SANKYO SEISAKUSHO CO.

Welding positioner

RollerDrive®

SP series

The ZERO-Backlash Technology

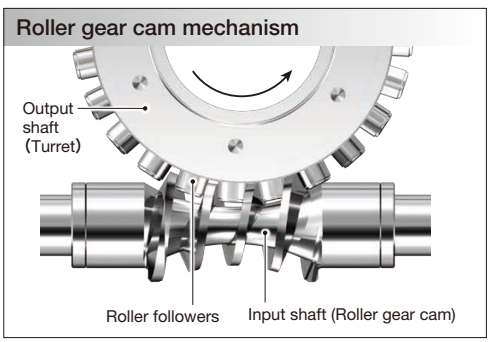
A mechanism developed through the pursuit of outstanding functionality and performance.

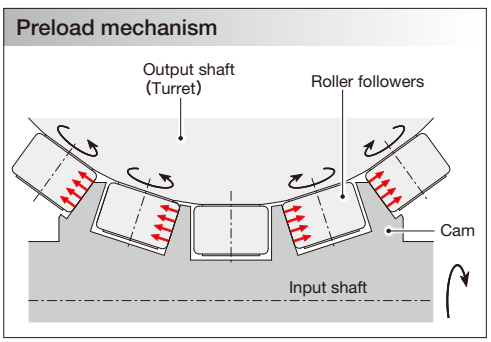
Superior movement achieved with zero-backlash technology

In FA equipment, motion control using servo systems is a crucial element which greatly affects equipment performance. Naturally, equipment specifications and performance are designed assuming that the expected motion is attained, but if there are factors such as backlash, insufficient rigidity or control instability in the motion control section, then output motion will deviate from input control commands, and it will be difficult to attain the expected performance.
With the RollerDrive SP Series, a servomotor is mechanically reduced while maintaining powerful torque, rigidity and stability. An output motion faithful to input control commands can be attained by achieving zero-backlash with our unique preloaded mechanism. This is a revolutionary FA motion control unit, which combines rolling transmission for high-efficiency and elimination of wear, an orthogonal layout of input and output axes for greater compactness, and standard features like a large diameter hollow shaft for greater ease-of-use.

Theory of Operation

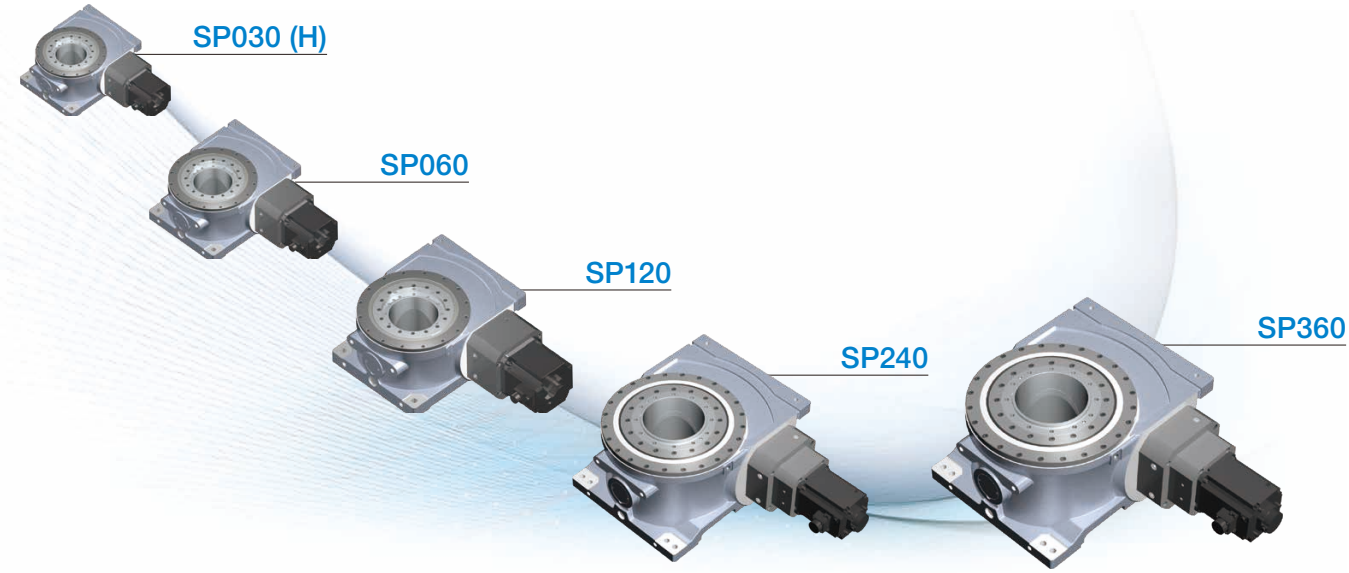
The RollerDrive is a positioner that utilizes a roller gear cam mechanism –one of the best motion control mechanisms– and includes an input shaft (roller gear cam) and an output shaft (turret) that incorporates roller followers.
The roller followers are preloaded against a screw-like input shaft to eliminate backlash.
Our proprietary adjustment mechanism provides optimum preload.
The roller followers in the turret use internal roller bearings to transfer torque while rotating.
This mechanism ensures zero backlash, precision, and efficiency while preventing wear. It also provides long-term, consistent accuracy.
The servomotor drive delivers unparalleled, ultimate motion control.





RollerDrive® SP series

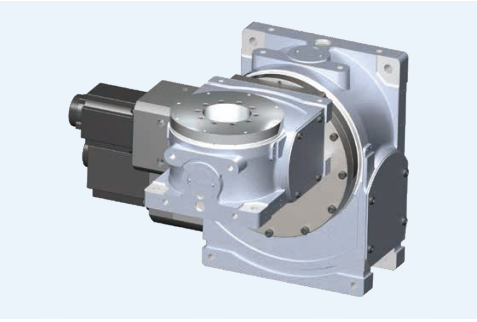
Welding Positioners for Greater Space-Savings and Higher Productivity



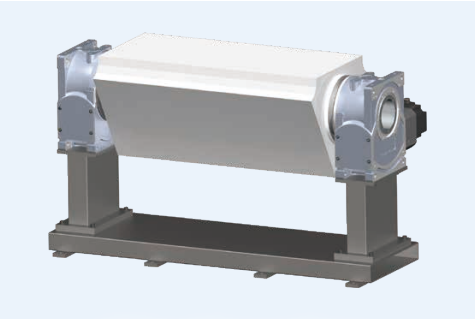
Features

- Payload : 300kg ～ 3,600kg
- Repeatability : ± 0.03㎜ (SP030 ～ SP120 : R=250㎜ position)
- Large hollow bore : Φ 245㎜ (SP360)
- Excellent stability and ensure shortening the tact time
- Thin-profile body : 190㎜ (SP030 ～ SP060)
- Tough against impact from emergency stops

