

Shaft type Ø50mm Magnetic Single-turn Absolute Rotary Encoder

■ Features

- Higher resistant to vibration and impact by magnetic elements than optical encoder
- Various output code: BCD, Binary, Gray code
- Various and high resolution
(32, 40, 45, 48, 64, 90, 128, 180, 256, 360, 512, 720, 1024-division)
- Power supply: 5VDC $\pm 5\%$, 12-24VDC $\pm 5\%$
- Protection structure IP50 (IEC standard)

⚠ Please read "Safety Considerations" in the instruction manual before using.



■ Ordering Information

MGA50S	8	1024	1	R	N	5
Series	Shaft diameter	Pulses/revolution	Output code	Revolution direction	Control output	Power supply
Ø50mm shaft type	Ø8mm	Refer to resolution	1: BCD code 2: Binary code 3: Gray code	F: Output value increase at CW direction R: Output value increase at CCW direction	N: NPN open collector output	5: 5VDC $\pm 5\%$ 24: 12-24VDC $\pm 5\%$

■ Specifications

Type		Shaft Type Ø50mm Magnetic Single-turn Absolute Rotary Encoder				
Model		MGA50S8-□□□□-N-□□				
Resolution※1		32, 40, 45, 48, 64, 90, 128, 180, 256, 360, 512, 720, 1024-division				
Electrical specification	Output	Hysteresis	$\pm 0.1^\circ$			
		Positioning error※2	± 1 -bit (LSB: Least Significant Bit)			
		Output code	Division	BCD code	Binary code	Gray code
		1024	TS: 0.3515° $\pm 15'$ (13-bit)	TS: 0.3515° $\pm 15'$ (10-bit)	TS: 0.703° $\pm 15'$ (10-bit)	TS: 0.703° $\pm 15'$ (10-bit)
			TS: 0.5° $\pm 25'$ (11-bit)	TS: 0.5° $\pm 25'$ (10-bit)	TS: 1° $\pm 25'$ (10-bit)	TS: 1° $\pm 25'$ (10-bit)
			TS: 0.703° $\pm 25'$ (11-bit)	TS: 0.703° $\pm 25'$ (9-bit)	TS: 1.406° $\pm 25'$ (9-bit)	TS: 1.406° $\pm 25'$ (9-bit)
			TS: 1° $\pm 25'$ (10-bit)	TS: 1° $\pm 25'$ (9-bit)	TS: 2° $\pm 25'$ (9-bit)	TS: 2° $\pm 25'$ (9-bit)
			TS: 1.406° $\pm 25'$ (10-bit)	TS: 1.406° $\pm 25'$ (8-bit)	TS: 2.8125° $\pm 25'$ (8-bit)	TS: 2.8125° $\pm 25'$ (8-bit)
			TS: 2° $\pm 25'$ (9-bit)	TS: 2° $\pm 25'$ (8-bit)	TS: 4° $\pm 25'$ (8-bit)	TS: 4° $\pm 25'$ (8-bit)
			TS: 2.8125° $\pm 25'$ (9-bit)	TS: 2.8125° $\pm 25'$ (7-bit)	TS: 5.625° $\pm 25'$ (7-bit)	TS: 5.625° $\pm 25'$ (7-bit)
			TS: 4° $\pm 25'$ (8-bit)	TS: 4° $\pm 25'$ (7-bit)	TS: 8° $\pm 25'$ (7-bit)	TS: 8° $\pm 25'$ (7-bit)
