Swivel jaw

pneumatic
# Swivel Jaws

<table>
<thead>
<tr>
<th>Order no./Paar</th>
<th>Swivel angle [°]</th>
<th>Torque/Paar [Nm]</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Information</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>SB32-C</td>
<td>90/180</td>
<td>0,2</td>
<td>10</td>
</tr>
<tr>
<td>SB40-B</td>
<td>90/180</td>
<td>0,6</td>
<td>12</td>
</tr>
<tr>
<td>SB54-B</td>
<td>90/180</td>
<td>3,2</td>
<td>14</td>
</tr>
<tr>
<td>Swivel jaws Formulas</td>
<td></td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>

## Swivel Jaws Formulas

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Swivel angle [°]</th>
<th>Torque [Nm]</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Information</td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>SB50-90-B</td>
<td>90</td>
<td>1,2</td>
<td>22</td>
</tr>
<tr>
<td>SB50-180-B</td>
<td>180</td>
<td>1,2</td>
<td>22</td>
</tr>
<tr>
<td>SB50G</td>
<td>-</td>
<td>-</td>
<td>22</td>
</tr>
<tr>
<td>SB74-90-B</td>
<td>90</td>
<td>3,5</td>
<td>24</td>
</tr>
<tr>
<td>SB74-180-B</td>
<td>180</td>
<td>3,5</td>
<td>24</td>
</tr>
<tr>
<td>SB74G</td>
<td>-</td>
<td>-</td>
<td>24</td>
</tr>
<tr>
<td>SB100-90-B</td>
<td>90</td>
<td>10,0</td>
<td>26</td>
</tr>
<tr>
<td>SB100-180-B</td>
<td>180</td>
<td>10,0</td>
<td>26</td>
</tr>
<tr>
<td>SB100G</td>
<td>-</td>
<td>-</td>
<td>26</td>
</tr>
<tr>
<td>SB150-90</td>
<td>90</td>
<td>23,0</td>
<td>28</td>
</tr>
<tr>
<td>SB150-180</td>
<td>180</td>
<td>23,0</td>
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<tr>
<td>SB150G</td>
<td>-</td>
<td>-</td>
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<tr>
<td>SB190-90</td>
<td>90</td>
<td>57,0</td>
<td>30</td>
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<tr>
<td>SB190-180</td>
<td>180</td>
<td>57,0</td>
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<td>SB190G</td>
<td>-</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>Swivel jaws Formulas</td>
<td></td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>
Features

- Small compact swivel jaw in three sizes, with torque up to 3.2 Nm
- Optimally suited to low mass workpieces, for 90° or 180° swivel angle, convertible for quick batch change
- Can be screwed on directly as a gripping jaw on the gripper, gripping and rotating as a compact unit, various universal jaws available as accessories

Functional diagram

Two way bearing drive shaft
- High force and torque intake

Drive shaft
- As hexagonal or round shaft with feather key, depending on design
- Quick and cost effective positioning of application-specific workpiece intakes

Force transfer
- Stable toothed belt with steel inlay
- Quiet, reliable, durable

Drive with stable counterbearing
- Low torsion for maximum force transfer

Fixing and positioning
- Alternate on several sides for individual assembly of the swivel jaws

Stop
- Swivel angle of 0 – 180°
- Stable, with Fibroflex stop surface
- Alternate 0°-90°-stop included in the delivery

Endposition
- +/- 3° Adjustable end position

Position sensing
- Inquiry of end positions 0° and 90° (or 180°) via inductive proximity switch
- Integrated in housing, no additional interference contour

Energy feed
- Possible from several sides (from SB40)

Robust, light housing
- Hard, coated aluminium alloy

Drive
- Double acting rotor cylinder
Terms

**Torque:** force moment on the swivel jaw drive shaft

**Swivel time:** time required to cover 0°/90° or 0°/180° swivel movement

**Repeatability:** dispersion of stop position at 100 consecutive swivel cycles

**Cycle:** Distance covered by the drive wing in one 0°/90°/0° or 0°/180°/0° swivel movement

**Maintenance:** maintenance free up to 10 Mio. swivel cycles
(please see the owner’s manual for conditions, download from www.sommer-automatic.com)
• long maintenance intervals keep costs down
• long durability

Model

<table>
<thead>
<tr>
<th>Order no./pair</th>
<th>Swivel angle</th>
<th>Torque/pair</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB32-D</td>
<td>90° oder 180°</td>
<td>0.2 Nm</td>
</tr>
<tr>
<td>SB40-B</td>
<td>90° oder 180°</td>
<td>0.6 Nm</td>
</tr>
<tr>
<td>SB54-B</td>
<td>90° oder 180°</td>
<td>3.2 Nm</td>
</tr>
</tbody>
</table>

Order advice
SB32-D, SB40-B and SB54-B are delivered pairwise

Application example
Swivel jaws

Drive
Double acting pneumatic rotor cylinder
- Maximum torque in both rotation directions
- Torque up to 3.2 Nm

Swivel angle 90° or 180°
End stop can be aligned via adjustment screw +/-3°
- External fix stop to absorb the force over housing prevents overload of toothed belt and drive rotor

Force transfer
Via toothed belt
- Optimum steering of drive force in torque
- High repeat accuracy
- Two way ball bearings for high torque intake

Machine connection
Energy supply, attachment and positioning-possibilities on several sides
- Optimum integration into the workroom through individual mounting situation
**Individual workpiece intakes**

Direct screwing on drive flange via hexagon or round shaft with feather key
- Stable, anti-twist connection
- Low design effort
- Quick and cost effective positioning of application-specific workpiece intakes

**Tension roller**

Shift free swivel movement due to tension roller
- Clean swivel movement
- High repeat accuracy

**Position sensing**

Intake for inductive proximity switch
- Process safe
- Low interference contour
- Compact

**Energy feed**

Recommended via one-way flow control valve
- Allows speed regulation and adapted approach to the end position
Swivel jaws

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Included in the delivery

Stop
90° Order no. BGEH03350
90° Order no. BGEH0340
(90° assembled ex works)

Sleeve for proximity switch
Order no. BDMS03210

Straight pin to close the bore for proximity switch
Order no. C632504100

Pin screw for clamping of the proximity switch
Order no. C091303089
Order no. C091303099

Accessory list

Proximity switch
Order no. NJ4-E2

Pneumatic fittings
Order no. GVM5

Basic jaw
Order no. SB32-1-C (K1) (pair)
Order no. SB32-1-C/01 (K2) (pair)

