■ Dimensions – SHA 060 (1 Stage, Ratio(i) = 1/10)

■ Dimensions – SHA 060 (1 Stage, Ratio(i) = 1/18)

Hollow Rotary Table

■ Dimensions – SHA 085 (1 Stage, Ratio(i) = 1/10)
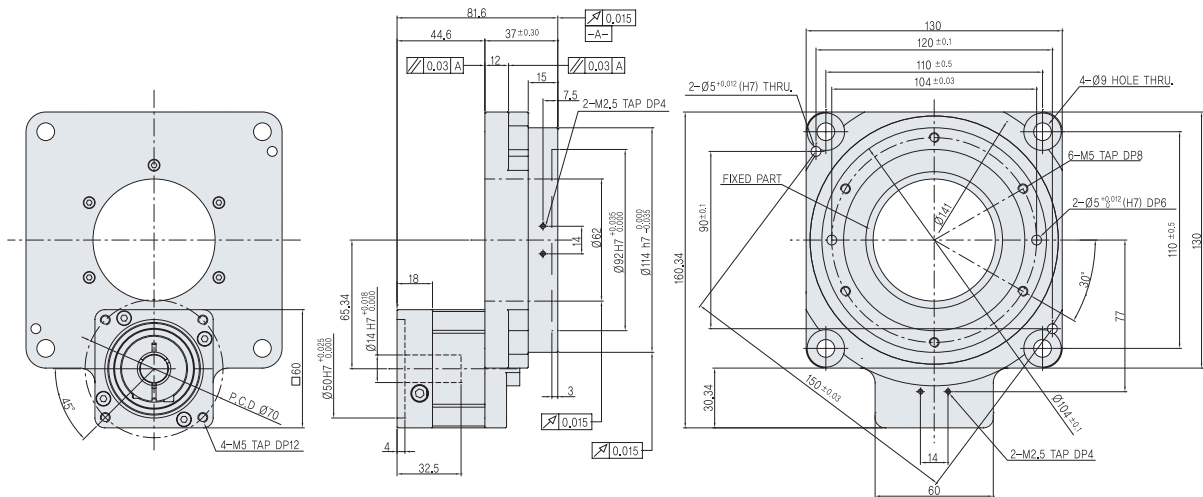

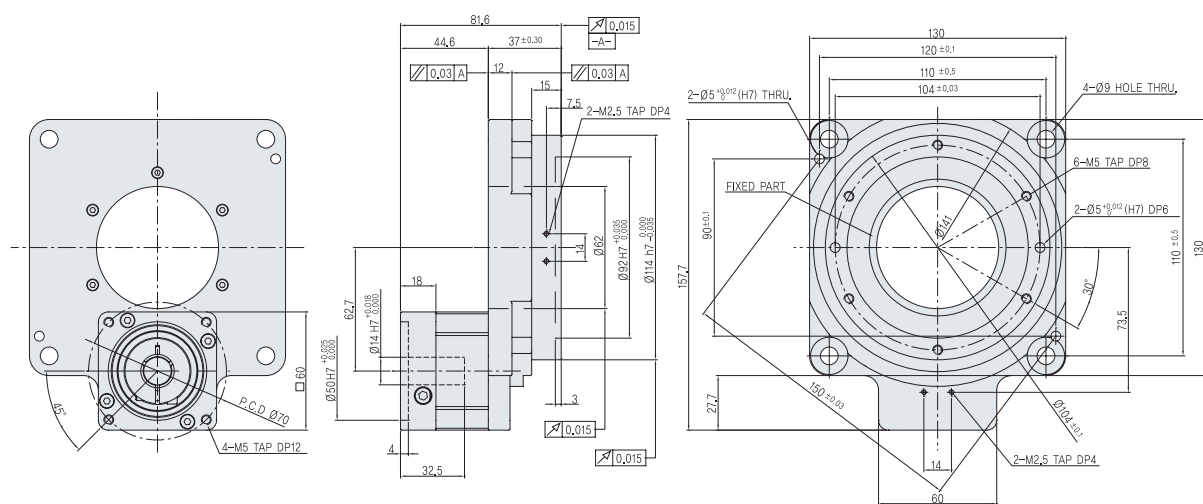
■ Dimensions – SHA 085 (1 Stage, Ratio(i) = 1/18)

