

Autonics

ROTARY ENCODER(INCREMENTAL TYPE) ENA/ENC SERIES

MANUAL



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.

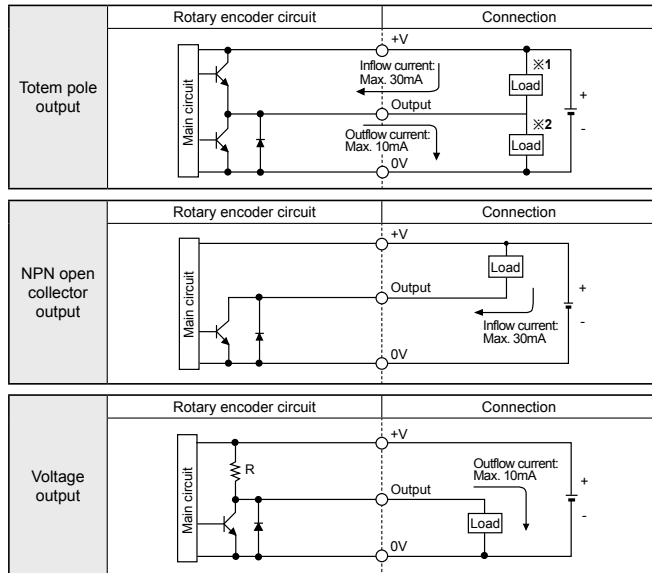
Caution

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

Ordering information

ENA	5000	2	N	24
Series	Pulse/1 Revolution	Output phase	Output	Power supply
Shaft type to be mounted at the side (Shaft diameter ø10mm)	See resolution	2: A, B 3: A, B, Z	T: Totem Pole output N: NPN open collector output V: Voltage output	5: 5VDC±5% 24: 12-24VDC±5%
※Standard: ENA-[PULSE]-2-N-24				
ENC	1	1	N	24
Series	Output phase	Min. measuring unit	Output	Power supply
Wheel type	1: A, B	1: 1mm 3: 1m 5: 0.1yd	T: Totem Pole output N: NPN open collector output V: Voltage output	5: 5VDC±5% 24: 12-24VDC±5%
No mark: Normal type C: Cable outgoing connector type(※) ※Cable length: 250mm				

Control output diagram



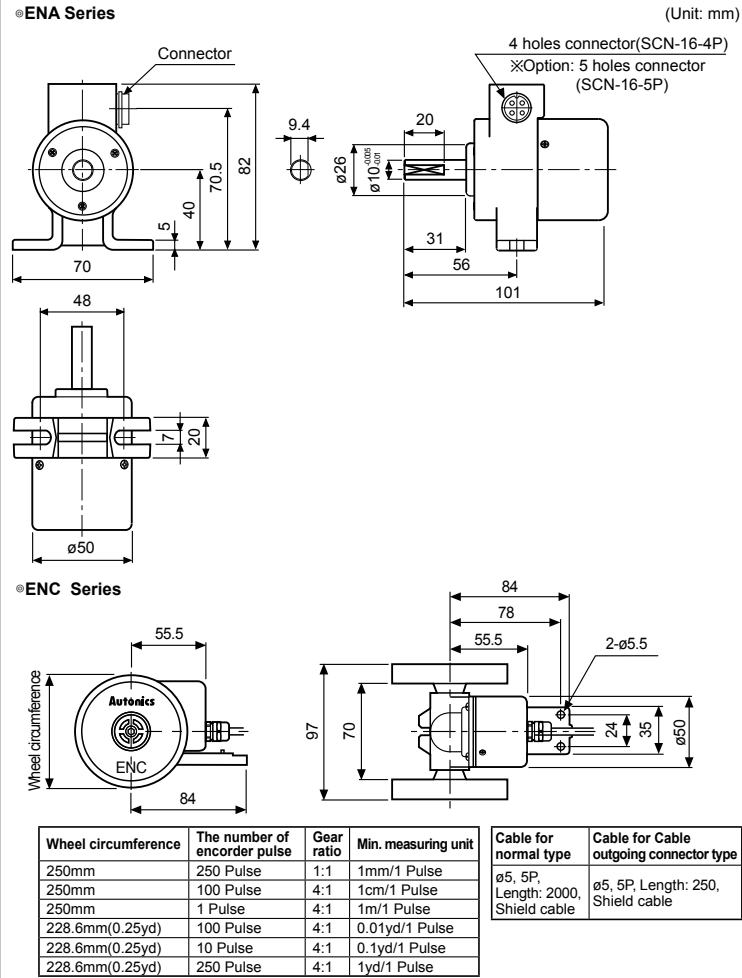
※The output circuit of A, B, Z phase are the same.
※Totem pole output can be used for NPN open collector type(※1) or voltage output type(※2).
※The above specifications are subject to change without notice.

