

Built-in Gear / Rotary Actuator Type 2-Phase Closed-loop Stepper Motor (□ 42 mm, □ 60 mm)



Ai-M-G / Ai-M-R 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

- Built-in planetary gear type motor (Ai-M-G)
- Built-in rotary actuator type motor (Ai-M-R)
- Supports □ 42 mm, □ 60 mm

Ordering Information

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

Ai - M - ① M A - ② ③

① Frame size

Number: Frame size (unit: mm)

③ Reduction ratio

5: 1:5
7.2: 1:7.2
10: 1:10

② Motor type

G: Built-in gear type
R: Built-in rotary actuator type

Product Components

- Product
- Instruction manual

Specifications

Model	Ai-M-42MA-G5	Ai-M-42MA-G7.2	Ai-M-42MA-G10
Max. stop torque	1.5 N m	2 N m	2 N m
Rotor inertia moment	54×10 ⁻⁷ kg · m ²		
Rated current	1.7 A / Phase		
Allowable torque	1 N m	1.5 N m	1.5 N m
Standard step angle	0.36°	0.25°	0.18°
Backlash	35 min (0.58°)		
Resistance	1.85 Ω / Phase ±10%		
Inductance	3.5 mH / Phase ±20%		
Unit weight (packaged)	≈ 0.58 kg (≈ 0.70 kg)		

Model	Ai-M-60MA-□5	Ai-M-60MA-□7.2	Ai-M-60MA-□10
Max. stop torque	7 N m	9 N m	11 N m
Rotor inertia moment	490×10 ⁻⁷ kg · m ²		
Rated current	3.5 A / Phase		
Allowable torque	5 N m	6 N m	7 N m
Standard step angle	0.36°	0.25°	0.18°
Backlash	35 min (0.58°)		
Resistance	1.23 Ω / Phase ±10%		
Inductance	2.6 mH / Phase ±20%		
Unit weight (packaged) ⁰¹⁾	≈ 1.52 kg (≈ 1.68 kg)		
	≈ 1.60 kg (≈ 1.76 kg)		

01) Listed in order of Built-in gear type / Built-in rotary actuator type

Motor phase	2-phase
Run method	Bipolar
Insulation class	B type (130°C)
Insulation resistance	Between motor coil and case: ≥ 100 MΩ (500 VDC≐ megger)
Dielectric strength	Between motor coil and case: 500 VAC~ 50 / 60 Hz for 1 minute
Vibration	1.5 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≤ 50 G
Ambient temp.	0 to 50°C, storage: -20 to 70°C (no freezing or condensation)
Ambient humi.	20 to 85%RH, storage: 15 to 90%RH (no freezing or condensation)
Protection rating	IP30 (IEC standard)
Approval	CE
Stop angle error	± 0.09° (Full step, no load)
Shaft vibration	0.03 mm T.I.R.
Radial Movement ⁰²⁾	≤ 0.025 mm T.I.R.
Axial Movement ⁰²⁾	≤ 0.01 mm T.I.R.
Shaft concentricity	0.05 mm T.I.R.
Shaft perpendicularity	0.075 mm T.I.R.

01) Amount of radial shaft displacement when applying radial load (25 N) to the end of the motor shaft

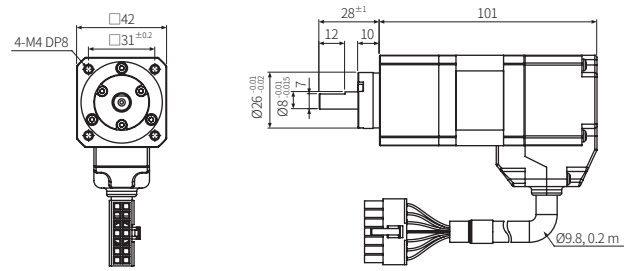
02) Amount of axial shaft displacement when applying axial load (50 N) to the motor shaft

Encoder type	Incremental Rotary Encoder
Power supply	5 VDC ≐ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 50 mA (no load)
Resolution	10,000 PPR (2,500 PPR × 4-multiply)
Control output	Line driver output
Output phase	A, \bar{A} , B, \bar{B} , Z, \bar{Z}
Output waveform	Output duty rate: $\frac{T}{2} \pm \frac{T}{4}$, A-B phase difference $\frac{T}{4} \pm \frac{T}{8}$ (T = 1 cycle of A)
Inflow current	≤ 20 mA
Residual voltage	≤ 0.5 VDC≐
Outflow current	≤ -20 mA
Output voltage	≥ 2.5 VDC≐
Response speed	≤ 0.5 μs (based on cable length: 2 m, I sink = 20 mA)
Max. response frequency	300 kHz

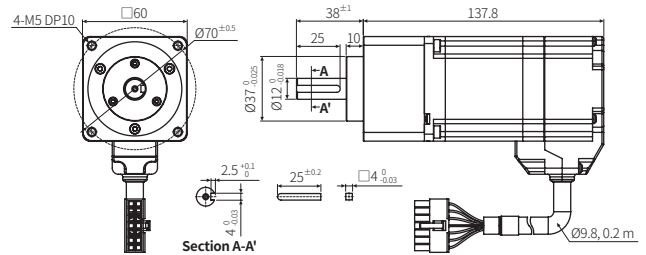
Dimensions

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

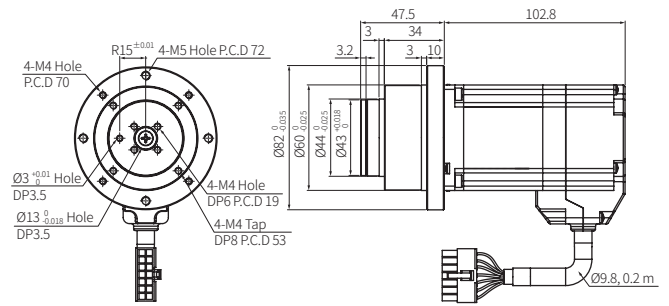
■ Ai-M-42MA-G□



■ Ai-M-60MA-G□



■ Ai-M-60MA-R□



Sold Separately

- Motor + Encoder cable: C1D14M-□ (fixed type), C1DF14M-□ (flexible type)
- Flexible coupling: ERB Series