## **Autonics**

## **ROTARY ACTUATOR TYPE 5 PHASE Stepper motor**

U







Standard type

Brake built-in type

Thank you very much for selecting Autonics products. For your safety, please read the following before using.

## Caution for your safety

\*Please keep these instructions and review them before using this unit.

XPlease observe the cautions that follow;

★ Warning Serious injury may result if instructions are not followed.

↑ Caution Product may be damaged, or injury may result if instructions are not followed.

The following is an explanation of the symbols used in the operation manual. ▲Caution: Injury or danger may occur under special conditions.

## **⚠** Warning

- 1. In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.
- It may cause a fire, human injury or property loss.
- 2. Do not use this unit where flammable or explosive gas, corrosion and water exist. It may cause a fire or burn.
- 3. Installation, connection, operation, control, maintenance should be carried out by person who has been qualified.
- It may cause a fire or human injury, give electronic shock.
- 4. Please install it in power off.
- It may cause electronic shock
- 5. Please earth or install it with housing so that protecting a touch of human body. It may cause electronic shock or human injury.
- 6. Do not disassemble or modify this unit.

It may cause damage to this product or quality down

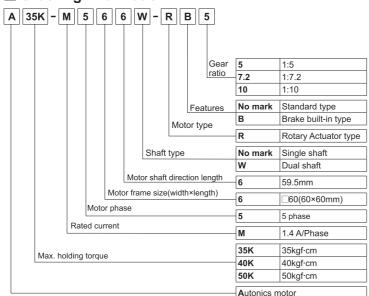
## **∧** Caution

- 1. Please keep the specification of this unit.
- It may cause damage to this product.
- 2. Do not put obstacle object for well ventilation around this unit. It may cause a damage to this product or malfunction of peripheral equipment by motor heating
- 3. Please fix this unit on a metal plate tightly.
- It may cause human injury or damage of this product and peripheral device.
- 4. Please stop this unit when mechanical trouble occurring.
- It may cause a fire or human injury.
- 5. Do not inordinate impact or continuous vibration to this unit. It may cause malfunction of this product.
- 6. The surface temperature of the motor is possible to over  $70^\circ\text{C}$  in normal operating state. Please put a caution mark on outstanding place when somebody may approach to the operating motor.
- It may cause a burn
- 7. Do not use the brake for safety.

It may cause breakdown or malfunction of peripheral device.

- 8. Do not carry the cable or rotating part of this unit.
- It may cause damage to this product or human injury.
- 9. Please put a cover on the rotating part of this unit. It may cause human injury.
- 10. Please separate as industrial scrapped material when disuse this unit.
- \*The above specifications are subject to change and some models may be discontinued without notice.

## Ordering information



## Specifications

AK-M566(W)-R□ / AK-M566-RB□					
Model		A35K-M566(W)-R5	A40K-M566(W)-R7.2	A50K- M566(W)-R10	
		A35K-M566-RB5	A40K-M566-RB7.2	A50K-M566-RB10	
Max. allowable torque*1		35 kgf·cm (3.4 N·m)	40 kgf·cm (3.9 N·m)	50 kgf·cm (4.9 N·m)	
Rotor moment of inertia <sup>*2</sup>		280 g·cm² (280x10 <sup>-7</sup> kg·m²)			
Rated current		1.4 A/Phase			
Basic step angle		0.144°/0.072° (Full/Half)	0.1°/0.05° (Full/Half)	0.072°/0.036° (Full/Half)	
Gear ratio		1:5	1:7.2	1:10	
Allowable speed range		0 to 360 rpm	0 to 250 rpm	0 to 180 rpm	
Backlash		±20'(0.33°)			
Electro-magnetic brake	Rated excitation voltage	24VDC(non- polarity)			
	Rated excitation current	0.33A			
	Static friction torque	8kgf·cm			
	Rotation part inertia moment	2.9×10 <sup>-6</sup> kg·m <sup>2</sup>			
	Insulation class	CLASS B type(130°C)			
	B type Brake	For power on, brake is off, and a motor starts operating			
	Operating time	Max. 20ms			
	Releasing time	Max. 25ms			
Absolute position error		±20'(0.33°)			
Lost motion		±25′(0.33°)			
Weight <sup>**3</sup>		Standard type: Approx. 1.4kg(Approx. 1.3kg) Brake built-in type: Approx. 1.7kg(Approx. 1.6kg)			

Con	Common specification					
Insul	ation class	CLASS B type(130°C)				
Insul	ation resistance	Min. 100MΩ(at 500VDC megger) between Motor coil-case				
Diele	ectric strength	1 minute at 1 kVAC 50/60Hz between Motor coil-case				
Environment	Ambient temperature	-10 to 50°C, Storage: -25 to 85°C				
Enviro	Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH				
Prote	ection	IP30(IEC34-5 standards)				

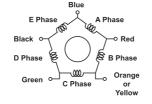
- ×1: Max, allowable torque is standable torque when supply the rated current and stop the motor.
- **%2**: Moment of rotor inertia indicates a part, except Gear-Head part.
- X3: The weight is with packaging and the weight in parentheses is only unit weight.
- Environment resistance is rated at no freezing or condensation.

## Connection diagram

Our 5 phase stepper motor is internally wired in a pentagon connection

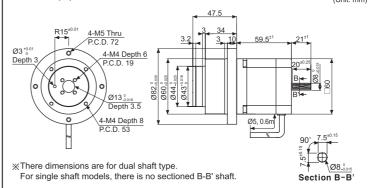
Therefore, it is a proper product for the driver working as a bipolar pentagon driving method of 5 phase stepper motor drivers.