Basic jaw (rubber coated)
Order no. SB32-2-C (pair)

Plug 3-pole
Order no. S12-G-3

One-way flow control valve
Order no. DRV1/11

Subject to change without prior notice
Order no.: SB32-D

Swivel angle [°]: 90/180
Torque per jaw [Nm]: 0.1
Swivel angle 90° or 180° adjustable +/- [°]: 3
Repeatability +/- [°]: 0.5
Fa [N]: 180
F0 [N]*: 90
Fz [N]*: 90
Mr [Nm]: 2.1
Min./max. operating pressure [bar]: 3/7
Min./max. operating temperature [°C]: 5/80
Air volume per cycle [cm³]: 2
Weight [g]**: 300

All data measured at 6 bar/jaw
* Consider the force of the grippers
** Total weight pair

Subject to change without prior notice
Swivel jaws

Included in the delivery

- Stop
  - 90° Order no. BGEH03350
  - 180° Order no. BGEH04150
  - (180° assembled ex works)

- Sleeve for proximity switch
  Order no. BDMS03210

- Straight pin to close the bore for proximity switch
  Order no. C632504100

- Pin screw for clamping of the proximity switch
  Order no. C913030089
  Order no. C913030129

- Feather key for drive shaft
  Order no. C688522080

Accessory list

- Proximity switch
  Order no. NJ4-E2

- Pneumatic fittings
  Order no. DRVM5x4

- Basic jaw
  Order no. SB40-1 (pair)

- Basic jaw (rubber coated)
  Order no. SB40-2 (pair)

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Subject to change without prior notice

Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com
**SB40-B**

<table>
<thead>
<tr>
<th>Order no.: SB40-B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Swivel angle [°]:</td>
<td>90/180</td>
</tr>
<tr>
<td>Torque per jaw [Nm]:</td>
<td>0.3</td>
</tr>
<tr>
<td>Swivel angle 90° or 180° adjustable +/- [°]:</td>
<td>3</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
<td>0.5</td>
</tr>
<tr>
<td>$F_A$ [N]:</td>
<td>770</td>
</tr>
<tr>
<td>$F_D$ [N]*:</td>
<td>385</td>
</tr>
<tr>
<td>$F_z$ [N]*:</td>
<td>385</td>
</tr>
<tr>
<td>$M_r$ [Nm]:</td>
<td>10.8</td>
</tr>
<tr>
<td>Min./max. operating pressure [bar]:</td>
<td>3/7</td>
</tr>
<tr>
<td>Min./max. operating temperature [°C]:</td>
<td>5/80</td>
</tr>
<tr>
<td>Air volume per cycle [cm³]:</td>
<td>4</td>
</tr>
<tr>
<td>Weight [g]**:</td>
<td>700</td>
</tr>
</tbody>
</table>

All data measured at 6 bar/jaw
* Consider the force of the grippers
** Total weight pair

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**Subjects to change without prior notice**
Swivel jaws

Included in the delivery

- Stop 90° Order no. BGEH05591
  180° Order no. BGEH05491 (180° assembled ex works)
- Straight pin to close the bore for proximity switch Order no. BKUN05410
- Sleeve for proximity switch Order no. BDMS03210
- Pin screw for clamping of the proximity switch Order no. C0913040129 Order no. C0913040069
- Feather key for drive shaft Order no. CE08533100

Accessory list

- Proximity switch Order no. NJ4-E2
- Pneumatic fittings Order no. WVM5
- Basic jaw Order no. SB54-1 (pair)
- Basic jaw (rubber coated) Order no. SB54-2 (pair)

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Swivel time [sec]

Moment of inertia [kg m²]

Subject to change without prior notice

Moment of inertia Forces and Moments

Shows the static bearing load

Subject to change without prior notice

Shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Swivel time [sec]

Moment of inertia [kg m²]

Subject to change without prior notice
### SB54-B

<table>
<thead>
<tr>
<th><strong>Order no.:</strong> SB54-B</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Swivel angle [°]:</strong></td>
<td>90/180</td>
</tr>
<tr>
<td><strong>Torque per jaw [Nm]:</strong></td>
<td>1,6</td>
</tr>
<tr>
<td><strong>Swivel angle 90° or 180° adjustable +/- [°]:</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Repeatability +/- [°]:</strong></td>
<td>0,5</td>
</tr>
<tr>
<td><strong>F\text{a} [N]:</strong></td>
<td>850</td>
</tr>
<tr>
<td><strong>F\text{d} [N]*:</strong></td>
<td>425</td>
</tr>
<tr>
<td><strong>F\text{z} [N]*:</strong></td>
<td>425</td>
</tr>
<tr>
<td><strong>M\text{r} [Nm]:</strong></td>
<td>15,3</td>
</tr>
<tr>
<td><strong>Min./max. operating pressure [bar]:</strong></td>
<td>3/7</td>
</tr>
<tr>
<td><strong>Min./max. operating temperature [°C]:</strong></td>
<td>5/80</td>
</tr>
<tr>
<td><strong>Air volume per cycle [cm³]:</strong></td>
<td>16</td>
</tr>
<tr>
<td><strong>Weight [kg]****:</strong></td>
<td>2,2</td>
</tr>
</tbody>
</table>

All data measured at 6 bar/jaw

* Consider the force of the grippers
** Total weight pair

Subject to change without prior notice
**Features**

- Compact swivel jaw in five sizes, with a torque up to 57 Nm and large drive flange for easy connection, dual ball bearings for a high moment intake
- With integrated and patented hydraulic shock absorbers, built into the pressure chamber, cooled due to permanent air flow and therefore constant in damping behaviour
- Can be screwed on directly as a gripping jaw on the gripper, gripping and rotating as a compact unit, with large central bore on the drive shaft to feed-through supply lines (from SB150)

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**Functional diagram**

- **Two way bearing drive shaft**
  - High force and torque intake

- **Endposition**
  - Stable external fix stop for endposition

- **Force transfer**
  - Stable gear wheel set
  - Precise, reliable, durable

- **Integrated and patented shock absorbers**
  - Adjustable end position damping

- **Energy feed**
  - Possible from several sides

- **Position inquiry**
  - Inquiry of end position 0° and 90° (or 180°) via inductive proximity switch
  - Adjustable on twistable switch cam

- **Drive**
  - Double acting pneumatic cylinder

- **Drive flange**
  - Large size drive flange with end stop and large central hole (from SB150)
  - Quick and cost-effective positioning of application-specific workpiece intakes

- **Endposition**
  - +/- 3° Adjustable end position

- **Endposition**
  - For speed (included in the delivery)