		64	TP1: 4.5° $\pm 60'$ (1-bit) TP2: 1.125° $\pm 60'$ (1-bit) TS: 5.625° $\pm 60'$ (7-bit) EP: 5.625° $\pm 60'$ (1-bit)	TP1: 4.5° $\pm 60'$ (1-bit) TP2: 1.125° $\pm 60'$ (1-bit) TS: 5.625° $\pm 60'$ (6-bit) EP: 5.625° $\pm 60'$ (1-bit)	TP1: 4.5° $\pm 60'$ (1-bit) TP2: 1.125° $\pm 60'$ (1-bit) TS: 11.25° $\pm 60'$ (6-bit) EP: 5.625° $\pm 60'$ (1-bit)	TP1: 4.5° $\pm 60'$ (1-bit) TP2: 1.125° $\pm 60'$ (1-bit) TS: 11.25° $\pm 60'$ (6-bit) EP: 5.625° $\pm 60'$ (1-bit)
			TP1: 6° $\pm 60'$ (1-bit) TP2: 1.5° $\pm 60'$ (1-bit) TS: 7.5° $\pm 60'$ (7-bit) EP: 7.5° $\pm 60'$ (1-bit)	TP1: 6° $\pm 60'$ (1-bit) TP2: 1.5° $\pm 60'$ (1-bit) TS: 7.5° $\pm 60'$ (6-bit) EP: 7.5° $\pm 60'$ (1-bit)	TP1: 6° $\pm 60'$ (1-bit) TP2: 1.5° $\pm 60'$ (1-bit) TS: 15° $\pm 60'$ (6-bit) EP: 7.5° $\pm 60'$ (1-bit)	TP1: 6° $\pm 60'$ (1-bit) TP2: 1.5° $\pm 60'$ (1-bit) TS: 15° $\pm 60'$ (6-bit) EP: 7.5° $\pm 60'$ (1-bit)
			TP1: 6.4° $\pm 60'$ (1-bit) TP2: 1.6° $\pm 60'$ (1-bit) TS: 8° $\pm 60'$ (7-bit) EP: 8° $\pm 60'$ (1-bit)	TP1: 6.4° $\pm 60'$ (1-bit) TP2: 1.6° $\pm 60'$ (1-bit) TS: 8° $\pm 60'$ (6-bit) EP: 8° $\pm 60'$ (1-bit)	TP1: 6.4° $\pm 60'$ (1-bit) TP2: 1.6° $\pm 60'$ (1-bit) TS: 16° $\pm 60'$ (6-bit) EP: 8° $\pm 60'$ (1-bit)	TP1: 6.4° $\pm 60'$ (1-bit) TP2: 1.6° $\pm 60'$ (1-bit) TS: 16° $\pm 60'$ (6-bit) EP: 8° $\pm 60'$ (1-bit)
		40	TP1: 7.2° $\pm 60'$ (1-bit) TP2: 1.8° $\pm 60'$ (1-bit) TS: 9° $\pm 60'$ (6-bit) EP: 9° $\pm 60'$ (1-bit)	TP1: 7.2° $\pm 60'$ (1-bit) TP2: 1.8° $\pm 60'$ (1-bit) TS: 9° $\pm 60'$ (6-bit) EP: 9° $\pm 60'$ (1-bit)	TP1: 7.2° $\pm 60'$ (1-bit) TP2: 1.8° $\pm 60'$ (1-bit) TS: 18° $\pm 60'$ (6-bit) EP: 9° $\pm 60'$ (1-bit)	TP1: 7.2° $\pm 60'$ (1-bit) TP2: 1.8° $\pm 60'$ (1-bit) TS: 18° $\pm 60'$ (6-bit) EP: 9° $\pm 60'$ (1-bit)
			TP1: 9° $\pm 60'$ (1-bit) TP2: 2.25° $\pm 60'$ (1-bit) TS: 11.25° $\pm 60'$ (6-bit) EP: 11.25° $\pm 60'$ (1-bit)	TP1: 9° $\pm 60'$ (1-bit) TP2: 2.25° $\pm 60'$ (1-bit) TS: 11.25° $\pm 60'$ (5-bit) EP: 11.25° $\pm 60'$ (1-bit)	TP1: 9° $\pm 60'$ (1-bit) TP2: 2.25° $\pm 60'$ (1-bit) TS: 22.5° $\pm 60'$ (5-bit) EP: 11.25° $\pm 60'$ (1-bit)	TP1: 9° $\pm 60'$ (1-bit) TP2: 2.25° $\pm 60'$ (1-bit) TS: 22.5° $\pm 60'$ (5-bit) EP: 11.25° $\pm 60'$ (1-bit)

※1: Not indicated resolutions are customizable.

