Welding positioner

RollerDrive®

SP series

Product specifications may be changed without prior notice. Before ordering, please contact our sales department.

All patent rights and copyrights for parts of mechanisms described in this catalog and for trademarks, images, drawings etc. belong to Sankyo Seisakusho Co.

“RollerDrive” is a registered trademark of Sankyo Seisakusho Co. in Japan.
**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 Reducer is a precision reducer that uses the roller gear cam mechanism, one of the finest motion control mechanisms available. The unit is constructed from an input shaft and a turret (output shaft) that is assembled with 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)
- Oversized hollow shaft: 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
- Straddle-mounted BBQ welding positioner
- Horizontal single-axis welding positioner
- Ferris-wheel type welding positioner
### Product Code

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Gear Ratio</th>
<th>Servomotor Position</th>
<th>Attachment Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP030</td>
<td>140</td>
<td>T</td>
<td>T surface</td>
</tr>
<tr>
<td>SP030H ¹</td>
<td>056</td>
<td>SP030H</td>
<td>U surface</td>
</tr>
<tr>
<td>SP060</td>
<td>140</td>
<td>SP060</td>
<td></td>
</tr>
<tr>
<td>SP120</td>
<td>120</td>
<td>SP120</td>
<td></td>
</tr>
<tr>
<td>SP240</td>
<td>126</td>
<td>SP240</td>
<td></td>
</tr>
<tr>
<td>SP360</td>
<td>168</td>
<td>SP360</td>
<td></td>
</tr>
</tbody>
</table>

¹ High-speed model.

² The servomotor to be mounted should be equipped with an oil seal.

### RollerDrive Surfaces

**Servo motor position**

<table>
<thead>
<tr>
<th>U</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Servo motor position U" /></td>
<td><img src="image" alt="Servo motor position T" /></td>
</tr>
</tbody>
</table>

**Servo motor connector position**

<table>
<thead>
<tr>
<th>R</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Servo motor connector position R" /></td>
<td><img src="image" alt="Servo motor connector position S" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Servo motor connector position V" /></td>
<td><img src="image" alt="Servo motor connector position W" /></td>
<td><img src="image" alt="For a motor to be mounted by the customer" /></td>
</tr>
</tbody>
</table>

* Shown with servomotor on “T” surface
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>SP030</th>
<th>SP030H</th>
<th>SP060</th>
<th>SP120</th>
<th>SP240</th>
<th>SP360</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output table diameter (mm)</td>
<td>155</td>
<td>155</td>
<td>155</td>
<td>220</td>
<td>260</td>
<td>335</td>
</tr>
<tr>
<td>Output hollow diameter (mm)</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>170</td>
<td>170</td>
<td>245</td>
</tr>
<tr>
<td>Allowable payload (kg)</td>
<td>300</td>
<td>300</td>
<td>600</td>
<td>1200</td>
<td>2400</td>
<td>3600</td>
</tr>
<tr>
<td>Allowable moment load¹ (N·m)</td>
<td>1,095</td>
<td>850</td>
<td>1,795</td>
<td>7,360</td>
<td>10,800</td>
<td>15,100</td>
</tr>
<tr>
<td>Gear ratio</td>
<td>140</td>
<td>56</td>
<td>140</td>
<td>120</td>
<td>126</td>
<td>168</td>
</tr>
<tr>
<td>Maximum rotating speed (min⁻¹)</td>
<td>30 (180°/sec)</td>
<td>60 (360°/sec)</td>
<td>30 (180°/sec)</td>
<td>20 (120°/sec)</td>
<td>20 (120°/sec)</td>
<td>20 (120°/sec)</td>
</tr>
<tr>
<td>Repeatability (mm)</td>
<td>± 0.03 (R=250mm)</td>
<td>± 0.03 (R=250mm)</td>
<td>± 0.03 (R=250mm)</td>
<td>± 0.03 (R=500mm)</td>
<td>± 0.05 (R=500mm)</td>
<td>± 0.05 (R=500mm)</td>
</tr>
<tr>
<td>Momentary max. allowable torque (N·m)</td>
<td>1,900</td>
<td>1,160</td>
<td>2,720</td>
<td>6,900</td>
<td>9,400</td>
<td>12,700</td>
</tr>
<tr>
<td>Start / Stop limit torque (N·m)</td>
<td>875</td>
<td>510</td>
<td>1,350</td>
<td>1,960</td>
<td>5,150</td>
<td>9,580</td>
</tr>
<tr>
<td>Internal moment of inertia at the input shaft² (kg·m²)</td>
<td>3.73 × 10⁻⁴</td>
<td>4.20 × 10⁻⁴</td>
<td>3.73 × 10⁻⁴</td>
<td>1.667 × 10⁻³</td>
<td>4.340 × 10⁻³</td>
<td>6.530 × 10⁻³</td>
</tr>
<tr>
<td>Recommended motor power³ (kW)</td>
<td>1kW</td>
<td>1kW</td>
<td>1.5kW</td>
<td>2kW</td>
<td>5.5kW</td>
<td>7.5kW</td>
</tr>
<tr>
<td>Paint color</td>
<td>N1.5 (Black)</td>
<td>N1.5 (Black)</td>
<td>N1.5 (Black)</td>
<td>N1.5 (Black)</td>
<td>N1.5 (Black)</td>
<td>N1.5 (Black)</td>
</tr>
<tr>
<td>Net weight (kg)</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>270</td>
<td>545</td>
<td>780</td>
</tr>
</tbody>
</table>