■ Dimensions – SHA 130 (1 Stage, Ratio(i) = 1/10)
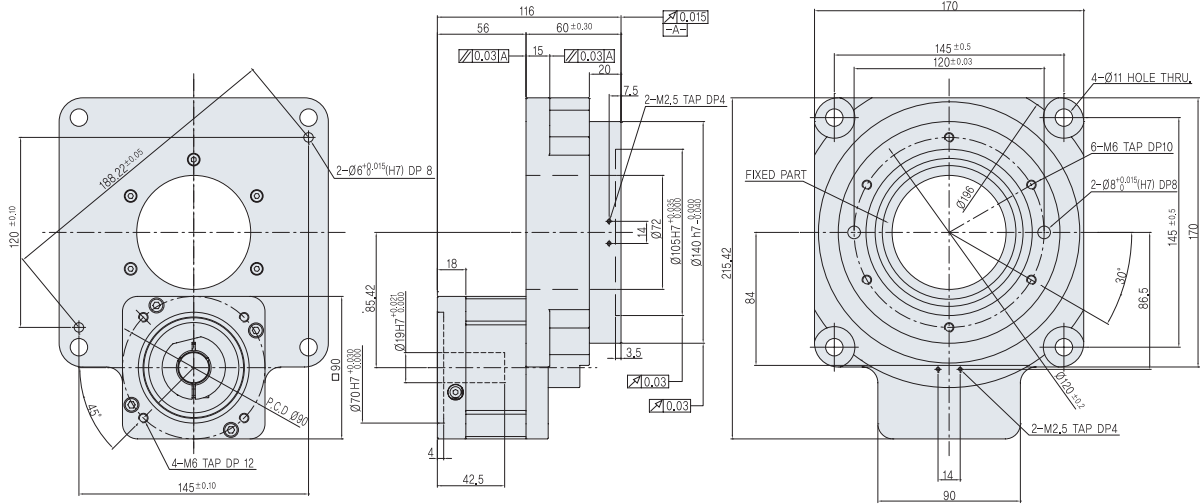

■ Dimensions – SHA 130 (1 Stage, Ratio(i) = 1/18)

Hollow Rotary Table

■ Dimensions – SHA 170 (1 Stage, Ratio(i) = 1/10)
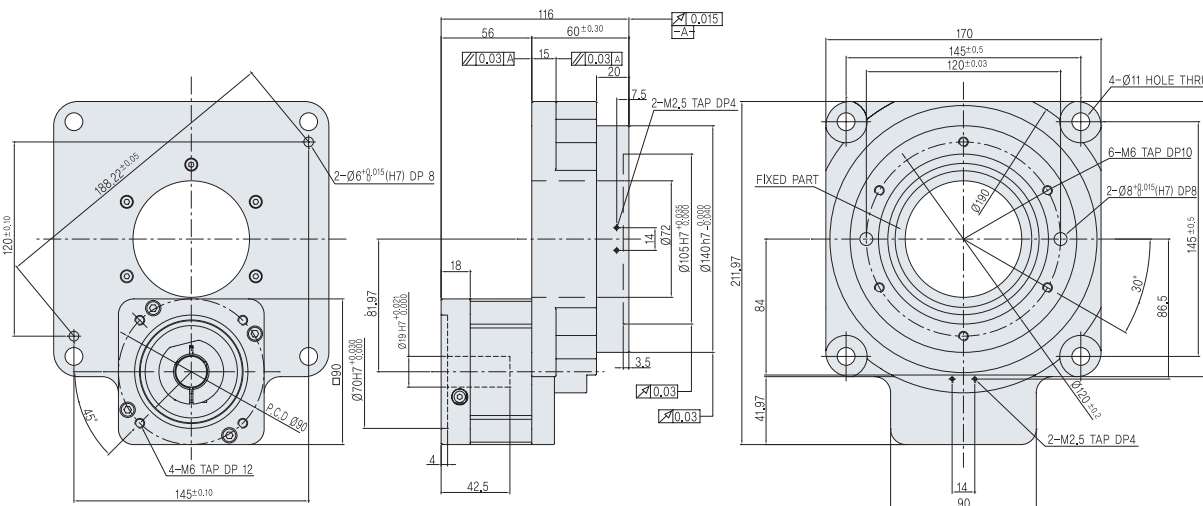

■ Dimensions – SHA 170 (1 Stage, Ratio(i) = 1/18)

■ Dimensions – SHA 200 (1 Stage, Ratio(i) = 1/10)

■ Dimensions – SHA 200 (1 Stage, Ratio(i) = 1/18)

Hollow Rotary Table Selection

■ Check Point to select Hollow Rotary Table

① Calculating moments of inertia (load inertia Moment).

