

Autonics

**ROTARY ENCODER(INCREMENTAL TYPE)
E100H SERIES**

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

■ Safety Considerations

- ※Please observe all safety considerations for safe and proper product operation to avoid hazards.
- ※⚠ symbol represents caution due to special circumstances in which hazards may occur.
- ⚠ Warning** Failure to follow these instructions may result in serious injury or death.
- ⚠ Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

- 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 fire, personal injury, or economic loss.
- Install on a device panel to use.**
Failure to follow this instruction may result in fire.
- Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.

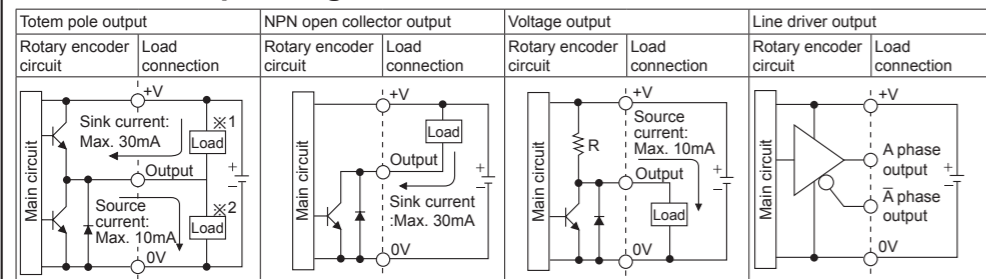
⚠ Caution

- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Do not short the load.**
Failure to follow this instruction may result in product damage by fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in fire or explosion.
- 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.

■ Ordering Information

E100H	35	10000	3	N	24
Series	Shaft inside diameter	Pulses/revolution	Output phase	Control output	Power supply
Ø100mm, Hollow shaft type	Ø35mm	512, 1024, 10000	3: A, B, Z 6: A, \bar{A} , B, \bar{B} , Z, \bar{Z}	T: Totem pole output N: NPN open collector output V: Voltage output L: Line driver output	5: 5VDC ±5% 24: 12-24VDC ±5%

■ Control Output Diagram



- The output circuit of A, B, Z phase are the same. (Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{Z})
- Totem pole output can be used for NPN open collector output type (※1) or voltage output type (※2).

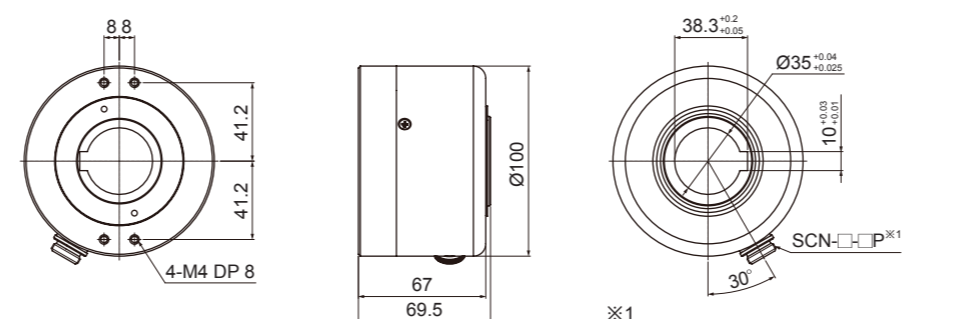
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual, and the technical descriptions (catalog, homepage).