The figure shows the relationship of inside each phase and wire color of stepper motor.

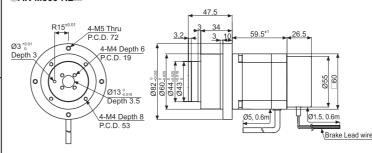


## Dimensions

OAK-M566(W)-R



#### OAK-M566-RB



%There is no dual shaft type for brake built-in type.

#### Installation

#### 1. Installation of the motor

- · With considering heat radiation and vibration isolation, make sure the motor's inrow to be kept as close as possible against a metal panel having high thermal conductivity such as iron or aluminum. Make sure to use mounting plates with thickness more
- · As shown in the figure below, total 4 mounting Tap Holes on F1 and F2 are used to fix rotary actuator. In case of using M4, screw connecting torque is 2N,m and 4,4N,m when using M5.



 Do not apply excessive force on motor cable when installing rotary actuators. Do not forcibly pull or insert the cable. It may cause poor connection or disconnection of the cable. In case of frequent cable movement required application, proper safety countermeasures must be ensured.



## 2. Installation condition

Install the motor in a place that meets certain conditions specified below. It may cause product damage if instructions are not following 1 It shall be used indoors.

- (This product is designed / manufactured to be installed on machinery as a part.)

  ② Within -10°C to 50°C (at non-freezing status) of ambient temperature
- 3 Within 85%RH (at non-dew status) of ambient humidity
- The place without explosive, flammable and corrosive gas
- (5) The place without direct ray of light
- The place without dust, dregs, etc.
- 7) The place without water, oil, etc.
- ® The place where easy heat dissipation could be made
- § The place where no continuous vibration or severe shock
- The place with less salt content
- The place with less electronic noise occurred by welding machine, motor, etc.
- @ The place where no radioactive substances and magnetic fields exist. It shall be no vacuum status as well

## 3. Installation of attachment (index table, arm, etc.)

- · Mount the attachment on the output flange using M4 screw. Note that Ø13 inlow part is processed with C0.3. It is necessary to process the attachment under C0.2 to mount. Place a positioning pin on flange's positioning hole and push it in. Make sure not to place the pin on output flange.
- Do not use a hammer to mount the attachment. It may cause product damage Please cautiously mount the attachment with hands in a gentle manner
- Make sure that attachment mounted on the output to be tightly fixed. It may cause an accident, if it is detached from the actuator during operation.

#### 4. Proper operation

- Observe the rated product specification
- · Do not apply rotational load to the motor when it stops.
- · Do not apply the excessive load to the motor during operation. It may cause step out
- · Use a sensor to detect a completed division or the starting point.

#### 5. Application

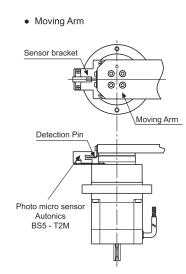




#### 6. Sensor attachment

Index Table

Sensor bracket Detection Pir Photo micro senso



## Caution for using

## 1. Use the motor within the allowable torque range.

The allowable torque range indicates the maximum value of mechanical strength of gear part and the total of ac/deceleration torque of start/stop and friction torque shall not be exceed the allowable torque range, or it may cause the breakdown of gear.

## 2. Use the motor within the allowable speed range.

The allowable speed range includes the revolution number of gear and pulse speed of motor. Use the motor within the allowable speed range, or it may shorten the life cycle of gear part. (Backlash is increased.)

#### 3. Be careful of backlash when positioning the motors in both CW/CCW directions.

Backlash refers to the displacement occurred on motor's output shaft while gear's input axis is fixed. Geared type stepper motors are to realize high accuracy and low backlash. When positioning the motors in both CW/CCW directions, however, backlash may possibly occur. Therefore, make sure that motor positioning will be made in one single direction in case of geared type motors.

#### 4. Temperature rise

The surface temperature of motor shall be under 100°C and it can be significantly increased in case of running motor by constant current drive. In this case, use the fan to lower the temperature forcedly.

## 5. Using at low temperature

Using motors at low temperature may cause reducing maximum starting / driving characteristics of the motor as ball bearing's grease consistency decreases due to low temperature. (Note that the lower the bearing's grease consistency, the higher the bearing's friction torques.) Start the motor in a steady manner since motor's torque is not to be influenced

## 6. Clack sound when using electromagnetic brake

In case of brake built-in type motors, there occurs certain sound while turning on/ off the power to the motor. This is not a product failure symptom. Do not strike or disassemble the product for this.

■ Tachometer/Pulse(Rate)meters

SSR/Power controllers

Sensor controllers

## Major products

- Photoelectric sensors Temperature controllers ■ Fiber optic sensors ■ Temperature/Humidity transducers
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors Display units Pressure sensors Panel meters
- Rotary encoders Counters
- Connectors/Sockets Timers
- Switching mode power supplies
- Control switches/Lamps/Buzzers I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO<sub>2</sub>, Nd:YAG)
- Laser welding/soldering system

# ■ VERNSEAS SALES: #402-404, Bucheon Techno Park, 655, Pyeongcheon-ro, Wommi-gu, Bucheon, Gyeonggi-do, Korea TEL: 82-32-610-2730 / FAX: 82-32-329-0728 ■ E-mail: sales@autonics.com

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ng-ro 513beon-gil, Haeundae-gu, Busan, Kore

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