Make sure that the inertia moment for returned object is less than 30 times of the actuator's inertia moment.

② Use the following formula to calculate the acceleration torque.

$$\text{Acceleration Torque } Ta[N \cdot m] = (J_M + J_A + J_W) * \frac{\pi}{30} * \frac{(N_2 - N_1)}{t_1}$$

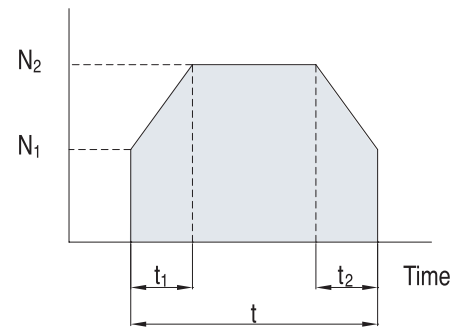J_M : inertia Moment [kgm2] for applied motor [kg·m²]
J_A : Actuator's inertia Moment [kg·m²]
J_W : Load inertia Moment [kg·m²]
N_2 : Operating rotation speed [r/min]
N_1 : Starting rotation speed [r/min]
t_1 : Accelerating (Decelerating) Time [s]

③ Calculating the Required Torque.

The required torque is calculated by multiplying the sum of load torque from the frictional resistance and the acceleration torque by safety coefficient.

$$\text{Required Torque } T = (\text{Load Torque}[N \cdot m] + \text{AcceleratingTorque}[N \cdot m]) \times \text{safety coefficient}$$
$$= (T_L + T_a) \times S$$

The safety coefficient, S is greater than 1.5.

④ The required torque of the selected motor, T must fall within the the specification of the speed-torque.
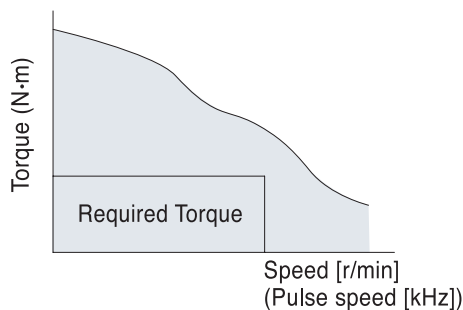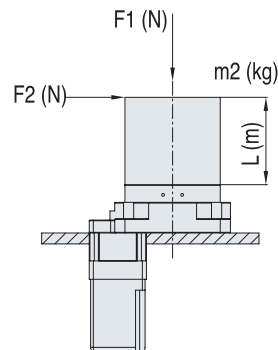
⑤ Calculating Thrust Load, Moment Load

When the load is given to the output table as shown below, be sure the calculated thrust load and moment load using the formulas below are within the specified limit.

Model	A
SHA 060	0.010
SHA 085	0.015
SHA 130	0.017
SHA 170	0.033
SHA 200	0.033
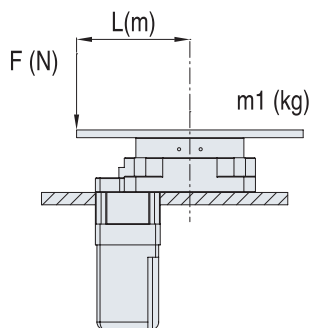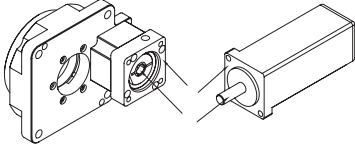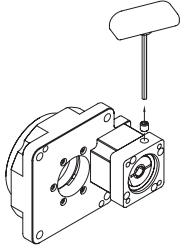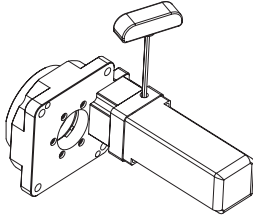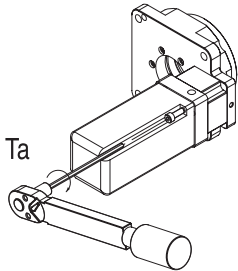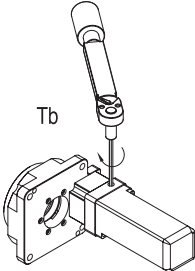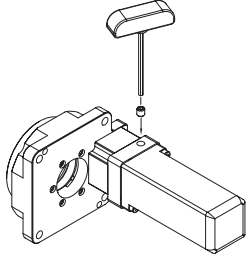
Thrust Load [N] : $F_t = F + m_1 \times g$
Moment Load [N·m] : $M = F \times L$
g : Gravitational Acceleration 9.807 [m/s²]

