Autonics ENA Series Side Mount Type Incremental Rotary Encoders Instruction Manual

Contents

Autonics ENA Series Side Mount Type Incremental Rotary Encoders

Product Information

The ENA Series Side Mount Type Incremental Rotary Encoders are devices used to detect the position, speed, and direction of rotating shafts or objects. These encoders are commonly used in industrial machineries such as CNC machines, robotics, and automated production lines.

product Specifications

- Resolution: 1/2/5 PPR to 10-5,000 PPR
- Control output: Totem pole output, NPN open collector output, Voltage output
- Output phase: A, B / A, B, Z output model
- Inflow current: 30 mA
- Residual voltage: 0.4 VDC
- Outflow current: Max. 30 mA load for Voltage output and NPN open collector output; Max. 10 mA load for Totem pole output

Product Components

The ENA series Side Mount Type Incremental Rotary Encoders come with the following components:

- Encoder body
- Cable with connector

Cautions during Use

- Do not use the encoder outside of the rated specifications to avoid fire or product damage.
- Do not short the load to avoid fire.
- Avoid using the encoder near equipment that generates strong magnetic force or high-frequency noise and strong alkaline or acidic substances to prevent product damage.

Cautions during Installation

- Install the encoder only on a device panel to avoid fire.

- Do not connect, repair, or inspect the unit while it is connected to a power source to avoid fire.
- Check the connections before wiring to avoid fire.
- Do not disassemble or modify the unit to avoid fire.

Ordering Information

Refer to the Autonics website to select the appropriate model and specifications for your application. The listed combinations are for reference only, and the actual product may not support all combinations.

Product Usage Instructions

1. Ensure that the power supply for the machinery is turned off before installing the encoder.
2. Install the encoder on the device panel using the appropriate mounting hardware.
3. Wire the encoder according to the Connections section of the user manual.
4. Turn on the power supply and verify that the encoder is working properly by checking the output phase using an oscilloscope or similar device.
5. Refer to the user manual for troubleshooting or maintenance procedures if necessary.

Thank you for choosing our Autonics product. Read and understand the instruction manual and manual thoroughly before using the product. For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website. Keep this instruction manual in a place where you can find easily. The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice. Follow Autonics website for the latest information.

Safety Considerations

- Observe all ‘Safety Considerations’ for safe and proper operation to avoid hazards.
- symbol indicates caution due to special circumstances in which hazards may occur.

Warning Failure to follow instructions may result in serious injury or death.

1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime / disaster prevention devices, etc.) Failure to follow this instruction may result in personal injury, economic loss or fire.
2. Do not use the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.
   Failure to follow this instruction may result in explosion or fire.
3. Install on a device panel to use. Failure to follow this instruction may result in fire.
4. Do not connect, repair, or inspect the unit while connected to a power source. Failure to follow this instruction may result in fire.
5. Check ‘Connections’ before wiring. Failure to follow this instruction may result in fire.
6. Do not disassemble or modify the unit. Failure to follow this instruction may result in fire.

Caution Failure to follow instructions may result in injury or product damage.

1. Use the unit within the rated specifications. Failure to follow this instruction may result in fire or product damage.
2. Do not short the load. Failure to follow this instruction may result in fire.
3. Do not use the unit near the place where there is the equipment which generates strong magnetic force or high frequency noise and strong alkaline, strong acidic exists. Failure to follow this instruction may result in product damage.

Cautions during Use

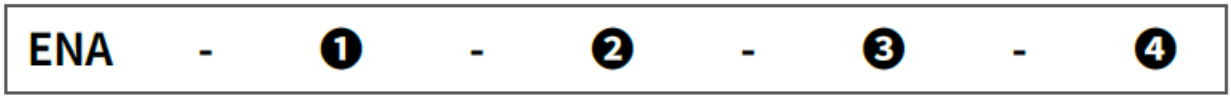
- Follow instructions in ‘Cautions during Use’. Otherwise, It may cause unexpected accidents.
- 5 VDC, 12 – 24 VDC power supply should be insulated and limited voltage / current or Class 2, SELV power supply device.
- For using the unit with the equipment which generates noise (switching regulator, inverter, servo motor, etc.), ground the shield wire to the F.G. terminal.
- Ground the shield wire to the F.G. terminal.
- When supplying power with SMPS, ground the F.G. terminal and connect the noise canceling capacitor between the 0 V and F.G. terminals.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
- Check the wire type and response frequency when extending wire because of distortion of waveform or residual voltage increment etc. by line resistance or capacity between lines.
- This unit may be used in the following environments.
    - Indoors (in the environment condition rated in ‘Specifications’)
    - Altitude max. 2,000 m
    - Pollution degree 2
    - Installation category II