※2: When turning ON/OFF the unit, there may be ± 1 -bit (LSB) error at present position by hysteresis.

※3: TP1, TP2 other output angles are available as option.

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) LIDAR

(D) Door/Area Sensors

(E) Vision Sensors

(F) Proximity Sensors

(G) Pressure Sensors

(H) Rotary Encoders

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

MGA50S Series

Specifications

Type		Shaft Type Ø50mm Magnetic Single-turn Absolute Rotary Encoder	
Model		MGA50S8-□□□-N-□	
Electrical specification	Output	Output type	NPN open collector output
		Output capacity	Load current max. 32mA, residual voltage max. 1VDC≡
		Output logic	Negative logic output
		Response time (rise/fall)	Max. 1μs (cable length: 2m, I sink=32mA)
	Max. response frequency		30kHz
	Power supply		5VDC≡ ±5% (ripple P-P: max. 5%), 12-24VDC≡ ±5% (ripple P-P: max. 5%)
	Current consumption		Max. 60mA (disconnection of load)
	Insulation resistance		Over 100MΩ (at 500VDC megger between all terminals and case)
	Dielectric strength		750VAC 50/60Hz for 1 min (between all terminals and case)
Connection		Axial cable type (cable gland)	
Mechanical specification	Starting torque		Max. 70gf·cm (0.007N·m)
	Moment of inertia		Max. 80g·cm ² (8×10 ⁻⁶ kg·m ²)
	Shaft loading		Radial: max. 10kgf, Thrust: max. 2.5kgf
	Max. allowable revolution※4		3,000rpm
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. 75G	
Environ-ment	Ambient temperature	-10 to 70°C, storage: -25 to 85°C	
	Ambient humidity	35 to 85%RH, storage: 35 to 90%RH	
Protection structure		IP50 (IEC standard)	
Cable		Ø6mm, 17-wire, 2m, Shield cable (AWG 28, core diameter: 0.08mm, number of cores: 17, insulator diameter: Ø0.8mm)	
Accessory		Bracket, Coupling	
Approval		CE	
Weight※5		Approx. 400g (approx. 270g)	

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

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

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

※Environment resistance is rated at no freezing or condensation.

Control Output Circuit

Output type	NPN open collector output	
Type	Rotary encoder	Load connection
Output circuit		

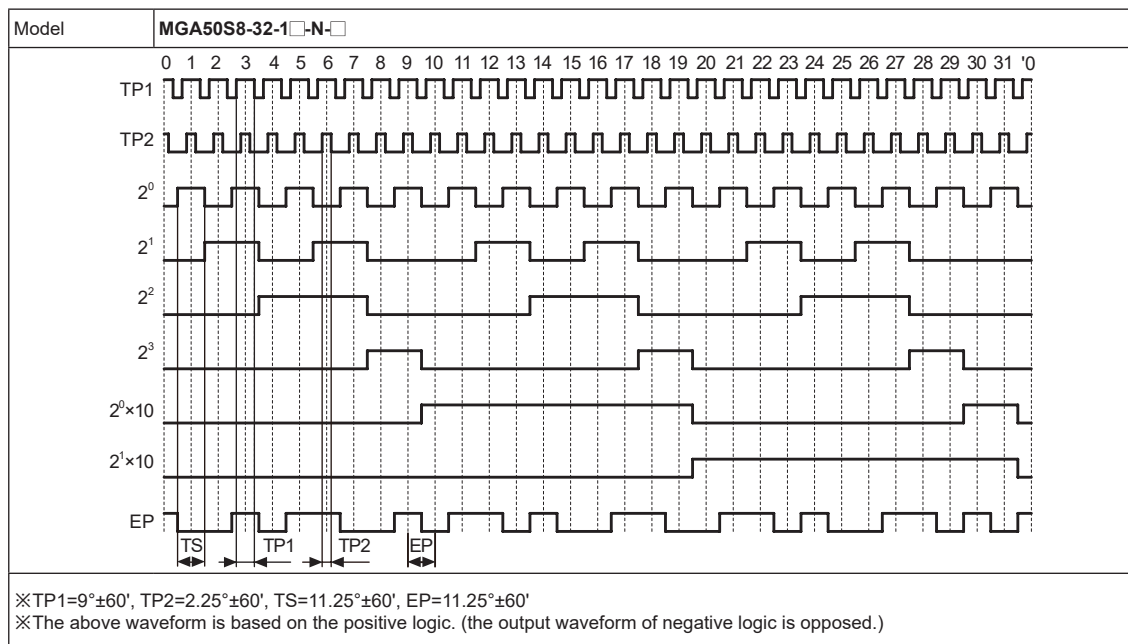
※The output of each bit is same circuit.

