□42mm/□60mm/□85mm Hollow shaft type

▣Features

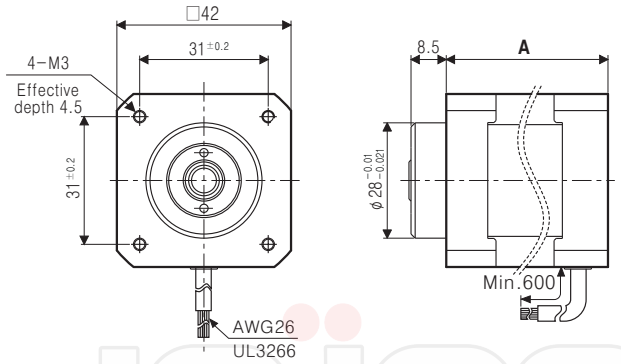
- ●Compact design and light weight with high accuracy, speed and torque
- ●Suitable for small-sized equipment applications
- ●Remove the coupling connecting Ball-screw, TM-screw directly.
- ●Remove resonance(vibration · noise) without coupling.
- ●Cost-effective

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

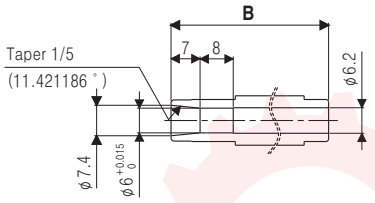
CE

▣Dimensions

◎42 Square



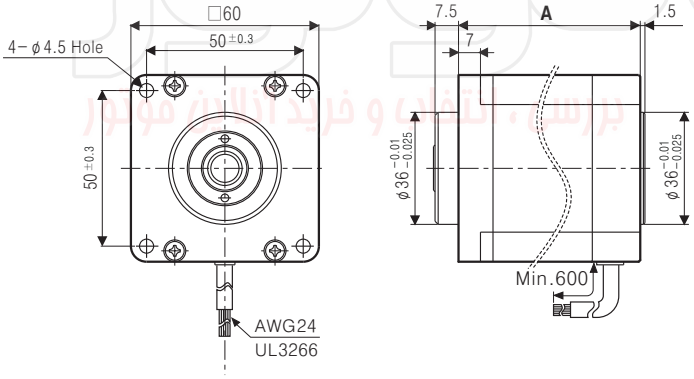
●Hole Dimensions



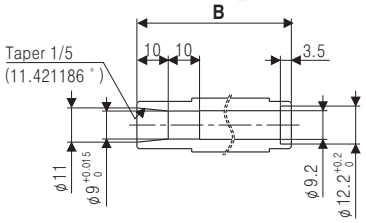
MODEL	A	B
AH1K-S543	33	38
AH2K-S544	39	44
AH3K-S545	47	52

(Unit:mm)

◎60 Square



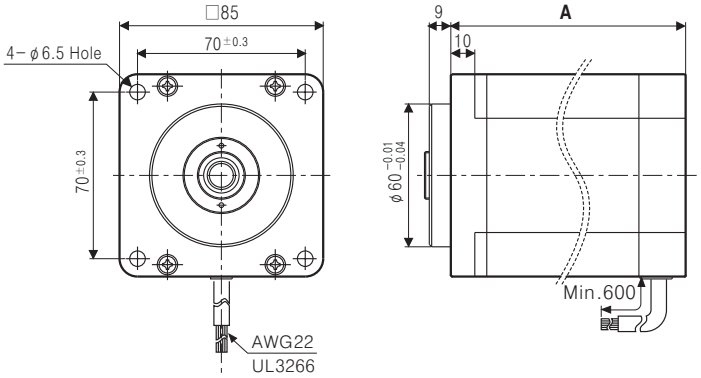
●Hole Dimensions



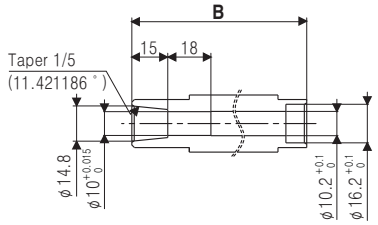
MODEL	A	B
AH4K-□564	48.5	49.3
AH8K-□566	59.5	60.3
AH16K-□569	89	89.8

(Unit:mm)

◎85 Square



●Hole Dimensions



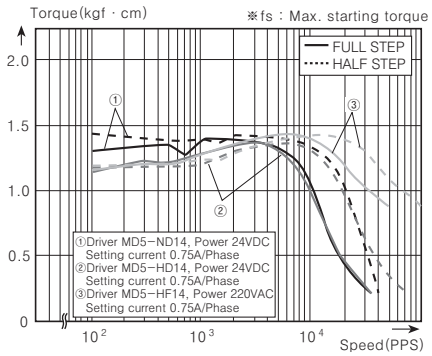
MODEL	A	B
AH21K-□596	68	73
AH41K-□599	98	102.5
AH63K-□5913	128	133

(Unit:mm)

※Depending on processing of shaft to be assembled, hollow shaft type can be used both single and dual shaft.

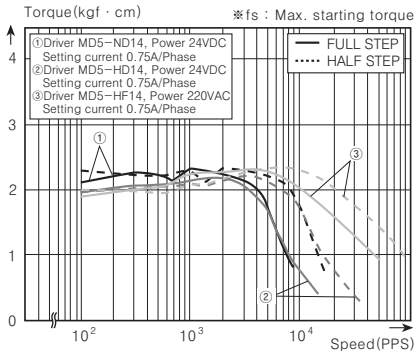
▣Characteristic

●AH1K-S543



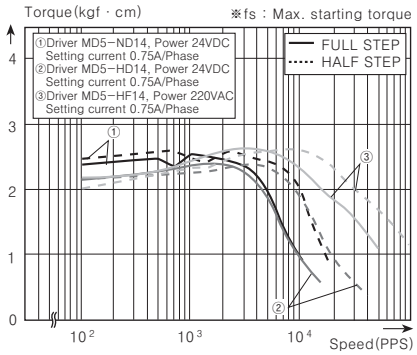
①fs Full Step:3.3kpps, Half Step:6.6kpps
②fs Full Step:3.4kpps, Half Step:6.7kpps
③fs Full Step:3.5kpps, Half Step:6.8kpps

●AH2K-S544



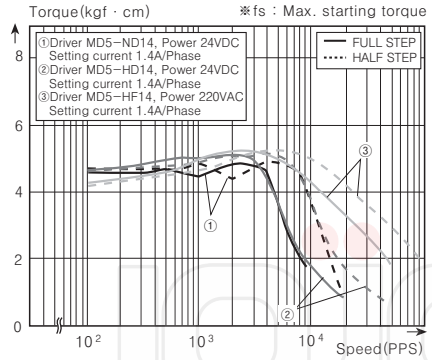
①fs Full Step:3.2kpps, Half Step:6.3kpps
②fs Full Step:3.3kpps, Half Step:6.5kpps
③fs Full Step:3.4kpps, Half Step:6.7kpps

●AH3K-S545



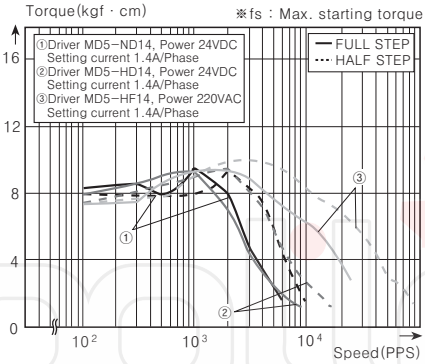
①fs Full Step:3kpps, Half Step:5.9kpps
②fs Full Step:3.1kpps, Half Step:6.1kpps
③fs Full Step:3.2kpps, Half Step:6.4kpps

●AH4K-M564



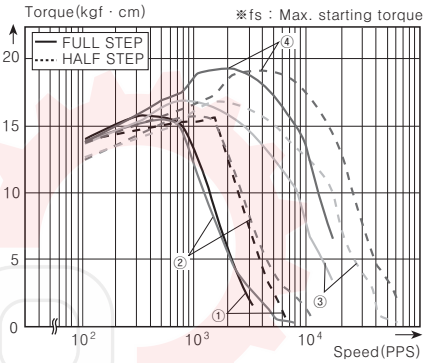
①fs Full Step:2.7kpps, Half Step:5.3kpps
②fs Full Step:2.7kpps, Half Step:5.8kpps
③fs Full Step:3.7kpps, Half Step:7.2kpps

●AH8K-M566



①fs Full Step:2.1kpps, Half Step:4.1kpps
②fs Full Step:2.1kpps, Half Step:4.2kpps
③fs Full Step:3.2kpps, Half Step:6.3kpps

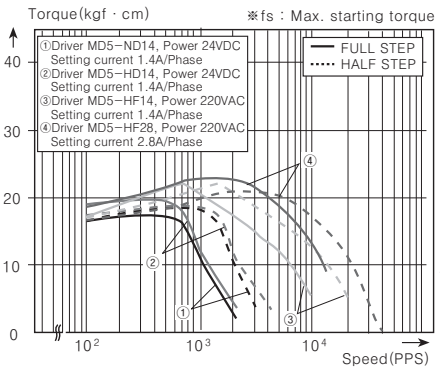
●AH16K-M(G)569



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase
④Driver MD5-HF28, Power 220VAC, Setting current 2.8A/Phase

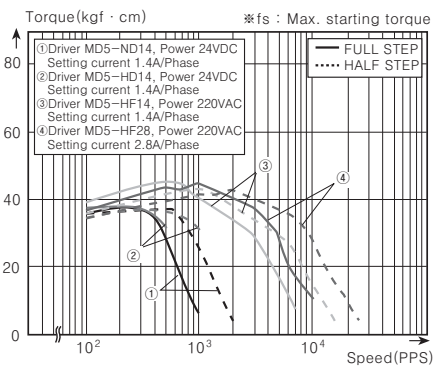
①fs Full Step:1.8kpps, Half Step:3.5kpps
②fs Full Step:1.9kpps, Half Step:3.5kpps
③fs Full Step:2.6kpps, Half Step:5.2kpps
④fs Full Step:3.4kpps, Half Step:6.8kpps

●AH21K-M(G)596



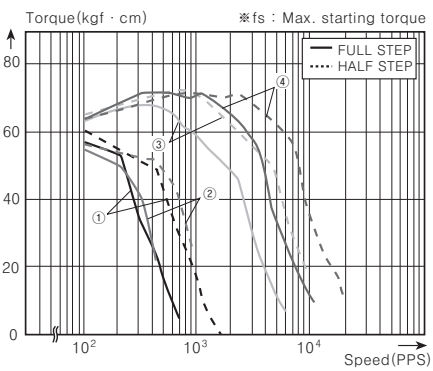
①fs Full Step:1.5kpps, Half Step:2.9kpps
②fs Full Step:1.6kpps, Half Step:3.1kpps
③fs Full Step:2.2kpps, Half Step:4.4kpps
④fs Full Step:2.3kpps, Half Step:4.6kpps

●AH41K-M(G)599



①fs Full Step:1.4kpps, Half Step:2.7kpps
②fs Full Step:1.5kpps, Half Step:2.9kpps
③fs Full Step:1.8kpps, Half Step:3.6kpps
④fs Full Step:2.1kpps, Half Step:4.3kpps

●AH63K-G5913



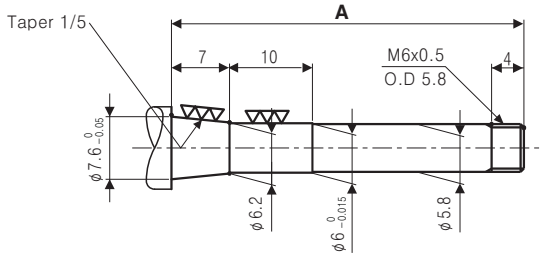
①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase
④Driver MD5-HF28, Power 220VAC, Setting current 2.8A/Phase

①fs Full Step:1kpps, Half Step:2.1kpps
②fs Full Step:1.1kpps, Half Step:2.2kpps
③fs Full Step:1.8kpps, Half Step:3.6kpps
④fs Full Step:1.9kpps, Half Step:3.8kpps

▣Processing example for shaft assembly

In order to assemble external shafts into Autonics motors, the shafts must be processed as shown in the figures below.

