

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 ±5%, 12-24VDC ±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 ±5% 24: 12-24VDC ±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	±0.1°			
		Positioning error*2	±1-bit (LSB: Least Significant Bit)			
	Output phase/ Output angle*3	Output code	Division	BCD code	Binary code	Gray code
			1024	TS: 0.3515°±15' (13-bit)	TS: 0.3515°±15' (10-bit)	TS: 0.703°±15' (10-bit)
		720	TS: 0.5°±25' (11-bit)	TS: 0.5°±25' (10-bit)	TS: 1°±25' (10-bit)	
		512	TS: 0.703°±25' (11-bit)	TS: 0.703°±25' (9-bit)	TS: 1.406°±25' (9-bit)	
		360	TS: 1°±25' (10-bit)	TS: 1°±25' (9-bit)	TS: 2°±25' (9-bit)	
		256	TS: 1.406°±25' (10-bit)	TS: 1.406°±25' (8-bit)	TS: 2.8125°±25' (8-bit)	
		180	TS: 2°±25' (9-bit)	TS: 2°±25' (8-bit)	TS: 4°±25' (8-bit)	
		128	TS: 2.8125°±25' (9-bit)	TS: 2.8125°±25' (7-bit)	TS: 5.625°±25' (7-bit)	
		90	TS: 4°±25' (8-bit)	TS: 4°±25' (7-bit)	TS: 8°±25' (7-bit)	
		64	TP1: 4.5°±60' (1-bit) TP2: 1.125°±60' (1-bit) TS: 5.625°±60' (7-bit) EP: 5.625°±60' (1-bit)	TP1: 4.5°±60' (1-bit) TP2: 1.125°±60' (1-bit) TS: 5.625°±60' (6-bit) EP: 5.625°±60' (1-bit)	TP1: 4.5°±60' (1-bit) TP2: 1.125°±60' (1-bit) TS: 11.25°±60' (6-bit) EP: 5.625°±60' (1-bit)	
		48	TP1: 6°±60' (1-bit) TP2: 1.5°±60' (1-bit) TS: 7.5°±60' (7-bit) EP: 7.5°±60' (1-bit)	TP1: 6°±60' (1-bit) TP2: 1.5°±60' (1-bit) TS: 7.5°±60' (6-bit) EP: 7.5°±60' (1-bit)	TP1: 6°±60' (1-bit) TP2: 15°±60' (1-bit) TS: 1.5°±60' (6-bit) EP: 7.5°±60' (1-bit)	
		45	TP1: 6.4°±60' (1-bit) TP2: 1.6°±60' (1-bit) TS: 8°±60' (7-bit) EP: 8°±60' (1-bit)	TP1: 6.4°±60' (1-bit) TP2: 1.6°±60' (1-bit) TS: 8°±60' (6-bit) EP: 8°±60' (1-bit)	TP1: 6.4°±60' (1-bit) TP2: 1.6°±60' (1-bit) TS: 16°±60' (6-bit) EP: 8°±60' (1-bit)	
40	TP1: 7.2°±60' (1-bit) TP2: 1.8°±60' (1-bit) TS: 9°±60' (6-bit) EP: 9°±60' (1-bit)	TP1: 7.2°±60' (1-bit) TP2: 1.8°±60' (1-bit) TS: 9°±60' (6-bit) EP: 9°±60' (1-bit)	TP1: 7.2°±60' (1-bit) TP2: 1.8°±60' (1-bit) TS: 18°±60' (6-bit) EP: 9°±60' (1-bit)			
32	TP1: 9°±60' (1-bit) TP2: 2.25°±60' (1-bit) TS: 11.25°±60' (6-bit) EP: 11.25°±60' (1-bit)	TP1: 9°±60' (1-bit) TP2: 2.25°±60' (1-bit) TS: 11.25°±60' (5-bit) EP: 11.25°±60' (1-bit)	TP1: 9°±60' (1-bit) TP2: 2.25°±60' (1-bit) TS: 22.5°±60' (5-bit) EP: 11.25°±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		
Environment	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)		