Thrust Load [N] : $F_t = F_1 + m_2 \times g$
Moment Load [N·m] : $M = F_2 \times (L + A)$
g : Gravitational Acceleration 9.807 [m/s²]

1. Installation Instructions

1 Brush away and clean out any foreign substances on the surface after verifying the size of the motor and the rotary table.

2 Remove the screw plug from the adapter flange and adjust the position so that the clamp bolt is noticeable. (See 「Appendix 1」.)

3 When mounting onto the motor, closely adhere the adapter flange of the rotary table and the motor mounting side and slightly tighten the clamping bolt so that the clamp ring not idle.

4 Bolts diagonally tighten based on the standard Ta. (See 「Appendix 2」.)

5 Tighten the clamp ring based on the standard Tb. (See 「Appendix 2」.)

6 Tighten the screw plug.

Appendix 1 How to install motor

Remove the key and make sure that the key way of the If the motor shaft has a key-way, input shaft is positioned in line with the slots of the bushing and clamp ring as shown in Fig. B. Arranging the slots of the clamp ring and bushing with shaft key-way allows for maximum tightening of the clamp ring cap screw.

Bushing
Clamp Bolt
Input Shaft
Clamp Ring
Motor Shaft
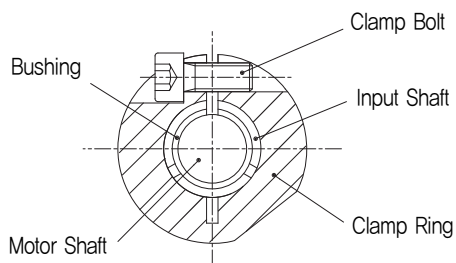
(Figure A) Motor shaft without key
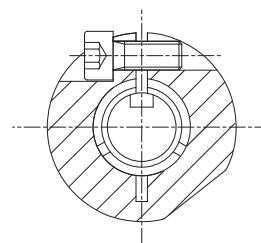
(Figure B) Motor shaft with key

Installation Instructions

■ 2. How to mount Actuator

Using 2 holes (for SHA 060, the mounting hole and the locating pin hole are common), install the actuator onto the mounting plate of the machine as the figure shown below. These holes are to be used for accurate positioning of the actuator on the machine.

Be sure to firmly secure the locating pin in the mounting plate. Allow holes through the mounting plate to provide an escape of the motor.

Mounting Bolt / Spring Washer
(User Preparation)