●42 Square single shaft type

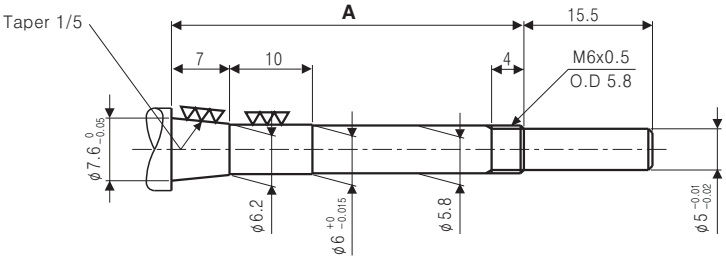


(Unit:mm)

MODEL	A
AH1K-S543	42.5
AH2K-S544	48.5
AH3K-S545	56.5

※Lock Nut is included.

●42 Square dual shaft type

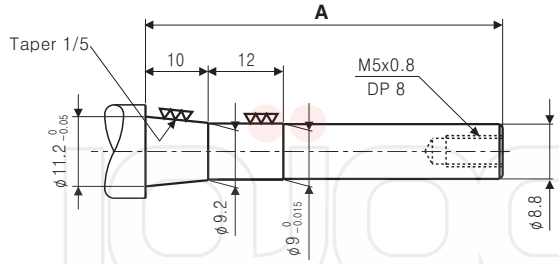


(Unit:mm)

MODEL	A
AH1K-S543W	42.5
AH2K-S544W	48.5
AH3K-S545W	56.5

※Lock Nut is included.

●60 Square single shaft type

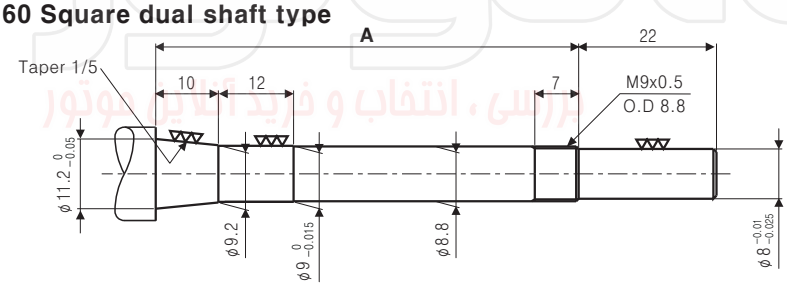


(Unit:mm)

MODEL	A
AH4K-□564	46
AH8K-□566	57
AH16K-□569	86.5

※Hexagon wrench bolt, Flat washer, Spring washer and Lock Nut are included.

●60 Square dual shaft type

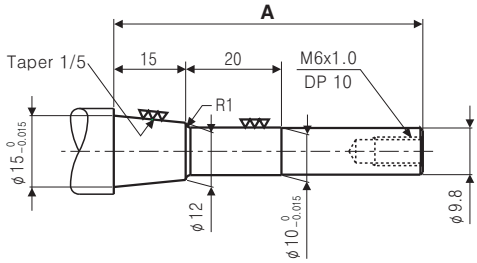


(Unit:mm)

MODEL	A
AH4K-□564W	56.5
AH8K-□566W	67.5
AH16K-□569W	97

※Lock Nut is included.

●85 Square single shaft type

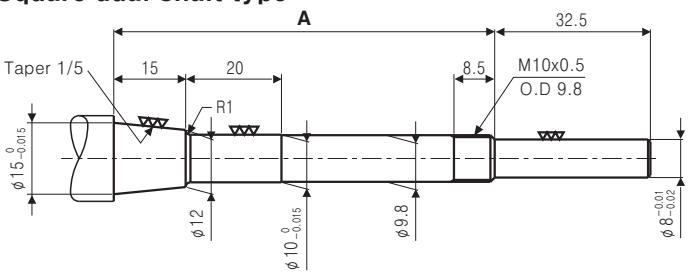


(Unit:mm)

MODEL	A
AH21K-□596	64.5
AH41K-□599	94
AH63K-□5913	124.5

※Hexagon wrench bolt, Flat washer, Spring washer and Lock Nut are included.

●85 Square dual shaft type



(Unit:mm)

MODEL	A
AH21K-□596W	79.5
AH41K-□599W	109.5
AH63K-□5913W	139.5

※Lock Nut is included.

□24mm/□42mm/□60mm/□85mm Shaft type
□60mm/□85mm Shaft type+Brake built-in type

▣Features

- ●Compact design and light weight with high accuracy, speed and torque
- ●Suitable for small-sized equipment applications
- ●Brake □60mm, □85mm of shaft type for compact equipment (AK-B Series)
- ●Brake force is released(AK-B Series) when applying power on brake wire. (24VDC non-polar type)
- ●Cost-effective

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


24 Square


42 Square


85 Square

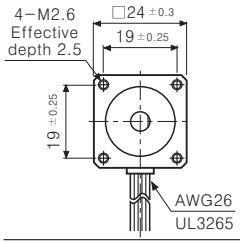

60 Square

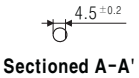

60 Square Brake built-in type

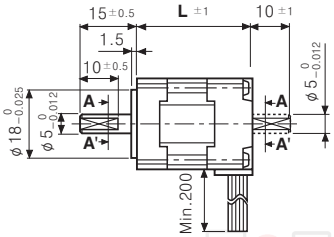

85 Square Brake built-in type

▣Dimensions

◎24 Square





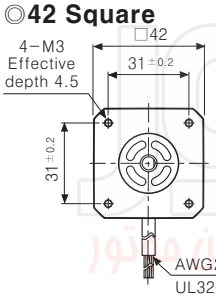


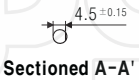
(Unit:mm)

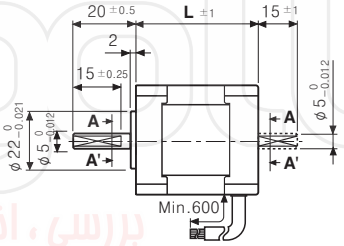
MODEL	L
02K-S523(W)	30.5
04K-S525(W)	46.5

※These dimensions are for dual shaft models. For single shaft models, ignore dotted line (·····) part.

◎42 Square





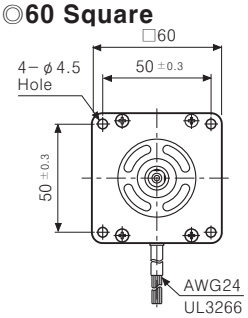


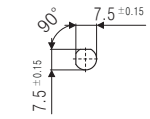
(Unit:mm)

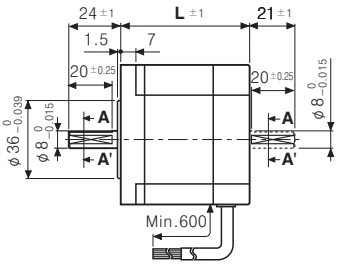
MODEL	L
A1K-S543(W)-□	33
A2K-S544(W)-□	39
A3K-S545(W)-□	47

※These dimensions are for dual shaft models. For single shaft models, ignore dotted line (·····) part.

◎60 Square





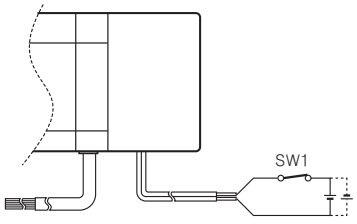


<Shaft type>

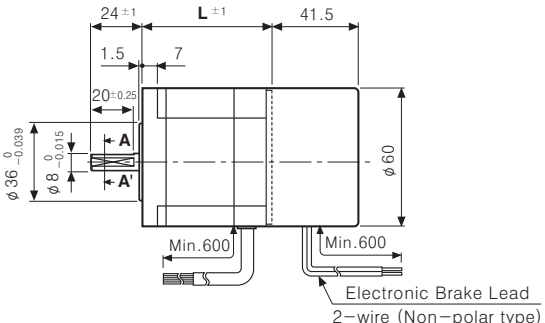
(Unit:mm)

MODEL	L
A4K-□564(W)-□B	48.5
A8K-□566(W)-□B	59.5
A16K-□569(W)-□B	89

※These dimensions are for dual shaft models. For single shaft models, ignore dotted line (·····) part.



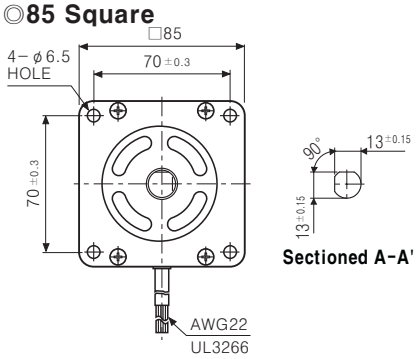
※Brake is non-polar "B" type.
Be sure to observe rated excitation voltage (24VDC).
※SW1 ON-Brake release / SW1 OFF-Brake execute

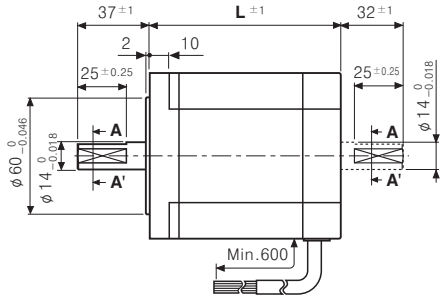


<Brake built-in type>

▣Dimensions

◎85 Square



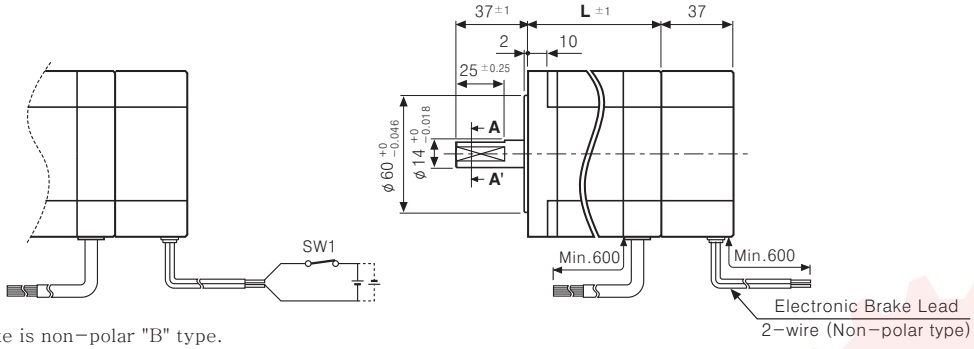


(Unit:mm)

MODEL	L
A21K-□596(W)-□B	68
A41K-□599(W)-□B	98
A63K-□5913(W)-□B	128

※These dimensions are for dual shaft models. For single shaft models, ignore dotted line (·····) part.