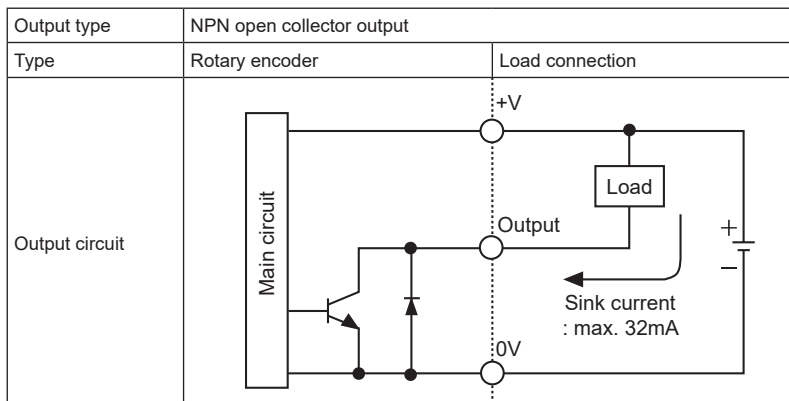
※4: Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※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



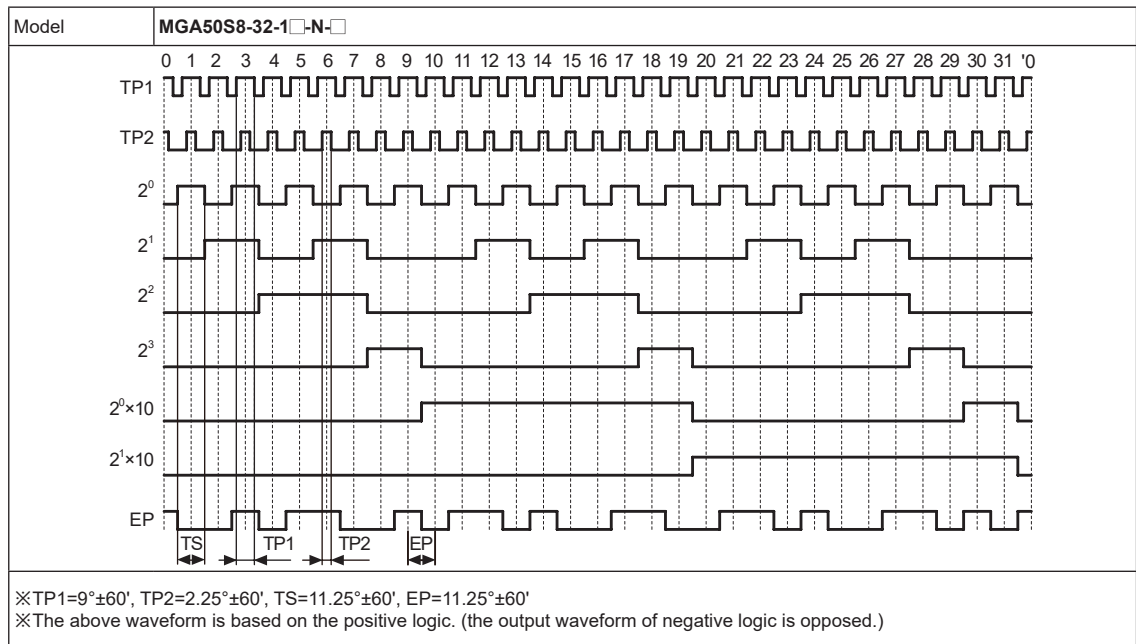
※The output of each bit is same circuit.