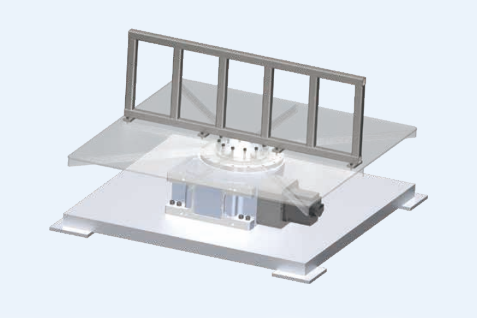
Applications



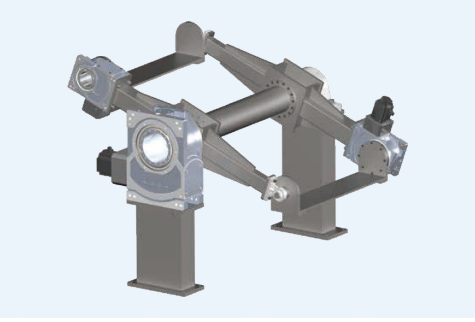
Cantilever-mounted 2-axis welding positioner



BBQ welding positioner



Horizontal single-axis welding positioner



Ferris-wheel type welding positioner

Product Code

Product Code

1 SP060	-	2 140	3 T	-	4 AA	-	5 S

1 Model

Model
SP030
SP030H[*1]
SP060
SP120
SP240
SP360

2 Gear ratio

140	SP030
056	SP030H
140	SP060
120	SP120
126	SP240
168	SP360

3 Servomotor[*2] position

T	T surface
U	U surface

4 Attachment code

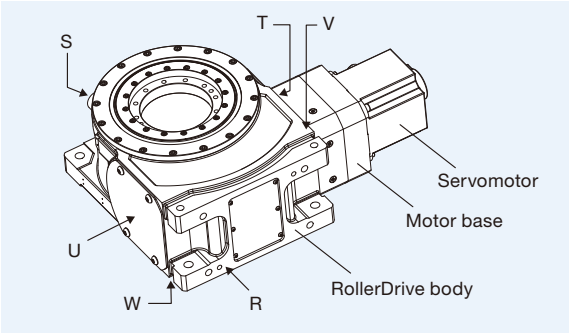
Select an attachment code by referring to page 7.

5 Servo motor Connector position

R	R surface (Motor mounted by Sankyo)
S	S surface (Motor mounted by Sankyo)
V	V surface (Motor mounted by Sankyo)
W	W surface (Motor mounted by Sankyo)
Z	For a motor to be mounted by the customer

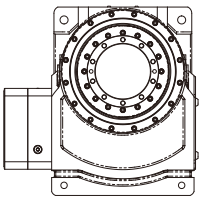
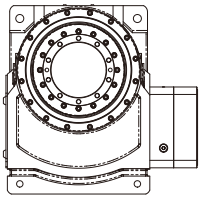
*1 High-speed model.
*2 The servo motor to be mounted should be equipped with an oil seal.

RollerDrive Surfaces

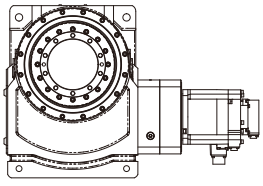
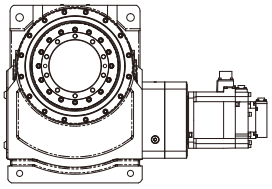


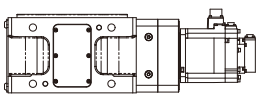
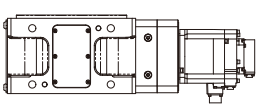
* Shown with servomotor on "T" surface

Servo motor position

U	T
	

Servo motor connector position

R	S
	

V	W	Z
		For a motor to be installed by the customer

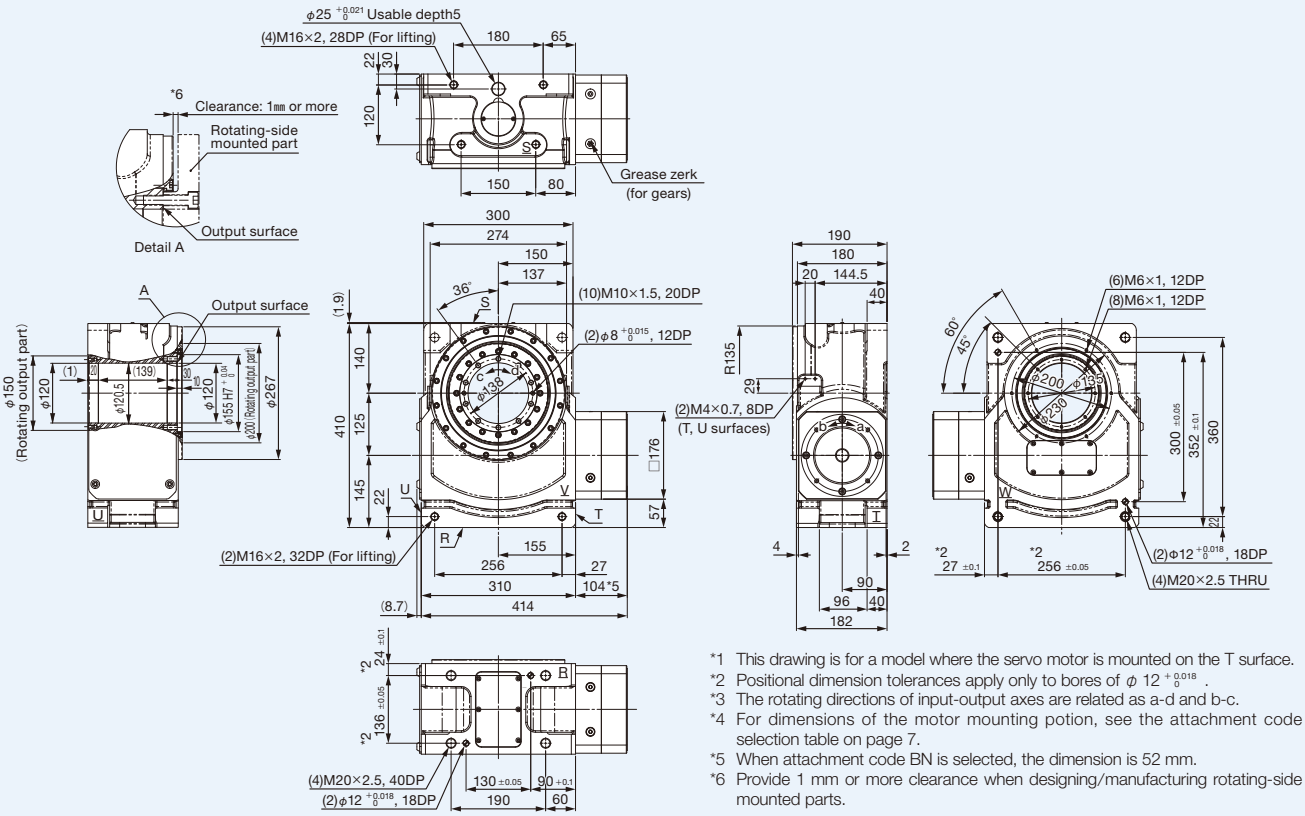
Specifications

Model		SP030	SP030H	SP060	SP120	SP240	SP360
Allowable payload	kg	300	300	600	1,200	2,400	3,600
Output table diameter	mm	155	155	155	220	260	335
Output hollow diameter	mm	120	120	120	170	170	245
Gear ratio		140	56	140	120	126	168
Maximum rotating speed	min^{-1}	30 (180° /sec)	60 (360° /sec)	30 (180° /sec)	20 (120° /sec)	20 (120° /sec)	20 (120° /sec)
Repeatability	mm	± 0.03 (R=250mm)	± 0.03 (R=250mm)	± 0.03 (R=250mm)	± 0.03 (R=250mm)	± 0.05 (R=500mm)	± 0.05 (R=500mm)
Momentary max. allowable torque	N · m	1,900	1,160	2,720	6,900	9,400	12,700
Start / Stop limit torque	N · m	875	510	1,350	1,960	5,150	9,580
Allowable moment load*1	N · m	1,095	850	1,795	7,360	10,800	15,100
Internal moment of inertia at the input shaft*2	$kg \cdot m^2$	3.73×10^{-4}	4.20×10^{-4}	3.73×10^{-4}	1.667×10^{-3}	4.340×10^{-3}	6.530×10^{-3}
Recommended motor capacity*3	kW	1	1	1.5	2	5.5	7.5
Paint color		Silver	Silver	Silver	Silver	Silver	Silver
Net weight	kg	120	120	120	270	545	780

*1 Allowable moment load depends on the mounting direction and payload. For details, please refer to the allowable moment diagrams on pages 8 to 10.
*2 Internal moment of inertia at the input shaft depends on the attachment code. For details, please refer to the attachment code selection table on page 7.
*3 Recommended motor capacity value is reference only. It depends on the operating conditions.