〈Shaft type〉

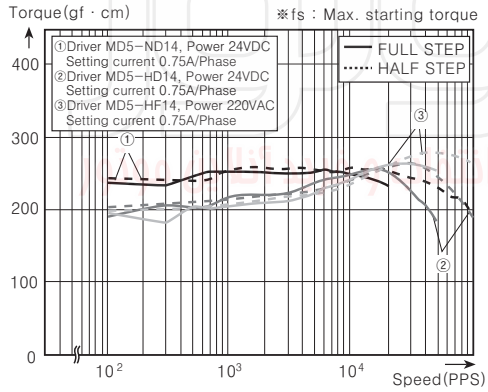


※Brake is non-polar "B" type.
Be sure to observe rated excitation voltage (24VDC).
※SW1 ON-Brake Release / SW1 OFF-Brake Execute

〈Brake built-in type〉

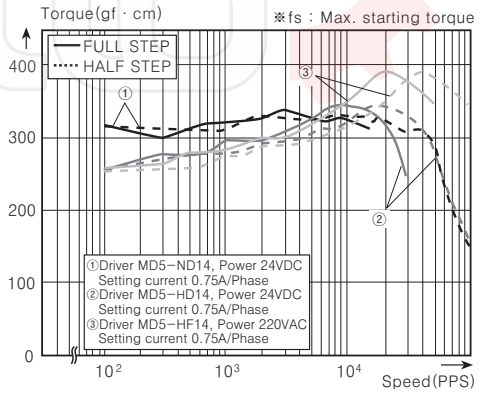
▣Characteristic

●02K-S523



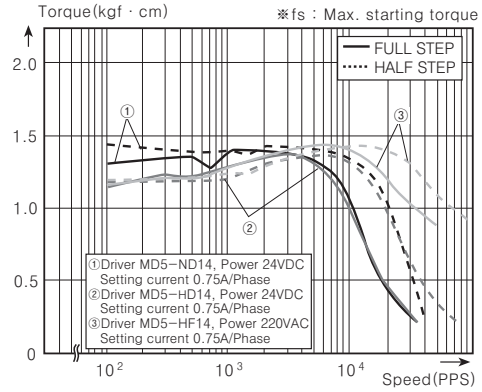
①fs Full Step:3.6kpps, Half Step:7.1kpps
②fs Full Step:3.7kpps, Half Step:7.2kpps
③fs Full Step:3.8kpps, Half Step:7.5kpps

●04K-S525



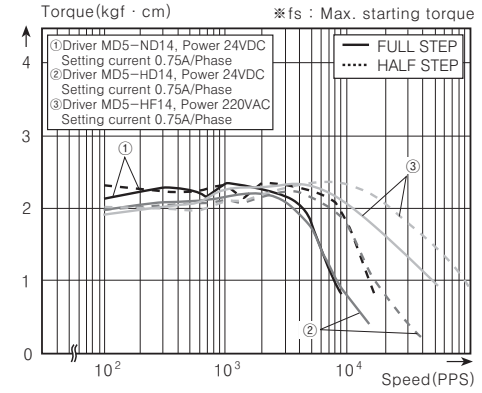
①fs Full Step:3.1kpps, Half Step:6.1kpps
②fs Full Step:3.2kpps, Half Step:6.3kpps
③fs Full Step:3.3kpps, Half Step:6.5kpps

●A1K-S543



①fs Full Step:3.3kpps, Half Step:6.6kpps
②fs Full Step:3.4kpps, Half Step:6.7kpps
③fs Full Step:3.5kpps, Half Step:6.8kpps

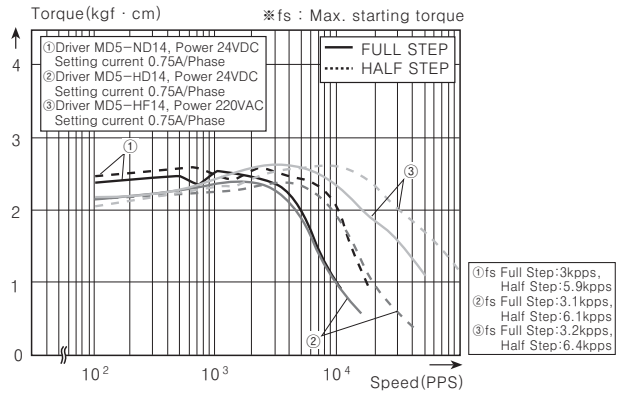
●A2K-□544



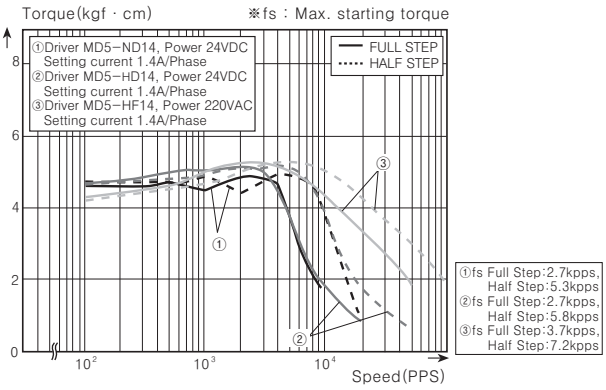
①fs Full Step:3.2kpps, Half Step:6.3kpps
②fs Full Step:3.3kpps, Half Step:6.5kpps
③fs Full Step:3.4kpps, Half Step:6.7kpps

▣Characteristic

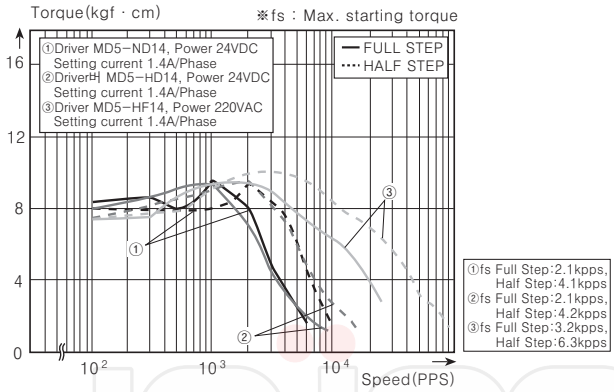
●A3K-S545



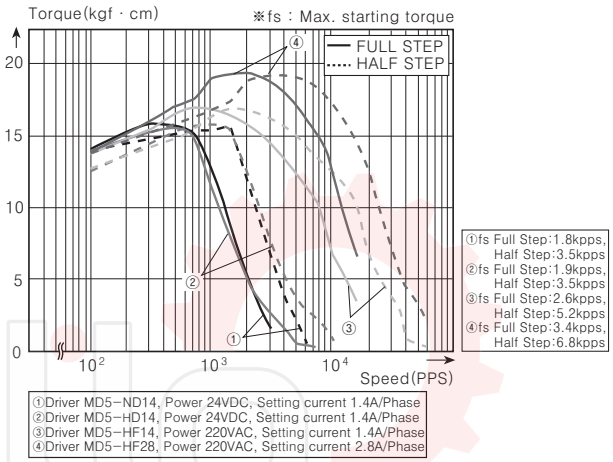
●A4K-M564 / A4K-M564-B



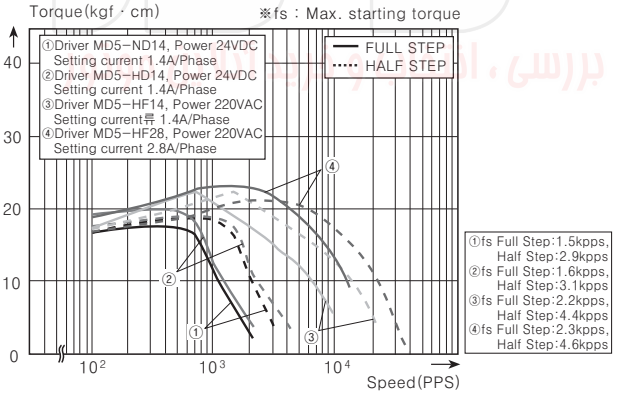
●A8K-M566 / A8K-M566-B



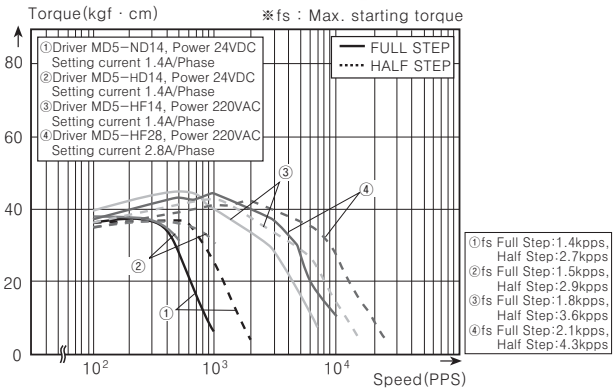
●A16K-□569 / A16K-□569-B



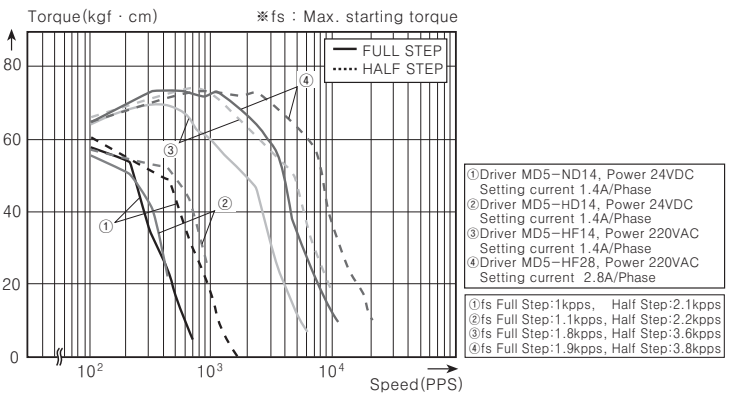
●A21K-□596 / A21K-□596-B



●A41K-□599 / A41K-□599-B



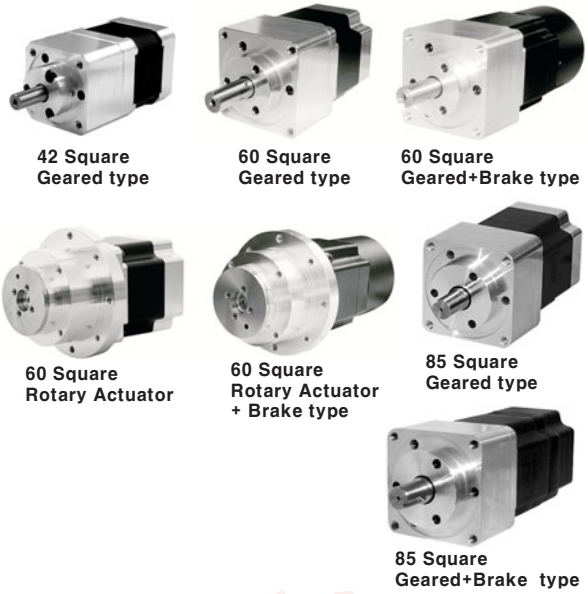
●A63K-G5913 / A63K-G5913-B



□42mm/□60mm/□85mm Geared type/Geared+Brake built-in type
□60mm Rotary actuator type/ Rotary actuator+Brake built-in type

▣Features

- ●Compact design and light weight with high accuracy, speed and torque
- ●Cost-effective
- ●Backlash
  : □42mm ☞ ±35' (0.58°), □60mm ☞ ±20' (0.33°)
  □85mm ☞ ±15' (0.25°)
- ●Brake force is released when applying power on brake wire.(24VDC non-polar type)
- ●Basic step angle
  : 1:5 ☞ 0.144°, 1:7.2 ☞ 0.1°, 1:10 ☞ 0.072°
- ●Allowable speed
  : 1:5 ☞ 0 to 360rpm, 1:7.2 ☞ 0 to 250rpm,
  1:10 ☞ 0 to 180rpm

