

Autonics

ROTARY ENCODER(INCREMENTAL TYPE)

E18S SERIES

INSTRUCTION MANUAL



[Axial cable type] [Radial cable type]

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

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 fire, personal injury, or economic loss.

2. **Install on a device panel to use.**

Failure to follow this instruction may result in fire.

3. **Do not connect, repair, or inspect the unit while connected to a power source.**

Failure to follow this instruction may result in fire.

4. **Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

5. **Do not disassemble or modify the unit.**

Failure to follow this instruction may result in fire.

⚠ Caution

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 product damage by fire.

3. **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.

4. **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.**

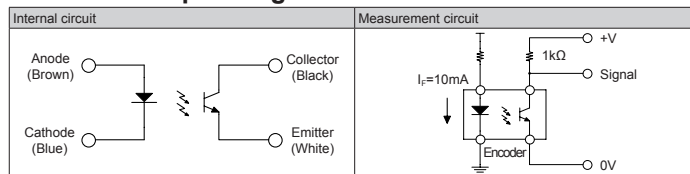
Failure to follow this instruction may result in product damage.

■ Ordering Information

E18S	2	300	1	A	5	R
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Series	Shaft diameter	Pulses/Revolution	Output phase	Control output	Power supply	Cable
Diameter Ø18mm shaft type	2: Ø2mm 2.5: Ø2.5mm	200, 300	1: A	A: No AMP	5: 5VDC ±5%	R: Axial cable type S: Radial cable type

■ Control Output Diagram



※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	Ø18mm Shaft type Incremental Rotary Encoder		
Resolution (PPR)	200, 300		
Electrical specification	Output phase	A phase	
	Output waveform	Quasi-sinusoidal (No AMP)	
	Output signal amplitude	Min. 150mV _{p-p}	
	Output amplitude variation	Max. 40%	
	Max. response frequency	10kHz	
	Power supply	5VDC± ±5% (ripple P-P: max. 5%)	
	Insulation resistance	Over 100MΩ (at 500VDC megger between all terminals and case)	
Dielectric strength	500VAC 50/60Hz for 1 min (between all terminals and case)		
	Connection	Axial cable type, radial cable type	
Optical elements specifications	LED	Current flow	I _f : max. 50mA
	Photo transistor	Reverse voltage	V _R : max. 5VDC±
		Current consumption	P _D : max. 95mW
		Collector-Emitter voltage	V _{CEO} : max. 30VDC±
		Emitter-Collector voltage	V _{ECO} : max. 5VDC±
		Collector current	I _C : max. 20mA
Collector current consumption	P _C : max. 75mW		
Mechanical specification	Starting torque	Max. 10gf·cm (10×10 ⁻³ N·m)	
	Moment of inertia	Max. 0.5g·cm ² (5×10 ⁻⁶ kg·m ²)	
	Shaft loading	Radial: 200gf, Thrust: 200gf	
		Max. allowable revolution*1	3000rpm
Vibration	1.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) 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 (IEC standard)		
Cable	Ø1mm, 4-wire, 150mm, Flat ribbon cable (AWG26, core diameter: 0.16mm, number of cores: 7, insulator diameter: Ø0.98mm)		
Accessory	Ø2mm coupling (only for the Ø2mm shaft diameter model)		
Weight*2	Approx. 33.5g (approx. 10g)		

*1: Make sure that Max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

$$\text{[Max. response revolution(rpm)]} = \frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$$

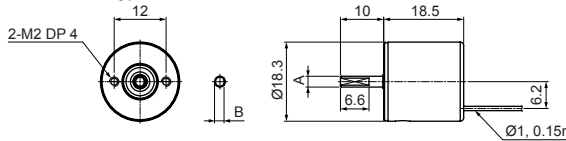
*2: The weight includes packaging. The weight in parenthesis in for unit only.

※Environment resistance is rated at no freezing or condensation.

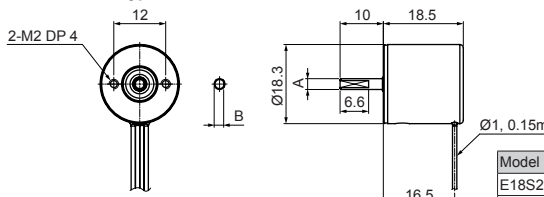
■ Dimension

(unit: mm)

○ Axial cable type

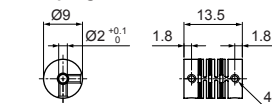


○ Radial cable type



Model	A	B
E18S2	Ø2.0 ^{+0.01} _{-0.02}	1.8 ⁰ _{-0.1}
E18S2.5	Ø2.5 ^{+0.01} _{-0.02}	2.3 ⁰ _{-0.1}

○ Coupling



- Parallel misalignment: max. 0.15mm
- Angular misalignment: max. 2°
- End-play: max. 0.2mm

※Do not load overweight on the shaft.

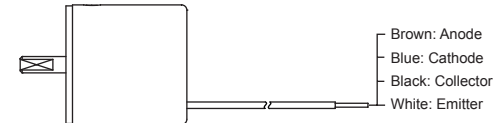
※Do not put strong impact when insert a coupling into shaft.

Failure to follow this instruction may result in product damage.

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

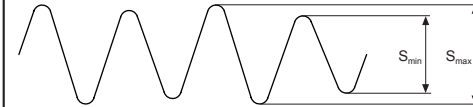
※When you install this unit, if eccentricity and deflection angle are larger, it may shorten the life cycle of this unit.

■ Connections



※Do not apply tensile strength over 10N to the cable.

■ Output Waveform



※Output signal amplitude: S_{min} ≥ 150mV_{p-p}

※Output amplitude variation: (S_{max}/S_{min}-1) × 100 ≤ 40%

■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- 5VDC 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.
- When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
- 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. 2,000m
 - Pollution degree 2
 - 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

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