

# Autonics

## 5-Phase Geared type Stepping Motor

M A N U A L



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.
- Please 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.

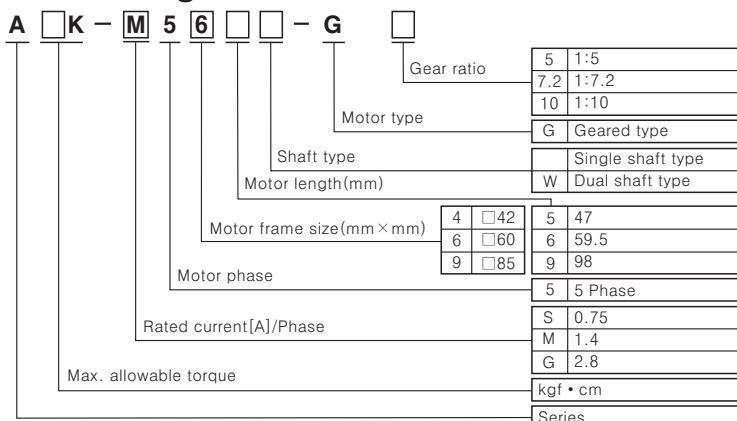
### Warning

- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information on type required. It may cause serious human injury or a fire, property.
- Do not use this unit at place where there are flammable or explosive gas, corrosion and water exist. It may cause a fire or burn.
- 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.
- Please install it in power off. It may give electronic shock.
- Please earth or install it with housing so that protecting a touch of human body. It may give electronic shock or human injury.
- Do not disassemble or modify this unit. It may cause damage to this product or quality down.

### Caution

- Please keep the specification of this unit. It may cause damage to this product.
- 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.
- Please fix this unit on a metal plate tightly. It may cause human injury or damage of this product and peripheral device.
- Please stop this unit when mechanical trouble occurred. It may cause a fire or human injury.
- The surface temperature of the motor can be over 70°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.
- Do not use the brake for safety. It may cause breakdown or malfunction of peripheral device.
- Do not carry the cable or rotating part of this unit. It may cause human injury.
- Please put a cover on the rotating part of this unit. It may cause human injury.
- Please separate as industrial scrapped material when disuse this unit.

### Ordering informaion



\*The above specification is changeable at anytime without notice.

### Specifications

Model	A10K-S545(W)-G5	A15K-S545(W)-G7.2	A15K-S545(W)-G10
Max. Holding torque(*1)	10[kgf·cm] 1.0[N·m]	15[kgf·cm] 1.5[N·m]	15[kgf·cm] 1.5[N·m]
Rotor inertia(*2)	68g·cm <sup>2</sup> 68×10 <sup>-7</sup> kg·m <sup>2</sup>		
Rated current	0.75[A/Phase]		
Basic step angle	0.144°/0.072° (Full step/Half step)	0.1°/0.05° (Full step/Half step)	0.072°/0.036° (Full step/Half step)
Permissible speed range[rpm]	0 ~ 360		
Backlash[min]	±35(0.58°)		
Weight	Approx. 5.8kg		

Model	A35K-M566(W)-G5	A40K-M566(W)-G7.2	A50K-M566(W)-G10
Max. Holding torque(*1)	35[kgf·cm] 3.5[N·m]	40[kgf·cm] 4.0[N·m]	50[kgf·cm] 5.0[N·m]
Rotor inertia(*2)	280g·cm <sup>2</sup> 280×10 <sup>-7</sup> kg·m <sup>2</sup>		
Rated current	1.4[A/Phase]		
Basic step angle	0.144°/0.072° (Full step/Half step)	0.1°/0.05° (Full step/Half step)	0.072°/0.036° (Full step/Half step)
Permissible speed range[rpm]	0 ~ 360		
Backlash[min]	±20(0.33°)		
Weight	Approx. 1.3kg		