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

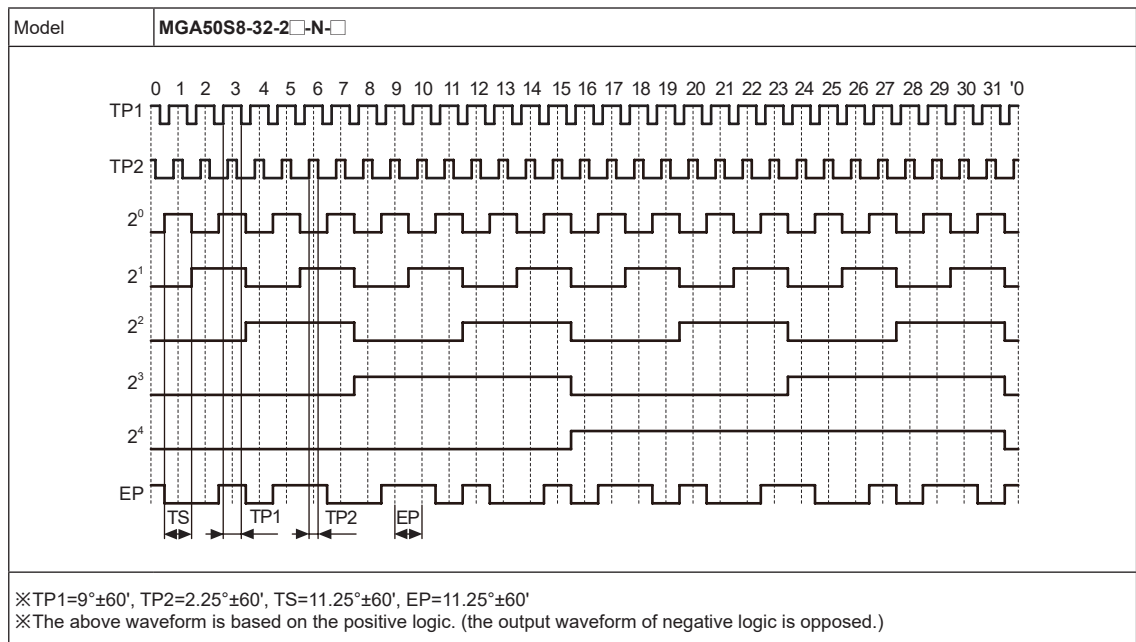
Absolute Ø50mm Magnetic Single-turn Shaft Type

Output Waveform

32-division (BCD code output)



32-division (Binary code output)



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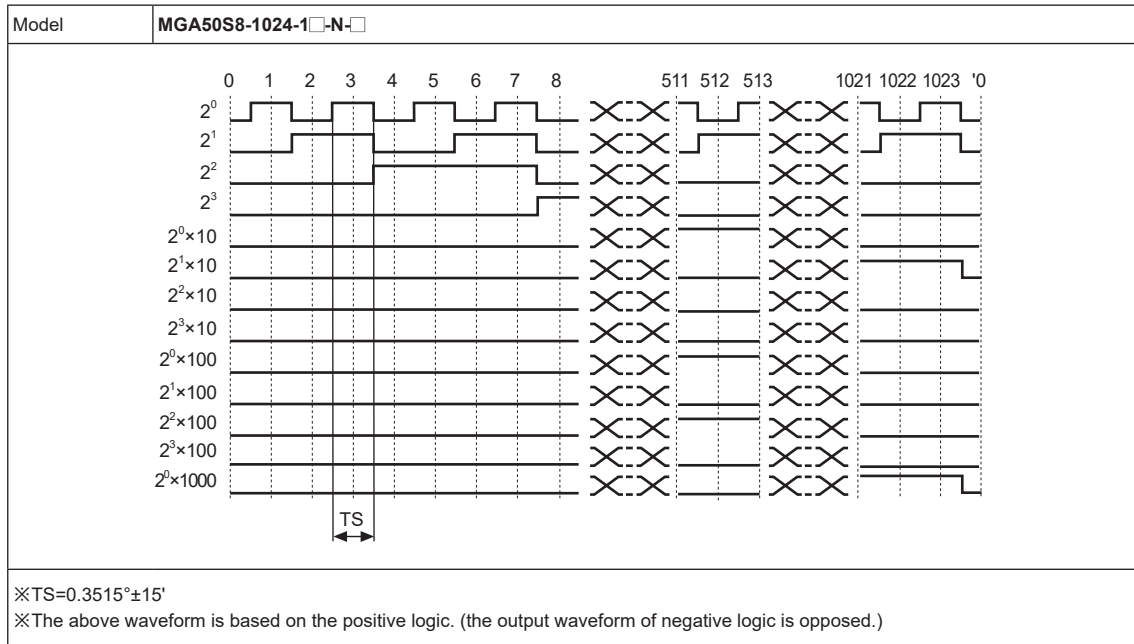
(H) Rotary Encoders