Cautions during Installation

- Install the unit correctly with the usage environment, location, and designated specifications.
- Do not load overweight on the shaft.
- Do not put strong impact when insert a coupling into shaft. Failure to follow this instruction may result in product damage.
- When fixing the product or coupling with a wrench, tighten under 0.15 N m.
- If the coupling error (parallel misalignment, angular misalignment) between the shaft increases while installation, the life cycle of the coupling and the encoder can be shorten.
- Do not apply tensile strength over 30 N to the cable.

Ordering Information

This is only for reference, the actual prodcut does not support all combinations. For selecting the specified model, follow the Autonics website.



Resolution
Number: Refer to resolution in ‘Specifications’

Output phase

- 2: A, B
- 3: A, B, Z

Control output

- T: Totem pole output
- N: NPN open collector output
- V: Voltage output

Power supply

- 5: 5 VDC ±5%
- 24: 12 – 24 VDC ±5%

Product Components

- Product (+ connector cable)
- Instruction manual
- Bolt × 4
- Coupling × 1

Connections

- Unused wires must be insulated.
- The metal case and shield cable of encoders must be grounded (F.G.).
- F.G. (Frame Ground) must be grounded separately.

A, B phase output model

- SCN-16-4P pin layout

Pin	Color	Function	Pin	Color	Function
1	Black	OUT A	3	Brown	+V
2	White	OUT B	4	Blue	GND

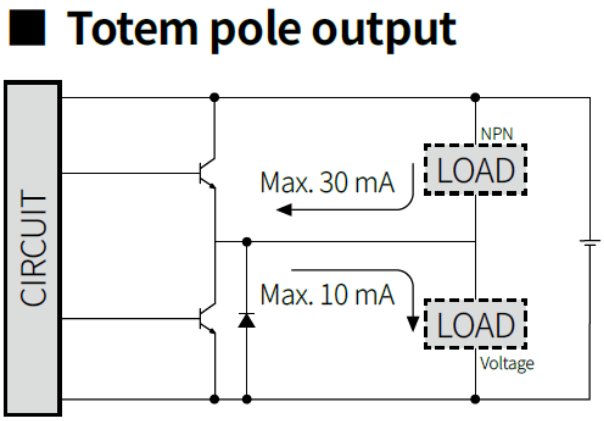
A, B, Z phase output model

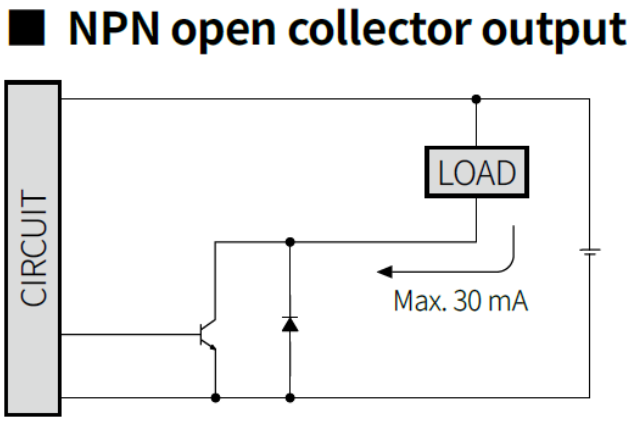
- SCN-16-5P pin layout

Pin	Color	Function	Pin	Color	Function
1	Black	OUT A	4	Brown	+V
2	White	OUT B	5	Blue	GND
3	Orange	OUT Z	–		