※Be sure that when applying excessive load or being short, the circuit may be damaged.

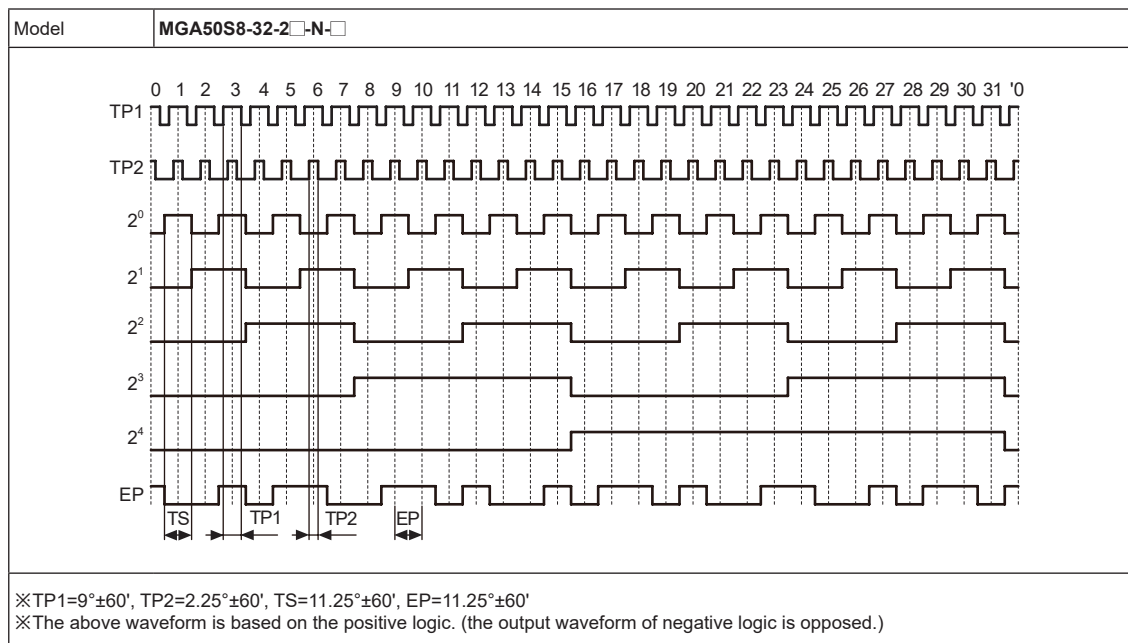
Absolute Ø50mm Magnetic Single-turn Shaft Type

■ Output Waveform

○ 32-division (BCD code output)



○ 32-division (Binary code output)