¹ Allowable moment load depends on the mounting direction and payload. For details, please refer to the allowable moment load 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 power value is reference only. It depends on the operating conditions.
Dimensions

### SP030(H) / SP060

- Dimensions:
  - φ150 (Rotating output part)
  - φ220

- Grease zerk (for gears)

- Usable depth: ±0.05*

- Positional dimension tolerances apply only to bores of φ12.5, 16DP.

- The directions of input-output rotary axes are related as a-d and b-c.

- For dimensions of the motor mounting portion, see the attachment code selection table on page 7.

- When attachment code BN is selected, the dimension is 52 mm.

### SP120

- Dimensions:
  - φ170 (Rotating output part)
  - φ200

- Grease zerk (for gears)

- Usable depth: ±0.05*

- Positional dimension tolerances apply only to bores of φ12.5, 16DP.

- The directions of input-output rotary axes are related as a-d and b-c.

- For dimensions of the motor mounting portion, see the attachment code selection table on page 7.

*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 φ12.5, 16DP.

*3 The directions of input-output rotary axes are related as a-d and b-c.

*4 For dimensions of the motor mounting portion, see the attachment code selection table on page 7.

*5 When attachment code BN is selected, the dimension is 52 mm.
**SP240**

- **Output table**
- **Grease zerk (for gears)**

*1 This drawing is for a model where the servo motor is mounted on the T surface.

*2 Positional dimension tolerances apply only to ø12.5 mm.

*3 The directions of input-output rotary axes are related as a-d and b-c.

*4 For dimensions of the motor mounting portion, see the attachment code selection table on page 7.

**SP360**

- **Output table**
- **Grease zerk (for gears)**

*1 This drawing is for a model where the servo motor is mounted on the T surface.

*2 Positional dimension tolerances apply only to ø12.5 mm.

*3 The directions of input-output rotary axes are related as a-d and b-c.

*4 For dimensions of the motor mounting portion, see the attachment code selection table on page 7.
## Attachment Code Selection Chart