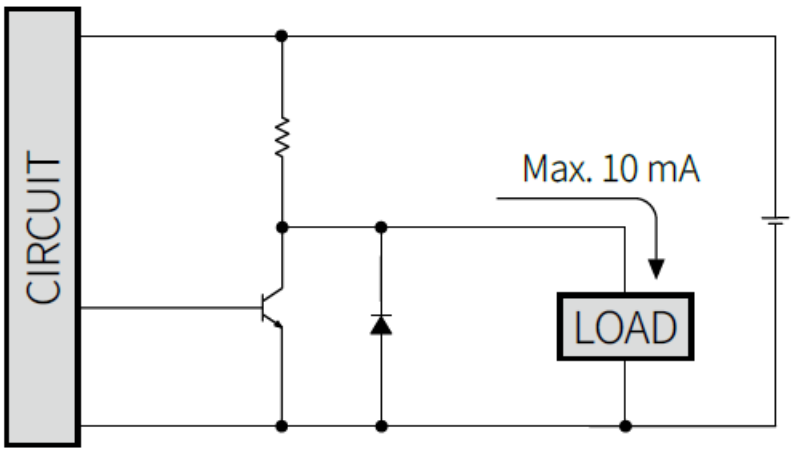
Inner Circuit

- Output circuits are identical for all output phase.



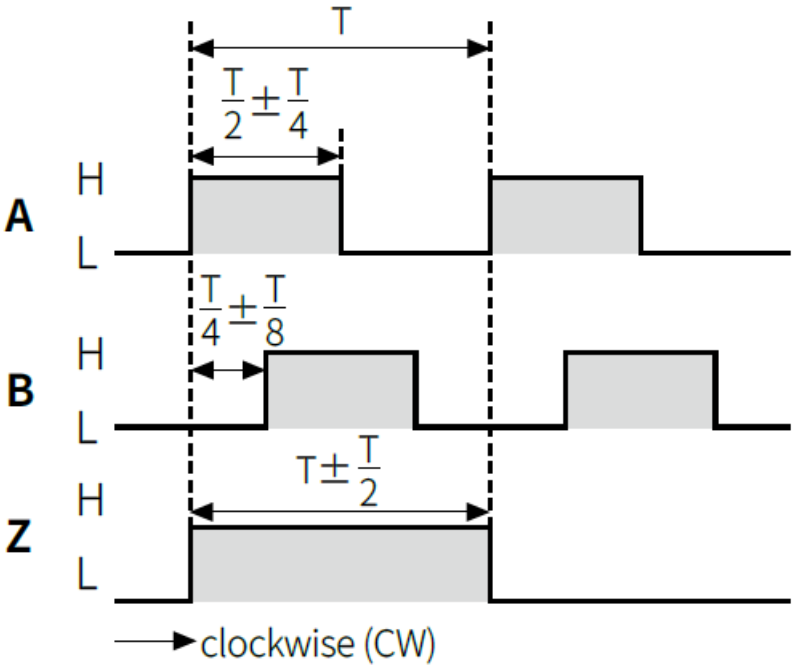


■ Voltage output



Output Waveform

- The rotation direction is based on facing the shaft, and it is clockwise (CW) when rotating to the right.
- Phase difference between A and B: T 4± T 8 (T = 1 cycle of A)



Specifications

Model	ENA-□-□-T-□	ENA-□-□-N-□	ENA-□-□-V-□
Resolution	1 / 2 / 5 PPR [01)] 10 to 5,000 PPR model		

Control output	Totem pole output	NPN open collector output	Voltage output
Output phase	A, B / A, B, Z output model	A, B / A, B, Z output model	A, B / A, B, Z output model
Inflow current	≤ 30 mA	≤ 30 mA	–
Residual voltage	≤ 0.4 VDC	≤ 0.4 VDC	≤ 0.4 VDC
Outflow current	≤ 10 mA	–	≤ 10 mA
Output voltage (5 VDC)	≥ (power supply -2.0) VDC	–	–
Output voltage (12 – 24 VDC)	≥ (power supply -3.0) VDC	–	–
Response speed [02)]	≤ 1		
Max. response freq.	300 kHz		
Max. allowable revolution [03)]	5,000 rpm		
Starting torque	≤ 0.007 N m		
Inertia moment	≤ 80 g·cm^2 (8 × 10^{-6} kg·m^2)		
Allowable shaft load	Radial: ≤ 10 kgf, Thrust: ≤ 2.5 kgf		
Unit weight	≈ 345 g		
Approval			