Mounting Hole
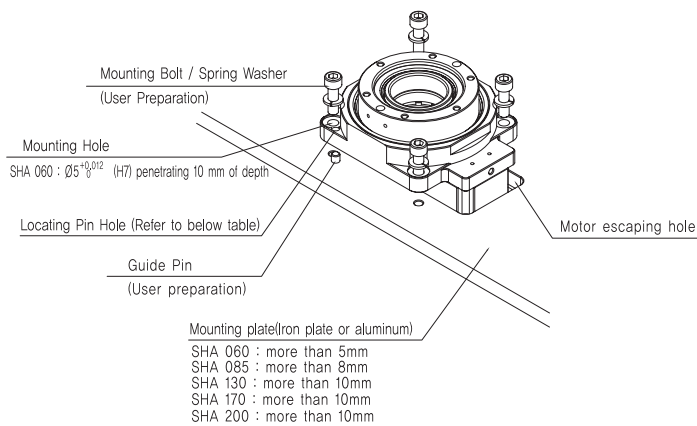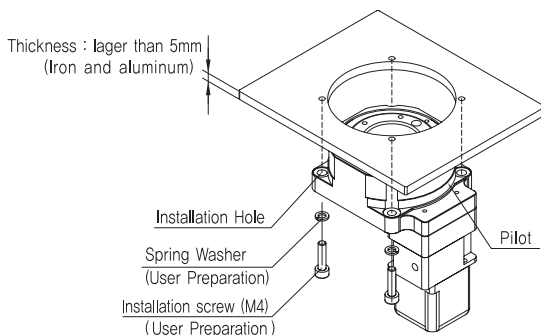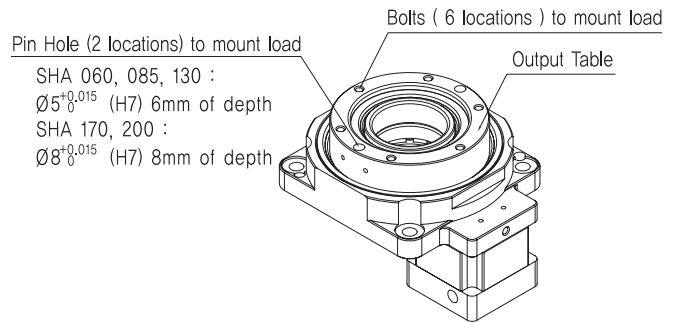SHA 060 : Ø5$^{+0.012}_{0}$ (H7) penetrating 10 mm of depth

Locating Pin Hole (Refer to below table)

Guide Pin
(User preparation)

Motor escaping hole

Mounting plate(Iron plate or aluminum)
SHA 060 : more than 5mm
SHA 085 : more than 8mm
SHA 130 : more than 10mm
SHA 170 : more than 10mm
SHA 200 : more than 10mm

※ Locating Pin Hole

Product	Pin Hole Diameter(mm)	Pin Hole Depth(mm)	Number of Pin Holes
SHA 085	Ø5 $^{+0.012}_{0}$ (H7)	10.5 (Penetrating)	2
SHA 130		12 (Penetrating)	
SHA 170	Ø6$^{+0.015}_{0}$ (H7)	6 (Closed)	2
SHA 200	Ø8$^{+0.015}_{0}$ (H7)	8 (Closed)	2 (one spot among them is a long hole with 8 to 10)

HA 060(i=1/18) can be installed using a mounting pilot part as shown in the figure below. However, if the optional origin of senser is used, installation from this direction is not available.

Thickness : lager than 5mm
(Iron and aluminum)

Installation Hole

Spring Washer
(User Preparation)

Installation screw (M4)
(User Preparation)

Pilot

■ 3. How to mount load on output table

Install the load using the mounting screw holes in 6 locations in the output table. There are 2 pin holes to install the load in the output table and use them to determine the locations of the load. Be sure affix the pins firmly on the load.

Bolts (6 locations) to mount load

Pin Hole (2 locations) to mount load

Output Table

SHA 060, 085, 130 :
Ø5$^{+0.015}_{0}$ (H7) 6mm of depth
SHA 170, 200 :
Ø8$^{+0.015}_{0}$ (H7) 8mm of depth

■ Installation Precaution

The following installation precaution should be read thoroughly before installation.

This product is designed and manufactured for the purpose of assembling equipment

● Indoors (Area not exposed to direct sun)
● Area free of heat radiation
● Operating ambient temperature: 0~+50℃
   Under the origin sensor: 0~+40℃
● Operating ambient humidity: under 85%
● No explosive, inflammable and acid gas present
● Area it can be protected from dust, oil, and splashing water
● Area not exposed to direct vibration and excessive impact

■ Appendix 2 Wrench Bolt tightening torque

Wrench Bolt Size	Motor mounting(8.8T) Ta		Clamp ring(12.9T) Tb	
	N·m	kgf·cm	N·m	kgf·cm
M3	1.28	13	2.15	22
M4	2.9	30	4.95	50
M5	5.75	59	9.7	99
M6	9.9	101	16.5	168
M8	24	245	40	408
M10	48	489	81	826
M12	83	846	140	1,428
M14	132	1,346	220	2,243
M16	200	2,039	340	3,467

■ Appendix 3 Conversion Table (Torque)

