Shaft Type Ø18mm Incremental Rotary Encoder [NPN open collector/Voltage/No Amp. output]

▣ Features

- **Ultra-compact (Ø18mm) and ultra-lightweight (12g/10g)**
- 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 the instruction 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

Shaft Type Ø18mm Incremental Rotary Encoder [NPN open collector/Voltage output]

▣ Specifications

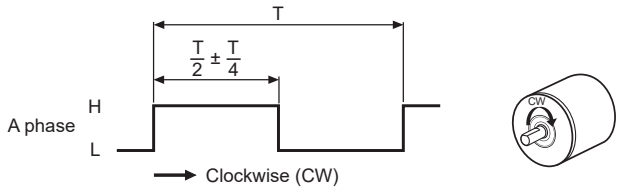
Item			Ø18mm shaft type of Incremental Rotary Encoder
Resolution (PPR)※1			100, 200, 300, 400
Electrical specification	Output phase		A phase
	Control output	NPN open collector output	Load current: max. 30mA, residual voltage: max. 0.4VDC⎓
		Voltage output	Load current: max. 10mA, residual voltage: max. 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^{-4} N·m)
	Moment of inertia		Max. 0.5g·cm² (5×10^{-8} kg·m²)
	Shaft loading		Radial: max. 200gf, Thrust: max. 200gf
	Max. allowable revolution※2		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℃, storage: -20 to 80℃
		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			CE c UL us
Weight※3			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.

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

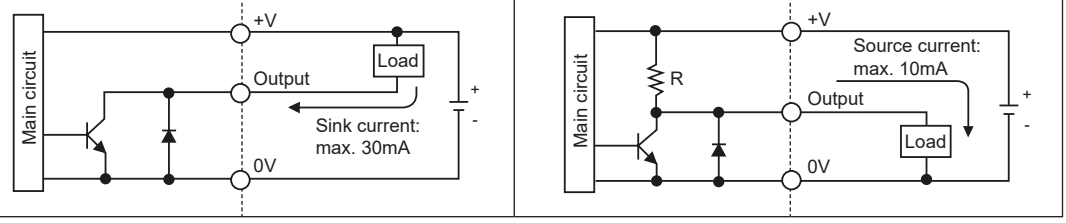
※3: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Output Waveform

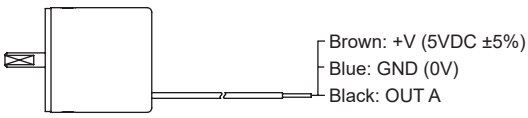


▣ Control Output Diagram

NPN open collector output		Voltage output	
Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection



▣ Connections

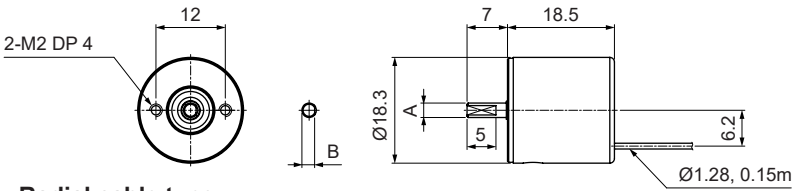


※Do not apply tensile strength over 10N to the cable.

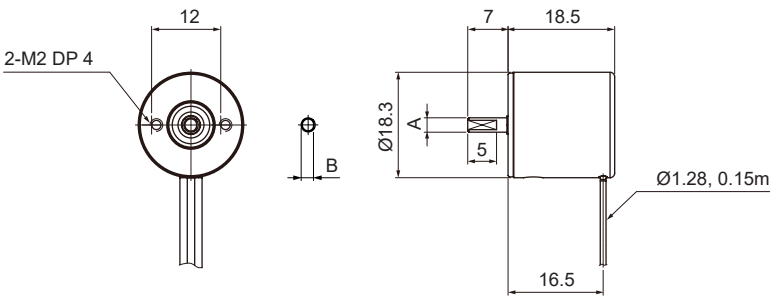
▣ Dimensions

(unit: mm)

• Axial cable type

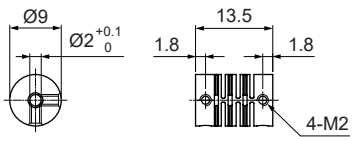


• Radial cable type



Model	A	B
E18S2	$Ø2.0^{-0.004}_{-0.02}$	1.7
E18S2.5	$Ø2.5^{-0.004}_{-0.02}$	2.2

◎ 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 0.15N·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 the "Glossary" section of Technical Description.
※For flexible coupling (ERB series) information, refer to ERB series section.

