

Autonics

ROTARY ENCODER (INCREMENTAL TYPE))

E20 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 personal injury, economic loss or 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 explosion or fire.
- 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

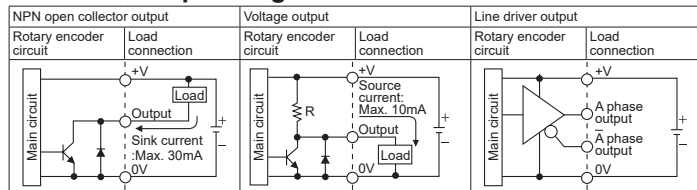
- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Do not short the load.**
Failure to follow this instruction may result in fire.
- Do not use the unit near the place where there is the equipment which generates strong magnetic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

Ordering Information

E20[S]	2	360	3	N	12	R
Series	Shaft diameter	Pulses/revolution	Output phase	Control output	Power supply	Cable
Ø20mm Shaft type	External 2: Ø2mm	100, 200, 320, 360	3: A, B, Z 6: A, B, Z A, B, Z	N: NPN open collector output V: Voltage output L: Line driver output	5: 5VDC ±5% 12: 12VDC ±5%	R: Axial cable type S: Radial cable type
Ø20mm hollow built-in type	Inside 2: Ø2mm, 2.5: Ø2.5mm, 3: Ø3mm					

※The power of Line driver is only for 5VDC.

Control Output Diagram



- The output circuit of A, B, Z phase are the same. (Line driver output is A, A̅, B̅, Z̅)

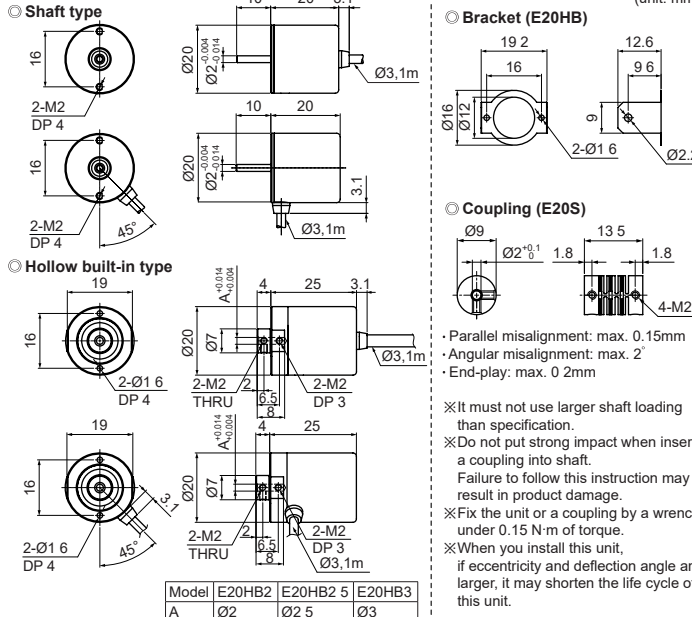
- ※The above specifications are subject to change and some models may be discontinued without notice.
- ※Be sure to follow cautions written in the instruction manual, and the technical descriptions (catalog, homepage).

Specifications

Item	Ø20mm Shaft type/Hollow built-in type Incremental Rotary Encoder	
Model	E20S2-□-3-N-□□ E20S2-□-3-V-□□ E20S2-□-6-L-5-□	E20HB-□-3-N-□□ E20HB-□-3-V-□□ E20HB-□-6-L-5-□
Resolution (PPR) ^{※1}	100, 200, 320, 360	
Output phase	A, B, Z phase (line driver output A, A̅, B̅, Z̅, Z̅ phase)	
Phase difference of output	Phase difference between A and B: $T \pm \frac{T}{8}$ (T=1 cycle of A phase)	
Electrical specification	Control output	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: min. 2.5VDC=
Response time (rise/fall)	NPN open collector output	Max. 1µs (cable length: 1m, I sink=20mA)
	Voltage output	
	Line driver output	Max. 0.5µs (cable length: 1m, I sink=20mA)
Max. response frequency	100kHz	
Power supply	• 5VDC= ±5% • 12VDC= ±5%	
Current consumption	Max. 60mA (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	500VAC 50/60Hz for 1 minute (between all terminals and case)	
Connection	Axial cable type, radial cable type	
Mechanical specification	Starting torque	Max. 5gf cm (5×10 ⁻³ N m)
	Moment of inertia	Max. 0.5g cm ² (5×10 ⁻⁸ kg m ²)
	Shaft loading	Radial: 200gf, Thrust : 200gf
Max. allowable revolution ^{※2}	6,000rpm	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours	
Shock	Approx. max. 50G	
Environment	Ambient temp.	-10 to 70°C, storage: -20 to 80°C
	Ambient humi.	35 to 85%RH, storage: 35 to 90%RH
Protection structure	IP50 (EC standard)	
Cable	Ø3mm, 5-wire (line driver output: 8-wire), 1m, Shield cable	
Accessory	Ø2mm Coupling (shaft type), Bracket (hollow built-in type)	
Approval	CE (except line driver output)	
Unit weight	Approx. 35g	

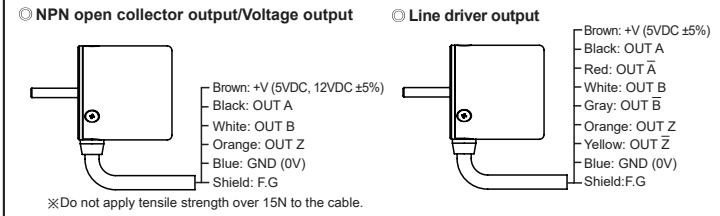
- ※1: Not indicated resolutions are customizable.
- ※2: Make sure that Max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.
[Max. response revolution (rpm)] = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec.}$
- ※Environment resistance is rated at no freezing or condensation.

Dimension

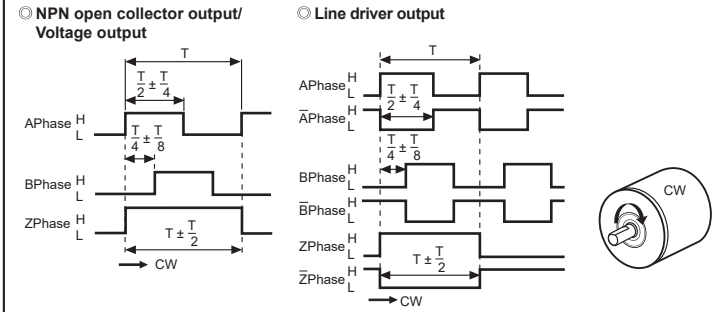


Model	E20HB2	E20HB2 5	E20HB3
A	Ø2	Ø2.5	Ø3

Connections



Output Waveform



Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected actions.
- 5VDC, 12VDC 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.
 - ① Indoors (in the environment condition rated in 'Specifications')
 - ② Altitude max. 2,000m
 - ③ Pollution degree 2
 - ④ Installation 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