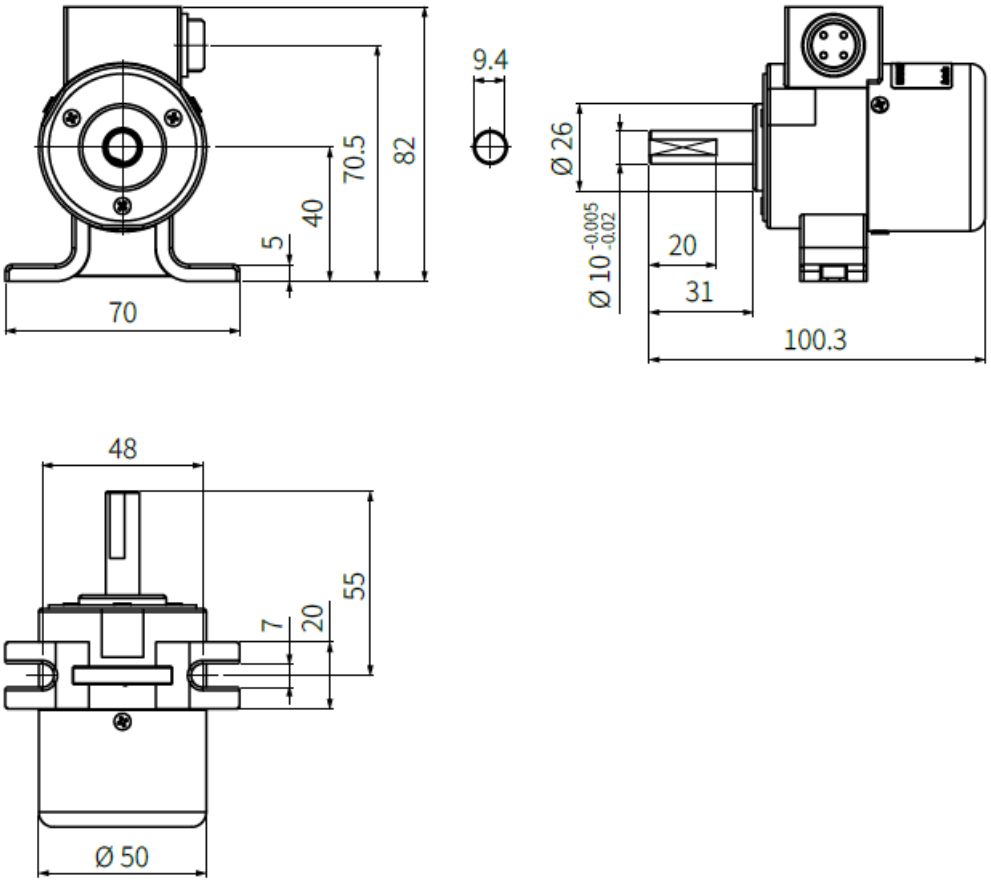
1. Depending on the control ouput, only A, B are output.

2. Based on cable length: 2 m, I sink: 20 mA
3. Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution [max. response revolution (rpm) = max. response frequency resolution × 60 sec]