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

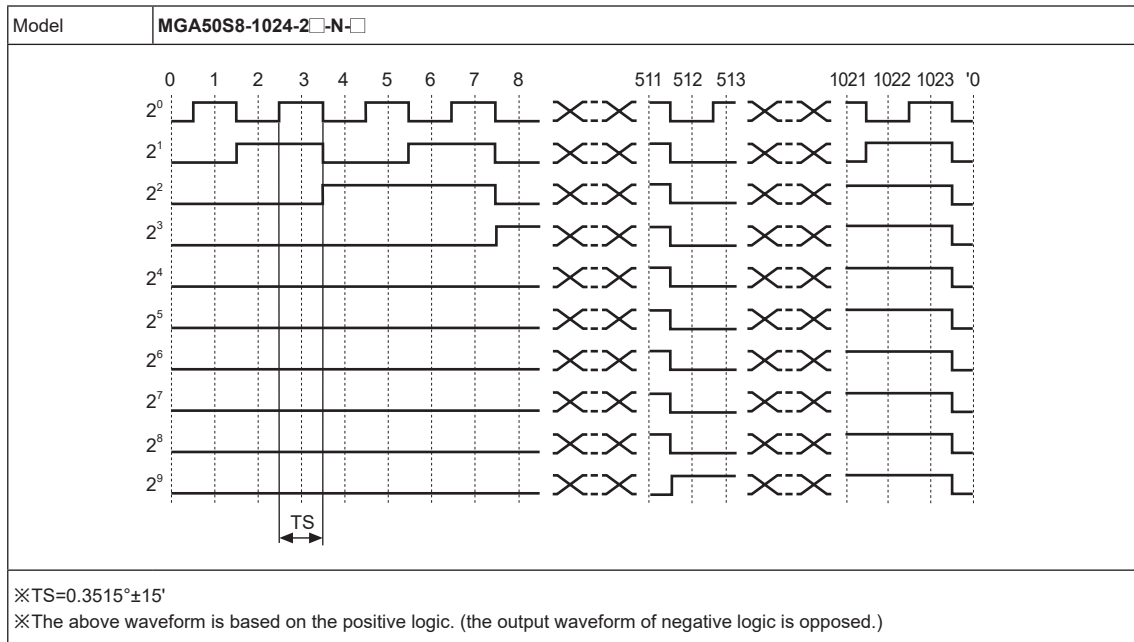
MGA50S Series

■ 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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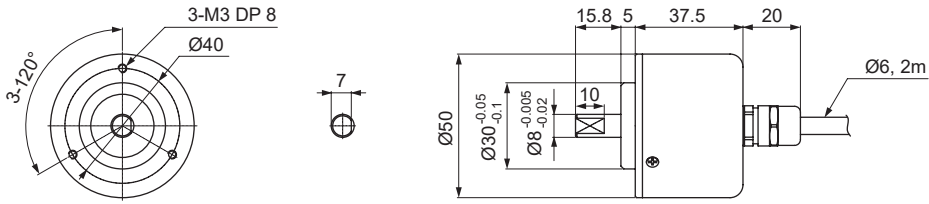
(H) Rotary Encoders

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

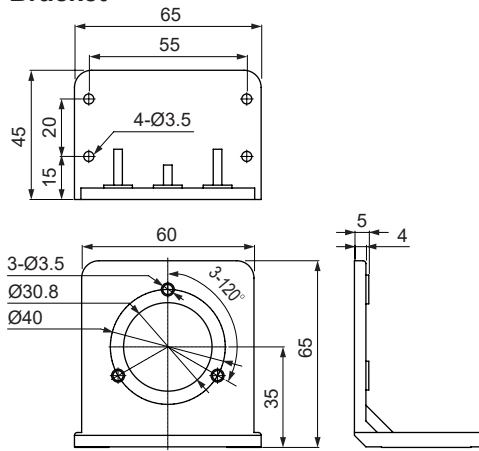
MGA50S Series

■ Dimensions

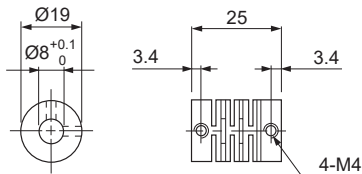
(unit: mm)



◎ 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.