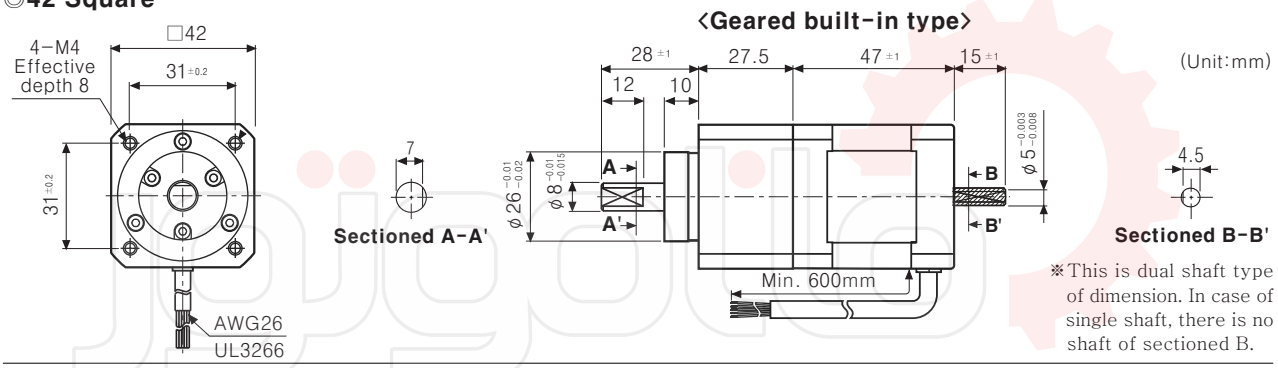


⚠ Please read "Caution for your safety" in operation manual before using.

CE

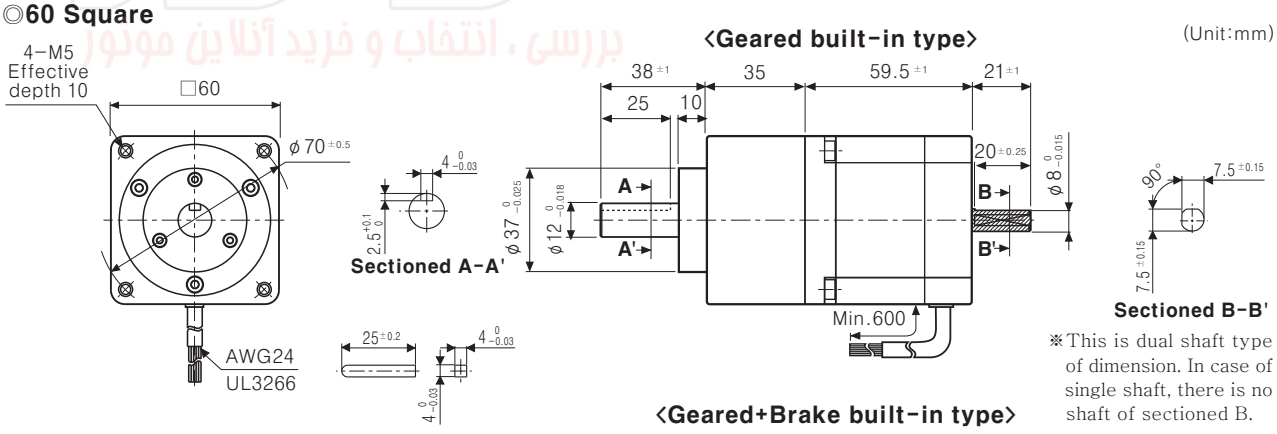
▣Dimensions

◎42 Square

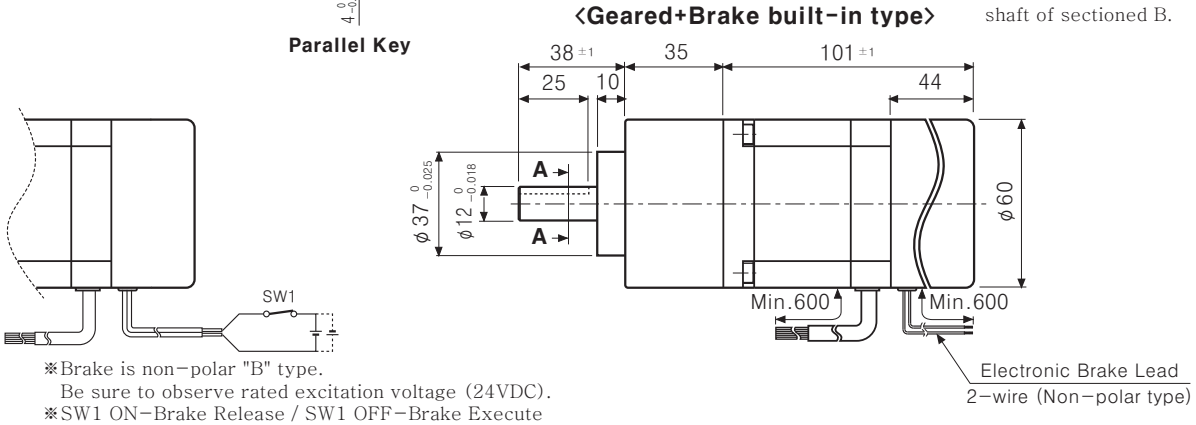


※This is dual shaft type of dimension. In case of single shaft, there is no shaft of sectioned B.

◎60 Square



※This is dual shaft type of dimension. In case of single shaft, there is no shaft of sectioned B.



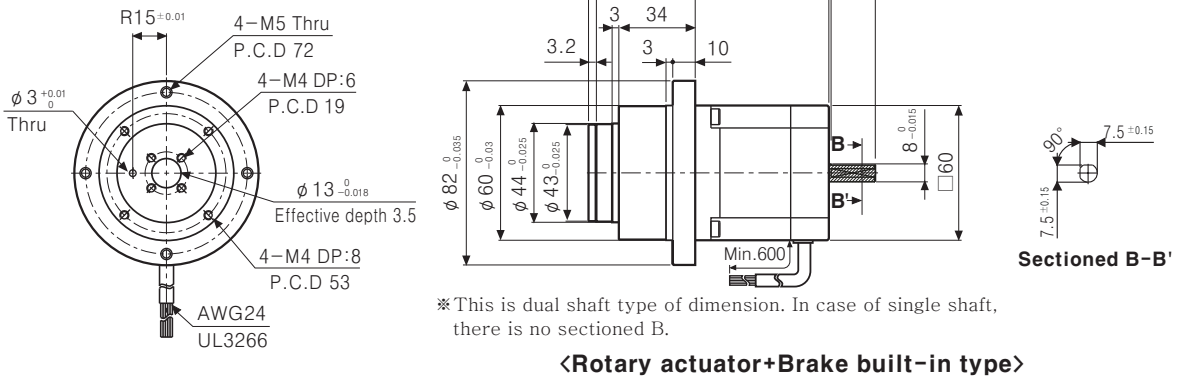
※Brake is non-polar "B" type.
Be sure to observe rated excitation voltage (24VDC).
※SW1 ON-Brake Release / SW1 OFF-Brake Execute

▣Dimensions

◎60 Square

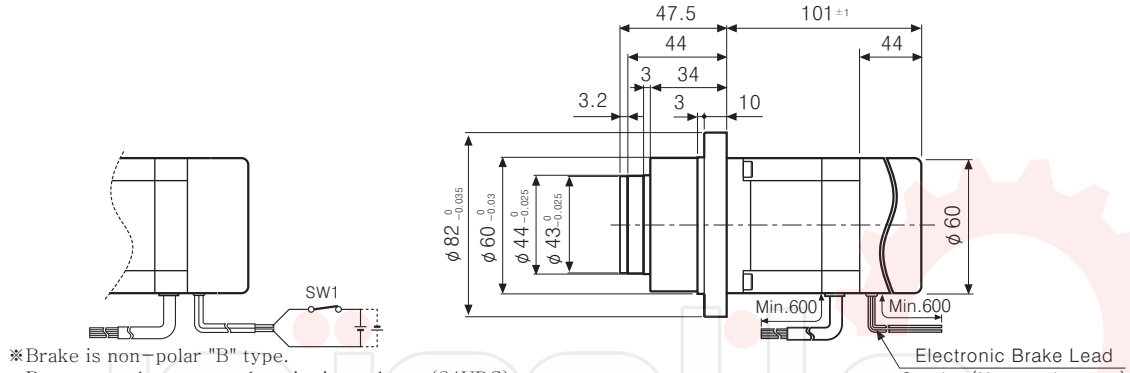
(Unit:mm)

<Rotary actuator type>



※This is dual shaft type of dimension. In case of single shaft, there is no sectioned B.

<Rotary actuator+Brake built-in type>

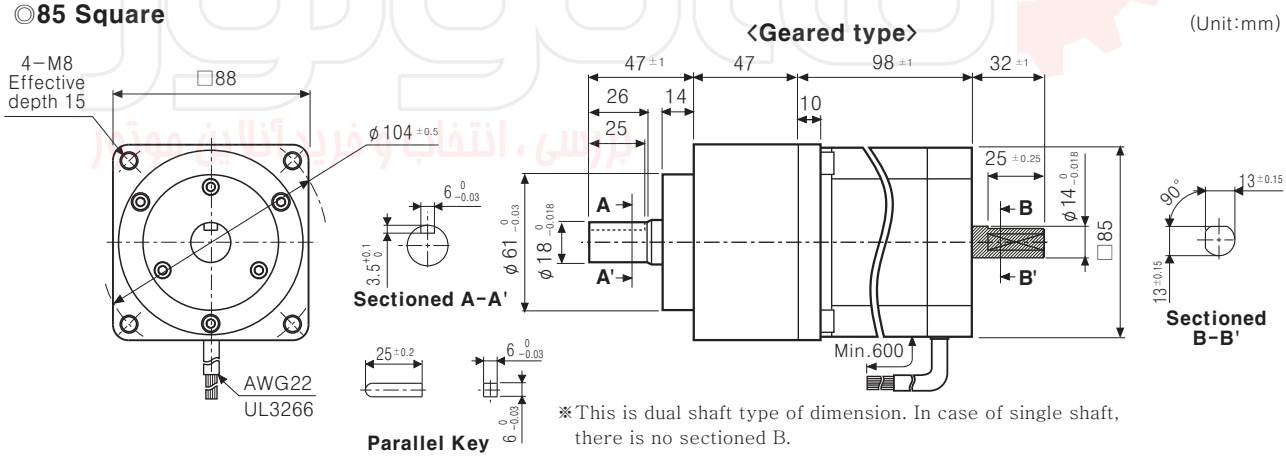


※Brake is non-polar "B" type.
Be sure to observe rated excitation voltage (24VDC).
※SW1 ON-Brake Release / SW1 OFF-Brake Execute

◎85 Square

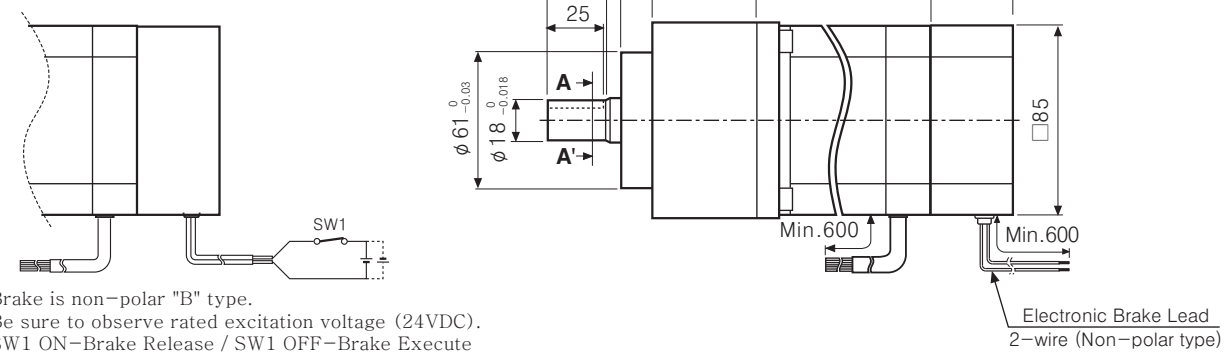
(Unit:mm)

<Geared type>



※This is dual shaft type of dimension. In case of single shaft, there is no sectioned B.

