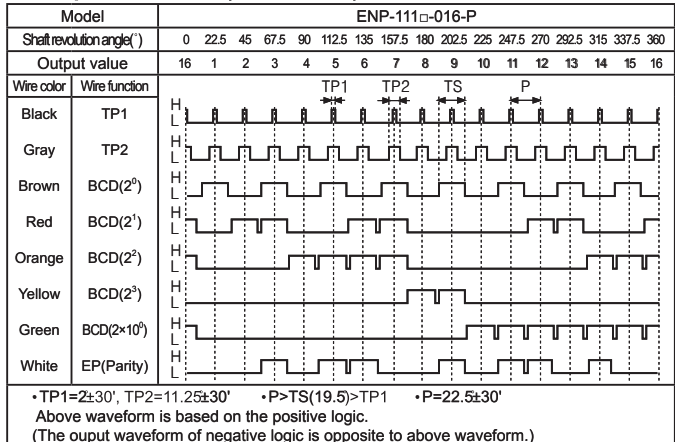
Dimensions



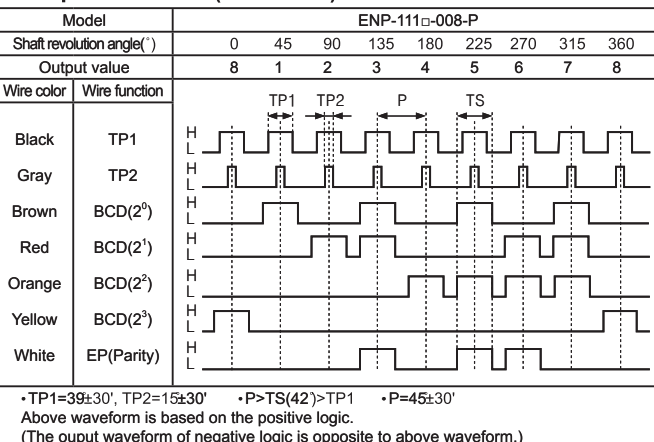
Output waveform (6 division)



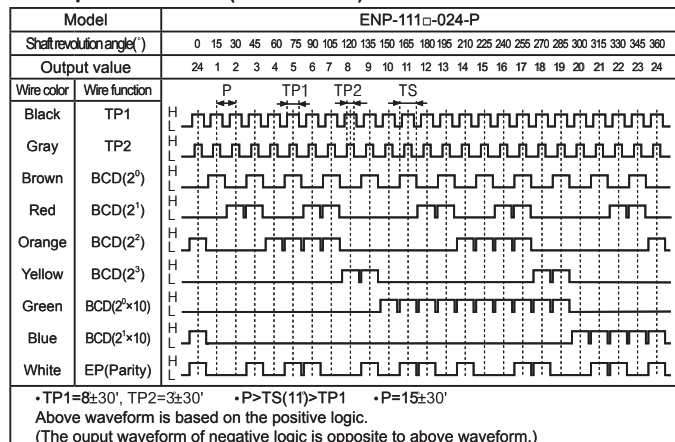
Output waveform (16 division)



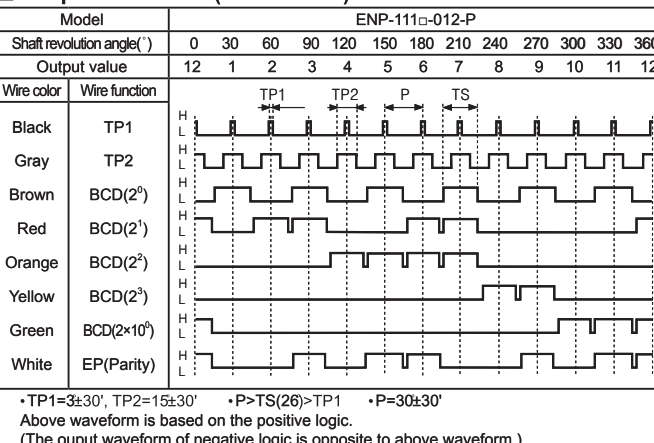
Output waveform (8 division)



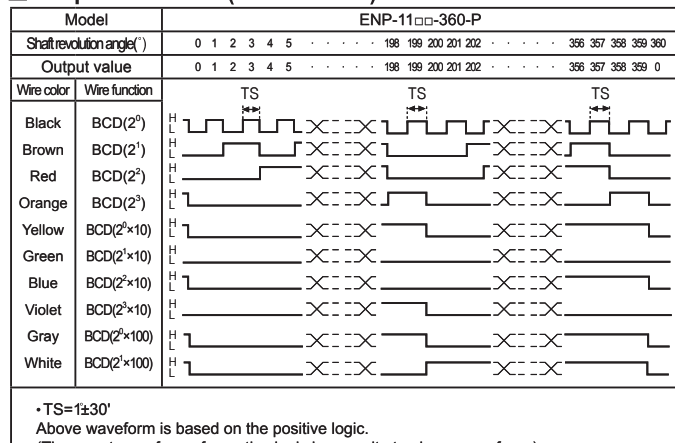
Output waveform (24 division)



Output waveform (12 division)



Output waveform (360 division)



※The above specifications are subject to change and some models may be discontinued without notice.