- **Robust, lightweight housing**
  - Hard coated aluminium alloy

- **Fixing and positioning**
  - Alternate on several sides for individual assembly of the swivel jaws
Terms

**Torque:** force moment on the swivel jaw drive shaft

**Swivel time:** time required to cover 0°/90° or 0°/180° swivel movement

**Repeatability:** dispersion of stop position at 100 consecutive swivel cycles

**Cycle:** distance covered by the drive wing in one 0°/90°/0° or 0°/180/0° swivel movement

**Maintenance:** maintenance free up to 10 Mio. Swivel cycles (please see the owner’s manual for conditions, download from www.sommer-automatic.com)

- long maintenance intervals keep costs down
- long durability

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**Model**

**G:** swivel jaw without drive and damping serves as counter bearing

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<table>
<thead>
<tr>
<th>Order no.</th>
<th>Swivel angle</th>
<th>Torque</th>
<th>Centre through-bore in the driving shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB50-90-B</td>
<td>90°</td>
<td>1,2 Nm</td>
<td>-</td>
</tr>
<tr>
<td>SB50-180-B</td>
<td>180°</td>
<td>1,2 Nm</td>
<td>-</td>
</tr>
<tr>
<td>SB50G</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SB74-90-B</td>
<td>90°</td>
<td>3,5 Nm</td>
<td>-</td>
</tr>
<tr>
<td>SB74-180-B</td>
<td>180°</td>
<td>3,5 Nm</td>
<td>-</td>
</tr>
<tr>
<td>SB74G</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SB100-90-B</td>
<td>90°</td>
<td>10 Nm</td>
<td>-</td>
</tr>
<tr>
<td>SB100-180-B</td>
<td>180°</td>
<td>10 Nm</td>
<td>-</td>
</tr>
<tr>
<td>SB100G</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SB150-90</td>
<td>90°</td>
<td>23 Nm</td>
<td>Ø 28,5 mm</td>
</tr>
<tr>
<td>SB150-180</td>
<td>180°</td>
<td>23 Nm</td>
<td>Ø 28,5 mm</td>
</tr>
<tr>
<td>SB150G</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SB190-90</td>
<td>90°</td>
<td>57 Nm</td>
<td>Ø 34,0 mm</td>
</tr>
<tr>
<td>SB190-180</td>
<td>180°</td>
<td>57 Nm</td>
<td>Ø 34,0 mm</td>
</tr>
<tr>
<td>SB190G</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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**Application example**

![Application example diagram](image)
Swivel jaws

**Drive**

*Double acting pneumatic cylinder*

- Maximum torque in both rotation directions
- Torque up to 57 Nm

**Swivel angle 90° or 180°**

*End stop can be aligned via adjustment screw +/- 3°*

- External fix stop to absorb the force over housing presents overload of the gear wheels

**Force transfer**

*Via gear wheel set*

- Precise steering of drive force in torque
- High repeat accuracy
- Multi way ball bearing for high torque intake

**Position sensing**

*Intake for inductive proximity switch*

- Process safe
- Adjustable
- Compact
**Large drive flange**

For simple connection

- With central bore (from SB150) for cable feed-through
- Low construction and extension effort for connection of follow-up tools

**Machine connection**

Energy supply, attachment and positioning-possibilities on serveral sides

- Optimum integration into the workroom due to individual installation position

**End position damping**

Hydraulic shock absorber with spiral groove technology

- Low wear approach to end position, gentle energy absorption due to profiled spiral groove
- The damping characteristics can be individually adjusted by the screw depth
- Built into the pressure chamber, cooled by permanent air flow, constant damping behavior
Swivel jaws

Moment of inertia
shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments
Shows the static bearing load

Included in the delivery

- Mounting block
  Order no. KB8K-02

- Pneumatic fittings
  Order no. DRVM5x4

Accessory list

- Proximity switch
  Order no. NJ8-E2S

- Cable angled plug
  Order no. KAW500

- Cable straight plug
  Order no. KAG500

- Plug 3-pole
  Order no. S12-G-3

Subject to change without prior notice

Swivel time [sec]

Moments of inertia [kg m²]

Swivel time [sec]

21.8 mm

78 mm

90°
<table>
<thead>
<tr>
<th>Order no.:</th>
<th>SB50-90-B</th>
<th>SB50-180-B</th>
<th>SB50G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swivel angle [°]:</td>
<td>90</td>
<td>180</td>
<td>-</td>
</tr>
<tr>
<td>Torque per jaw [Nm]:</td>
<td>1,2</td>
<td>1,2</td>
<td>-</td>
</tr>
<tr>
<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
<td>0,01</td>
<td>0,01</td>
<td>-</td>
</tr>
<tr>
<td>Fx [N]:</td>
<td>1720</td>
<td>1720</td>
<td>1720</td>
</tr>
<tr>
<td>Fo [N]*:</td>
<td>860</td>
<td>860</td>
<td>860</td>
</tr>
<tr>
<td>Fz [N]*:</td>
<td>630</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>Mr [Nm]:</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Min./max. operating pressure [bar]:</td>
<td>3/8</td>
<td>3/8</td>
<td>-</td>
</tr>
<tr>
<td>Min./max. operating temperature [°C]:</td>
<td>5/80</td>
<td>5/80</td>
<td>-</td>
</tr>
<tr>
<td>Air volume per cycle [cm³]:</td>
<td>5,5</td>
<td>7,5</td>
<td>-</td>
</tr>
<tr>
<td>Weight [g]:</td>
<td>750</td>
<td>750</td>
<td>450</td>
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</tbody>
</table>

* All data measured at 6 bar
* Consider the force of the grippers

Subject to change without prior notice
Swivel jaws

Swivel jaws

Included in the delivery

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Moment of inertia [kg m^2]

Swivel time [sec]