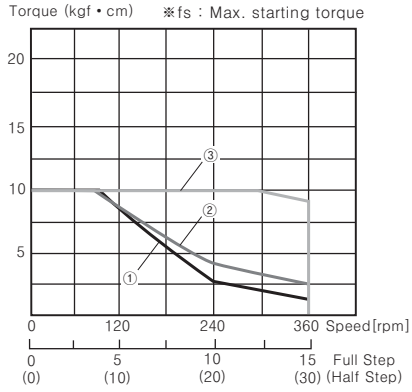
<Geared+Brake built-in type>



※Brake is non-polar "B" type.
Be sure to observe rated excitation voltage (24VDC).
※SW1 ON-Brake Release / SW1 OFF-Brake Execute

▣Characteristic

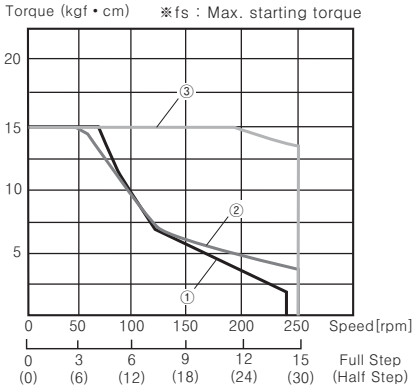
●A10K-S545(W)-G5



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase

①fs:3.1kpps
②fs:3.2kpps
③fs:3.2kpps

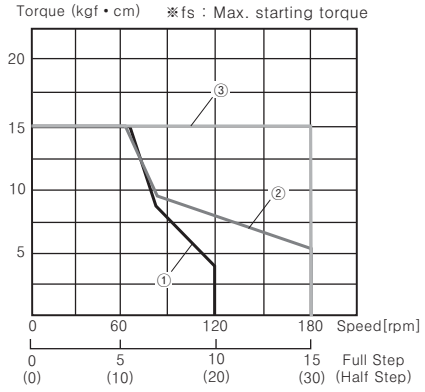
●A15K-S545(W)-G7.2



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase

①fs:3.2kpps
②fs:3.3kpps
③fs:3.4kpps

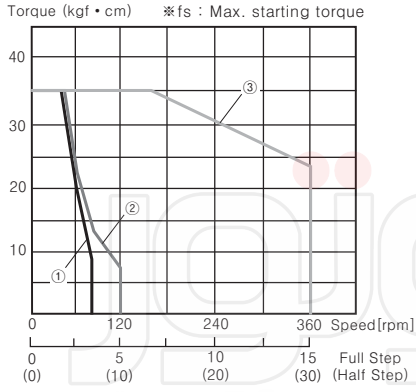
●A15K-S545(W)-G10



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase

①fs:3.3kpps
②fs:3.3kpps
③fs:3.4kpps

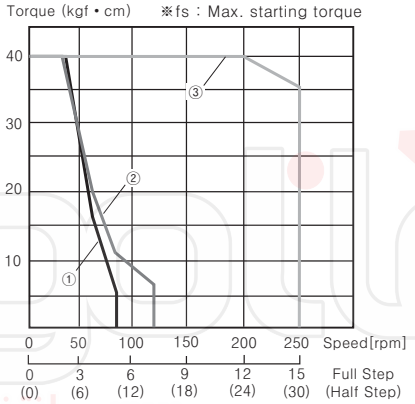
●A35K-M566(W)-□5
A35K-M566-□B5



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase

①fs:2.3kpps
②fs:2.3kpps
③fs:2.6kpps

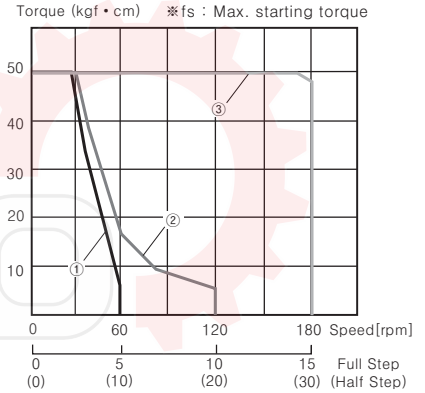
●A40K-M566(W)-□7.2
A40K-M566-□B7.2



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase

①fs:2.2kpps
②fs:2.3kpps
③fs:2.6kpps

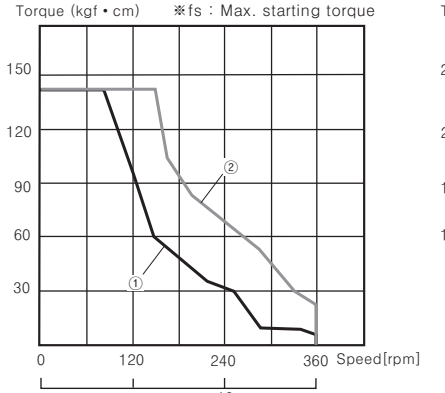
●A50K-M566(W)-□10
A50K-M566-□B10



①Driver MD5-ND14, Power 24VDC, Setting current 1.4A/Phase
②Driver MD5-HD14, Power 24VDC, Setting current 1.4A/Phase
③Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase

①fs:2.3kpps
②fs:2.3kpps
③fs:2.8kpps

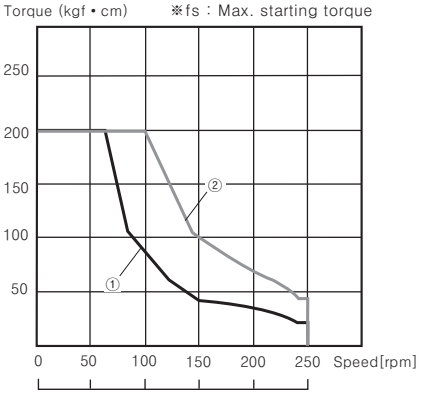
●A140K-□599(W)-G5
A140K-□599-GB5



①Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase
②Driver MD5-HF28, Power 220VAC, Setting current 2.8A/Phase

①fs:1.8kpps
②fs:2.1kpps

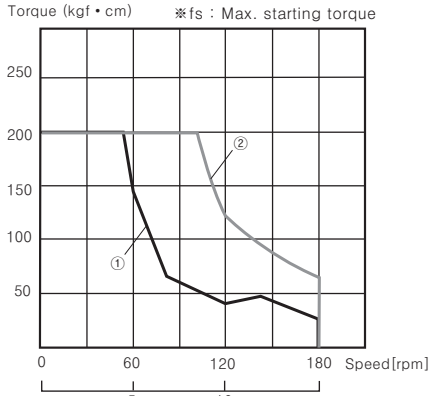
●A200K-□599(W)-G7.2
A200K-□599-GB7.2



①Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase
②Driver MD5-HF28, Power 220VAC, Setting current 2.8A/Phase

①fs:1.8kpps
②fs:2.1kpps

●A200K-□599(W)-G10
A200K-□599-GB10



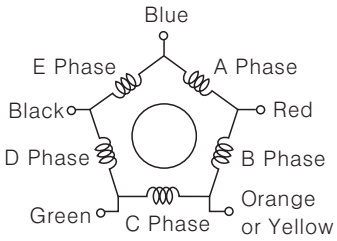
①Driver MD5-HF14, Power 220VAC, Setting current 1.4A/Phase
②Driver MD5-HF28, Power 220VAC, Setting current 2.8A/Phase

①fs:1.9kpps
②fs:2.1kpps

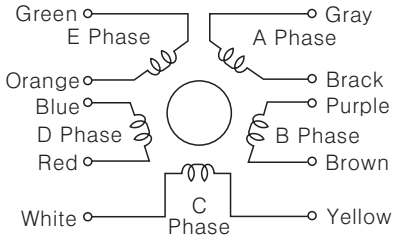
▣Connection diagram of 5-phase stepping motor

Refer to below for correlations of motor's each phase(coil) and the color of lead wire.
Note that pentagon connection type is a standard model. (Standard connection type is an option model.)

●Pantagon wiring(Standard)



●Standard wiring(Option)



In case of connecting standard connection type models to motor drivers, make sure that motor's lead wire connection must be made as specified in the table.

Lead wire color for standard connection type	Lead wire color for pentagon connection type
Gray+Red	Blue
Yellow+Black	Red
Orange+White	Orange
Brown+Green	Green
Blue+Purple	Black

▣Motor Installation

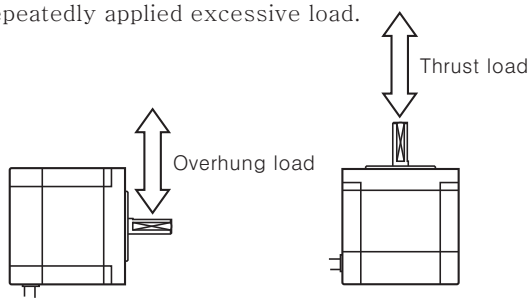
◎Shaft type stepping motor

●Mounting direction

Motors can be mounted in any directions – facing up, facing down and sideways. No matter which direction motors to be mounted, be sure not to apply overhung or thrust load on the shaft.

1) Overhung load : A type of load to be applied in vertical directions on the shaft having effect on output shaft and bearings to shorten its lifecycle. In case excessive overhung load is applied on the shaft, it may cause bearing damage, output shaft bending or fatigue failure caused by repeatedly applied excessive load.

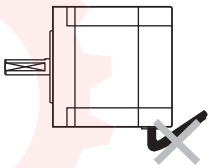
2) Thrust load : A type of load to be applied in parallel directions on the shaft having direct effect on output shaft and bearings to shorten its lifecycle. In case excessive thrust load is applied on the shaft, it may cause bearing damage, output shaft bending or fatigue failure caused by repeatedly applied excessive load.



Refer to the table below for allowable shaft overhung load / thrust load.

Motor type	Allowable overhung load per certain distance(mm) from the end of shaft					Allowable thrust load
	0	5	10	15	20	
20 Square	20[N] 2[kgf]	25[N] 2.5[kgf]	34[N] 3.4[kgf]	—	—	Under the load of Motor
42 Square	20[N] 2[kgf]	25[N] 2.5[kgf]	34[N] 3.4[kgf]	52[N] 5.2[kgf]	—	
60 Square	63[N] 6.3[kgf]	75[N] 7.5[kgf]	95[N] 9.5[kgf]	130[N] 13[kgf]	190[N] 19[kgf]	
85 Square	260[N] 26[kgf]	290[N] 29[kgf]	340[N] 34[kgf]	390[N] 39[kgf]	480[N] 48[kgf]	

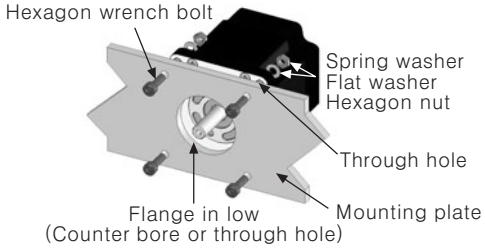
Do not apply excessive force on motor cable when installing motors.
It may cause disconnection of motor cable.