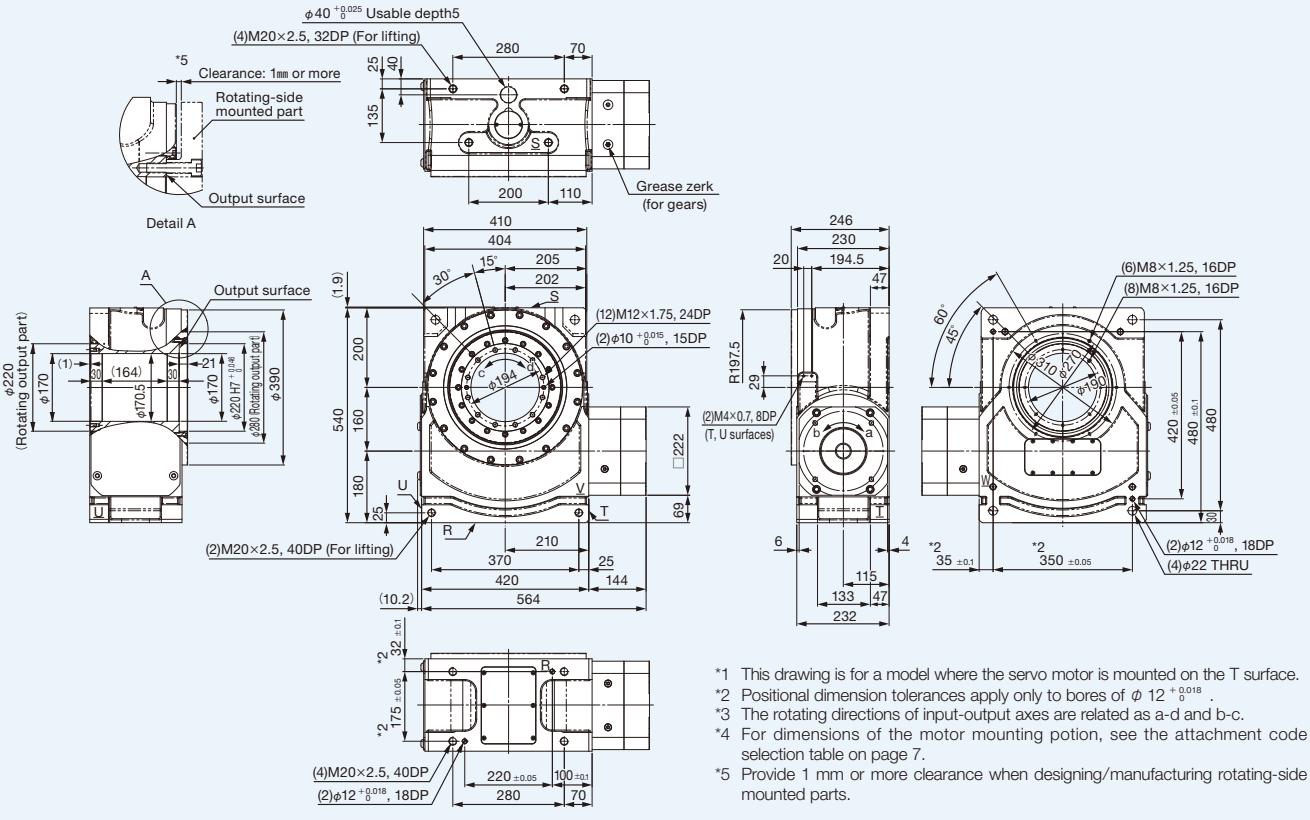
Dimensions

SP030(H) / SP060



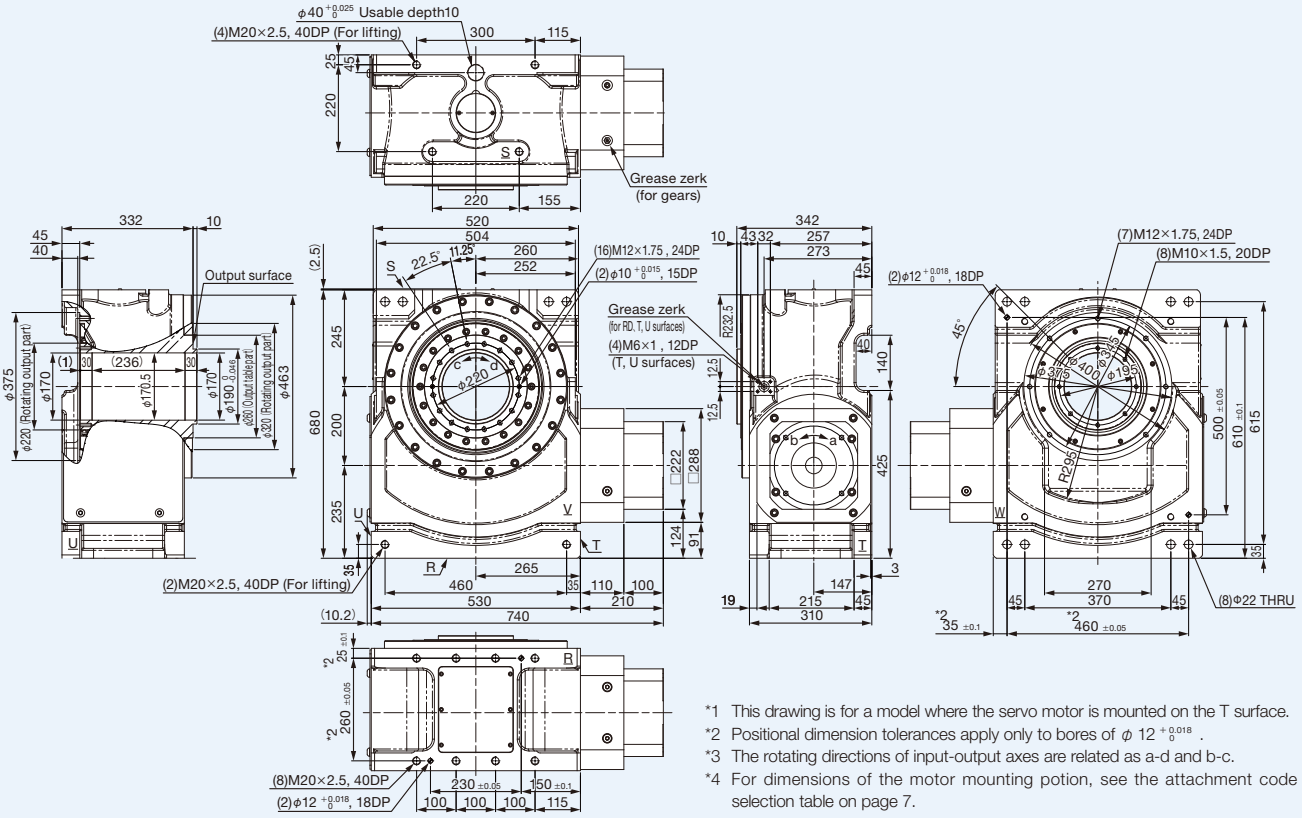
*1 This drawing is for a model where the servo motor is mounted on the T surface.
*2 Positional dimension tolerances apply only to bores of ϕ 12 +0.018 0 .
*3 The rotating directions of input-output axes are related as a-d and b-c.
*4 For dimensions of the motor mounting potion, see the attachment code selection table on page 7.
*5 When attachment code BN is selected, the dimension is 52 mm.
*6 Provide 1 mm or more clearance when designing/manufacturing rotating-side mounted parts.