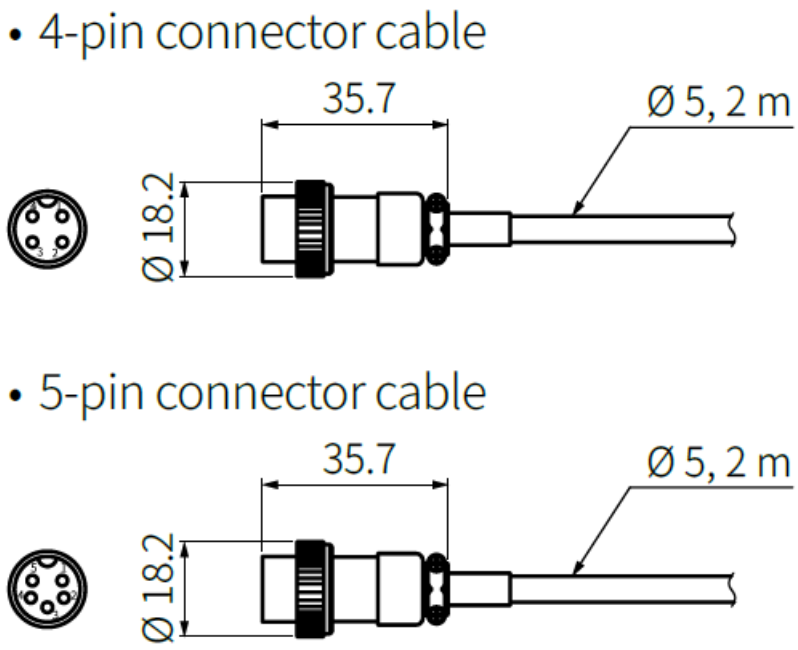
Power supply	5 VDC ± 5% (ripple P-P: ≤ 5%) / 12 – 24 VDC ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 80 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC megger)
Dielectric strength	Between all terminals and case: 750 VAC 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 ℃, storage: -25 to 85 ℃ (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Radial connector type
Cable spec.	Ø 5 mm, 2 m, shield cable A, B phase output model: 4-wire / A, B, Z phase output model: 5-wire
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	A, B phase output model: SCN-16-4P socket type A, B, Z phase output model: SCN-16-5P socket type

Dimensions

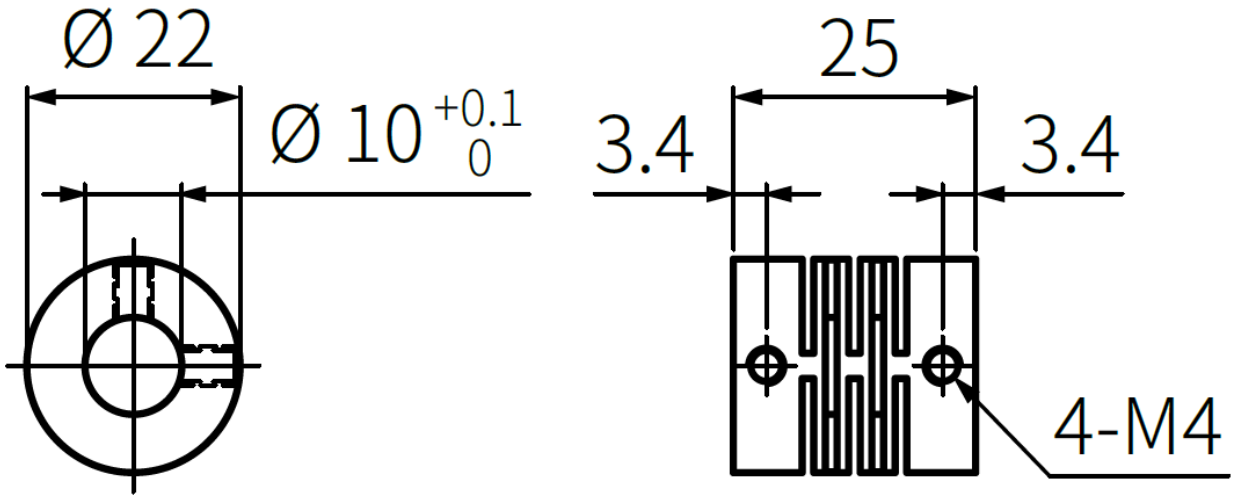
- Unit: mm, For the detailed drawings, follow the Autonics website.



Connector cable



Coupling



- Parallel misalignment: ≤ 0.25 mm
- Angular misalignment: ≤ 5°
- End-play: ≤ 0.5 mm

Documents / Resources

	Autonics ENA Series Side Mount Type Incremental Rotary Encoders [pdf] Instruction Manual ENA Series, ENA Series Side Mount Type Incremental Rotary Encoders, Side Mount Type Incremental Rotary Encoders, Type Incremental Rotary Encoders, Incremental Rotary Encoders, Rotary Encoders

References

- autonics.com