- SB74

Accessories

- Mounting block
  Order no. KB8K-02

- Pneumatic fittings
  Order no. DRVM5x4

Accessory list

- Proximity switch
  Order no. NJ8-E2S

- Cable angled plug
  Order no. KAWS00

- Cable straight plug
  Order no. KAG500

- Plug 3-pole
  Order no. S12-G-3

24 Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com
<table>
<thead>
<tr>
<th>Order no.:</th>
<th>SB74-90-B</th>
<th>SB74-180-B</th>
<th>SB74G</th>
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<tbody>
<tr>
<td>Swivel angle [°]:</td>
<td>90</td>
<td>180</td>
<td>-</td>
</tr>
<tr>
<td>Torque per jaw [Nm]:</td>
<td>3.5</td>
<td>3.5</td>
<td>-</td>
</tr>
<tr>
<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
<td>0.01</td>
<td>0.01</td>
<td>-</td>
</tr>
<tr>
<td>Fa [N]:</td>
<td>2400</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>Fo [N]*:</td>
<td>1200</td>
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<tr>
<td>Fz [N]*:</td>
<td>630</td>
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<td>630</td>
</tr>
<tr>
<td>Mr [Nm]:</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Min./max. operating pressure [bar]:</td>
<td>3/8</td>
<td>3/8</td>
<td>-</td>
</tr>
<tr>
<td>Min./max. operating temperature [°C]:</td>
<td>5/80</td>
<td>5/80</td>
<td>-</td>
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<td>Air volume per cycle [cm³]:</td>
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</tr>
</tbody>
</table>

All data measured at 6 bar

*Consider the force of the grippers

Subject to change without prior notice
Swivel jaws

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Included in the delivery

Mounting block
Order no. KB8K-02

Pneumatic fittings
Order no. DRV1/8x6

Accessory list

Proximity switch
Order no. NJ8-E2S

Cable angled plug
Order no. KAW500

Cable straight plug
Order no. KAG500

Plug 3-pole
Order no. S12-G-3

Swivel time [sec]

Subject to change without prior notice

Forces and Moments

Moment of inertia [kg m²]

Swivel time [sec]

0 0,2 0,4 0,6 0,8 1,0 1,2 1,4 1,6 1,8 2,0 2,2 2,4 2,6 2,8 3,0

0 0,5 1,0 1,5 2,0 2,5 3,0 3,5 4,0 4,5

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<table>
<thead>
<tr>
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<td>Swivel angle [°]:</td>
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<td>Torque per jaw [Nm]:</td>
<td>10</td>
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<td>-</td>
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<tr>
<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
<td>0.01</td>
<td>0.01</td>
<td>-</td>
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<tr>
<td>Fx [N]:</td>
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<td>4000</td>
<td>4000</td>
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<td>Fz [N]*:</td>
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<td>Mr [Nm]:</td>
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<td>Min./max. operating pressure [bar]:</td>
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<td>Min./max. operating temperature [°C]:</td>
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<td>Air volume per cycle [cm³]:</td>
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<td>1.5</td>
</tr>
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All data measured at 6 bar

* Consider the force of the grippers

---

**SB100-B**

1. Fixing swivel jaws
2. Energy supply
3. Adjusting screw
4. Fixing for mounting block
5. Fixing tool side
6. Fix stop 90° bzw. 180°
7. Switch cam 90° bzw. 180°
8. Direction of rotation
9. Air connection swivel to 90° or 180°
10. Air connection swivel to 0°
11. Air connection swivel to 90° or 180° (alternate)
12. Air connection swivel to 0° (alternate)

---

**SB100G**

---

Subject to change without prior notice
Swivel jaws

Moment of inertia
shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments
Shows the static bearing load

Moment of inertia [kg m²]

Swivel time [sec]

Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com

Included in the delivery

Mounting block
Order no. KB8K

Pneumatic fittings
Order no. DRV1/4x8

Accessory list

Proximity switch
Order no. NJ8-E2S

Cable angled plug
Order no. KAW500

Cable straight plug
Order no. KAG500

Plug 3-pole
Order no. S12-G-3

Subject to change without prior notice

Forces and Moments

Shows the static bearing load
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<tr>
<th>Order no.:</th>
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<th>SB150G</th>
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<td>3</td>
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<tr>
<td>Repeatability +/- [°]:</td>
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<td>0,01</td>
<td>0,01</td>
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<tr>
<td>Fa [N]:</td>
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<td>15000</td>
<td>15000</td>
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<td>7500</td>
<td>7500</td>
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<tr>
<td>Fz [N]*:</td>
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<td>3700</td>
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</table>

All data measured at 6 bar
* Consider the force of the grippers

Subject to change without prior notice
Swivel jaws

Moment of inertia
shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments
Shows the static bearing load

Includes in the delivery

Mounting block
Order no. KB12-03

Pneumatic fittings
Order no. DRV1/4x8

Accessory list

Proximity switch
Order no. NJ12-E2S

Cable angled plug
Order no. KAW500

Cable straight plug
Order no. KAG500

Plug 3-pole
Order no. S12-G-3

Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com
**Order no.:**

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<td>-</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
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<td>Fö [N]*:</td>
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<tr>
<td>Fz [N]*:</td>
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<td>-</td>
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<td>Min./max. operating temperature [°C]:</td>
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<td>5/80</td>
<td>-</td>
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<tr>
<td>Weight [kg]:</td>
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</table>

All data measured at 6 bar

* Consider the force of the grippers

Subject to change without prior notice
1. Moment of Inertia Calculation

In the technical tables, the "Force" of the swivel-jaws is declared in Nm. This value declares a torque, produced by the swivel jaws, when a pressure of 6 bar is supplied.

In order to size a swivel-jaws correctly, one requires different basic data such as workpiece-weight and lever-length to center of gravity. For increased application-safety, a factor of safety may be inserted into the calculation.

In the following example calculation (1.1) a Swivel-jaw application is shown as an example.

**Example Calculation 1.1.**

**Given:**
- Weight of workpiece = \( F_{\text{Wst.}} \) = 2,5 kg \( \times \) 9,81m/s\(^2\) = 24,53 N
- Length of Lever Wst. = \( l \) = 0,09 m
- Safety Factor = \( \nu \) = 1,5

**Find:**
- Torque = \( M \)

**Calculations:**
\[
M = F_{\text{Wst.}} \times l \times \nu \\
M = 24,53 \text{ N} \times 0,09 \text{ m} \times 1,5 \\
M = 3,31 \text{ Nm}
\]

**Result:**
On the basis of the torque, the selection falls to the SB74-B, with a torque of 3,5 Nm at 6 bar.
2. Moment of Inertia Calculation

The sample calculation (2.2, page 34) shows the selection of a swivel-jaw, with symmetrical application and follower, by the moment of inertia. The moment of inertia describes the inertia of a body during a rotational movement. This unit is required to determine about the swivel-time of the respective swivel-jaws.

Should the workpiece or the gripper have a shape, the corresponding formulas (2.1) must be used to calculate the moment of inertia (J).