SP120



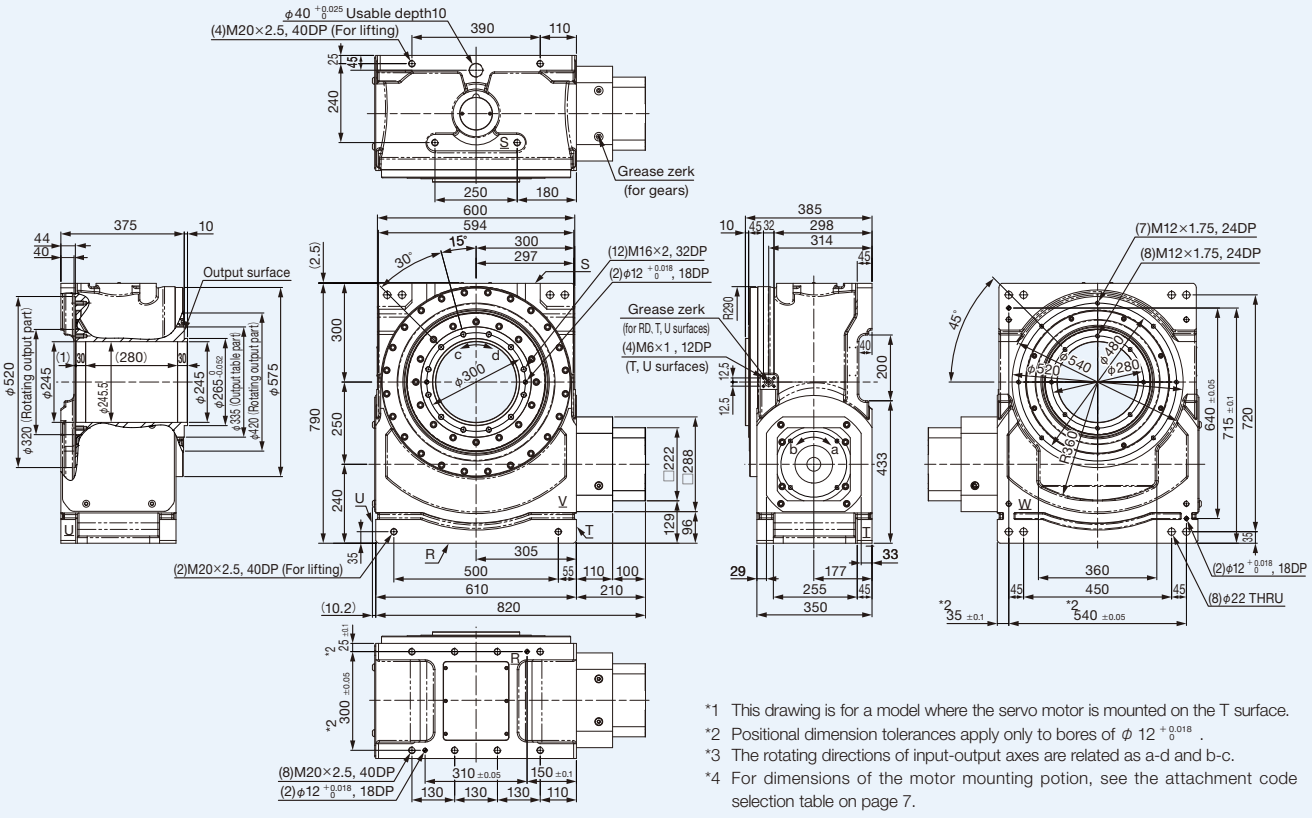
*1 This drawing is for a model where the servo motor is mounted on the T surface.
*2 Positional dimension tolerances apply only to bores of ϕ 12 +0.018 0 .
*3 The rotating directions of input-output axes are related as a-d and b-c.
*4 For dimensions of the motor mounting potion, see the attachment code selection table on page 7.
*5 Provide 1 mm or more clearance when designing/manufacturing rotating-side mounted parts.

SP240



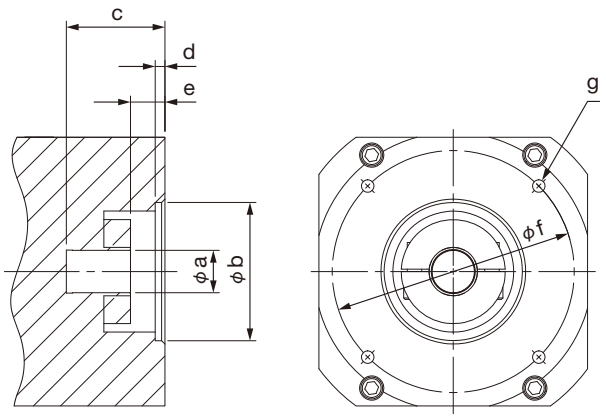
*1 This drawing is for a model where the servo motor is mounted on the T surface.
*2 Positional dimension tolerances apply only to bores of ϕ 12 $^{+0.018}_{0}$.
*3 The rotating directions of input-output axes are related as a-d and b-c.
*4 For dimensions of the motor mounting potion, see the attachment code selection table on page 7.

SP360

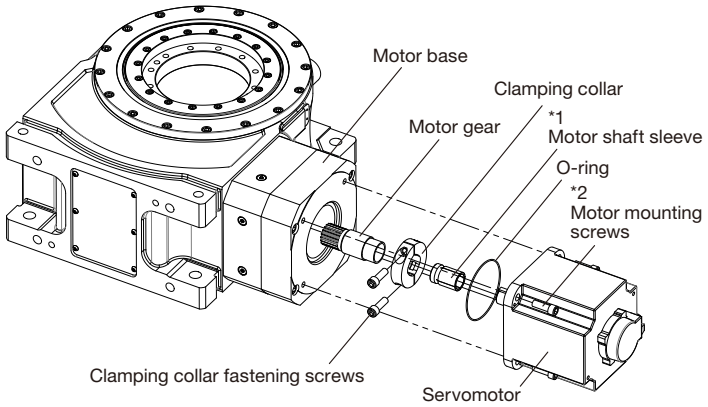


*1 This drawing is for a model where the servo motor is mounted on the T surface.
*2 Positional dimension tolerances apply only to bores of ϕ 12 $^{+0.018}_{0}$.
*3 The rotating directions of input-output axes are related as a-d and b-c.
*4 For dimensions of the motor mounting potion, see the attachment code selection table on page 7.