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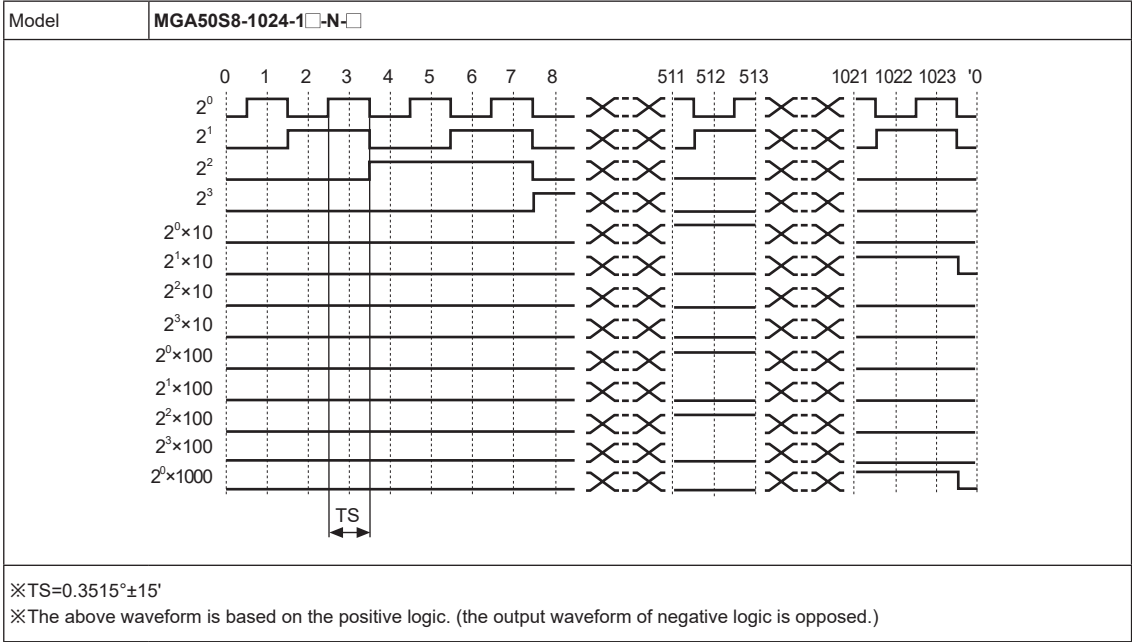
(H)
Rotary
Encoders

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

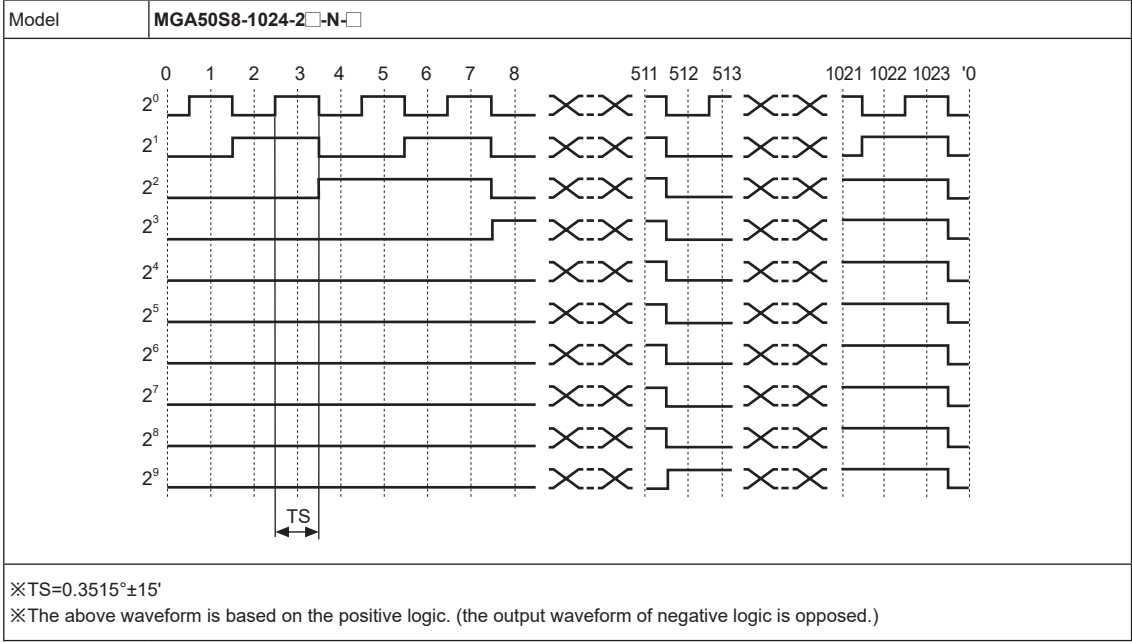
MGA50S Series

■ Output Waveform

◎ 1024-division (BCD code output)