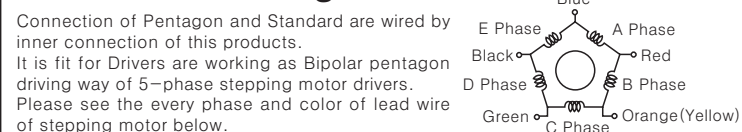
Model	A140K-M599(W)-G5	A140K-G599(W)-G5	A200K-M599(W)-G7.2	A200K-G599(W)-G7.2	A200K-M599(W)-G10	A200K-G599(W)-G10
Max. Holding torque(*1)	140[kgf·cm] 14[N·m]	140[kgf·cm] 14[N·m]	200[kgf·cm] 20[N·m]	200[kgf·cm] 20[N·m]	200[kgf·cm] 20[N·m]	200[kgf·cm] 20[N·m]
Rotor inertia(*2)	2,700g·cm <sup>2</sup> 2,700×10 <sup>-7</sup> kg·m <sup>2</sup>					
Rated current	1.4[A/Phase]	2.8[A/Phase]	1.4[A/Phase]	2.8[A/Phase]	1.4[A/Phase]	2.8[A/Phase]
Basic step angle	0.144°/0.072° (Full step/Half step)	0.144°/0.072° (Full step/Half step)	0.1°/0.05° (Full step/Half step)	0.1°/0.05° (Full step/Half step)	0.072°/0.036° (Full step/Half step)	0.072°/0.036° (Full step/Half step)
Permissible speed range[rpm]	0 ~ 360					
Backlash[min]	±15(0.25°)					
Weight	Approx. 4.4kg					

### Common specification

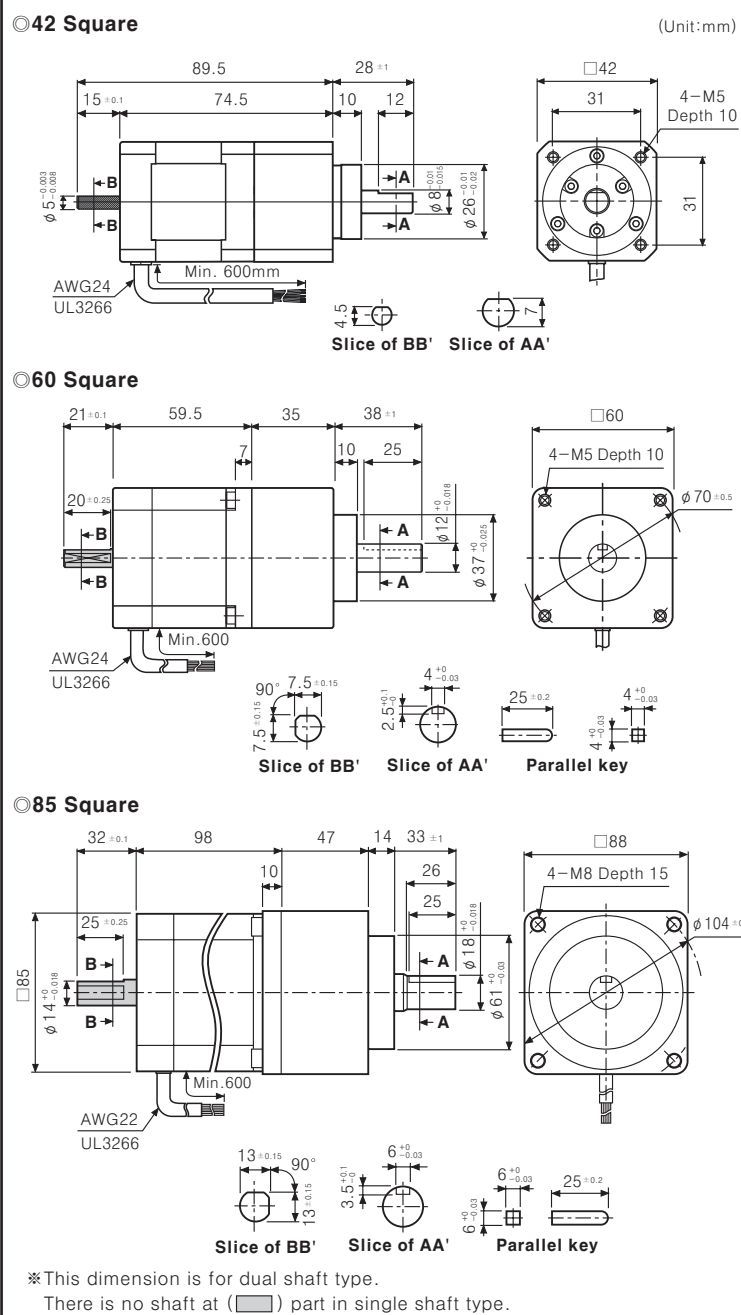
Operation type	Planetary gear type	
Drive type	5-Phase stepping motor	
Standard	IEC34-5	
Protection	IP30	
Insulation class	CLASS B(130°C)	
Insulation resistance	Min. 100MΩ(at 500VDC), in Motor coil-case	
Dielectric strength	1.0(at 0.75[A/Phase]) is 0.5kV for 1min. in motor coil-case	
Temperature rise	5-Phase excitation for rated current, below 80°C at stop status(resistance method)	
Operation environment	Ambient temp.	0°C ~ +50°C(at non-freezing status)
	Altitude	Max. 1,000m above the sea level
	Humidity	Max. 85%(at non-dew status)
Transportation /Storage environment	Ambient temp.	-25°C ~ +70°C
	Altitude	Max. 3,000m above the sea level
	Humidity	Max. 85%(at non-dew status)
Static angle error(*3)	±3 min.	
Shaft runout	0.05 T.I.R.[mm] (*6)	
Radial movement(*4)	0.025 [mm] Max.(Load 5N)	
Axial movement(*5)	0.075 [mm] Max.(Load 10N)	
Concentricity for shaft of setup in low	0.075 T.I.R.[mm]	
Perpendicularity of seating plane shaft	0.075 T.I.R.[mm]	
Rotation direction of the Motor and the Gear-Head output axis is same.		