<table>
<thead>
<tr>
<th>Model</th>
<th>Attachment code</th>
<th>φ a</th>
<th>φ b</th>
<th>c</th>
<th>d</th>
<th>φ e</th>
<th>f</th>
<th>J (internal moment of inertia at the input shaft) [kg m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP030</td>
<td>AN</td>
<td>24</td>
<td>0.055</td>
<td>0</td>
<td>110</td>
<td>8</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>19</td>
<td>0.055</td>
<td>0</td>
<td>110</td>
<td>8</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>22</td>
<td>0.055</td>
<td>0</td>
<td>110</td>
<td>8</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td></td>
<td>BN</td>
<td>17</td>
<td>0.046</td>
<td>0</td>
<td>110</td>
<td>4.1</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td>SP030H</td>
<td>AN</td>
<td>24</td>
<td>0.055</td>
<td>0</td>
<td>110</td>
<td>8</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>19</td>
<td>0.055</td>
<td>0</td>
<td>110</td>
<td>8</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>22</td>
<td>0.055</td>
<td>0</td>
<td>110</td>
<td>8</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td></td>
<td>BN</td>
<td>17</td>
<td>0.046</td>
<td>0</td>
<td>110</td>
<td>4.1</td>
<td>145</td>
<td>(4)M8 × 1.25, DP16</td>
</tr>
<tr>
<td>SP120</td>
<td>AN</td>
<td>35</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>8</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>32</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>8</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>28</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>8</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>BN</td>
<td>35</td>
<td>0.046</td>
<td>0</td>
<td>200</td>
<td>8</td>
<td>235</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td>SP240</td>
<td>AN</td>
<td>42</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>32</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>35</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AC</td>
<td>38</td>
<td>0.046</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>BB</td>
<td>35</td>
<td>0.046</td>
<td>0</td>
<td>200</td>
<td>16</td>
<td>235</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td>SP360</td>
<td>AN</td>
<td>42</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>32</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>35</td>
<td>0.055</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>AC</td>
<td>38</td>
<td>0.046</td>
<td>0</td>
<td>114.3</td>
<td>16</td>
<td>200</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
<tr>
<td></td>
<td>BB</td>
<td>35</td>
<td>0.046</td>
<td>0</td>
<td>200</td>
<td>16</td>
<td>235</td>
<td>(4)M12 × 1.75, DP24</td>
</tr>
</tbody>
</table>

### Motor mounting portion

Motor base  
Clamping collar  
Motor gear  
Motor shaft sleeve  
O-ring  
Motor mounting screws  
Servomotor  
Clamping collar fastening screws

*1 This may not be included depending on the specification.

*2 The motor mounting screws are not included.
Allowable Moment Load Diagrams / Allowable Payloads

*Payload value is reference only.

**SP030**
- Allowable payloads for different centers of gravity of load (horizontal position)

**SP030H**
- Allowable payloads for different centers of gravity of load (horizontal position)

**Allowable Moment Load Diagram**

![Allowable Moment Load Diagram](image)

**Allowable Moment Load Diagram**

![Allowable Moment Load Diagram](image)
Allowable Moment Load Diagrams / Allowable Payloads

*Payload value is reference only.

### SP060

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

- **Allowable Moment Load Diagram**

### SP120

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

- **Allowable Moment Load Diagram**
SP240

_allowable payloads for different centers of gravity of load (horizontal position)_

_allowable moment load diagram_

SP360

_allowable payloads for different centers of gravity of load (horizontal position)_

_allowable moment load diagram_
Other RollerDrive Products

**MR series**
The RollerDrive MR series, the smallest in the world, has been developed to meet the increasing demands for downsized manufacturing equipment as workpieces in the market are becoming smaller and more accurate. The zero-backlash feature enables high repeatability and great durability. The MR series broadens the horizon of FA equipment design in limited spaces, offering excellent performance in semiconductor/display-related manufacturing inspection equipment, as well as in assembly, transport, and measurement applications.

**RA series**
The RA Series is a compact unit designed for easy integration. It features zero-backlash for precision positioning performance, and our RollerDrive precision reducer for high power transmission efficiency. Cross-roller bearings are standard on the output for precision motion with strong rigidity.

Upon request, a servomotor can be sized and mounted to provide a drop-in solution that does not require you to design or assemble a drive system. The output features an oversized hollow bore for use in conjunction with other equipment, and for routing cables and pipes.

**RU series**
The RU series provides all-purpose models for a broad range of industries, combining performance (accuracy, rigidity, etc.) and functionality (high gear ratios, environmental considerations, etc.). The high rigidity achieved by use of a cast iron chassis and rigid output bearings finds ideal applications in heavy-load environments, such as deburring and caulking.

Applications include, among others, assembling automotive components, machining large components, and transporting heavy objects, which can only be handled using equipment built for high torque, precision, and rigidity.

**RCD series**
The RCD series consists of single-axis tables, which are the basic for Sankyo CNC rotary tables and designed for smaller size and lighter weight as compared with conventional machines without sacrificing rigidity. The tables are operated more easily with a rich variety of options: support table, tail stock, rotary joint, and encoder, which may be necessary for some machining conditions. In terms of performance compared with conventional worm reducer tables, the clampless machining ability contributes to a significant productivity increase because of reduction in non-cutting time.