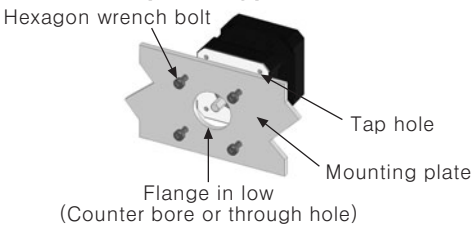
●Mounting method

With considering heat radiation and vibration isolation, mount the motor as tight as possible against a metal panel having high thermal conductivity such as iron or aluminum.
When mounting motors, use hexagon wrench bolts, spring washers or flat washers.
Refer to the table below for allowable thickness of mounting plate and bolt size.

< Through hole type motor >



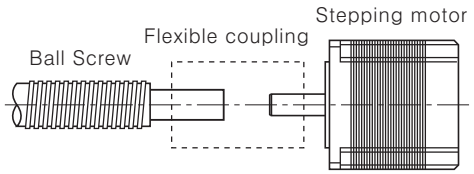
< Tap hole type motor >



Motor size	Thickness of mounting plate	Using bolt
24 Square	Min. 3mm	M2.6
42 Square	Min. 4mm	M3
60 Square	Min. 5mm	M4
85 Square	Min. 8mm	M6

●Connection with load

In case of using motors with connecting a load-Ball screw or TM-screw - to motor's shaft, make sure to use flexible couplings as shown in the figure below.
If the center of the load is not matched to that of shaft, it may cause severe vibration, shaft damage or shortened lifecycle of bearings.
Do not disassemble or modify motor shaft in order to connect a load. Contact us if it is required.
In case of making connection with a pulley or a belt, be sure to observe allowable Thrust load and Radial load. Make sure no severe vibration applied on shaft.

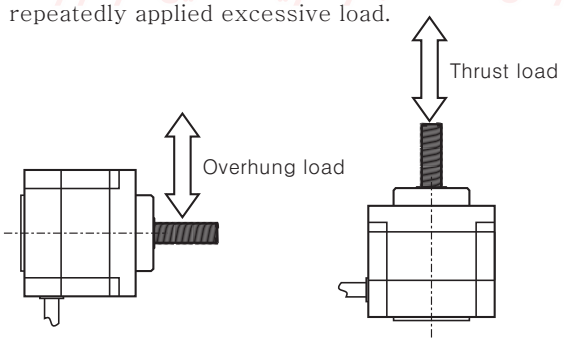


◎Hole type stepping motor

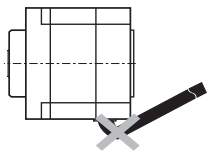
●Mounting direction

Motors can be mounted in any directions - facing up, facing down and sideways. No matter which direction motors to be mounted, be sure not to apply overhung or thrust load on the shaft.

1) Overhung load: A type of load to be applied in vertical directions on the shaft having effect on output shaft and bearings to shorten its lifecycle. In case excessive overhung load is applied on the shaft, it may cause bearing damage, output shaft bending or fatigue failure caused by repeatedly applied excessive load.
2) Thrust load: A type of load to be applied in parallel directions on the shaft having direct effect on output shaft and bearings to shorten its lifecycle. In case excessive thrust load is applied on the shaft, it may cause bearing damage, output shaft bending or fatigue failure caused by repeatedly applied excessive load.



Do not apply excessive force on motor cable when installing motors.
It may cause disconnection of motor cable.

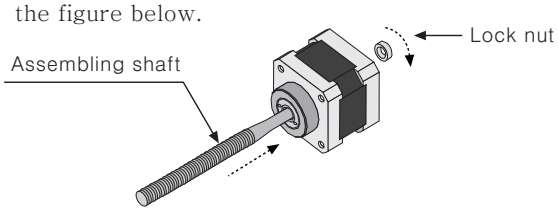


●Shaft assembly for hollow shaft motor

Make sure that external shaft assembly into motors must be made as sturdy as possible. If not, motor's torque might not be thoroughly transmitted to the shaft. In case no additional shaft assembly changes would be made, it is recommended to apply adhesives on bolt fixing part.

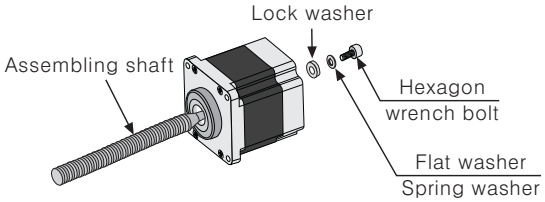
1. TAP hole type motor

Use pliers to fasten Lock Nut tightly as shown in the figure below.



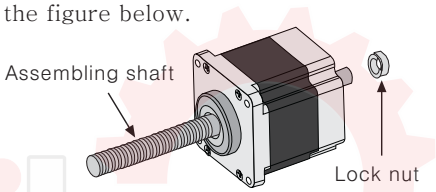
2. Through hole type motor with single shaft

Use hexagon wrench bolts, spring washers, flat washers and Lock washers to fasten the shaft tightly as shown in the figure below.



3. Through hole type motor with dual shaft

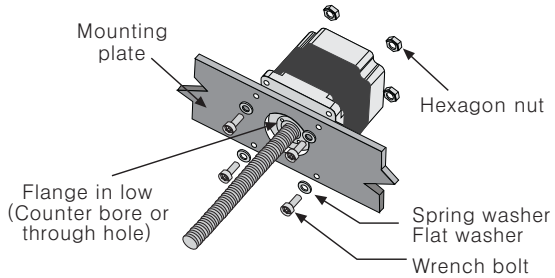
Use a Lock nut to fasten the shaft tightly as shown in the figure below.



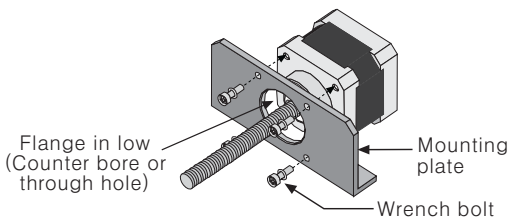
●Mounting method

With considering heat radiation and vibration isolation, mount the motor as tight as possible against a metal panel having high thermal conductivity such as iron or aluminum.
When mounting motors, use hexagon wrench bolts, spring washers or flat washers.
Refer to the table below for allowable thickness of mounting plate and bolt size.

< Through hole type >



< TAP hole type >



Model	Thickness of mounting plate	Using bolt
AH□K-□54□Series	Min. 4mm	M3
AH□K-□56□Series	Min. 5mm	M4
AH□K-□59□Series	Min. 8mm	M6

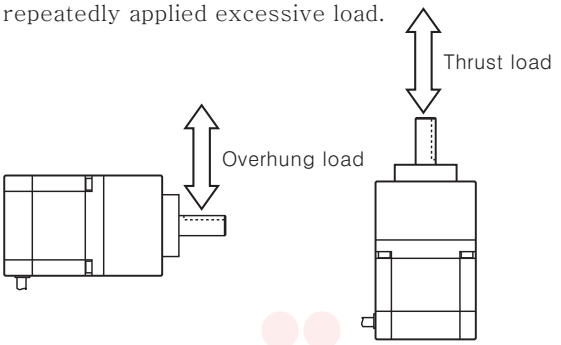
◎Geared type stepping motor

●Mounting direction

Motors can be mounted in any directions – facing up, facing down and sideways. No matter which direction motors to be mounted, be sure not to apply overhung or thrust load on the shaft.

1) Overhung load : A type of load to be applied in vertical directions on the shaft having effect on output shaft and bearings to shorten its lifecycle. In case excessive overhung load is applied on the shaft, it may cause bearing damage, output shaft bending or fatigue failure caused by repeatedly applied excessive load.

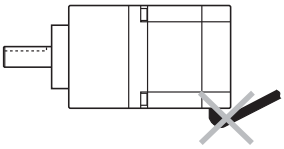
2) Thrust load : A type of load to be applied in parallel directions on the shaft having direct effect on output shaft and bearings to shorten its lifecycle. In case excessive thrust load is applied on the shaft, it may cause bearing damage, output shaft bending or fatigue failure caused by repeatedly applied excessive load.



Refer to the table below for allowable shaft overhung load / thrust load.

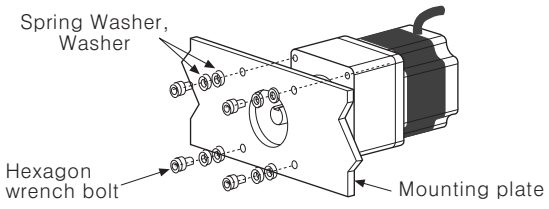
Motor type	Allowable overhung load per certain distance(mm) from the end of shaft					Allowable thrust load
	0	5	10	15	20	
42 Square	73[N] 7.3[kgf]	84[N] 8.4[kgf]	100[N] 10[kgf]	123[N] 12.3[kgf]	—	50[N] 5[kgf]
60 Square	250[N] 25[kgf]	270[N] 27[kgf]	300[N] 30[kgf]	340[N] 34[kgf]	390[N] 39[kgf]	100[N] 10[kgf]
85 Square	480[N] 48[kgf]	540[N] 54[kgf]	600[N] 60[kgf]	680[N] 68[kgf]	790[N] 79[kgf]	300[N] 30[kgf]

Do not apply excessive force on motor cable when installing motors.
It may cause disconnection of motor cable.



●Mounting method

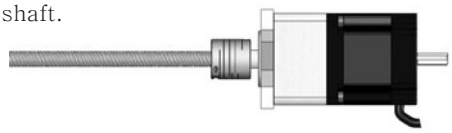
With considering heat radiation and vibration isolation, mount the motor as tight as possible against a metal panel having high thermal conductivity such as iron or aluminum.
When mounting motors, use hexagon wrench bolts, spring washers or flat washers.
Refer to the table below for allowable thickness of mounting plate and bolt size.



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

●Connection with load

In case of using motors with connecting a load– Ball screw or TM–screw – to motor's shaft, make sure to use flexible couplings as shown in the figure below.
If the center of the load is not matched to that of shaft, it may cause severe vibration, shaft damage or shortened lifecycle of bearings.
Do not disassemble or modify motor shaft in order to connect a load. Contact us if it is required.
In case of making connection with a pulley or a belt, be sure to observe allowable Thrust load and Radial load. Make sure no severe vibration applied on shaft.

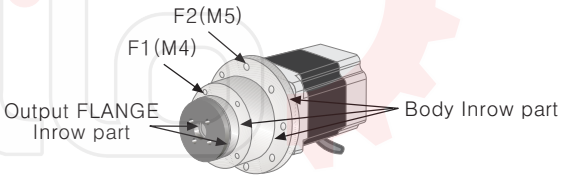


◎Rotary actuator type stepping motor

●Installation of motor

①With 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 than 8mm.

②As 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 2[N.m] and 4.4[N.m] when using M5.



③Do 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.

●Accessory mounting (Table or Arm)

①Mount the accessory (table or arm) on output axis flange using M4 screw. Note that ϕ13 Inrow part is processed with c0.3. It is necessary to process the accessory 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.

②Do not use a hammer to mount the accessory (table or arm). It may cause product damage. Mount the accessory with hands in a gentle manner.

③Make sure that accessory mounted on output axis to be fixed as tight as possible. It may cause an accident if an actuator is detached from the motor while driving.

