

MGA50S Series Ø50mm Shaft Magnetic Absolute Type

Diameter Ø50mm Shaft type Magnetic 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-divisions)
- Power supply : 5VDC ±5%, 12-24VDC ±5%
- Protection structure IP50 (IEC standard)



⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering Information

MGA50S	8	1024	1	R	N	5
Series	Shaft diameter	Pulse/1Revolution	Output code	Revolution direction	Control output	Power supply
Diameter 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	Diameter Ø50mm shaft type magnetic 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}	±1bit (LSB: least significant bit)			
	Output phase/ Output angle ^{※3}	Output code		BCD code	Binary code	Gray code
			1024-division	TS: 0.3515°±15' (13-bit)	TS: 0.3515°±15' (10-bit)	TS: 0.703°±15' (10-bit)
		720-division	TS: 0.5°±25' (11-bit)	TS: 0.5°±25' (10-bit)	TS: 1°±25' (10-bit)	
		512-division	TS: 0.703°±25' (11-bit)	TS: 0.703°±25' (9-bit)	TS: 1.406°±25' (9-bit)	
		360-division	TS: 1°±25' (10-bit)	TS: 1°±25' (9-bit)	TS: 2°±25' (9-bit)	
		256-division	TS: 1.406°±25' (10-bit)	TS: 1.406°±25' (8-bit)	TS: 2.8125°±25' (8-bit)	
		180-division	TS: 2°±25' (9-bit)	TS: 2°±25' (8-bit)	TS: 4°±25' (8-bit)	
		128-division	TS: 2.8125°±25' (9-bit)	TS: 2.8125°±25' (7-bit)	TS: 5.625°±25' (7-bit)	
		90-division	TS: 4°±25' (8-bit)	TS: 4°±25' (7-bit)	TS: 8°±25' (7-bit)	
		64-division	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-division	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: 1.5°±60' (1-bit) TS: 15°±60' (6-bit) EP: 7.5°±60' (1-bit)	
		45-division	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-division	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-division	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.

(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

MGA50S Series

Specifications

Electrical specification	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: 10kgf, Thrust: 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)	

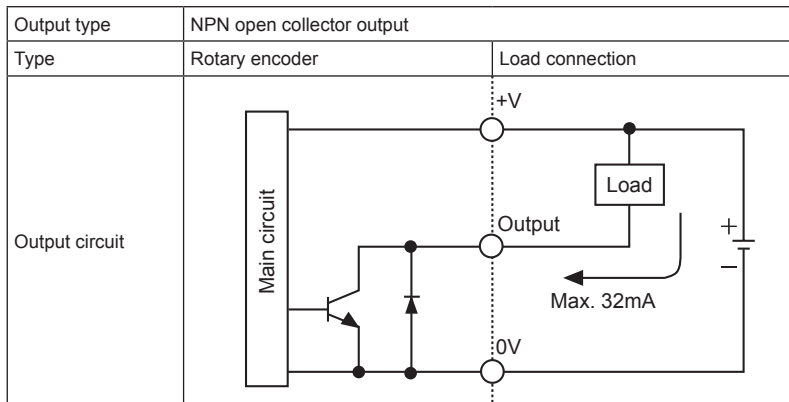
※4: Make sure that Max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

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

※Environment resistance is rated at no freezing or condensation.