**RT series**
The RT series provides cantilever-mounted, 2-axis tilting rotary tables with a compact body that fits in limited spaces. The tables are ideal for 5-axis machining of automotive/aircraft components and medical parts. The RollerDrive CNC eliminates the need for periodic calibration or adjustment as it is durable, free from internal component degradation and accuracy change over long periods.
Model Sizing Form for the *RollerDrive®* SP series

Customer's Company, Department

Address

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・㎡]

Center of gravity position: X, Y, Z [mm]

Support required: 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]

External load, except for loading weight of tool and workpiece

C) Motion pattern

Index period (angle of rotation per cycle): [deg]

Required information

D) Intended servomotor

Manufacturer

Model No.

Motor power (rated output): [kW]

E) Mounting direction of servomotor

T surface (right side viewed from front)

U surface (left side viewed from front)

Circle applicable answer.

F) Accompanying document

Yes / No

ID, etc.

Circle applicable answer.

SP-2018/10E-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
- No welding current within the main body (Connect a secondary welding current ground separately as needed.)
- Minimum electro magnetic noise (be cautious on welding machines)

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°C or less.
- If the product is used repeatedly with a small swing 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 2019.
- Patent rights and copyrights for some mechanisms, trademarks, images, drawings and other material in this catalog all belong to Sankyo Seisakusho Co. Copying, reuse or distribution of any material in this catalog without the permission of Sankyo Seisakusho is forbidden.

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

Group Company
SANKYO AMERICA INC.
10655 State Route 47 Sidney, Ohio, 45365 U.S.A.
PHONE:+1-(0)937-498-4901 • FAX:+1-(0)937-498-8403
E-mail:sales@sankyoautomation.com

SANKYO KOREA CO., LTD.
102-408, Digital Empire 2, Bill Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeongg-do, 443-734 Korea
PHONE:+82-(0)31-695-5801 • FAX:+82-(0)31-695-5803

SANKYO CHINA TRADING CO., LTD.
[ SHANGHAI HEAD OFFICE ]
Room 1103, Block B, No.391 Guiping Road,
Shanghai 200233 China
PHONE:+86-(0)21-5445-2813 • FAX:+86-(0)21-5445-2340
E-mail:sales@sankyochina-trading.com

[ SHENZHEN BRANCH OFFICE ]
Room 913, Xing Pu building, No.12 Guan Hong Road,
Guangzhou Economic Development Zone, Guangzhou 510670 China
PHONE:+86-(0)20-8985-1846 • FAX:+86-(0)20-8225-7346

HANGZHOU SANKYO MACHINERY CO., LTD.
No.2518 Jiang Dong 2 Road, Hangzhou Jiang Dong Industrial Park,
Xiaoshan Zerne, Hangzhou, Zhejiang, China
PHONE:+86-(0)571-8283-3211 • FAX:+86-(0)571-8283-1133

RODAX VIETNAM CO., LTD.
Plot No. M1, Thang Long Industrial Park II
Di Su, My Hao, Hung Yen, Viet Nam
PHONE:+84-(0)221-3-589708

SANKYO WORKS (THAILAND) CO., LTD.
9/31 Moo 5, Phaholyotin Road, Klongnueng,
Klong Luang, Pathumthani 12120 Thailand
PHONE:+66-(0)2-516-5355 • FAX:+66-(0)2-068-0931

Contact us

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

Head Office
3-37-3 Tabata-machi, Kita-ku, Tokyo, Japan 114-8538
PHONE: +81-(0)3-3800-3330
FAX: +81-(0)3-3800-3380
E-MAIL: overseas@sankyo-seisakusho.co.jp

TAIWAN
No.25, Gongyeqiu 40th Rd., Xiehe Vil., Xitun Dist., Taichung City 40768, Taiwan (R.O.C.)
PHONE. +886-(0)4-2359-4048
FAX. +886-(0)4-2359-4720
E-MAIL: tw-sales@rollerdrive.com
* Product specifications may be changed without prior notice. Before ordering, please contact our sales department.

All patent rights and copyrights for parts of mechanisms described in this catalog and for trademarks, images, drawings etc. belong to Sankyo Seisakusho Co.

*RollerDrive* is a registered trademark of Sankyo Seisakusho Co. in Japan.