Attachment Code Selection Chart



Motor mounting portion



*1 This may not be included depending on the specification.
*2 The motor mounting screws are not included.

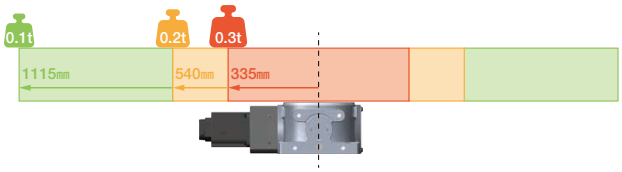
Model	Attachment code	ϕ a	ϕ b	c	d	e	ϕ f	g	J (Internal moment of inertia at the input shaft) [kg • m^2]
SP030 SP060	AN	24 $^{+0.021}_{0}$	110 $^{+0.035}_{0}$	38.0 ~ 58.5	8	21.5	145	(4)M8 × 1.25, DP16	3.69 × 10^{-4}
	AA	19 $^{+0.021}_{0}$	110 $^{+0.035}_{0}$	38.0 ~ 58.5	8	21.5	145	(4)M8 × 1.25, DP16	3.73 × 10^{-4}
	AB	22 $^{+0.021}_{0}$	110 $^{+0.035}_{0}$	38.0 ~ 58.5	8	21.5	145	(4)M8 × 1.25, DP16	3.71 × 10^{-4}
	BN	17 $^{+0.018}_{0}$	110 $^{+0.035}_{0}$	25.5 ~ 45.5	4.1	8.5	145	(4)M8 × 1.25, DP12	2.92 × 10^{-4}
SP030H	AN	24 $^{+0.021}_{0}$	110 $^{+0.035}_{0}$	38.0 ~ 58.5	8	21.5	145	(4)M8 × 1.25, DP16	4.16 × 10^{-4}
	AA	19 $^{+0.021}_{0}$	110 $^{+0.035}_{0}$	38.0 ~ 58.5	8	21.5	145	(4)M8 × 1.25, DP16	4.20 × 10^{-4}
	AB	22 $^{+0.021}_{0}$	110 $^{+0.035}_{0}$	38.0 ~ 58.5	8	21.5	145	(4)M8 × 1.25, DP16	4.18 × 10^{-4}
	BN	17 $^{+0.018}_{0}$	110 $^{+0.035}_{0}$	25.5 ~ 45.5	4.1	8.5	145	(4)M8 × 1.25, DP12	3.39 × 10^{-4}
SP120	AN	35 $^{+0.025}_{+0.009}$	114.3 $^{+0.035}_{0}$	52.5 ~ 81.5	8	28.5	200	(4)M12 × 1.75, DP24	1.633 × 10^{-3}
	AA	32 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	52.5 ~ 81.5	8	28.5	200	(4)M12 × 1.75, DP24	1.651 × 10^{-3}
	AB	28 $^{+0.021}_{0}$	114.3 $^{+0.035}_{0}$	52.5 ~ 81.5	8	28.5	200	(4)M12 × 1.75, DP24	1.667 × 10^{-3}
	BN	35 $^{+0.025}_{+0.009}$	200 $^{+0.046}_{0}$	52.5 ~ 81.5	8	28.5	235	(4)M12 × 1.75, DP24	1.633 × 10^{-3}
SP240	AN	42 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	4.246 × 10^{-3}
	AA	32 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	4.340 × 10^{-3}
	AB	35 $^{+0.025}_{+0.009}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	4.321 × 10^{-3}
	AC	38 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	4.296 × 10^{-3}
	BB	35 $^{+0.025}_{+0.009}$	200 $^{+0.046}_{0}$	55.0 ~ 113.0	16	25	235	(4)M12 × 1.75, DP24	4.321 × 10^{-3}
SP360	AN	42 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	6.436 × 10^{-3}
	AA	32 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	6.530 × 10^{-3}
	AB	35 $^{+0.025}_{+0.009}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	6.511 × 10^{-3}
	AC	38 $^{+0.025}_{0}$	114.3 $^{+0.035}_{0}$	55.0 ~ 113.0	16	25	200	(4)M12 × 1.75, DP24	6.486 × 10^{-3}
	BB	35 $^{+0.025}_{+0.009}$	200 $^{+0.046}_{0}$	55.0 ~ 113.0	16	25	235	(4)M12 × 1.75, DP24	6.511 × 10^{-3}

Allowable Moment Load Diagrams / Allowable Payloads

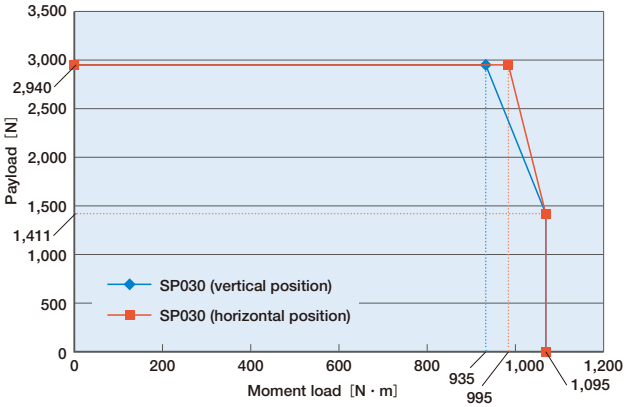
*Payload value is reference only.

SP030

Allowable payloads for different centers of gravity of load (horizontal position)

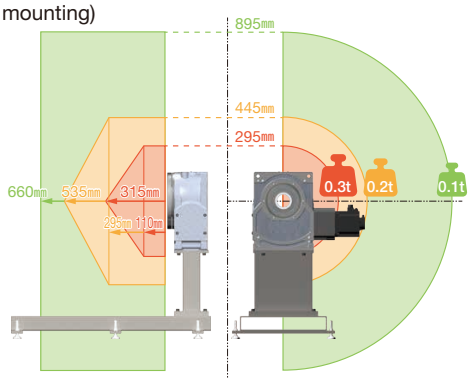


Allowable Moment Load Diagram

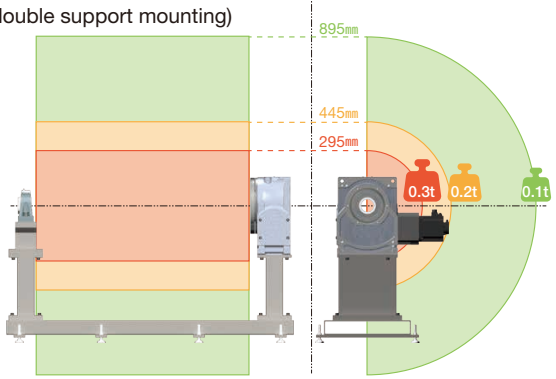


Allowable payloads for different centers of gravity of load (vertical position)

(For cantilever mounting)

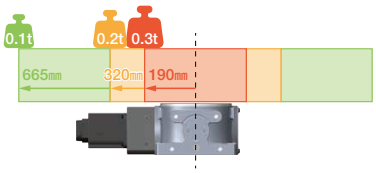


(For double support mounting)