Control Output Circuit



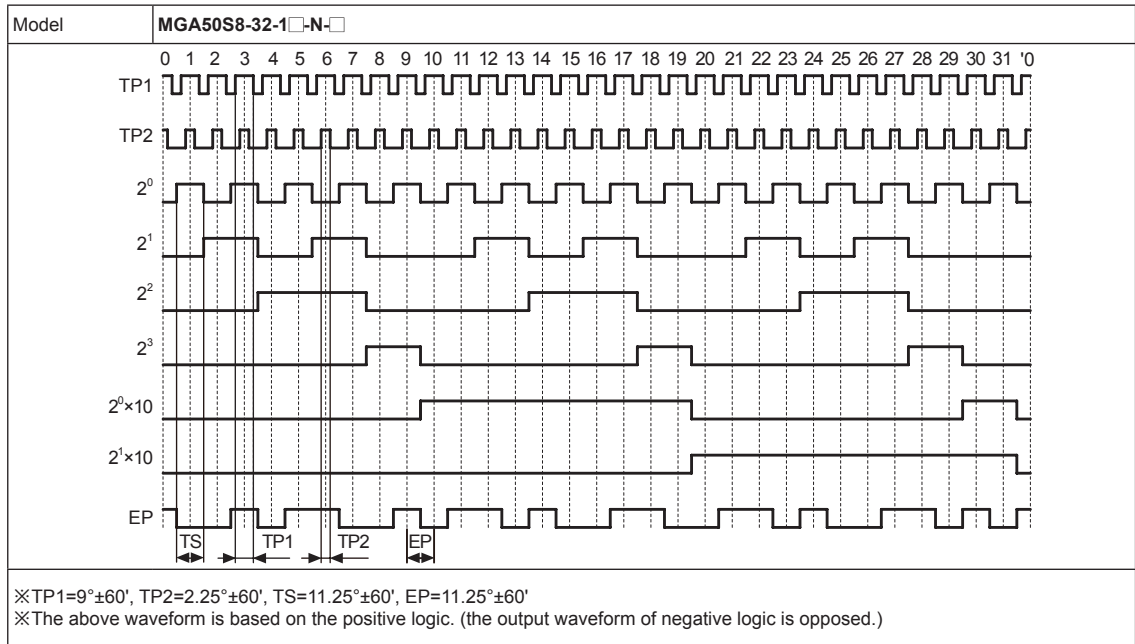
※The output of each bit is same circuit.

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

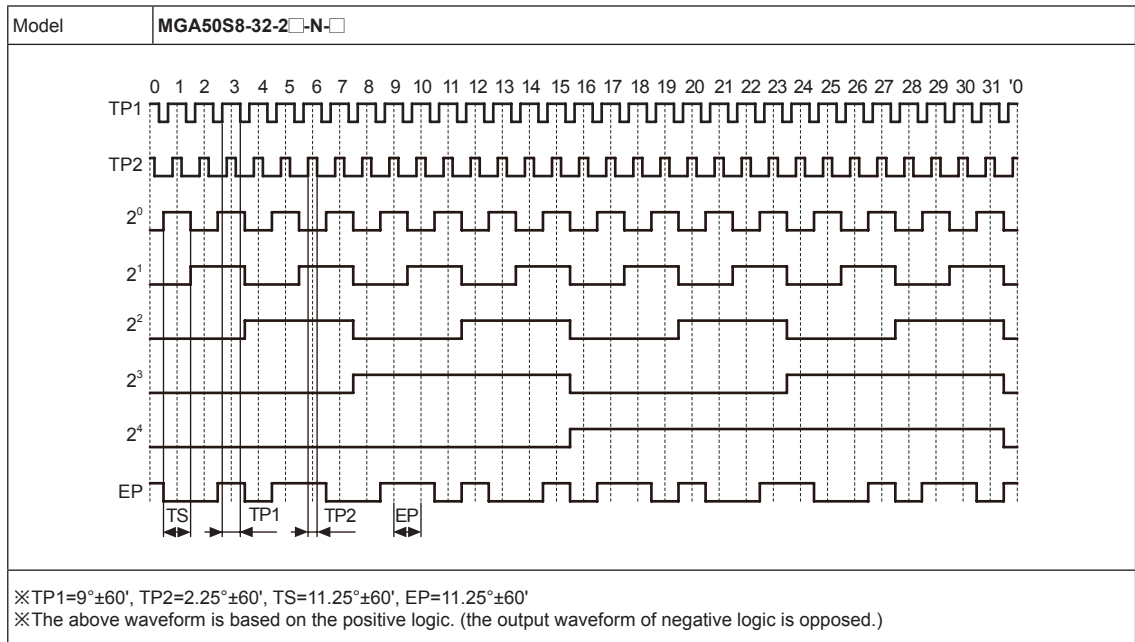
Ø50mm Shaft Magnetic Absolute Type

Output Waveform

32-division Output Waveform (BCD Code Output)