Units to be Converted	1 N·m	1 N·cm	1 kgf·m	1 kgf·cm	1 lbf·ft	1 lbf·in
1 N·m	1	10^2	0.10197	10.197	0.7376	8.8509
1 N·cm	10^{-2}	1	1.0197×10^{-3}	0.10197	7.376×10^{-3}	8.8509×10^{-2}
1 kgf·m	9.8066	980.665	1	10^2	7.233	86.79
1 kgf·cm	9.8066×10^{-2}	9.8066	10^{-2}	1	7.233×10^{-2}	0.8680
1 lbf·ft	1.356	1.356×10^2	0.1383	13.83	1	12
1 lbf·in	0.113	11.3	1.152×10^{-2}	1.152	8.333×10^{-2}	1

■ Appendix 4 Angular Unit Indication method

Angular Unit	Value	Symbol	약어
degree	1/360 circle	°	Deg
arcminute	1/60 degree	′ (prime)	arcmin, amin, MOA
arcsecond	1/60 arcminute	″ (double prime)	arcsec
miliarcsecond	1/1,000 arcsecond		mas

■ Appendix 5 Equipment Protection Grade (IP)

The IP(Ingress Protection) code is published by IEC529 and it specifies the class of protection provided against foreign objects and water in electrical enclosures. An IP code consists of the letters 'IP' as detailed below:

IP □ □

Protection against water (2nd digit)
Protection against foreign objects (1st digit)
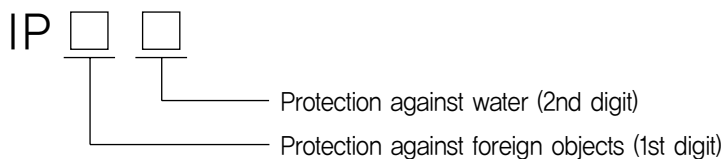
1 Classification of Protection against foreign objects (1st digit)

IP Indication	Level of Protection
IP0□	None
IP1□	Protected from access of a hands
IP2□	Protected from access of a fingers
IP3□	Protected against solid objects, tool etc
IP4□	Protected against wire
IP5□	Protected against dust
IP6□	Completed dust-proof

2 Classification of Protection against water (2nd digit)

IP Indication	Level of Protection
IP□0	None
IP□1	Protected against water drops falling vertically over a 15° range
IP□2	Protected against water drops falling vertically over a 60° range
IP□3	Protected against water spray from all directions
IP□4	Protected against water splattering from all directions
IP□5	Protected against water pouring from all directions
IP□6	Protected against strong water pouring from all directions
IP□7	Possible to use after immersion in water under certain conditions
IP□8	Possible to use under water

Cautions for Use

■ Caution

Please ensure to carefully read the precautions indicated below to prevent damage or injury to the user. Failure to read and understand these precautions may result in serious or possible fatal injury or damage to the product, or to related equipment and systems.

· Avoid hitting the product with a hammer and causing damage from a fall.
· Be cautious when connecting the product to the load side
· Handle the edge and key side of the product carefully
· Keep hands and other foreign substance away from the rotating shaft while the product in use
· Avoid excessive impact to the product when assembling a pulley, a coupling, a key etc.
· Do not exceed permissible torque , it may cause loosened bolts, shaking, damage, etc.
· Do not disassemble and reassemble the product. Doing so, the original performance may not be guaranteed.
· When sensing an abnormality, stop the operation immediately. It may adversely influence the system.

■ Warranty

The SPG warranty plan covers the product in the event that it fails to operate properly due to defects in materials or workmanship.
Coverage is effective on the date of the SPG product purchase and until the product either reaches 2000 hours worked on time, or 12 months from the date of purchase, whichever comes first.
The products and parts thereof have been used under normal operating conditions or under such conditions specified by the Company, SPG.
If any defects exist during the warranty period, SPG shall repair or exchange the product under this warranty However, this warranty does not cover:

① misuse, including unsuitable handling of the product

② repair done by anyone without the permission of SPG

③ damages not resulting from quality of product itself

④ accident, lighting, and other natural causes that does not come under SPG control