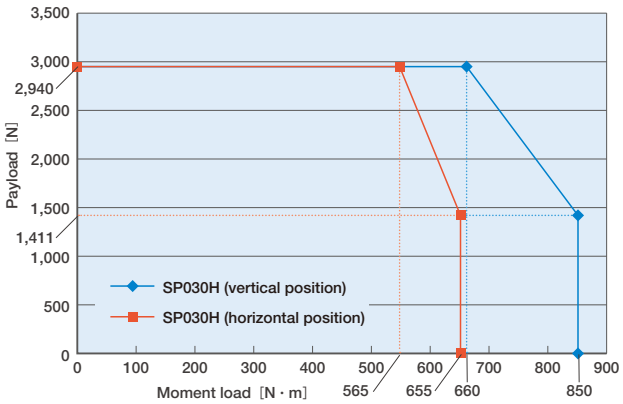


SP030H

Allowable payloads for different centers of gravity of load (horizontal position)

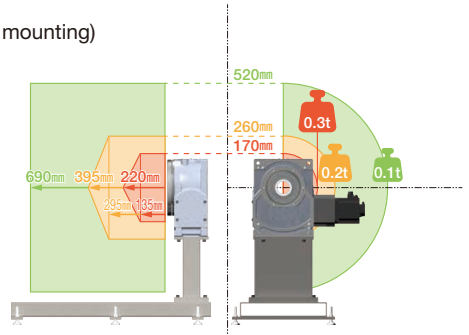


Allowable Moment Load Diagram

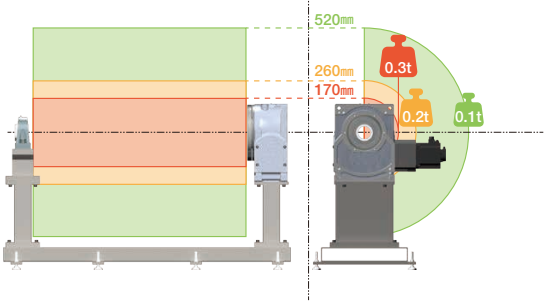


Allowable payloads for different centers of gravity of load (vertical position)

(For cantilever mounting)

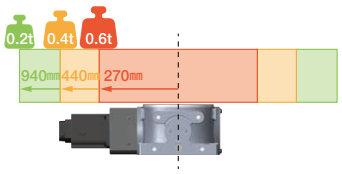


(For double support mounting)

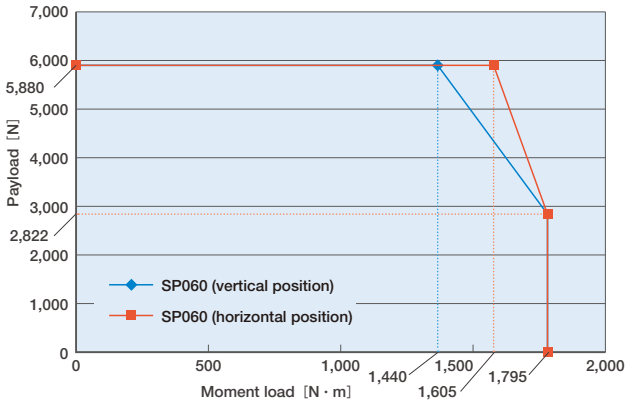


SP060

▶ Allowable payloads for different centers of gravity of load (horizontal position)

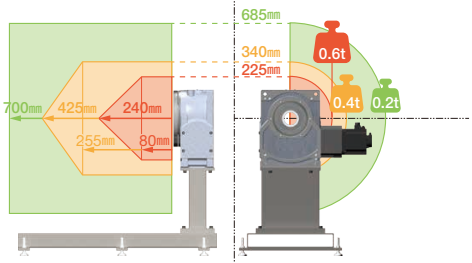


▶ Allowable Moment Load Diagram

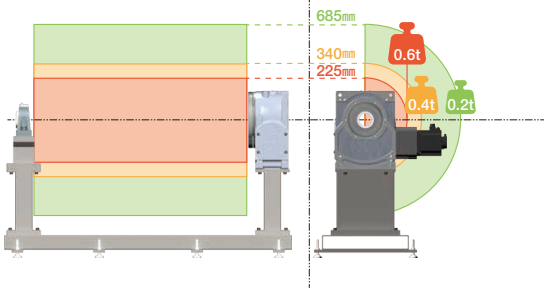


▶ Allowable payloads for different centers of gravity of load (vertical position)

(For cantilever mounting)

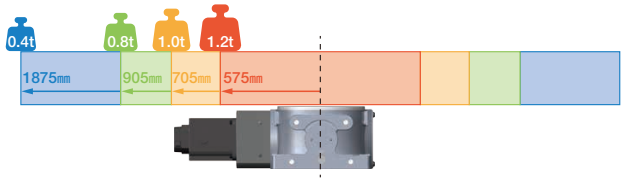


(For double support mounting)

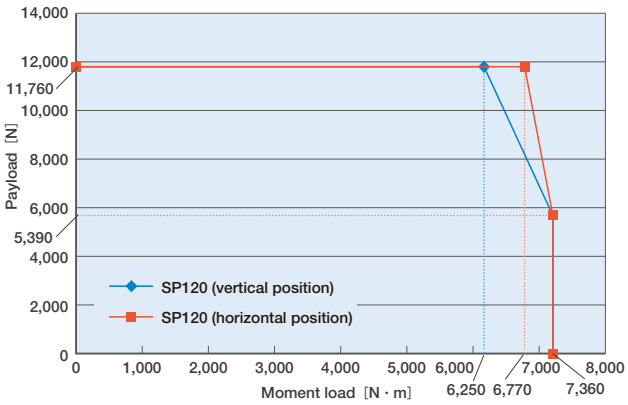


SP120

▶ Allowable payloads for different centers of gravity of load (horizontal position)

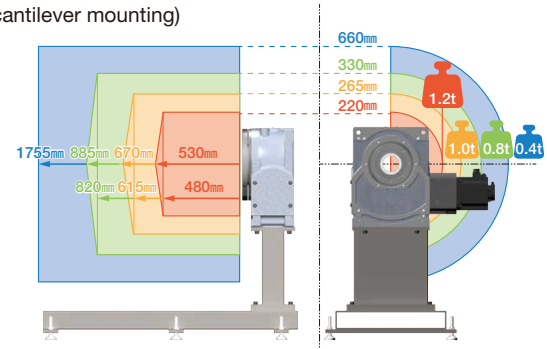


▶ Allowable Moment Load Diagram

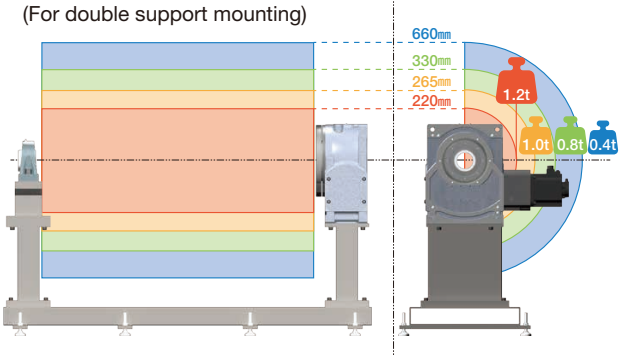


▶ Allowable payloads for different centers of gravity of load (vertical position)

(For cantilever mounting)