32-division Output Waveform (Binary Code Output)



(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

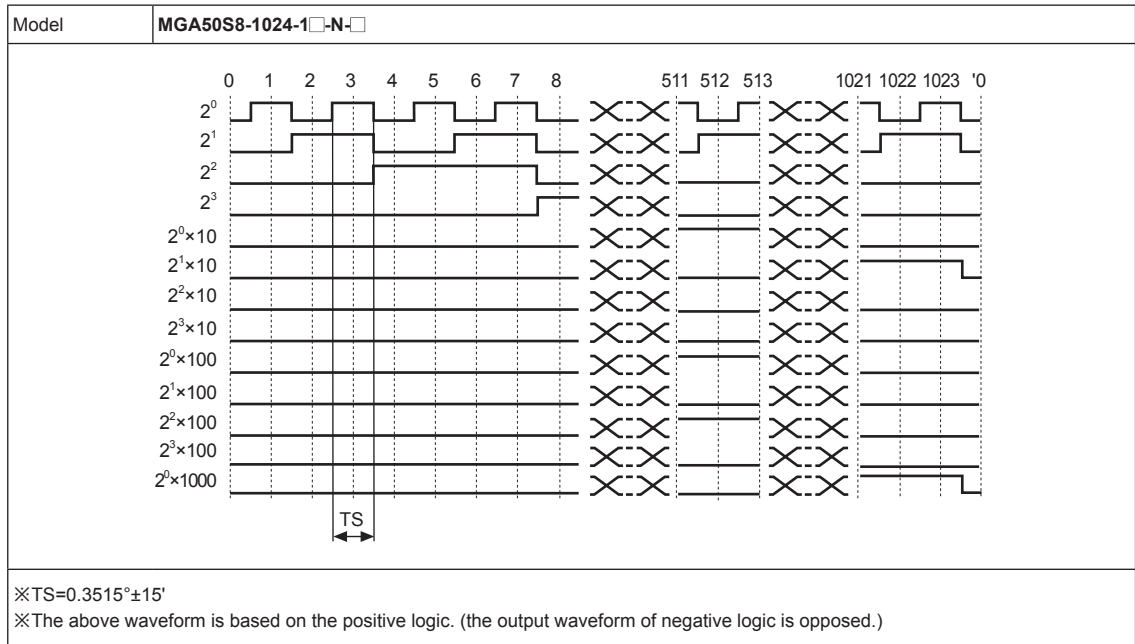
(R) Graphic/ Logic Panels

(S) Field Network Devices

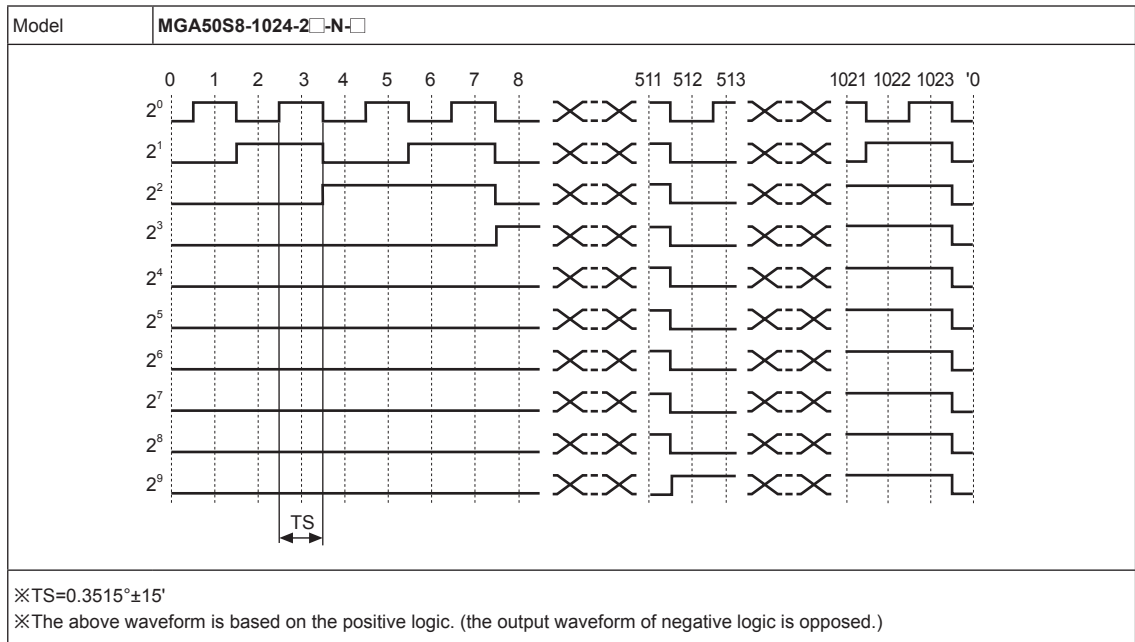
(T) Software

MGA50S Series

● 1024-division Output Waveform (BCD Code Output)



● 1024-division Output Waveform (Binary Code Output)



Ø50mm Shaft Magnetic Absolute 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): Not using.

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

(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

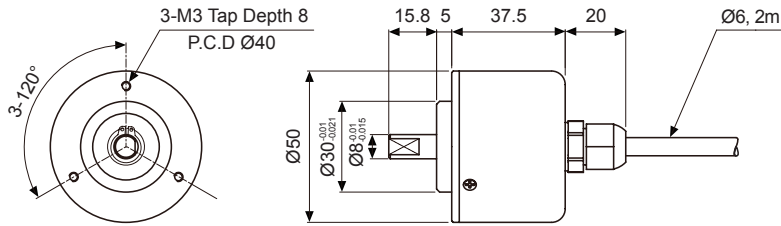
(S) Field Network Devices