◎ 1024-division (Binary code output)



Absolute Ø50mm Magnetic Single-turn Shaft Type

■ Connection

○ BCD code

Resolution		32	40	45	48	64	90	128	180	256	360	512	720	1024	
Color		-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	
Power	White	+V													
	Black	0V													
Output cable	Brown	2 ⁰													
	Red	2 ¹													
	Orange	2 ²													
	Yellow	2 ³													
	Green	2 ⁰ ×10													
	Blue	2 ¹ ×10													
	Purple	N-C		2 ² ×10											
	Gray	TP1					2 ³ ×10								
	Pink	TP2					N-C		2 ⁰ ×100						
	Transparent	EP					N-C				2 ¹ ×100				
	Light Brown	N-C										2 ² ×100			
	Light Yellow	N-C												2 ³ ×100	
	Light Green	N-C												2 ⁰ ×1000	
	Light Blue	N-C													
	Light Purple	N-C													
	Shield cable	Signal shield cable (F.G.)													

○ Binary Code/Gray code

Resolution		32	40	45	48	64	90	128	180	256	360	512	720	1024	
Color		-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	-division	
Power	White	+V													
	Black	0V													
Output cable	Brown	2 ⁰													
	Red	2 ¹													
	Orange	2 ²													
	Yellow	2 ³													
	Green	2 ⁴													
	Blue	N-C	2 ⁵												
	Purple	N-C					2 ⁶								
	Gray	TP1					N-C		2 ⁷						
	Pink	TP2					N-C				2 ⁸				
	Transparent	EP					N-C							2 ⁹	
	Light Brown	N-C													
	Light Yellow	N-C													
	Light Green	N-C													
	Light Blue	N-C													
	Light Purple	N-C													
	Shield cable	Signal shield cable (F.G.)													

※Non-using wires must be insulated.

※Encoder case and shield cable must be grounded.

※N-C (not connected)

※Please make sure not to short when wiring output cables because the dedicated driver IC is used at output circuit.

※Do not apply tensile strength over 30N to the cable.

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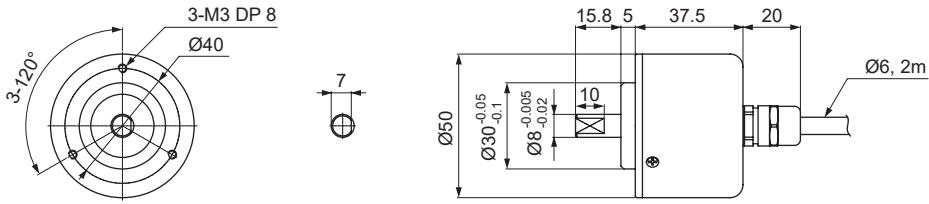
(H) Rotary Encoders

(I) Connectors/
Connector Cables/
Sensor Distribution
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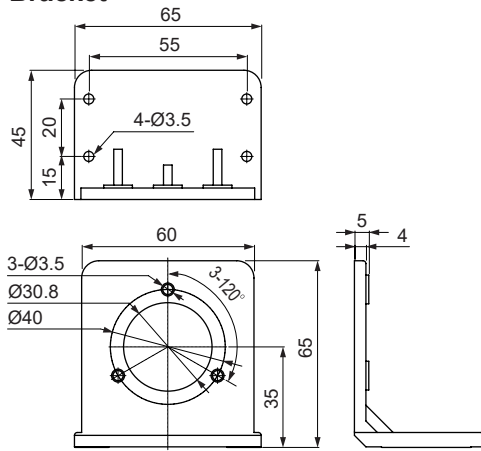
MGA50S Series

■ Dimensions

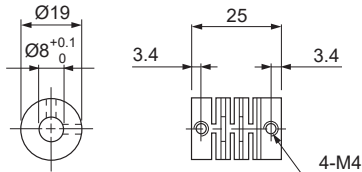
(unit: mm)



◎ Bracket



◎ Coupling



- Parallel misalignment: max. 0.25mm
- Angular misalignment: max. 5°
- End-play: max. 0.5mm

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