Formeln 2.1

**Full Cylinder:**
Rotating around its body axis
\[ J = \frac{1}{2} m \times r^2 \]

**Massive sphere:**
Rotating around its center of gravity
\[ J = \frac{2}{5} m \times r^2 \]

**Small Diameter Rod:**
Rotating around the center of gravity perpendicular to its body axis
\[ J = \frac{1}{12} m \times l^2 \]

**Hollow Cylinder:**
Rotating around its body axis
\[ J = \frac{1}{2} m \left( R^2 + r^2 \right) \]
R=Radius of cylinder, \( r \)= wall thickness

**Rectangular parallelogram:**
Rotating around its center of gravity
\[ J = \frac{1}{12} m \left( b^2 + l^2 \right) \]

**Ring:**
Rotating around its body axis
\[ J = m \left( R^2 + \frac{3}{4} r^2 \right) \]
### General

Longitudinal-dimensions in **meters**, mass in **kilogram** yields moment of inertia into **kgm²**

### Given:

**Workpiece:**
- Mass \( m_{Wst.} = 8 \text{ kg} \)
- Length \( l_{Wst.} = 0.12 \text{ m} \)
- Depth \( b_{Wst.} = 0.10 \text{ m} \)
- Radius \( r_{Wst.} = 0.12 \text{ m} \)

**Workpiece holder:**
- Mass \( m_{Wh1} = 0.3 \text{ kg} \)
- Diameter \( \phi_{Wh1} = 0.02 \text{ m} \)
- Length \( l_{Wh1} = 0.09 \text{ m} \)
- Mass \( m_{Wh2} = 1 \text{ kg} \)
- Diameter \( \phi_{Wh2} = 0.038 \text{ m} \)
Given:

Moment of Inertia workpiece = $J_{Wst. (top)} = J_{Wst. (bottom)}$

Moment of Inertia workpiece holder 1 = $J_{Wh1}$

Moment of Inertia workpiece holder 2 = $J_{Wh2}$

Total Moment of Inertia = $J_{ges.}$

Calculation:

$J_{total} = J_{Wst. (top)} + J_{Wst. (bottom)} + J_{Wh1} + J_{Wh2}$

$J_{Wst. (top)} = \frac{1}{12} m_{Wst.} \times (b_{Wst.}^2 + l_{Wst.}^2) + m_{Wst.} \times r^2$

$J_{Wst. (top)} = \frac{1}{12} 8 \text{ kg} \times ((0,10 \text{ m})^2 + (0,12 \text{ m})^2) + 8 \text{ kg} \times (0,12 \text{ m})^2$

$J_{Wst. (top)} = 0,13147 \text{ kgm}^2$

$J_{Wst. (bottom)} = J_{Wst. (top)}$

$J_{Wst. (bottom)} = 0,13147 \text{ kgm}^2$

$J_{Wh1} = \frac{1}{8} m \times r^2 + \frac{1}{12} m \times l^2$

$J_{Wh1} = \frac{1}{8} 0,3 \text{ kg} \times (0,01 \text{ m})^2 + \frac{1}{12} 0,3 \text{ kg} \times (0,09 \text{ m})^2$

$J_{Wh1} = 0,00021 \text{ kgm}^2$

$J_{Wh2} = \frac{1}{2} m \times r^2$

$J_{Wh2} = \frac{1}{2} 1 \text{ kg} \times (0,038 \text{ m})^2$

$J_{Wh2} = 0,00072 \text{ kgm}^2$

$J_{total} = 0,13147 \text{ kgm}^2 + 0,13147 \text{ kgm}^2 + 0,00021 \text{ kgm}^2 + 0,00072 \text{ kgm}^2$

$J_{total} = 0,264 \text{ kgm}^2$

Result:

By inserting the arbitrated value into the Diagram (2.3) which shows the moment of inertia in relation to time, one gets the swivel time.

The diagram (2.3) appears on the upper half of the first product page of each swivel-jaws.

**Diagramm 2.3**

Moment of inertia in [kg m²]

![Diagramm 2.3](image)

The SB74-180-B with follower SB74G, that is used in this application example, one gets a value of approximately 1 seconds.

Attention:

With this result, one must take into account, that this swivel-time is only realized with an correctly installed swivel-jaws supplied with 6 bar air pressure and calculated without factor of safety. For more information regarding the proper sizing of swivel-jaw, please go to our website, [www.sommer-automatic.com](http://www.sommer-automatic.com).
Swivel jaws
pneumatic

SB50-B
SB74-B
SB100-B
SB150
SB190
Swivel jaws

Features

- Compact swivel jaw in five sizes, with a torque up to 57 Nm and large drive flange for easy connection, dual ball bearings for a high moment intake
- With integrated and patented hydraulic shock absorbers, built into the pressure chamber, cooled due to permanent air flow and therefore constant in damping behaviour
- Can be screwed on directly as a gripping jaw on the gripper, gripping and rotating as a compact unit, with large central bore on the drive shaft to feed-through supply lines (from SB150)

Functional diagram

- Two way bearing drive shaft
  - High force and torque intake
- Endposition
  - Stable external fix stop for endposition
- Force transfer
  - Stable gear wheel set
  - Precise, reliable, durable
- Integrated and patented shock absorbers
  - Adjustable end position damping
- Energy feed
  - Possible from several sides
- Position inquiry
  - Inquiry of end position 0° and 90° (or 180°) via inductive proximity switch
  - Adjustable on twistable switch cam
- Drive flange
  - Large size drive flange with end stop and large central hole (from SB150)
  - Quick and cost-effective positioning of application-specific workpiece intakes
- Endposition
  - +/- 3° Adjustable end position
- Air flow control valve
  - For speed (included in the delivery)
- Robust, lightweight housing
  - Hard coated aluminium alloy
- Fixing and positioning
  - Alternate on several sides for individual assembly of the swivel jaws
- Drive
  - Double acting pneumatic cylinder
Terms

**Torque:** force moment on the swivel jaw drive shaft  
**Swivel time:** time required to cover 0°/90° or 0°/180° swivel movement  
**Repeatability:** dispersion of stop position at 100 consecutive swivel cycles  
**Cycle:** distance covered by the drive wing in one 0°/90°/0° or 0°/180/0° swivel movement  
**Maintenance:** maintenance free up to 10 Mio. Swivel cycles  
(please see the owner’s manual for conditions, download from www.sommer-automatic.com)