■ Specifications

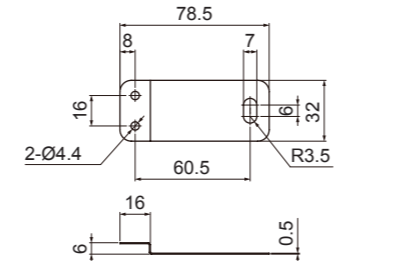
Item	Ø100mm hollow shaft type Incremental Rotary encoder	
Model	E100H35-□-3-T-□ E100H35-□-3-N-□ E100H35-□-3-V-□ E100H35-□-6-L-□	
Revolution (PPR)※1	512, 1024, 10000	
Output phase	A, B, Z phase (Line driver output A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)	
Phase difference of output	Phase difference between A and B: $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)	
Electrical specification	Totem pole output	• Low - Load current: max. 30mA, residual voltage: max. 0.4VDC= • High - Load current: max. 10mA, Output voltage (power supply 5VDC=): min. (power supply-2.0)VDC= Output voltage (power supply 12-24VDC=): min. (power supply-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=
	Line driver output	• Low - Load current: max. 20mA, residual: max. 0.5VDC= • High - Load current: max. -20mA, Output voltage (power supply 5VDC=): min. 2.5VDC= Output voltage (power supply 12-24VDC=): min. (power supply-3.0)VDC=
Mechanical specification	Totem pole output	Max. 1µs (Cable: 2m, I sink=20mA)
	NPN open collector output	Max. 1µs (Cable: 2m, I sink=20mA)
	Voltage output	Max. 0.5µs (Cable: 2m, I sink=20mA)
	Line driver output	Max. 0.5µs (Cable: 2m, I sink=20mA)
Max. response frequency	300kHz	
Power supply	• 5VDC= ±5% (ripple P-P: max. 5%) • 12-24VDC= ±5% (ripple P-P: max. 5%)	
Current consumption	Max. 80mA (disconnection of the load), Line driver output: max. 50mA (disconnection of the load)	
Insulation resistance	Over 100MΩ (at 500VDC between all terminals and case)	
Dielectric strength	750VAC 50/60Hz for 1 minute (between all terminals and case)	
Connection	Radial connector type	
Starting torque	Max. 300gf·cm (0.03N·m)	
Moment of inertia	Max. 800g·cm ² (8×10 ⁻⁵ kg·m ²)	
Shaft loading	Radial: 5kgf, Thrust: 2.5kgf	
Max. allowable revolution※2	3600rpm	
Vibration	1.5mm amplitude or 300m/s ² at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours	
Shock	Approx. max. 75G	
Environment	Ambient temp.	-10 to 70°C, storage: -25 to 85°C
	Ambient humi.	35 to 85%RH, storage: 35 to 90%RH
Protection structure	IP50 (IEC standard)	
Cable	Ø5, 5-wire (Line driver output: Ø6, 8-wire), 2m, Shield cable (AWG24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: Ø1mm)	
Accessory	Bracket: 2	
Approval	CE (except line driver output)	
Weight※3	Approx. 1400g (approx. 1130g)	

※1: Not indicated type is customizable.
※2: Max. allowable revolution ≥ Max. response revolution
[Max. response revolution (rpm) = $\frac{\text{Max. response frequency} \times 60 \text{ sec}}{\text{Resolution}}$]
Please select the resolution to make lower max. revolution than max. allowable revolution.
※3: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

■ Dimension



○ Bracket



※Fix the unit by a wrench under 0.15 N·m of torque.

■ Connections

○ Totem pole output / NPN open collector output / Voltage output



Pin No.	Function	Cable color
①	+V	Brown
②	0V	Blue
③	OUT A	Black
④	OUT B	White
⑤	OUT Z	Orange
⑥	F.G.	Shield
⑦	N-C	N-C

○ Line driver output

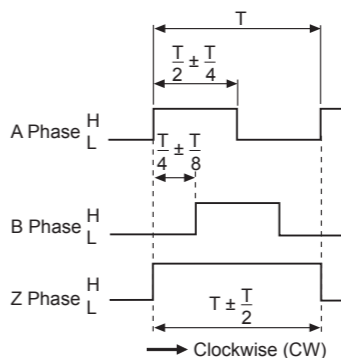


Pin No.	Function	Cable color
①	+V	Brown
②	0V	Blue
③	OUT A	Black
④	OUT \bar{A}	Red
⑤	F.G.	Shield
⑥	OUT B	White
⑦	OUT \bar{B}	Gray
⑧	OUT Z	Orange
⑨	OUT \bar{Z}	Yellow
⑩	N-C	N-C

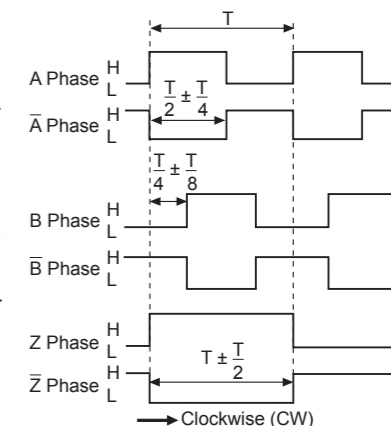
※N-C: Not connected
※Unused wires must be insulated.
※The metal case and shield cable should be grounded (F.G.).
※Do not apply tensile strength over 30N to the cable.

■ Output Waveform

○ Totem pole output / NPN open collector output / Voltage output



○ Line driver output



■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 5VDC, 12-24VDC 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 using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
- For Line driver unit, use the twisted pair wire which is attached seal and use the receiver for RS-422A communication.
- 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.
 - ①Indoors (in the environment condition rated in 'Specifications')
 - ②Altitude max. 2,000m
 - ③Pollution degree 2
 - ④Installation category II

■ Major 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/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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