●Proper use of product

Observe the rated product specification.

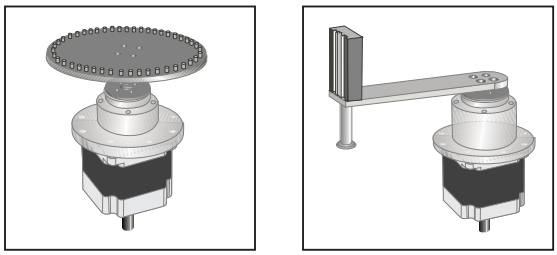
①Do not apply rotational load on the motor while it stops.

②Do not apply excessive load on the motor while driving. It may cause motors to miss a step.

③Use a sensor for home searching or division completed position detecting.

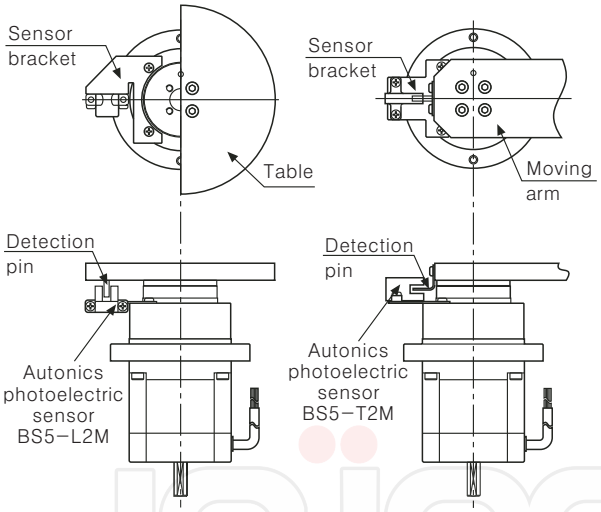
●Application example

<Index table> <Moving arm>



●Sensor Installation examples

<Index table> <Moving arm>



※Install an additional sensor to detect home position and to ensure motor's positioning, number of rotation and its speed.

▣Caution for using

●Installation condition

: Install the motor in a place that meets certain conditions specified below. It may cause product damage if instructions are not following.

①It shall be used indoors.
(This product is designed / manufactured to be installed on machinery as a part.)
②Within −10 to 50℃(at non−freezing status) of ambient temperature
③Within 85%RH (at non−dew status) of ambient humidity
④The place without explosive, flammable and corrosive gas
⑤The place without direct ray of light
⑥The place without dust, dregs etc.
⑦The place without water, oil etc.
⑧The place where easy heat dissipation could be made
⑨The place where no continuous vibration or severe shock
⑩The place with less salt content
⑪The place with less electronic noise occurred by welding machine, motor etc.
⑫The place where no radioactive substances and magnetic fields exist. It shall be no vacuum status as well.

●Do not disassemble or modify the product.

It may cause a malfunction due to small dregs. Once disassembling the motor, its performance would significantly decline.

●Do not impact the motor.

The air−gap, the distance between rotator and stator is processed as 0.05mm, but if it is impacted, the balance of air−gap can be broken and it may cause a malfunction.

●Use the motor within the rated torque range.

The rated 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 rated torque range, or, it may cause the breakdown of gear.

●Use the motor within the rated speed range.

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

●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 stepping 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.

●Temperature rise

The surface temperature of motor shall be under 100℃ 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.

●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.

●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.

●Using electromagnetic brake

Release brake force first by supplying the power to brake before starting the motor. If not, it may cause product malfunction and shortened lifecycle of brake due to brake pad wear−out.

▣Ordering information

●Application model : Shaft type, Hollow shaft type, Shaft type+Brake built-in type

A □ □K - S 5 4 4 □ - □ □

- Brake built-in (※)
  - Blank: Standard type
  - B: Brake built-in type
- Wire connection
  - Blank: Pentagon wiring
  - S: Standard wiring(Option)
- Motor shaft (※)
  - Blank: Single shaft
  - W: Dual shaft
- Motor length(mm)
- Motor frame size(mm)
  - 2: 24mm (24mm×24mm)
    - 3: 30.5mm
    - 5: 46.5mm
  - 4: 42mm (42mm×42mm)
    - 3: 33mm
    - 4: 39mm
    - 5: 47mm
  - 6: 60mm (60mm×60mm)
    - 4: 48.5mm
    - 6: 59.5mm
    - 9: 89mm
  - 9: 85mm (85mm×85mm)
    - 6: 68mm
    - 9: 98mm
    - 13: 128mm
- Motor phase
  - 5: 5 phase
- Rated current
  - S: 0.75A / Phase
  - M: 1.4 A/ Phase
  - G: 2.8 A/ Phase
- Max. holding torque
  - Square: kgf • cm(Refer to motor specification)
- Motor type
  - Blank: Shaft type
  - H: Hollow shaft type
- Item
  - Series

※Brake built-in type provides single shaft type only.

●Application model : Geared built-in type, Geared+Brake built-in type, Rotary actuator, Rotary actuator+Brake built-in type

A □K - S 5 4 5 □ - G 5

- Gear ratio
  - 5: 1 : 5
  - 7.2: 1 : 7.2
  - 10: 1 : 10
- Features
  - G: Geared built-in type
  - GB: Geared-Brake built-in type
  - R: Rotary actuator built-in type
  - RB: Rotary actuator-Brake built-in type
- Motor shaft
  - Blank: Single shaft
  - W: Dual shaft
- Motor length(mm)
  - 5: 47mm
  - 6: 59.5mm
  - 9: 98mm
- Motor frame size
  - 4: 42mm
  - 6: 60mm
  - 9: 85mm
- Motor phase
  - 5: 5 Phase
- Rated current
  - S: 0.75A/Phase
  - M: 1.4A/Phase
  - G: 2.8A/Phase
- Max. holding torque

10	10kgf • cm	50	50kgf • cm
15	15kgf • cm	140	140kgf • cm
35	35kgf • cm	200	200kgf • cm
40	40kgf • cm		

- Item
  - Series

5-Phase Stepping Motor

▣Specifications

Type		Model	A/phase (A)	Max. holding torque (kgf • cm)	Max. allowable torque (kgf • cm)	Moment of rotor inertia (g • cm²)	Winding resistance(Ω)	Motor length (mm)
24 Square	Shaft type	**02K-S523(W)**	0.75	0.18	–	4.2	1.1	30.5
		04K-S525(W)	0.75	0.28	–	8.2	1.7	46.5
42 Square	Shaft type	**A1K-S543(W)**	0.75	1.3	–	35	1.7	33
		A2K-S544(W)	0.75	1.8	–	54	2.2	39
		A2K-M544(W)	1.4	1.8	–	54	2.2	39
		A3K-S545(W)	0.75	2.4	–	68	2.2	47
	Hollow shaft type	**AH1K-S543**	0.75	1.3	–	35	1.7	33
		AH2K-S544	0.75	1.8	–	54	2.2	39
		AH3K-S545	0.75	2.4	–	68	2.2	47
	Geared built-in type	**A10K-S545(W)-G5**	0.75	–	10	68	1.7	74.5
		A15K-S545(W)-G7.2	0.75	–	15	68	2.2	74.5
		A15K-S545(W)-G10	0.75	–	15	68	2.2	74.5
60 Square	Shaft type / Shaft + Brake built-in type	**A4K-S564(W)-B**	0.75	4.2	–	175	2.6	48.5
		A4K-M564(W)-B	1.4	4.2	–	175	0.8	48.5
		A8K-S566(W)-B	0.75	8.3	–	280	4.0	59.5
		A8K-M566(W)-B	1.4	8.3	–	280	1.1	59.5
		A16K-M569(W)-B	1.4	16.6	–	560	1.8	89
		A16K-G569(W)-B	2.8	16.6	–	560	0.56	89
	Hollow shaft type	**AH4K-S564(W)**	0.75	4.2	–	175	2.6	48.5
		AH4K-M564(W)	1.4	4.2	–	175	0.8	48.5
		AH8K-S566(W)	0.75	8.3	–	280	4.0	59.5
		AH8K-M566(W)	1.4	8.3	–	280	1.1	59.5
		AH16K-M569(W)	1.4	16.6	–	560	1.8	89
		AH16K-G569(W)	2.8	16.6	–	560	0.56	89
	Geared built-in type	**A35K-M566(W)-G5**	1.4	–	35	280	1.1	94.5
		A40K-M566(W)-G7.2	1.4	–	40	280	1.1	94.5
		A50K-M566(W)-G10	1.4	–	50	280	1.1	94.5
	Geared + Brake built-in type	**A35K-M566-GB5**	1.4	–	35	280	1.1	136
		A40K-M566-GB7.2	1.4	–	40	280	1.1	136
		A50K-M566-GB10	1.4	–	50	280	1.1	136
	Rotary actuator type	**A35K-M566(W)-R5**	1.4	–	35	280	1.1	93.5
		A40K-M566(W)-R7.2	1.4	–	40	280	1.1	93.5
		A50K-M566(W)-R10	1.4	–	50	280	1.1	93.5
	Rotary actuator + Brake built-in type	**A35K-M566-RB5**	1.4	–	35	280	1.1	136
		A40K-M566-RB7.2	1.4	–	40	280	1.1	136
		A50K-M566-RB10	1.4	–	50	280	1.1	136
85 Square	Shaft type / Shaft + Brake built-in type	**A21K-M596(W)-B**	1.4	21	–	1400	1.76	68
		A21K-G596(W)-B	2.8	21	–	1400	0.4	68
		A41K-M599(W)-B	1.4	41	–	2700	2.6	98
		A41K-G599(W)-B	2.8	41	–	2700	0.58	98
		A63K-M5913(W)-B	1.4	63	–	4000	3.92	128
		A63K-G5913(W)-B	2.8	63	–	4000	0.86	128
	Hollow shaft type	**AH21K-M596(W)**	1.4	21	–	1400	1.76	68
		AH21K-G596(W)	2.8	21	–	1400	0.4	68
		AH41K-M599(W)	1.4	41	–	2700	2.6	98
		AH41K-G599(W)	2.8	41	–	2700	0.58	98
		AH63K-M5913(W)	1.4	63	–	4000	3.92	128
		AH63K-G5913(W)	2.8	63	–	4000	0.86	128
	Geared built-in type	**A140K-M599(W)-G5**	1.4	–	140	2700	2.6	145
		A140K-G599(W)-G5	2.8	–	140	2700	0.58	145
		A200K-M599(W)-G7.2	1.4	–	200	2700	2.6	145
		A200K-G599(W)-G7.2	2.8	–	200	2700	0.58	145
		A200K-M599(W)-G10	1.4	–	200	2700	2.6	145
		A200K-G599(W)-G10	2.8	–	200	2700	0.58	145
	Geared + Brake built-in type	**A140K-M599-GB5**	1.4	–	140	2700	2.6	182
		A140K-G599-GB5	2.8	–	140	2700	0.58	182
		A200K-M599-GB7.2	1.4	–	200	2700	2.6	182
		A200K-G599-GB7.2	2.8	–	200	2700	0.58	182
		A200K-M599-GB10	1.4	–	200	2700	2.6	182
		A200K-G599-GB10	2.8	–	200	2700	0.58	182

※**(W)** stands for dual shaft of motor. The brake built-in type provides single shaft type only.
※Motor length was measured without shaft.
※Hollow shaft type with standard wiring is customizable.(Except for 24mm)