- long maintenance intervals keep costs down  
- long durability

---

**Model**

**G:** swivel jaw without drive and damping serves as counter bearing

---

### Order no. | Swivel angle | Torque | Centre through-bore in the driving shaft
--- | --- | --- | ---
SB50-90-B | 90° | 1.2 Nm | -
SB50-180-B | 180° | 1.2 Nm | -
SB50G | - | - | -
SB74-90-B | 90° | 3.5 Nm | -
SB74-180-B | 180° | 3.5 Nm | -
SB74G | - | - | -
SB100-90-B | 90° | 10 Nm | -
SB100-180-B | 180° | 10 Nm | -
SB100G | - | - | -
SB150-90 | 90° | 23 Nm | Ø 28.5 mm
SB150-180 | 180° | 23 Nm | Ø 28.5 mm
SB150G | - | - | -
SB190-90 | 90° | 57 Nm | Ø 34.0 mm
SB190-180 | 180° | 57 Nm | Ø 34.0 mm
SB190G | - | - | -

---

**Application example**

Drive  
Counter bearing
Swivel Jaws

**Drive**

*Double acting pneumatic cylinder*
- Maximum torque in both rotation directions
- Torque up to 57 Nm

**Swivel angle 90° or 180°**

*End stop can be aligned via adjustment screw +/- 3°*
- External fix stop to absorb the force over housing presents overload of the gear wheels

**Force transfer**

*Via gear wheel set*
- Precise steering of drive force in torque
- High repeat accuracy
- Multi way ball bearing for high torque intake

**Position sensing**

*Intake for inductive proximity switch*
- Process safe
- Adjustable
- Compact
**Large drive flange**
*For simple connection*
- With central bore (from SB150) for cable feed-through
- Low construction and extension effort for connection of follow-up tools

**Machine connection**
*Energy supply, attachment and positioning-possibilities on serveral sides*
- Optimum integration into the workroom due to individual installation position

**End position damping**
*Hydraulic shock absorber with spiral groove technology*
- Low wear approach to end position, gentle energy absorption due to profiled spiral groove
- The damping characteristics can be individually adjusted by the screw depth
- Built into the pressure chamber, cooled by permanent air flow, constant damping behavior
Swivel jaws

Moment of inertia
shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments
Shows the static bearing load

Included in the delivery

Mounting block
Order no. KB8K-02

Pneumatic fittings
Order no. DRVM5x4

Accessory list

Proximity switch
Order no. NJ8-E2S

Cable angled plug
Order no. KAWS00

Cable straight plug
Order no. KAG500

Plug 3-pole
Order no. S12-G-3

Accessories

Subject to change without prior notice

22 Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com
### Specifications

<table>
<thead>
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<th>Order no.:</th>
<th>SB50-90-B</th>
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<td>Torque per jaw [Nm]:</td>
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<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
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<tr>
<td>Repeatability +/- [°]:</td>
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<tr>
<td>Fx [N]:</td>
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<td>Air volume per cycle [cm³]:</td>
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<td>Weight [g]:</td>
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<td>750</td>
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All data measured at 6 bar

* Consider the force of the grippers

---

**SB50-B**

1. Fixing swivel jaws
2. Energy supply
3. Adjusting screw
4. Fixing for mounting block
5. Fixing tool side
6. Fix stop 90° bzw. 180°
7. Switch cam 90° bzw. 180°
8. Direction of rotation
9. Air connection swivel to 90° or 180°
10. Air connection swivel to 0°
11. Air connection swivel to 90° or 180° (alternate)
12. Air connection swivel to 0° (alternate)

---

**SB50G**

---

Subject to change without prior notice
Swivel jaws

Included in the delivery

- Mounting block
  Order no. KB8K-02

- Pneumatic fittings
  Order no. DRVM5x4

Accessories

- Proximity switch
  Order no. NJ8-E2S

- Cable angled plug
  Order no. KAW500

- Cable straight plug
  Order no. KAG500

- Plug 3-pole
  Order no. S12-G-3

Moments of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Swivel jaws

118 mm
80 mm

Moment of inertia [kg m²]

Swivel time [sec]

0 0,25 0,50 0,75 1,00 1,25 1,50 1,75

0 0,4 0,8 1,2 1,6 2,0 2,4 2,8

Subject to change without prior notice

Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com
<table>
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<td>Torque per jaw [Nm]:</td>
<td>3.5</td>
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<td>-</td>
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<tr>
<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
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<td>3</td>
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<tr>
<td>Repeatability +/- [°]:</td>
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<td>Mr [Nm]:</td>
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</tr>
<tr>
<td>Min./max. operating pressure [bar]:</td>
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<td>-</td>
</tr>
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<td>Min./max. operating temperature [°C]:</td>
<td>5/80</td>
<td>5/80</td>
<td>-</td>
</tr>
<tr>
<td>Air volume per cycle [cm³]:</td>
<td>16</td>
<td>21</td>
<td>-</td>
</tr>
<tr>
<td>Weight [g]:</td>
<td>1.7</td>
<td>1.7</td>
<td>1.1</td>
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</table>

All data measured at 6 bar

* Consider the force of the grippers

Subject to change without prior notice
Swivel jaws

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Included in the delivery

Mounting block
Order no. KB8K-02

Pneumatic fittings
Order no. DRV1/8x6

Accessory list

Proximity switch
Order no. NJ8-E2S

Cable angled plug
Order no. KAW500

Cable straight plug
Order no. KAG500

Plug 3-pole
Order no. S12-G-3

Subject to change without prior notice
<table>
<thead>
<tr>
<th>Order no.:</th>
<th>SB100-90-B</th>
<th>SB100-180-B</th>
<th>SB100G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swivel angle [°]:</td>
<td>90</td>
<td>180</td>
<td>-</td>
</tr>
<tr>
<td>Torque per jaw [Nm]:</td>
<td>10</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
<td>0.01</td>
<td>0.01</td>
<td>-</td>
</tr>
<tr>
<td>Fa [N]:</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Fz [N]*:</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>Mr [Nm]:</td>
<td>70</td>
<td>70</td>
<td>-</td>
</tr>
<tr>
<td>Min./max. operating pressure [bar]:</td>
<td>3/8</td>
<td>3/8</td>
<td>-</td>
</tr>
<tr>
<td>Min./max. operating temperature [°C]:</td>
<td>5/80</td>
<td>5/80</td>
<td>-</td>
</tr>
<tr>
<td>Air volume per cycle [cm³]:</td>
<td>40</td>
<td>54</td>
<td>-</td>
</tr>
<tr>
<td>Weight [kg]:</td>
<td>4,0</td>
<td>4,0</td>
<td>1,5</td>
</tr>
</tbody>
</table>