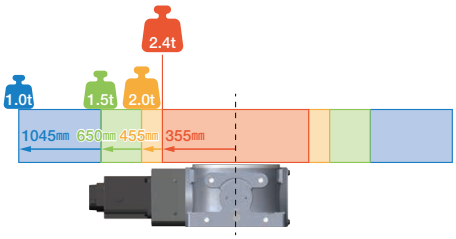


(For double support mounting)

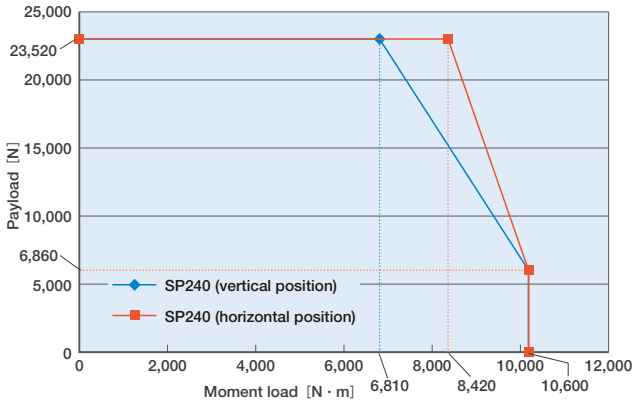


SP240

Allowable payloads for different centers of gravity of load (horizontal position)

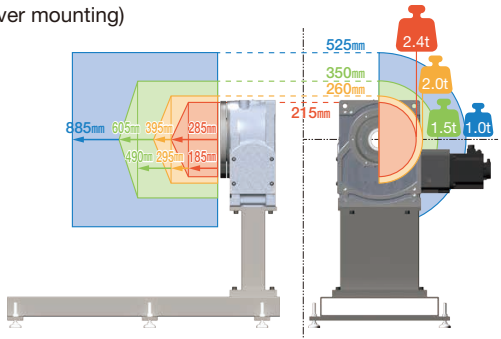


Allowable Moment Load Diagram

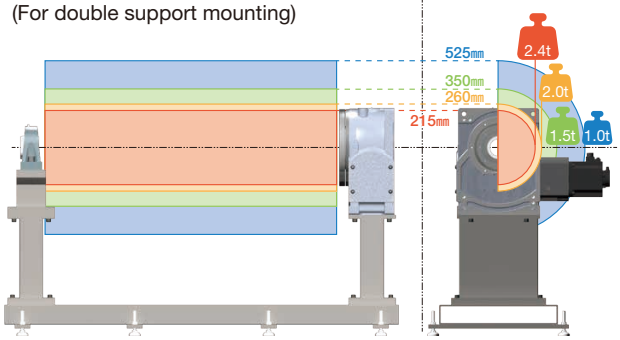


Allowable payloads for different centers of gravity of load (vertical position)

(For cantilever mounting)

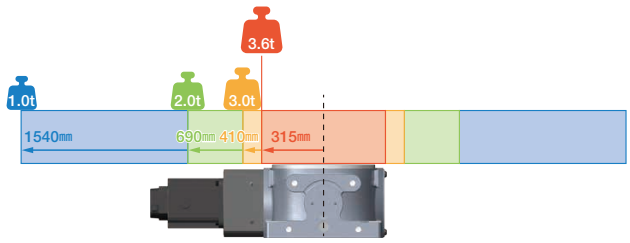


(For double support mounting)

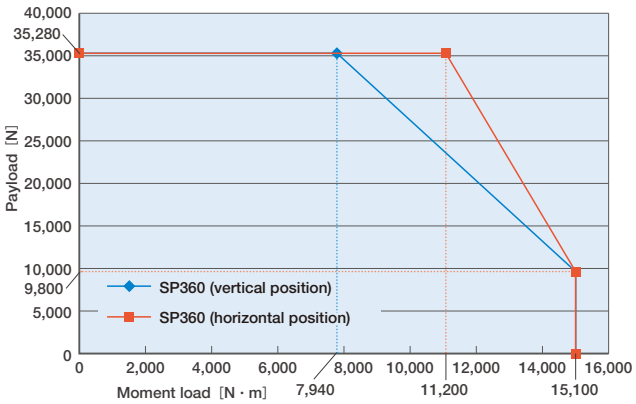


SP360

Allowable payloads for different centers of gravity of load (horizontal position)

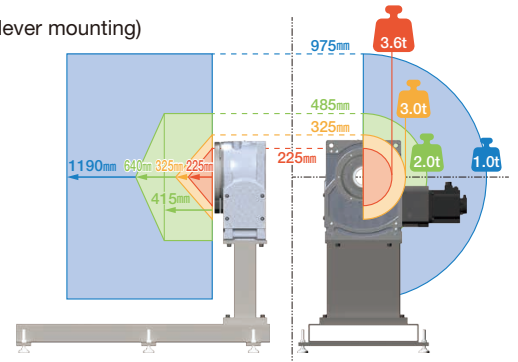


Allowable Moment Load Diagram

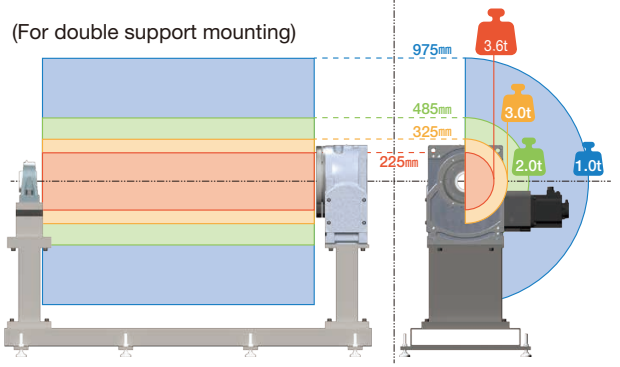


Allowable payloads for different centers of gravity of load (vertical position)

(For cantilever mounting)



(For double support mounting)



Attention: Date:

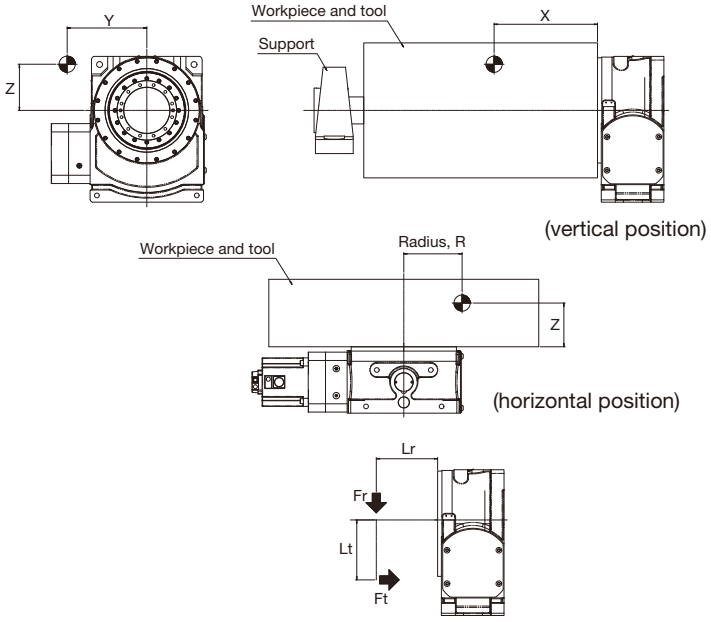
Our contact person:

Model Sizing Form for the *RollerDrive*® SP series

Customer's Company, Department	TEL
Address	FAX
Name	Email

A) Application

B) Overview drawing, loads, operating environment, etc.