▣Specifications

●24 square

Model	02K-S523(W)	04K-S525(W)
Max. holding torque	0.18 kgf • cm (0.018N • m)	0.28kgf • cm (0.028 N • m)
Moment of rotor inertia	4.2 g • cm^2 (4.2×10^{-7}kg • m^2)	8.2 g • cm^2 (8.2×10^{-7}kgf • m^2)
Rated current	0.75A/Phase	
Basic step angle	0.72° / 0.36° (Full step/Half step)	
Insulation class	CLASS B type(130℃)	
Insulation resistance	Min. 100MΩ(at 500VDC megger) between motor coil-case	
Dielectric strength	1Min. at 0.5kVAC 50/60Hz between motor coil-case	
Ambient temperature	-10 to 50℃(Storage condition : -25 to 85℃)	
Ambient humidity	35 to 85%RH(at non-freezing status)	
Protection	IP30(IEC34-5 standard)	
Unit weight	Approx. 0.07kg	Approx. 0.12kg
Reference	Q-23 to 31	

●42 square

Model								
Model	Shaft type	A1K-S543(W)	A2K-S544(W)	A2K-M544(W)	A3K-S545(W)	———	———	———
Model	Hollow shaft type	AH1K-S543	AH2K-S544	———	AH3K-S545	———	———	———
Model	Shaft type+ Geared buit-in type	———	———	———	———	A10K-S545(W)-G5	A15K-S545(W)-G7.2	A15K-S545(W)-G10
Max. allowable torque		———	———	———	———	10kgf · cm (1.0 N · m)	15kgf · cm (1.5 N · m)	15kgf · cm (1.5 N · m)
Max. holding torque		1.3kgf · cm (0.13 N·m)	1.8kgf · cm (0.18 N · m)		2.4kgf · cm (0.24 N · m)	———	———	———
Moment of rotor inertia		35g · cm^2 (35×10^{-7}kg·m^2)	54g · cm^2 (54×10^{-7}kg·m^2)		68g · cm^2 (68×10^{-7}kg·m^2)	68g · cm^2 (68×10^{-7}kg·m^2)		
Rated current		0.75A/Phase		1.4A/Phase	0.75A/Phase			
Basic step angle		0.72° / 0.36(Full / Half step)				0.144° / 0.072° (Full/Half step)	0.1° / 0.05° (Full/Half step)	0.072° / 0.036° (Full/Half step)
Gear ratio		———				1 : 5	1 : 7.2	1 : 10
Allowable speed range		———				0 to 360rpm	0 to 250rpm	0 to 180rpm
Backlash[min]		———				±35' (0.58°)		
Insulation class		CLASS B type(130℃)						
Insulation resistance		Min. 100MΩ(at 500VDC megger) between motor coil-case						
Dielectric strength		1Min. at 1kVAC(0.5kVAC for 0.75A/Phase) 50/60Hz between Motor coil-case						
Ambient temperature		-10 to 50℃(Storage condition : -25 to 85℃)						
Ambient humidity		35 to 85%RH(at non-freezing status)						
Protection		IP30(IEC34-5 standard)						
Unit weight		Approx. 0.25kg	Approx. 0.3kg		Approx. 0.4kg	Approx. 0.58kg		
Reference		Q-23 to 31						

5-Phase Stepping Motor

▣Specifications

●60 square

Model	Shaft type	**A4K-S564(W)**	**A4K-M564(W)**	**A8K-S566(W)**	**A8K-M566(W)**	**A16K-M569(W)**	**A16K-G569(W)**
	Hollow shaft type	**AH4K-S564(W)**	**AH4K-M564(W)**	**AH8K-S566(W)**	**AH8K-M566(W)**	**AH16K-M569(W)**	**AH16K-G569(W)**
	Shaft type+ Brake buit-in type	**A4K-S564-B**	**A4K-M564-B**	**A8K-S566-B**	**A8K-M566-B**	**A16K-M569-B**	**A16K-G569-B**
Max. holding torque		4.2kgf • cm(0.42N • m)		8.3kgf • cm(0.83N • m)		16.6kgf • cm(1.66N • m)	
Moment of rotor inertia		175g • cm² (175×10⁻⁷kg • m²)		280g • cm² (280×10⁻⁷kg • m²)		560g • cm² (560×10⁻⁷kg • m²)	
Rated current		0.75A/Phase	1.4A/Phase	0.75A/Phase	1.4A/Phase	1.4A/Phase	2.8A/Phase
Basic step angle		0.72° / 0.36(Full/Half step)					
Electro magnetic brake	Rated excitation voltage	24VDC(non-polarity)					
	Rated excitation current	0.33A					
	Static friction torque	4kgf • cm					
	Rotation part inertia	2.5×10⁻⁶kgf • cm²					
	Operating time	Max. 22ms					
	Releasing time	Max. 37ms					
Insulation class		CLASS B type(130℃)					
Insulation resistance		Min. 100MΩ (at 500VDC megger) between motor coil-case					
Dielectric strength		1Min. at 1kVAC(0.5kVAC for 0.75A/Phase) 50/60Hz between motor coil-case					
Ambient temperature		-10 to 50℃(Storage condition : -25 to 85℃)					
Ambient humidity		35 to 85%RH(at non-freezing status)					
Protection		IP30(IEC34-5 standard)					
Unit weight		Standard type : 0.6kg, Brake built-in type : 0.9kg		Standard type : 0.8kg, Brake built-in type : 1.1kg		Standard type : 1.3kg, Brake built-in type : 1.6kg	
Reference		**Q-23 to 28**					

●60 square

Model	Shaft type+ Geared buit-in type	**A35K-M566(W)-G5**	**A40K-M566(W)-G7.2**	**A50K-M566(W)-G10**
	Geared type+ Brake built-in type	**A35K-M566-GB5**	**A40K-M566-GB7.2**	**A50K-M566-GB10**
	Rotary actuator type	**A35K-M566(W)-R5**	**A40K-M566(W)-R7.2**	**A50K-M566(W)-R10**
	Rotary actuator type+ Brake built-in type	**A35K-M566-RB5**	**A40K-M566-RB7.2**	**A50K-M566-RB10**
Max. holding torque		35kgf • cm(3.5N • m)	40kgf • cm(4.0 N • m)	50kgf • cm(5.0 N • m)
Moment of rotor inertia		280 g • cm² (280×10⁻⁷kg • m²)		
Rated current		1.4A/Phase		
Basic step angle		0.144° / 0.072° (Full/Half step)	0.1° / 0.05° (Full/Half step)	0.072° / 0.036° (Full/Half step)
Gear ratio		1 : 5	1 : 7.2	1 : 10
Allowable speed range		0 to 360rpm	0 to 250rpm	0 to 180rpm
Backlash[min]		±20' (0.33°)		
Electro magnetic brake	Rated excitation voltage	24VDC(non-polarity)		
	Rated excitation current	0.33A		
	Static friction torque	4kgf • cm		
	Rotation part inertia	2.5×10⁻⁶kgf • cm²		
	Operating time	Max. 22ms		
	Releasing time	Max. 37ms		
Absolute position error **(★1)**		±20 minute(0.33°)		
Lost motion **(★1)**		±20 minute(0.33°)		
Insulation class		CLASS B type(130℃)		
Insulation resistance		Min. 100MΩ (at 500VDC megger) between motor coil-case		
Dielectric strength		1Min. at 1kVAC 50/60Hz between motor coil-case		
Ambient temperature		-10 to 50℃(Storage condition : -25 to 85℃)		
Ambient humidity		35 to 85%RH(at non-freezing status)		
Protection		IP30(IEC34-5 standard)		
Unit weight		Geared type:1.3kg, Geared+Brake type:1.4kg, Rotary actuator type:1.5kg, Rotary actuator+Brake type:1.8kg		
Reference		**Q-29 to 31**		

※**(★1)** It is only available for rotary actuator type.

▣Specifications

●85 square

Model	Shaft type	A21K-M596(W)	A21K-G596(W)	A41K-M599(W)	A41K-G599(W)	A63K-M5913(W)	A63K-G5913(W)
	Hollow shaft type	AH21K-M596(W)	AH21K-G596(W)	AH41K-M599(W)	AH41K-G599(W)	AH63K-M5913(W)	AH63K-G5913(W)
	Shaft type+ Brake buit-in type	A21K-M596-B	A21K-G596-B	A41K-M599-B	A41K-G599-B	A63K-M5913-B	A63K-G5913-B
Max. holding torque		21kgf • cm(2.1 N • m)		41kgf • cm(4.1 N • m)		63kgf • cm(6.3 N • m)	
Moment of rotor inertia		1400 g • cm² (1400×10⁻⁷kg • m²)		2700 g • cm² (2700×10⁻⁷kg • m²)		4000 g • cm² (4000×10⁻⁷kg • m²)	
Rated current		1.4A/Phase	2.8A/Phase	1.4A/Phase	2.8A/Phase	1.4A/Phase	2.8A/Phase
Basic step angle		0.72° / 0.36° (Full/Half step)					
Electro magnetic brake	Rated excitation voltage	24VDC(non-polarity)					
	Rated excitation current	0.62A					
	Static friction torque	40kgf • cm					
	Rotation part inertia	42.5×10⁻⁶kgf • cm²					
	Operating time	Max. 80ms					
	Releasing time	Max. 70ms					
Insulation class		CLASS B type(130℃)					
Insulation resistance		Min. 100MΩ (at 500VDC megger) between motor coil-case					
Dielectric strength		1Min. at 1kVAC 50/60Hz between motor coil-case					
Ambient temperature		-10 to 50℃(Storage condition : -25 to 85℃)					
Ambient humidity		35 to 85%RH(at non-freezing status)					
Protection		IP30(IEC34-5 standard)					
Unit weight		Standard type : 1.7kg, Brake built-in type : 2.9kg		Standard type : 2.8kg, Brake built-in type : 4.0kg		Standard type : 3.8kg, Brake built-in type : 5.0kg	
Reference		Q-23 to 28					

●85 square

Model	Shaft type+ Geared buit-in type	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
	Geared type+ Brake buit-in type	A140K-M599-GB5	A140K-G599-GB5	A200K-M599-GB7.2	A200K-G599-GB7.2	A200K-M599-GB10	A200K-G599-GB10
Max. holding torque		140kgf • cm(14 N • m)		200kgf • cm(20 N • m)		200kgf • cm(20 N • m)	
Moment of rotor inertia		2700 g • cm² (270×10⁻⁷ kg • m²)					
Rated current		1.4A/Phase	2.8A/Phase	1.4A/Phase	2.8A/Phase	1.4A/Phase	2.8A/Phase
Basic step angle		0.144° / 0.072° (Full/Half step)		0.1° / 0.05° (Full/Half step)		0.072° / 0.036° (Full/Half step)	
Gear ratio		1 : 5		1 : 7.2		1 : 10	
Allowable speed range		0 to 360rpm		0 to 250rpm		0 to 180rpm	
Backlash[min]		±15' (0.25°)					
Electro magnetic brake	Rated excitation voltage	24VDC(non-polarity)					
	Rated excitation current	0.62A					
	Static friction torque	40kgf • cm					
	Rotation part inertia	42.5×10⁻⁶ kgf • cm²					
	Operating time	Max. 80ms					
	Releasing time	Max. 70ms					
Insulation class		CLASS B type(130℃)					
Insulation resistance		Min. 100MΩ (at 500VDC megger) between motor coil-case					
Dielectric strength		1Min. at 1kVAC 50/60Hz between motor coil-case					
Ambient temperature		-10 to 50℃(Storage condition : -25 to 85℃)					
Ambient humidity		35 to 85%RH(at non-freezing status)					
Protection		IP30(IEC34-5 standard)					
Unit weight		Geared type : 4.4kg, Geared+Brake type : 5.6kg					
Reference		Q-29 to 31					