All data measured at 6 bar

* Consider the force of the grippers

### SB100-B

1. Fixing swivel jaws
2. Energy supply
3. Adjusting screw
4. Fixing for mounting block
5. Fixing tool side
6. Fix stop 90° bzw. 180°
7. Switch cam 90° bzw. 180°
8. Direction of rotation
9. Air connection swivel to 90° or 180°
10. Air connection swivel to 0°
11. Air connection swivel to 90° or 180° (alternate)
12. Air connection swivel to 0° (alternate)

### SB100G

Subject to change without prior notice
Swivel jaws

Swivel jaws

Moment of inertia

Forces and Moments

Shows the static bearing load

Swivel time [sec]

Moment of inertia [kg m²]

Includes the expected swivel time against the calculated moment of inertia (test rig pairwise)

Included in the delivery

<table>
<thead>
<tr>
<th>Item</th>
<th>Order No.</th>
</tr>
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<tbody>
<tr>
<td>Mounting block</td>
<td>KB8K</td>
</tr>
<tr>
<td>Pneumatic fittings</td>
<td>DRV1/4x8</td>
</tr>
</tbody>
</table>

Accessory list

<table>
<thead>
<tr>
<th>Item</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity switch</td>
<td>NJ8-E2S</td>
</tr>
<tr>
<td>Cable angled plug</td>
<td>KAW500</td>
</tr>
<tr>
<td>Cable straight plug</td>
<td>KAG500</td>
</tr>
<tr>
<td>Plug 3-pole</td>
<td>S12-G-3</td>
</tr>
</tbody>
</table>

Subject to change without prior notice

Accessories

Swivel jaws 247 mm

Swivel jaws 180 mm

Forces and Moments

28 Data, Drawings, 3-D models, Operating Instructions - www.sommer-automatic.com
Order no.: | SB150-90 | SB150-180 | SB150G
---|---|---|---
Swivel angle [°]: | 90 | 180 | -
Torque per jaw [Nm]: | 23 | 23 | -
Swivel 90° oder 180° adjustable +/- [°]: | 3 | 3 | 3
Repeatability +/- [°]: | 0,01 | 0,01 | 0,01
Fa [N]: | 16000 | 15000 | 15000
Fo [N]*: | 7500 | 7500 | 7500
Fz [N]*: | 3700 | 3700 | 3700
Mr [Nm]: | 270 | 270 | 270
Min./max. operating pressure [bar]: | 3/8 | 3/8 | -
Min./max. operating temperature [°C]: | 5/80 | 5/80 | -
Air volume per cycle [cm³]: | 190 | 260 | -
Weight [kg]: | 11,0 | 11,0 | 6,5

* All data measured at 6 bar
* Consider the force of the grippers

Subject to change without prior notice
Swivel jaws

Moment of inertia

shows the expected swivel time against the calculated moment of inertia (test rig pairwise)

Forces and Moments

Shows the static bearing load

Included in the delivery

Mounting block
Order no. KB12-03

Pneumatic fittings
Order no. DRV1/4x8

Accessory list

Proximity switch
Order no. NJ12-E2S

Cable angled plug
Order no. KAW500

Cable straight plug
Order no. KAG500

Plug 3-pole
Order no. S12-G-3

Subject to change without prior notice
### SB190

1. Fixing swivel jaws
2. Energy supply
3. Adjusting screw
4. Fixing for mounting block
5. Fixing tool side
6. Fix stop 90° bzw. 180°
7. Switch cam 90° bzw. 180°
8. Direction of rotation
9. Air connection swivel to 90° or 180°
10. Air connection swivel to 0°
11. Air connection swivel to 90° or 180° (alternate)
12. Air connection swivel to 0° (alternate)

### SB190G

Subject to change without prior notice

---

### Table

<table>
<thead>
<tr>
<th>Order no.:</th>
<th>SB190-90</th>
<th>SB190-180</th>
<th>SB190G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swivel angle [°]:</td>
<td>90</td>
<td>180</td>
<td>-</td>
</tr>
<tr>
<td>Torque per jaw [Nm]:</td>
<td>57</td>
<td>57</td>
<td>-</td>
</tr>
<tr>
<td>Swivel 90° oder 180° adjustable +/- [°]:</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Repeatability +/- [°]:</td>
<td>0.01</td>
<td>0.01</td>
<td>-</td>
</tr>
<tr>
<td>Fa [N]:</td>
<td>25000</td>
<td>25000</td>
<td>25000</td>
</tr>
<tr>
<td>Fz [N]*:</td>
<td>12500</td>
<td>12500</td>
<td>12500</td>
</tr>
<tr>
<td>Mr [Nm]:</td>
<td>6100</td>
<td>6100</td>
<td>6100</td>
</tr>
<tr>
<td>Min./max. operating pressure [bar]:</td>
<td>3/8</td>
<td>10/25</td>
<td>-</td>
</tr>
<tr>
<td>Min./max. operating temperature [°C]:</td>
<td>5/80</td>
<td>5/80</td>
<td>-</td>
</tr>
<tr>
<td>Air volume per cycle [cm³]:</td>
<td>320</td>
<td>320</td>
<td>-</td>
</tr>
<tr>
<td>Weight [kg]:</td>
<td>28,0</td>
<td>28,0</td>
<td>19,5</td>
</tr>
</tbody>
</table>

* All data measured at 6 bar

* Consider the force of the grippers
1. Moment of Inertia Calculation

In the technical tables, the “Force” of the swivel-jaws is declared in Nm. This value declares a torque, produced by the swivel jaws, when a pressure of 6 bar is supplied.

In order to size a swivel-jaws correctly, one requires different basic data such as workpiece-weight and lever-length to center of gravity. For increased application-safety, a factor of safety may be inserted into the calculation.

In the following example calculation (1.1) a Swivel-jaw application is shown as an example.

Example Calculation 1.1.

Given:
- Weight of workpiece: $F_{Wst.} = 2.5 \, \text{kg} \times 9.81 \, \text{m/s}^2 = 24.53 \, \text{N}$
- Length of Lever: $l = 0.09 \, \text{m}$
- Safety Factor: $\nu = 1.5$

Find:
- Torque: $M$

Calculations:
- $M = F_{Wst.} \times l \times \nu$
- $M = 24.53 \, \text{N} \times 0.09 \, \text{m} \times 1.5$
- $M = 3.31 \, \text{Nm}$

Result:
On the basis of the torque, the selection falls to the SB74-B, with a torque of 3.5 Nm at 6 bar.
2. Moment of Inertia Calculation

The sample calculation (2.2, page 34) shows the selection of a swivel-jaw, with symmetrical application and follower, by the moment of inertia. The moment of inertia describes the inertia of a body during a rotational movement. This unit is required to determine about the swivel-time of the respective swivel-jaws.

