

# 50 mm Diameter Absolute Multi-Turn Rotary Encoders (Magnetic)



## MGAM50 Series CATALOG

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Features

- High accuracy in harsh environments including shock, vibration, dust, and humidity (compared to optical encoders)
- Longer service life compared to optical encoders
- Output code: binary
- Output interface options: Parallel, SSI (Synchronous Serial Interface)
- 23-bit (8,388,608) total resolution
  - 10-bit single-turn (1024 divisions)
  - 13-bit multi-turn (8192 revolutions)
- Power supply: 12 - 24 VDC $\pm$  5%
- Overflow alarm (OVF) function
- IP50 protection structure (IEC standard)

### Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

**MGAM50 S 8 - 10 13 - B - ① - ② - 24**

#### ① Rotating direction

F: Increase output when the rotating direction is clockwise base on facing the shaft

R: Increase output when the rotating direction is counter-clockwise base on facing the shaft

#### ② Control output

PN: Parallel NPN open collector output  
S: SSI Line driver output

### Product Components

- Product
- Instruction manual
- Bolt × 7
- Coupling × 1
- Bracket × 1

### Specifications

Model	MGAM50S8-1013-B-F-PN-24	MGAM50S8-1013-B-F-S-24
<b>Resolution</b>	Single-turn: 1024 division Multi-turn: 8192 revolution	
<b>Rotation limit when power OFF <sup>(1)</sup></b>	± 90°	
<b>Hysteresis</b>	± 0.1°	
<b>Positioning error <sup>(2)</sup></b>	± 1 bit (LSB: Least Significant Bit)	
<b>Output code</b>	Binary 2 code	24 bit, Binary 2 code
<b>Output signal</b>	Single-turn data, Multi-turn count, Overflow alarm (OVF) <sup>(3)</sup>	
<b>Control output</b>	Parallel NPN open collector output	SSI (Synchronous Serial Interface) Line driver output
<b>Inflow current</b>	≤ 20 mA	≤ 20 mA
<b>Residual voltage</b>	≤ 1 VDC $\equiv$	≤ 0.5 VDC $\equiv$
<b>Outflow current</b>	-	≤ -20 mA
<b>Output voltage</b>	-	≥ 2.5 VDC $\equiv$
<b>Output logic</b>	Negative logic output	-
<b>Response speed <sup>(4)</sup></b>	≤ 1 μs	-
<b>Multi-turn count reset</b>	Input level: 0 - 1 VDC $\equiv$ Input logic: Low Active, Open for common use Input time: ≥ 100 ms	
<b>Clock</b>	-	Input level: 5 VDC $\equiv$ ± 5% Input frequency: 100 kHz to 1 MHz
<b>Max. response freq.</b>	30 kHz	-
<b>Max. allowable revolution <sup>(5)</sup></b>	3,000 rpm	
<b>Starting torque</b>	≤ 0.0069 N m	
<b>Inertia moment</b>	≤ 80 g · cm <sup>2</sup> (8 × 10 <sup>-6</sup> kg · m <sup>2</sup> )	
<b>Allowable shaft load</b>	Radial: 10 kgf, Thrust: 2.5 kgf	
<b>Unit weight (packaged)</b>	≈ 393 g (≈ 523 g)	≈ 261 g (≈ 391 g)
<b>Approval</b>	CE	

01) It calibrates the multi-turn count by comparing single-turn data before/after power off without counting multi-turn count when power off. Correct multi-turn count cannot be obtained if a rotating operation exceeding ± 90° is performed at the rotation position when power off. Use within the condition of rated rotating operation.

02) When power ON / OFF the unit, ± 1 bit (LSB) can be changed at current position due to hysteresis.

03) Outputs when multi-turn count is out of counting range (0 to 8191 revolution).

04) Based on cable length: 2 m, I sink = 20 mA

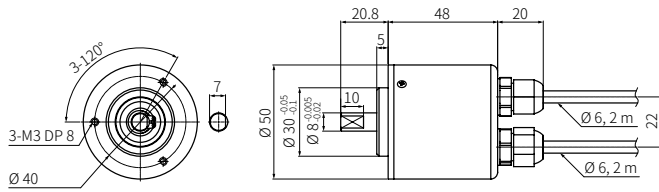
05) For parallel model Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution  
[max. response revolution (rpm) =  $\frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}$ ]

<b>Power supply</b>	12 - 24 VDC $\equiv$ ± 5% (ripple P-P: ≤ 5%)
<b>Current consumption</b>	Parallel NPN open collector output ≤ 100 mA (no load) SSI Line driver output ≤ 150 mA (no load)
<b>Insulation resistance</b>	Between all terminals and case: ≥ 100 MΩ (500 VDC $\equiv$ megger)
<b>Dielectric strength</b>	Between all terminals and case: 750 VAC ~ 50 / 60 Hz for 1 minute
<b>Vibration</b>	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
<b>Shock</b>	≤ 50 G
<b>Ambient temp.</b>	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
<b>Ambient humi.</b>	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
<b>Protection rating</b>	IP50 (IEC standard)
<b>Connection</b>	Axial cable type (cable gland)
<b>Cable spec.</b>	Ø 6 mm, 2 m, shield cable Parallel NPN open collector output: 17-wire × 2, SSI Line driver output: 10-wire
<b>Wire spec.</b>	AWG28 (0.08 mm), insulator diameter: Ø 0.8 mm Parallel NPN open collector output: 17-core, SSI Line driver output: 19-core

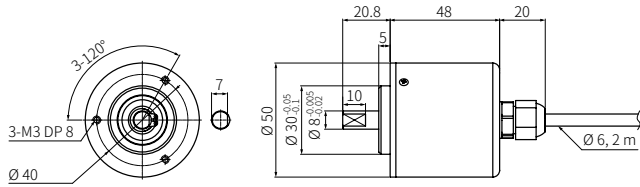
## Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics website.

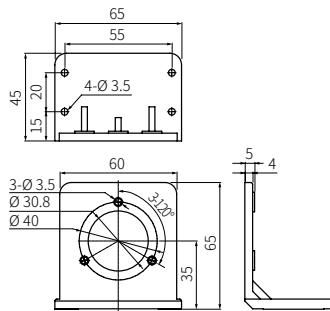
### ■ Parallel NPN open collector output



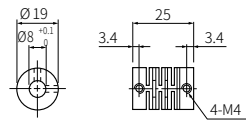
### ■ SSI Line driver output



### ■ Bracket



### ■ Coupling



- Parallel misalignment:  $\leq 0.25$  mm
- Angular misalignment:  $\leq 5^\circ$
- End-play:  $\leq 0.5$  mm