SPG warranty herein means the warranty of the product. SPG shall not be liable for consequential or incidental damage arising out of the failure of any product to operate properly.
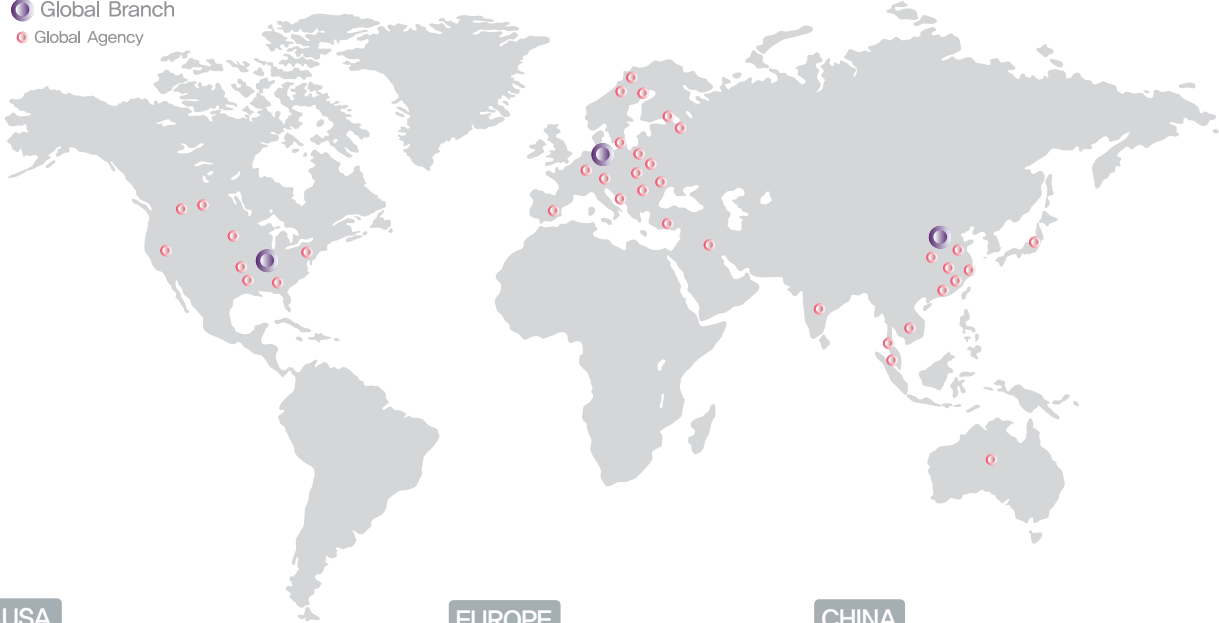
■ Domestic
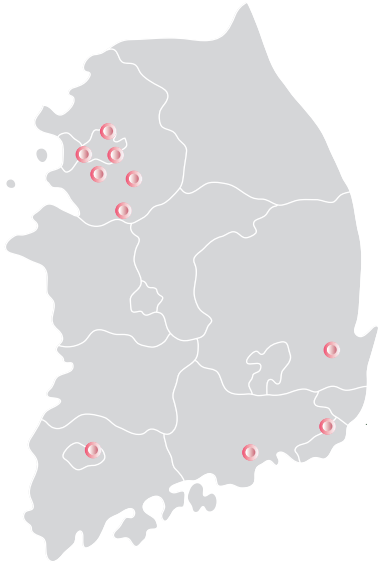
■ Domestic Distributors
 • For regional distributors information,
   please visit our website at www.spg.co.kr.

■ Worldwide

● Global Branch
● Global Agency

USA

SPG USA, INC
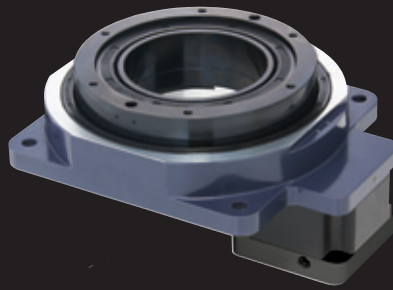501 LIVELY BLVD ELK GROVE VILLAGE, IL 60007, USA
TEL_1-847-439-4949 Fax. 1-847-439-4940

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SPG EUROPE B.V.
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SPG MOTOR(SUZHOU) CO.,LTD
168 HONGYE ROAD, SUZHOU INDUSTRIAL PARK,
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SPG **SPG Co., Ltd.**
http://www.spg.co.kr