- (\*1)Max. holding torque is a retaining torque when 5-phase excitation stopped after the rated current is flowed in Motor.
- (\*2)Inertia of Rotator indicates a part, except Gear-Head part.
- (\*3)Full Step, it is no-load value. (It varies as load size)
- (\*4)It is shaft displacement quantity of radial direction when load 5[N] is added to edge part of the motor shaft to vertical way.
- (\*5)It is shaft displacement quantity of axis direction when load 10[N] is added to the motor shaft to axis way.
- (\*6)T.I.R.(Total Indicator Reading) : It case of making 1 rotation with the standard point as the center, it indicates the whole quantity of dial gauge.

### Connection diagram

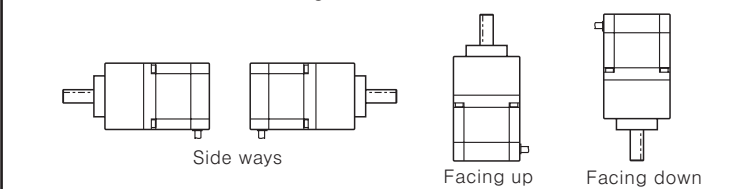


### Dimensions



### Installation

- Motor can be mounted freely in any direction of side ways, facing up or down as following. But please check overhung and thrust load on shaft. Refer to the below for overhung and thrust load at shaft.



Motor frame size	Overhung load capacity shaft distance from the front-edge[mm]				Thrust load capacity
	0	5	15	20	
42 Square	73[N] 7.3[kgf]	84[N] 8.4[kgf]	100[N] 10[kgf]	123[N] 12.3[kgf]	50[N] 5[kgf]
60 Square	250[N] 25[kgf]	270[N] 27[kgf]	300[N] 30[kgf]	340[N] 34[kgf]	390[N] 39[kgf]
85 Square	480[N] 48[kgf]	540[N] 54[kgf]	600[N] 60[kgf]	680[N] 68[kgf]	790[N] 79[kgf]

Please setup the motor without heavy pressure on it. And, don't bend, pull and insert a motor cable by inordinate force. It may cause for the snapping of motor cable. Please make sure it is used under safety protection if heavy pressure is added to the cable.

