

# E18S Series

## Shaft Type Ø18mm Incremental Rotary Encoder

### ■ Features

- Ultra-compact (Ø18mm) and ultra-lightweight (12g)
- Easy installation in tight or limited spaces
- Low moment of inertia
- Power supply: 5VDC ±5%



[Axial cable type]

[Radial cable type]

### ■ Applications

- Suitable for office machine such as ATMs, bill counting machines, copy machines

**⚠ Please read "Safety Considerations" in operation manual before using.**



※Except for No Amp. output type.

### ■ Ordering Information

**E18S**   **2.5**   –   **200**   –   **1**   –   **N**   –   **5**   –   **R**

Series	Shaft diameter	Pulses/revolution	Output phase	Control output	Power supply	Cable
Ø18mm, shaft type	2: Ø2mm 2.5: Ø2.5mm	100, 200, 300, 400	1: A	N: NPN open collector output V: Voltage output	5: 5VDC ±5%	R: Axial cable type S: Radial cable type
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

### ■ Specifications

#### ○ NPN open collector output / Voltage output type

Item	Diameter Ø18mm shaft type of Incremental Rotary Encoder		
Resolution (PPR) <sup>※1</sup>	100, 200, 300, 400		
Electrical specification	Output phase	A phase	
	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=
	Response time (rise/fall)	NPN open collector output	Max. 1μs (cable length: 1m, I sink = 20mA)
		Voltage output	
	Max. response frequency	25kHz	
	Power supply	5VDC= ±5% (ripple P-P: max. 5%)	
	Current consumption	Max. 50mA (disconnection of the load)	
	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		
Mechanical specification	Starting torque	Max. 10gf·cm (9.8×10 <sup>-4</sup> N·m)	
	Moment of inertia	Max. 0.5g·cm <sup>2</sup> (5×10 <sup>-8</sup> kg·m <sup>2</sup> )	
	Shaft loading	Radial: max. 200gf, Thrust: max. 200gf	
	Max. allowable revolution <sup>※2</sup>	6,000rpm	
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 temperature	-10 to 70°C, storage: -20 to 80°C	
	Ambient humidity	35 to 85%RH, storage: 35 to 90%RH	
Protection structure	IP50 (IEC standard)		
Cable	Ø1.28mm, 3-wire, 150mm, Flat ribbon cable (AWG26, core diameter: 0.16mm, number of cores: 7, insulator diameter: Ø1.28mm)		
Accessory	Ø2mm coupling (supplied only for Ø2mm shaft diameter model)		
Approval	<b>CE c UL US</b>		
Weight <sup>※3</sup>	Ø2mm Shaft diameter model: approx. 35.4g (approx. 12g) Ø2.5mm Shaft diameter model: approx. 34.2g (approx. 12g)		

※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.

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

※3: The weight includes packaging. The weight in parenthesis is for unit only.

※Environment resistance is rated at no freezing or condensation.

# Incremental Ø18mm Shaft Type

## ■ Specifications

### ◎ No Amp. output type

Item	Diameter Ø18mm shaft type of Incremental Rotary Encoder		
Resolution (PPR) <sup>※1</sup>	200, 300		
Electrical specification	Output phase	A phase	
	Output waveform	Quasi-sinusoidal (No Amp.)	
	Output signal amplitude	Min. 150mV <sub>P-P</sub>	
	Output amplitude variation	Max. 40%	
	Max. response frequency	10kHz	
	Power supply	5VDC $\pm$ 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 <sub>F</sub> : max. 50mA
		Reverse voltage	V <sub>R</sub> : max. 5VDC $\pm$
		Current consumption	P <sub>D</sub> : max. 95mW
	Photo transistor	Collector-Emitter voltage	V <sub>CEO</sub> : max. 30VDC $\pm$
		Emitter-Collector voltage	V <sub>ECO</sub> : max. 5VDC $\pm$
		Collector current	I <sub>C</sub> : max. 20mA
		Collector Current consumption	P <sub>C</sub> : max. 75mW
Mechanical specification	Starting torque	Max. 10gf·cm (9.8×10 <sup>-4</sup> N·m)	
	Moment of inertia	Max. 0.5g·cm <sup>2</sup> (5×10 <sup>-8</sup> kg·m <sup>2</sup> )	
	Shaft loading	Radial: max. 200gf, Thrust: max. 200gf	
	Max. allowable revolution <sup>※2</sup>	3,000rpm	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each of X, Y, Z directions for 2 hours		
Shock	Approx. max. 50G		
Environment	Ambient temperature	-10 to 70°C, storage: -20 to 80°C	
	Ambient humidity	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 <sup>※3</sup>	Approx. 33.5g (approx. 10g)		

※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.