Should the workpiece or the gripper have a shape, the corresponding formulas (2.1) must be used to calculate the moment of inertia (J).

Formulas 2.1

- **Full Cylinder:** Rotating around its body axis
  \[ J = \frac{1}{2} m \times r^2 \]

- **Massive sphere:** Rotating around its center of gravity
  \[ J = \frac{2}{5} m \times r^2 \]

- **Small Diameter Rod:** Rotating around the center of gravity perpendicular to its body axis
  \[ J = \frac{1}{12} m \times l^2 \]

- **Hollow cylinder:** Rotating around its body axis
  \[ J = \frac{1}{2} m \times (R^2 + r^2) \]
  \( R = \) Radius of cylinder, \( r = \) wall thickness

- **Rectangular parallelogram:** Rotating around its center of gravity
  \[ J = \frac{1}{12} m \times (b^2 + l^2) \]

- **Ring:** Rotating around its body axis
  \[ J = m \times (R^2 + \frac{3}{4} r^2) \]
### 2.2 Example Calculation

**General:** Longitudinal-dimensions in **meters**, mass in **kilogram** yields moment of inertia into **kgm²**.

**Given:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece: Mass</td>
<td>(m_{Wst.})</td>
<td>8 kg</td>
</tr>
<tr>
<td>Length</td>
<td>(l_{Wst.})</td>
<td>0.12 m</td>
</tr>
<tr>
<td>Depth</td>
<td>(b_{Wst.})</td>
<td>0.10 m</td>
</tr>
<tr>
<td>Radius</td>
<td>(r_{Wst.})</td>
<td>0.12 m</td>
</tr>
</tbody>
</table>

| Workpiece holder: Mass Wh1 | \(m_{Wh1}\) | 0.3 kg       |
| Diameter Wh1            | \(\phi_{Wh1}\) | 0.02 m      |
| Length Wh1              | \(l_{Wh1}\) | 0.09 m      |
| Mass Wh2                | \(m_{Wh2}\) | 1 kg        |
| Diameter Wh2            | \(\phi_{Wh2}\) | 0.038 m    |

![Sketch](image-url)
Given:

- Moment of Inertia workpiece = \( J_{Wst. (top)} = J_{Wst. (bottom)} \)
- Moment of Inertia workpiece holder 1 = \( J_{Wh1} \)
- Moment of Inertia workpiece holder 2 = \( J_{Wh2} \)
- Total Moment of Inertia = \( J_{ges.} \)

Calculation:

\[
J_{total} = J_{Wst. (top)} + J_{Wst. (bottom)} + J_{Wh1} + J_{Wh2}
\]

\[
J_{Wst. (top)} = \frac{1}{12} m_{Wst.} \times (b_{Wst.}^2 + l_{Wst.}^2) + m_{Wst.} \times r^2
\]

\[
J_{Wst. (top)} = \frac{1}{12} 8 \text{ kg} \times ((0,10 \text{ m})^2 + (0,12 \text{ m})^2) + 8 \text{ kg} \times (0,12 \text{ m})^2
\]

\[
J_{Wst. (top)} = 0,13147 \text{ kgm}^2
\]

\[
J_{Wst. (bottom)} = J_{Wst. (top)}
\]

\[
J_{Wst. (bottom)} = 0,13147 \text{ kgm}^2
\]

\[
J_{Wh1} = \frac{1}{4} m \times r^2 + \frac{1}{12} m \times l^2
\]

\[
J_{Wh1} = \frac{1}{4} 0,3 \text{ kg} \times (0,01 \text{ m})^2 + \frac{1}{12} 0,3 \text{ kg} \times (0,09 \text{ m})^2
\]

\[
J_{Wh1} = 0,00021 \text{ kgm}^2
\]

\[
J_{Wh2} = \frac{1}{2} m \times r^2
\]

\[
J_{Wh2} = \frac{1}{2} 1 \text{ kg} \times (0,038 \text{ m})^2
\]

\[
J_{Wh2} = 0,00072 \text{ kgm}^2
\]

\[
J_{total} = 0,13147 \text{ kgm}^2 + 0,13147 \text{ kgm}^2 + 0,00021 \text{ kgm}^2 + 0,00072 \text{ kgm}^2
\]

\[
J_{total} = 0,264 \text{ kgm}^2
\]

Result:

By inserting the arbitrated value into the Diagram (2.3) which shows the moment of inertia in relation to time, one gets the swivel time.

The diagram (2.3) appears on the upper half of the first product page of each swivel-jaws.

Diagramm 2.3

![Diagram](image)

The SB74-180-B with follower SB74G, that is used in this application example, one gets a value of approximately 1 seconds.

Attention:

With this result, one must take into account, that this swivel-time is only realized with a correctly installed swivel-jaws supplied with 6 bar air pressure and calculated without factor of safety. For more information regarding the proper sizing of swivel-jaw, please go to our website, www.sommer-automatic.com.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grippers</strong> pneumatic</td>
<td>01</td>
</tr>
<tr>
<td><strong>Grippers</strong> electrical</td>
<td>02</td>
</tr>
<tr>
<td><strong>Grippers</strong> hydraulic</td>
<td>03</td>
</tr>
<tr>
<td><strong>Grippers</strong> Special</td>
<td>04</td>
</tr>
<tr>
<td><strong>Grip &amp; Rotate Modules</strong> pneumatic</td>
<td>05</td>
</tr>
<tr>
<td><strong>Separators</strong></td>
<td>06</td>
</tr>
<tr>
<td><strong>Swivel Units</strong> pneumatic</td>
<td>07</td>
</tr>
<tr>
<td><strong>Swivel Units</strong> electrical</td>
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<td><strong>Swivel Units</strong> hydraulic</td>
<td>09</td>
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<tr>
<td><strong>Rotation Jaws</strong> pneumatic</td>
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</tr>
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<td><strong>Axial Compensation Modules</strong></td>
<td>11</td>
</tr>
<tr>
<td><strong>Tool Changers</strong></td>
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</tr>
<tr>
<td><strong>Robotics Accessories</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Linear Cylinders</strong></td>
<td>14</td>
</tr>
<tr>
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<td>15</td>
</tr>
<tr>
<td><strong>Air Vane Motors</strong></td>
<td>16</td>
</tr>
<tr>
<td><strong>Rotary Cylinders</strong></td>
<td>17</td>
</tr>
<tr>
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