- Motor mounting  
Please mount closely on the surface of a panel which has high-thermal conductivity such as iron, aluminum etc., for protection against heat and vibration. Please assemble motor using hexagon wrench bolt, spring washer and plane washer. Please see below table for the thickness of mounting plate and bolt.

Motor type	The thickness of mounting plate	Using bolt
42 Square	Min. 5mm	M4
60 Square	Min. 8mm	M5
85 Square	Min. 12mm	M8

- Connection with load  
Please use flexible coupling when assembling a load(Ball-screw etc.) at the shaft or motor. If the center is not matched, it may cause the life cycle of the bearing to be reduced or an incident such as break of the motor shaft may occurred. Please do not process the shaft and disassemble the product for the connection with load. When assembling pulley, Belt etc., please don't affect an impact or the weight of thrust to the shaft.
- Setting condition  
Please setup the motor in the place satisfying below conditions, or it may cause the breaking of the product.
  - Indoor(This product is for the mounting of machinery and tools.)
  - Ambient temperature is within -10°C to +50°C(at non-freezing status).
  - Ambient humidity is within 85%RH(at non-dew status).
  - The place where there are no flammable or explosive gas.
  - The place where there is no direct ray the sun.
  - The place where there is no inflow dust inside of the unit.
  - The place where there is no water or oil etc.
  - The place where there is no obstacle to indirect heated.
  - The place where there are no continuous vibration or inordinate impact etc.
  - The place where there is less salt content.
  - The place where there less noise by welder, power machinery etc.
  - The place where there ate no radiation material, magnetic field and it is not vaccum status.

### Caution for using

- Do not modify or disassemble the motor structure. The dusty substance can be infiltrated while modifying or disassembling, it may cause abnormal operation or breakdown. The motor performance can be dropped for a disassembly.
- Do not impact on the motor.  
There is an Air-Gap is a distance between a rotor and a stator as 0.05mm in a stepping motor. If the impact is inordinate, Air-Gap will be broken and it may cause the malfunction.
- Do not use it in excess of the allowable torque.  
The allowable torque indicates the mechanical strength limit value of the Gear part. Please use the motor so as the total value of ascend + descend torque of the motor driving + stopping and load(Friction) torque does not to exceed the allowable torque.
- Do not use it in excess of the allowable speed range.  
The allowable speed range indicates the allowable revolution of the Gear part and max. operating pulse speed. When it exceeds the allowable speed range, it may cause harmful damage to life cycle of Gear part. (Back-Lash will be bigger.)
- In case of setting the control position in CW, CCW direction, please be careful of the Back-lash when it is using. Back-lash is a displacement from output axis with an input part of decelerator is in a fixed status.  
The Gear type stepping motor is for high accuracy of positioning gear and it makes low back-lash, but it will be different in accuracy of both direction. In this case, positioning control from one direction is required.
- Temperature rise  
Please use it on the surface temperature under 100°C.  
The surface temperature of motor can be significantly increased in case of driving the motor by constant current. In this case please consider using forced cooling method like a fan etc.
- Usage in low temperature  
When ambient temperature is too low, frictional torque is increased because the power of ball bearing and gear head become weak. Because of this, the characteristic of max. self-operation's frequency and max. operation could be decreased.

\*It may cause malfunction if above instructions are not followed.

### Main products

- COUNTER
- TIMER
- TEMPERATURE CONTROLLER
- PANEL METER
- TACHO/LINE SPEED/PULSE METER
- DISPLAY UNIT
- PROXIMITY SENSOR
- PHOTOELECTRIC SENSOR
- FIBER OPTIC SENSOR
- PRESSURE SENSOR
- ROTARY ENCODER
- SENSOR CONTROLLER
- POWER CONTROLLER
- STEPPING MOTOR & DRIVER & CONTROLLER
- LASER MARKING SYSTEM (CO<sub>2</sub>, Nd:YAG)

**Autonics Corporation**  
http://www.autonics.com

**Satisfiable Partner For Factory Automation**

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