(T) Software

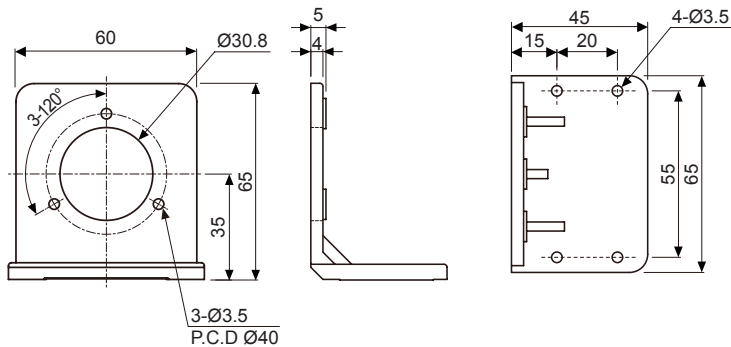
MGA50S Series

■ Dimensions

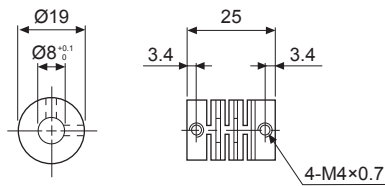
(unit: mm)



• Bracket



• Coupling (MGA50S)



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

※When mounting the coupling to the encoder shaft, if there is combined misalignment (parallel, angular misalignment) between rotating encoder shaft and mate shaft, it may cause encoder and coupling's life cycle to shorten.

※Do not load overweight on the shaft.

※For parallel misalignment, angular misalignment, end-play terms, refer to page F-71.

※For flexible coupling (ERB series) information, refer to page F-64.