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

※3: The weight includes packaging. The weight in parenthesis is for unit only.

※Environment resistance is rated at no freezing or condensation.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(K) Timers

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

(R) Graphic/ Logic Panels

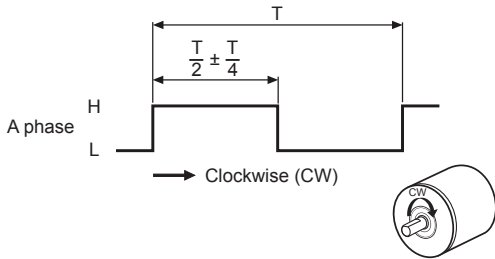
(S) Field Network Devices

(T) Software

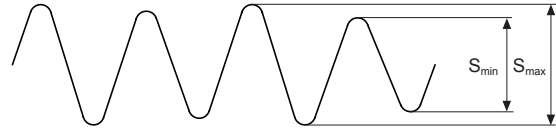
# E18S Series

## Output Waveform

○ NPN open collector output / Voltage output



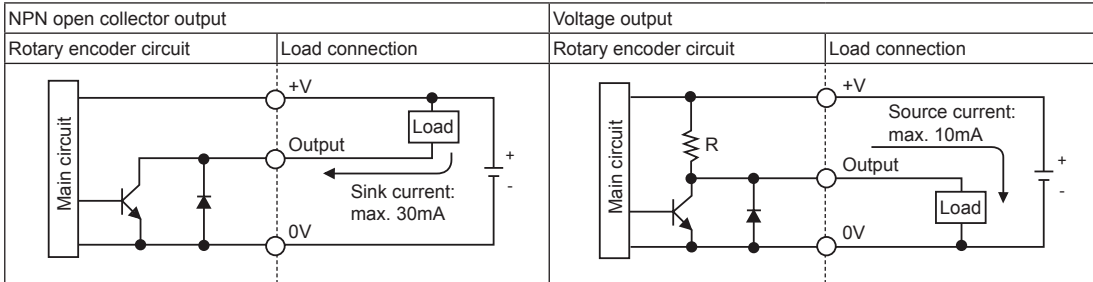
○ No Amp. output type



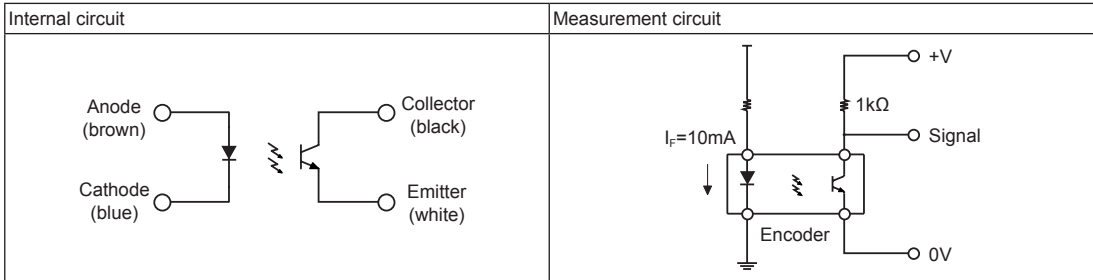
※Output signal amplitude:  $S_{min} \geq 150\text{mV}_{P-P}$   
Output amplitude variation:  $(S_{max}/S_{min}-1) \times 100 \leq 40\%$