Shaft Type Ø18mm Incremental Rotary Encoder [No Amp. output]

▣ Specifications

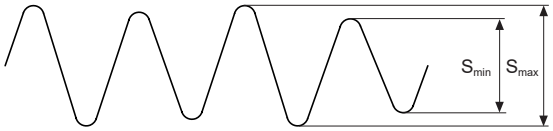
Item			Ø18mm shaft type of Incremental Rotary Encoder
Resolution (PPR)※1			200, 300
Electrical specification	Output phase		A phase
	Output waveform		Quasi-sinusoidal (No Amp.)
	Output signal amplitude		Min. 150mV_{P-P}
	Output amplitude variation		Max. 40%
	Max. response frequency		10kHz
	Power supply		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
		Reverse voltage	V_R: max. 5VDC⎓
		Current consumption	P_D: max. 95mW
	Photo transistor	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 (9.8×10^{-4}N·m)
	Moment of inertia		Max. 0.5g·cm² (5×10^{-8}kg·m²)
	Shaft loading		Radial: max. 200gf, Thrust: max. 200gf
	Max. allowable revolution※2		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℃, storage: -20 to 80℃
	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※3			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.

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

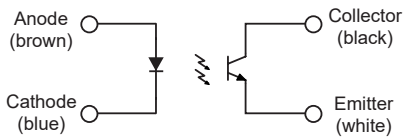
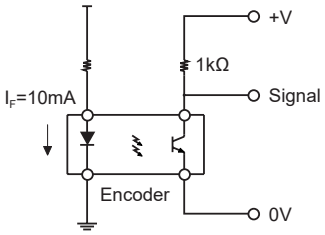
※3: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Output Waveform

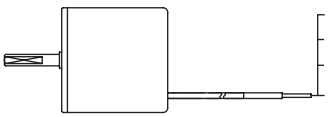


※Output signal amplitude: $S_{min} \geq 150mV_{P-P}$
Output amplitude variation: $(S_{max}/S_{min}-1)\times 100 \leq 40\%$

▣ Control Output Diagram

Internal circuit	Measurement circuit
	

▣ Connections

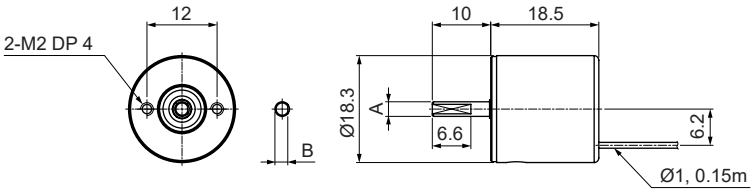


※Do not apply tensile strength over 10N to the cable.

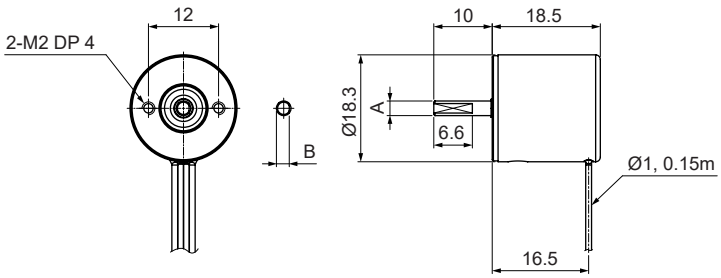
▣ Dimensions

(unit: mm)

● **Axial cable type**

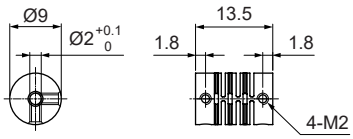


● **Radial cable type**



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



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- Angular misalignment: max. 2°
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