Specifications

Type	Diameter ø 60mm shaft type 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-111□-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-101□-360-N					
Resolution	6 division		8 division		12 division		16 division		24 division		360 division	
Output phase	TP(Timing Pulse): 2 bit TS(Signal Pulse): 4 bit (BCD,EP)		TP(Timing Pulse): 2 bit TS(Signal Pulse): 5 bit (BCD,EP)		TP(Timing Pulse): 2 bit TS(Signal Pulse): 6 bit (BCD,EP)		TP(Timing Pulse): 2 bit TS(Signal Pulse): 6 bit (BCD,EP)		TP(Timing Pulse): 2 bit TS(Signal Pulse): 7 bit (BCD,EP)		TS(Signal Pulse): 10 bit	
Output angle	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 voltage-1.5)VDC, Load current: Max. 32mA										
	NPN open collector output	Load current: Max. 32mA, Residual voltage: Max. 1VDC										
Response time	PNP open collector output	TON=800ns, TOFF=Max. 800ns(Cable length: 1m, I sink = 32mA)										
	NPN open collector output	TON=800ns, TOFF=Max. 800ns(Cable length: 1m, I sink = 32mA)										
Max. Response frequency	20kHz											
Power supply	5VDC ±5%(Ripple P-P: Max. 5%), 12-24VDC ±5%(Ripple P-P: Max. 5%)											
Current consumption	Max. 100mA(Disconnection of the load)											
Insulation resistance	Max. 100MΩ(at 500VDC megger between all terminals and case)											
Dielectric strength	750VAC 50/60Hz for 1 minute(between all terminals and case)											
Connection	Cable outgoing type											
Mechanical spec.	Starting torque	Max. 500gf·cm(0.05N·m)										
	Moment of inertia	Max. 300g·cm²(3×10⁻⁵kg·m²)										
	Shaft loading	Radial: 10kgf, Thrust: 2.5kgf										
	Mechanical revolution*1	3,600rpm										
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z direction for 2 hours											
Shock	Max. 75G											
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 standards)											
Cable	ø8mm, 12P, Length: 1m, Double shield cable (AWG 24, Core wire diameter: 0.08mm, No. of core wire: 40, Insulator out diameter: ø1mm)											
Accessory	Mounting bracket, Coupling											
Unit weight*2	Approx. 478g(Approx. 400g)											

*1: Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution. [Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$]

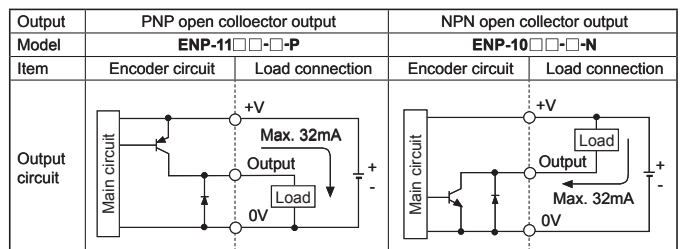
*2: The weight in parentheses is only unit weight. *Environment resistance is rated at no freezing or condensation.

Connections

Resolution	6 division	8 division	12 division	16 division	24 division	360 division
Wire color	White*1	+V				
Power wire	Black*1	GND(0V)				
	Shield wire	F.G.				
Output wire	Black	TP1*2				2 ⁰
	Brown	2 ²	2 ⁰	2 ⁰	2 ⁰	2 ¹
	Red	2 ¹	2 ¹	2 ¹	2 ¹	2 ²
	Orange	2 ²	2 ²	2 ²	2 ²	2 ³
	Yellow	N.C.	2 ³	2 ³	2 ³	2 ³ ×10
	Green	N.C.	N.C.	2 ³ ×10	2 ³ ×10	2 ³ ×10
	Blue	N.C.	N.C.	N.C.	N.C.	2 ³ ×10
	Purple	N.C.				2 ³ ×10
	Gray	TP2*2				2 ³ ×100
	White	EP(Parity)*3				2 ³ ×100
Shield wire	F.G.					

- *1: Insulator external diameter is ø1.5mm.
- *2: TP1/TP2: Because low resolution model has long output signal period, this signal for enable is easy to determine signal recognition point about output.
- *3: EP: Parity signal. It outputs odd parity.
- ※Unused wire must be insulated.
- ※Encoder case and shield wire must be grounded.
- ※N-C: Not Connected.
- ※Output cable must not be short-circuited, because Driver IC is used in output circuit.

Control output diagram



※The output circuit of each output signal is the same.

Caution for using

- Installation**
 - ① This unit is comprised in of precision components. Therefore please treat this product carefully.
 - ② When combine the coupling to encoder shaft, if there is big eccentricity or declination, it might shorten life cycle of the encoder or the coupling.
 - ③ Do not put strong impact when insert coupling into shaft.
 - ④ Please set zero point with metallic ball for sub-mounting, then use this unit.
 - For using**
 - ① Please connect shield wire to F.G. terminal.
 - ② Do not wire during power on. If not, it might cause da
 - ③ When the power source is a Switching power, please install the surge absorber in power line and wire should be shorter in order not to be influenced by noise. And F.G. terminals of the switching power must be grounded.
 - Environment**
 - Please do not use this unit with below environment, it causes malfunction.
 - ① Place where this unit or component may be damaged by strong vibration or impact.
 - ② Place where there is lots of flammable or corrosive gas.
 - ③ Place where strong magnet field or electric noise occur.
 - ④ Place where it is beyond of the rated temperature or humidity.
 - ⑤ Place where strong acids or alkali exists nearby.
 - ⑥ Place where there is the direct ray of the sun.
 - Vibration and Impact**
 - ① If a big impact or strong vibration applies to the product it may cause pulse errors. Be sure that when installing this unit.
 - ② Encoder with high resolution can be easily affected by vibration, therefore fix the mounting bracket when install this unit.
 - ③ Please use metallic coupling when the application needs severe acceleration or deceleration frequently.
 - Wire connection**
 - ① Do not draw the wire with over 30N strength after wiring.
 - ② If using the cable of encoder and high voltage line or power cable in the same conduit, it may cause malfunction or mechanical trouble. Please wire separately or use separated conduit.
- ※It may cause malfunction if above instructions are not followed.

Main products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO₂, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

Autonics Corporation
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