## Control Output Diagram

○ NPN open collector output / Voltage output



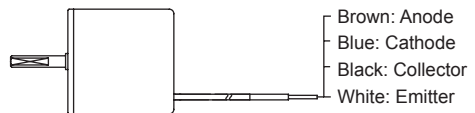
○ No Amp. output type



## Connections

○ NPN open collector output / Voltage output

○ No Amp. output type



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

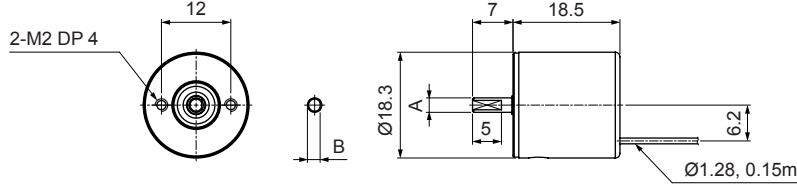
# Incremental Ø18mm Shaft Type

## ■ Dimensions

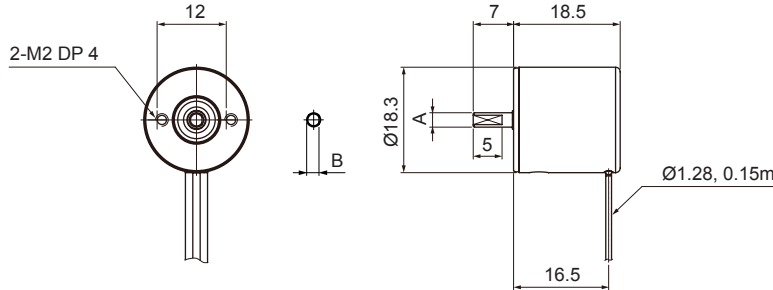
(unit: mm)

### ◎ NPN open collector output / Voltage output

#### ● Axial cable type



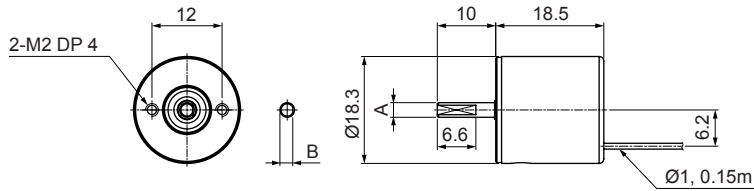
#### ● Radial cable type



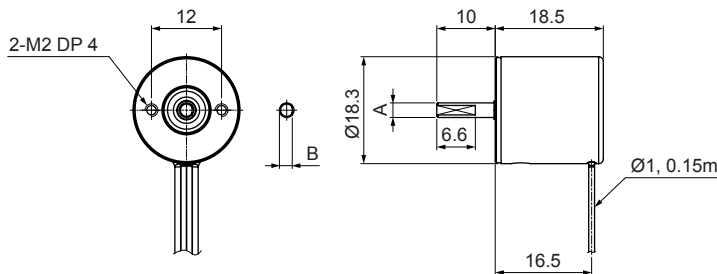
Model	A	B
E18S2	$\varnothing 2.0_{-0.02}^{-0.004}$	1.7
E18S2.5	$\varnothing 2.5_{-0.02}^{-0.004}$	2.2

### ◎ No Amp. output type

#### ● Axial cable type

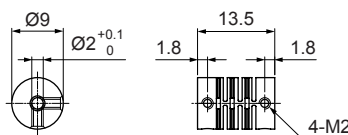


#### ● Radial cable type



Model	A	B
E18S2	$\varnothing 2.0_{-0.02}^{-0.01}$	$1.8_{-0.1}^0$
E18S2.5	$\varnothing 2.5_{-0.02}^{-0.01}$	$2.3_{-0.1}^0$

### ◎ 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.
- ※ For parallel misalignment, angular misalignment, end-play terms, refer to page F-87.
- ※ For flexible coupling (ERB series) information, refer to page F-80.

(A)	Photoelectric Sensors
(B)	Fiber Optic Sensors
(C)	Door/Area Sensors
(D)	Proximity Sensors
(E)	Pressure Sensors
(F)	Rotary Encoders
(G)	Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets
(H)	Temperature Controllers
(I)	SSRs / Power Controllers
(J)	Counters
(K)	Timers
(L)	Panel Meters
(M)	Tacho / Speed / Pulse Meters
(N)	Display Units
(O)	Sensor Controllers
(P)	Switching Mode Power Supplies
(Q)	Stepper Motors & Drivers & Controllers
(R)	Graphic/ Logic Panels
(S)	Field Network Devices
(T)	Software