Specifications

Incremental Rotary encoder	Shaft type encoder to be mounted at the side	Wheel type	
Model	ENA-□-3-T-□ ENA-□-3-N-□ ENA-□-3-V-□	ENC-1-□-T-□ ENC-1-□-N-□ ENC-1-□-V-□	
Resolution(P/R)※1	*1, *2, *5, 10, 12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000	1mm/Pulse, 1cm/Pulse, 1m/Pulse, 0.01yd/Pulse, 0.1yd/Pulse, 1yd/Pulse	
Output phase	A, B phase(Option: A, B, Z phase)	A, B phase	
Electrical specification	Phase difference of output	Output between A and B phase: $\frac{T}{4} \pm \frac{T}{8}$ (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	
	Response time (Rise/Fall)	Totem pole output NPN open collector output Voltage output Max. 1μs (Cable length: 2m, I sink=20mA)	
	Max. Response frequency	300kHz	180kHz
	Power supply	•5VDC ±5%(Ripple P-P: Max. 5%) •12-24VDC ±5%(Ripple P-P: Max. 5%)	
Mechanical specification	Current consumption	Max. 80mA(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	Connector type	Cable outgoing type, Cable outgoing connector type
	Starting torque	Max. 70gf·cm(0.007N·m)	Dependent on the coefficient of friction
	Moment of inertia	Max. 80g·cm ² (8×10 ⁻⁶ kg·m ²)	
	Shaft loading	Radial: 10kgf, Thrust: 2.5kgf	
	Max. allowable revolution※2	5,000rpm	
	Vibration	1.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each 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	ø5mm, 5P, Length: 2m, Shield cable (AWG 24, Core wire diameter: 0.08mm, No. of core wire: 40, Insulator out diameter: ø1mm)		
Accessory	ø10mm coupling		
Approval	CE		
Unit weight	Approx. 345g	Approx. 494g	

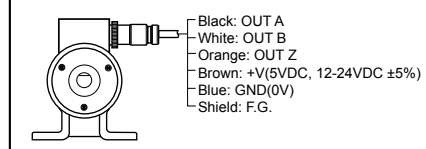
※1: 1, 2, 5 P/R are output A, B phase only.
※2: Max. allowable revolution ≥ Max. response revolution [Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$] Please select the resolution to make lower max. revolution than max. allowable revolution.
※Environment resistance is rated at no freezing or condensation.

Dimensions



Connections

ENA Series

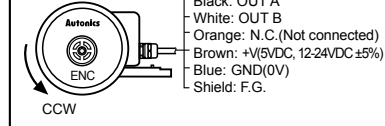


Pin No.	Cable color	Function
1	Black	OUT A
2	White	OUT B
3	Brown	+V
4	Blue	GND
5	Black	OUT A
6	White	OUT B
7	Orange	OUT Z
8	Brown	+V
9	Blue	GND

※Z phase output is option.
※Unused wires must be insulated.
※The shield cable and metal case of encoder must be grounded(F.G.).

ENC Series

Normal type



Cable outgoing connector type

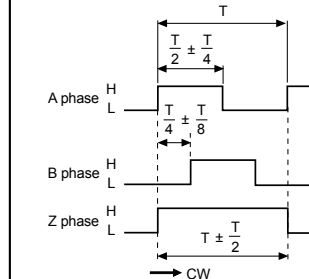
Pin No.	Cable color	Function
1	Black	OUT A
2	White	OUT B
3	Orange	N.C.
4	Brown	+V
5	Blue	GND
6	Shield	F.G.

※Unused wires must be insulated.
※The shield cable and metal case of encoder must be grounded(F.G.).

※It must be isolation grounded.

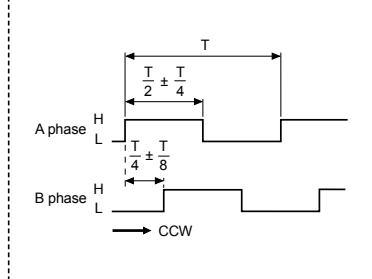
Output waveform

ENA Series



※Z phase output is option.
※Clockwise(CW): Right turn as from the shaft

ENC Series



※Counterclockwise(CCW): Based on wheel rotation direction.

Caution for using

- Installation**
 - ①This unit consists of precision components. If you drop this unit, it may lose the function. Please treat this product carefully.
 - ②When you install this unit, if eccentricity and deflection angle are larger, load is applied to the shaft. It may shorten the life cycle of this unit.(ENA)
 - ③Please mount this unit on panel with lowest the coefficient of friction between rotating detection part and target. It may cause shorten the life of this product. (ENC)
 - ④Do not put strong impact with hammer, etc when insert coupling into shaft.(ENA)
 - For using**
 - ①Do not cut or connect circuit when power is ON. It may cause damage to the unit.
 - ②When the power source is Switching Power, it may cause surge. Install a surge absorber in power line. Wire should be shorter in order not to be influenced by noise.
 - Environment**
 - Please do not use this unit with below environment, or it may cause malfunction.
 - ①Place where this unit or component may be damaged by strong vibration or impact.
 - ②Place where there is a lot of flammable or corrosive gases.
 - ③Place where strong magnet field or electric noise occurs.
 - ④Place where is beyond of the rated temperature or humidity.
 - ⑤Place where strong acids or alkali near by.
 - ⑥Place where there is the direct ray of the sun.
 - Vibration and Impact**
 - ①If a big impact or strong vibration applies to the product it may cause pulse errors. Be sure that when installing this unit.
 - ②Encoder with high resolution can be easily affected by vibration, therefore tighten fixing bracket when installing this unit.
 - Wire connection**
 - ①Do not pull out the wire with over 30N strength after fixing the unit and wiring the cable.
 - ②If wire encoder cable with high voltage line or power cable in the same conduit, it may cause a malfunction or mechanical problem. Please wire it separately or use separated conduit.
- ※It may cause malfunction if above instructions are not followed.

Major products

- Proximity sensors
- Area sensors
- Display units
- Rotary encoders
- Power controllers
- Photoelectric sensors
- Door/Door side sensors
- Graphic/Logic panels
- Temperature controllers
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Switching power supplies
- Stepping motors/drivers/motion controllers
- Field network devices
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system
- Counters
- Timers
- Panel meters
- Pressure sensors
- Fiber optic sensors
- Sensor controllers

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