Weight of workpiece and tool : W [kg]

Moment of inertia of workpiece and tool : I [kg·m²]

Center of gravity position
X Y Z
R [mm]

With support
Yes / No

External load, except for loading weight of tool and workpiece

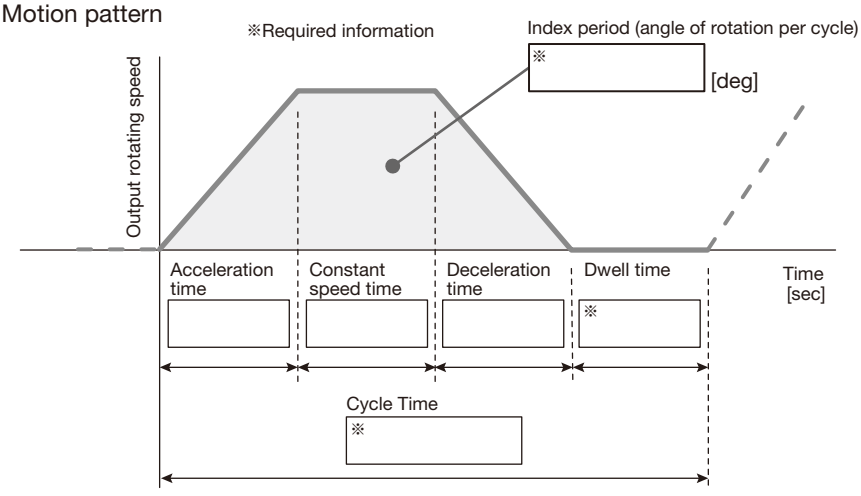
Thrust load : Ft [N]

Distance of thrust load operating point : Lt [mm]

Radial load : Fr [N]

Distance of radial load operating point : Lr [mm]

C) Motion pattern



D) Intended servomotor

Manufacturer

Model No.

Motor capacity (rated output) [kW]

E) Mounting side of servomotor

T surface (right side viewed from front)
U surface (left side viewed from front)
Circle applicable answer.

F) Accompanying document

Yes / No Circle applicable answer.

ID, etc.

SP-2020/12E-S

Contact sales person at Sankyo

Handling

Installation Site

The RollerDrive products with standard specifications should be installed in locations where they can be easily checked and maintained. Specifically:

- Environment temperature from 0 to +40 °C
- Humidity under 85% (no condensation)
- Non vacuum or extreme pressure
- No exposure to water, oil, chemicals, dusts, etc.
- No existence of explosive gas, other hazardous gas, or radio active materials
- No direct sunlight
- Excessive shock or force does not act
- Minimal electromagnetic noise
- Free of radioactive materials and strong magnetic fields
- No welding current within the main body (Connect a secondary welding current ground separately as needed.)

Operating Conditions

- Depending on the operation pattern, the product surface temperature may rise because of heating in the servo motor or the product itself. Ensure cooling to 60℃ or less.
- If the product is used repeatedly with a small rotation angle (10 degrees or less), the resultant poor lubrication may significantly reduce the product service life. Please contact us if the intended output rotation angle is 10 degrees or less.

⚠ Limitations on the use of this product

- This product cannot be used in applications where operation of the product has a direct impact in human life, or can cause bodily harm to people.

  The scope of these use limitations includes the following applications:

  i . Medical equipment

  ii . Nuclear power related equipment

  iii . Aerospace equipment

  iv . Equipment for handling explosive, corrosive or toxic substances etc.
- Please consult with our company if you are considering use in one of the above applications.
- If there is a possibility that this product will be used in a final use location outside Japan, in weapons or equipment for weapon manufacture, then it may be subject to regulation due to the Foreign Exchange and Foreign Trade Control Law. Please take extra care with regard to the application and region of use, and properly submit applications and follow procedures if necessary.

⚠ Notes on information

- Specifications, dimensions and other information relating to this product provided in this catalog are subject to change without prior notice.
- The information in this catalog is current as of February 2022.
-

Please refer to the instruction manual for other safety information or product handling details.

Welding Positioner Lineup

Horizontal models *SH series*

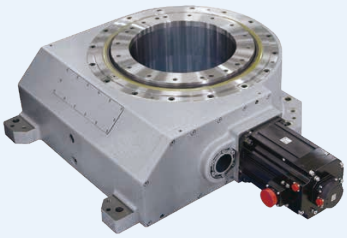
〈Features〉

- Large hollow bore output and wiring space for **simplified wiring and piping**
- Proprietary rolling reducer mechanism for **high-efficiency driving**
- Orthogonal axis with **no need to remove the jig** when replacing the motor

〈Size〉

- Payload : 5,000 (kg)

High-speed rotary welding positioner *RW series*



〈Features〉

- High speed and high accuacy with excellent setting performance for for **reduced tact time**
- Large hollow bore output and wiring space for **simplified wiring and piping**
- **Reduces downtime** with a durability that can withstand the impact of an emergency stop

〈Sizes〉

- Payload : 2,000, 5,000, 9,000 (kg)

Double supported 2-axis model *SP_DS series*

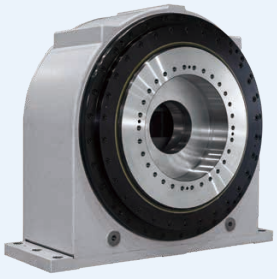
〈Features〉

- High speed and high accuracy with excellent settling performance for **reduced tact time**
- Thin-yet-highly rigid compact design capable of handling **payloads up to 600 kg**
- Large-diameter hollow bore on each axis for **simplified wiring and piping**

〈Size〉

- Payload : 600 (kg)

Vertical heavy load welding positioner, *SP10TV*



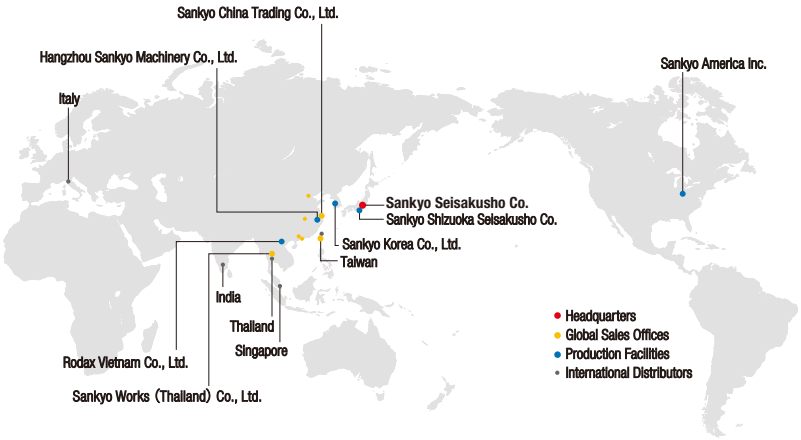
〈Features〉

- Enables **positioning a large-heavy workpiece** by using a heavy-load bearing
- Enables **stable positioning** by using a roller drive as driving init
- **Easy maintenance** with a simple design

〈Size〉

- Payload : 10,000 (kg)

Global network



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Mon-Fri AM8:30-12:00 PM13:00-17:30 UTC + 09:00 (JST) (Except public holidays and company holidays)

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SP-2022/02E(AZ)